

POPULAR

Computing WEEKLY

FREE GAMES
CASSETTES

35p

13-19 October 1983 Vol 2 No 41

This Week

Timex/Sinclair 2068

Ian Logan looks at the new Timex/Sinclair 2068 and sees how it compares with the Spectrum. See page 14.

Contour mapping

Bryan Skinner presents a simple contour mapping program to produce a range of interesting visual displays. See page 16.

Microradio

Ray Berry introduces the world of amateur radio and short-wave listening in the first of a series of weekly columns on page 43.

New releases

All the latest software games, including *Quest* from Hewson Consultants, *Steeple Jack* from English Software and *Valhalla* from Legend. See page 53.

★ STAR
Space Invaders
on 16K Spectrum.
See page 10.
GAME ★

News Desk

Oric joins up with Edenspring

ORIC Products International is to become part of Edenspring Investments, the property and travel investment group.

The takeover by Edenspring gives Oric the additional finance needed to fund expansion.

Said Oric's chairman John Tullis, "Because we are increasing our trade so rapidly and going into a number of new products in 1984 we have had to widen our capital base to finance the developments — we would not have been able to fund that ourselves."

John would not be drawn on the details of the new products: "We have new computers and peripherals and we also have products which are not in the computer field, particularly in the area of electronic optics."

"I intend to widen the company's product base and it is hoped that within two years computers and peripherals will

Continued on page 5

Aquarius dropped but reappears

MATTEL is to drop the Aquarius computer.

But it will not disappear. Instead, it will be taken over by its present manufacturer, Radofin. At the same time, the price of the machine — still to be called the Aquarius — will drop to £59.95, possibly to be discounted by retailers down to £49.95.

Confirming the changes, Radofin's managing director, Alan Leboff, said: "The deal we

have done with Mattel means that they will bring the price down to this level and then, at some point, we will take over supplying dealers directly, rather than as at present where we supply Mattel, who in turn supply the retailers.

"We hope the price drop will have a dramatic effect on sales," he added.

Mattel's wish to ease itself out of its Aquarius commit-

Continued on page 5



Classified

Classified

Classified

Classified

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

VALHALLA

GIVE YOUR BBC MICRO SOME STICK!
Joystick utility is a very clever program that will allow you to use joysticks with most programs on your BBC Micro Computer.
★ Simple to use — just press the keys ★ Requires just one block of memory space ★ Relocatable in memory ★ Sensitivity of joysticks can be varied.
This is an invaluable program that will heighten your enjoyment of your Micro. It is very easy for the beginner to use, but also provides plenty of scope for the more experienced user.
JOYSTICK UTILITY — £5 INC. (DISC — COMPATIBLE)
CHEQUES TO:
Clares Micro Supplies
Dept. PCW, 222 Townsfields Road, Winsford, Cheshire
Tel: (06055) 51374

TREBLE CHANCE POOLS FORECASTING program for 16K Spectrum or 16K ZX81, proven winner. Cassette with full instructions. Excellent value, £3.70. Why pay more? M. A. George, 12 Donne Avenue, Spital, Bebington Wirral, L63 9YH.

SOFTSAVE for the Vic20 is a 100 per cent machine code program which allows you to back-up most software on to a new tape. Cassette with instructions £4.95. From the new address: Softsave, 65 Stonewood, Bean, Dartford, Kent DA2 8BZ.

ELKAN ELECTRONICS
LOOK! LOOK!
Quick-Shot self-centring joysticks — improve your scores!
Dragon/Tandy Color £14.95 (+ £1 p&p)
(specially developed by ELKAN)
Nanos "quick-reference" cards — easier to use than the manuals!
DRAGON 32 £3.95
COMMODORE 64/VIC20 £3.95
6502 PROCESSOR £2.95
others, e.g.
Apple, Tandy, Sinclair available
Dragon's Eye on/off indicator £3.95
Dragon's Tail joystick extender £2.95
Send cash, cheque, credit card no., to:
ELKAN ELECTRONICS, FREEPOST,
11 Bury New Road,
Prestwich, Manchester M25 6LZ
Tel: 061-798 7613
See for full lists/catalogue

Continued on page 48

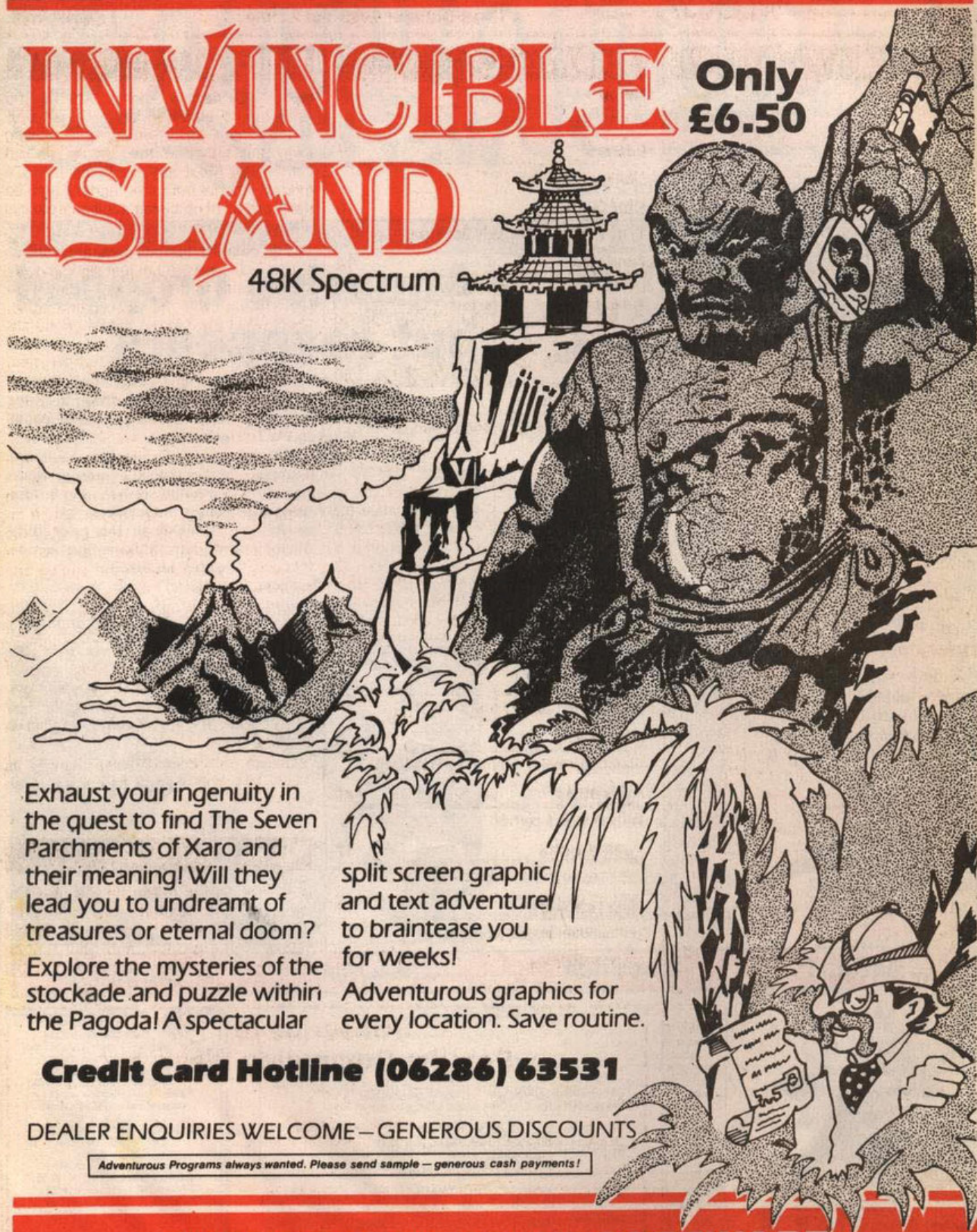
★ ★ **BRITAIN'S HOME COMPUTER WEEKLY** ★ ★

RICHARD SHEPHERD SOFTWARE

INVINCIBLE ISLAND

Only
£6.50

48K Spectrum



Exhaust your ingenuity in the quest to find The Seven Parchments of Xaro and their meaning! Will they lead you to undreamt of treasures or eternal doom?

Explore the mysteries of the stockade and puzzle within the Pagoda! A spectacular

split screen graphic and text adventure to braintease you for weeks!

Adventurous graphics for every location. Save routine.

Credit Card Hotline (06286) 63531

DEALER ENQUIRIES WELCOME — GENEROUS DISCOUNTS

Adventurous Programs always wanted. Please send sample — generous cash payments!

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELM SHOTT LANE, CIPPENHAM, SLOUGH, BERKS. TEL. (06286) 63531

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

Advertisement Executive

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.

Typesetting, origination and printing by

Chesham Press, Chesham, Bucks

Distributed by S M Distribution

London SW9. 01-274 8611. Telex: 261643

© Sunshine Publications Ltd 1983

ABC

MEMBER OF THE AUDIT
BUREAU OF CIRCULATIONS
ISSN 0265-0509

How to submit articles

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

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

Programs should, whenever possible, be computer printed.

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

Accuracy

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

This Week

News 5

Hunter killer

Letters 7

Computer novice

Star Game 10

Space Invaders on 16K Spectrum

Reviews 14

Ian Logan looks at the TS2068



Programming 16

Contour mapping by Bryan Skinner

Dragon 20

Pie chart by Richard Dodd

Spectrum 23

Scientific functions

BBC in education 24

Video captions by David King

Commodore 64 34

Little Professor by Les Allan

Open Forum 37

Five pages of your programs

Microradio 43

Start of a weekly column by Ray Berry

Adventure 45

Tony Bridge's corner

Peek & poke 47

Your questions answered

New releases 53

Latest software programs

Competitions 55

Puzzle, Top 10, Ziggurat

Editorial

Back in the days when the ZX81 was no more than a gleam in Uncle Clive's eye, authors were busily engaged in signing away the rights to their books to film companies. Most authors receive only a modest income from their endeavours, so the prospect of obtaining additional cash is always welcome.

Unfortunately, up until comparatively recently, authors were not just signing away the film rights to their books — they were also signing away the video game rights. Thus, when the Tolkien Estate gave Fantasy Films the rights to *The Lord of the Rings*, it also signed away the video game rights. Fantasy Films, in turn, has signed a deal with Parker Brothers, giving them the rights to produce an arcade game based on the Tolkien classic.

Consequently, Melbourne House, which produced an excellent adventure game around *The Hobbit*, is prevented from doing a follow-up. The Tolkien Estate no longer has the rights to *The Lord of the Rings* and Parker Brothers are not interested in giving Melbourne House any subsidiary rights.

However, it would be possible for Melbourne House to make a *Hobbit 2*, based on characters and situations from *The Hobbit* rather than *The Lord of the Rings*, if the Tolkien Estate was agreeable. But, despite the success of *The Hobbit*, the Tolkien Estate has decided against a *Hobbit 2*.

Unless the Tolkien Estate changes its mind, *The Hobbit* saga has come to an end.

Next Thursday

Just like Icarus, If you fly too close to the sun your feathers will come unstuck. Stick them back on to avoid falling to the ground, and gain points. Icarus, next week's star game from the unexpanded Vic20 by H Rivera.

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.

at the sign of the
BIG 'M'

MICRO MANAGEMENT

BIGGEST

prices
BEST
service

**OVER
1000**

SOFTWARE TITLES
AVAILABLE FOR BBC
SEND FOR LIST

- Britain's No 1 range of products
- Check our UK dealer network for your nearest outlet
- After sales, speedy service from our own factory and engineers

It's our aim to provide satisfaction at the sign of the Big 'M'. By providing local distributors, best prices and service, we offer you the most. If you don't see it in our ad., ask your local distributor, or write to our Head Office for full list. *All prices include VAT.* All products normally in stock but to prevent a wasted journey phone your local dealer first before calling.

**BBC ORIC ATARI COMMODORE
JUPITER COLOURGENIE SINCLAIR
DRAGON LYNX MICROPROFESSOR**

AGENTS

Head Office: 16 Princes St, Ipswich 0473 219461

Abergele
Abergele Computer Centre
8 Water St. 0745 826234

Ballymoney
Everyman Computers
Charlotte St. 02856 62116

Bedford
The Software Centre
52a Bromham Rd. 0234 44733

Birmingham
The Software Centre
80 Hurst St. 021 622 2696

Blackburn
Microwise, Conliffe Road
Whiteburch Estate 0294 678933

Bodmin
Microtest Ltd
18 Normandy Way 0208 3171

Bridgend
Automation Services
31 Wernlys Rd, Penyal 0656 720959

Bristol
Brennell Computers Ltd
24 Park Row 0272 294188

Bromley
Datastore
6 Chatterton Rd. 01 460 8991

Bury St Edmunds
Bury Computer Centre
Guildhall St. 0284 708772

Cambridge
GCC (Cambridge) Ltd
66 High St, Sawston 0223 935330

Chelmsford
Essex Computer Centre
Moulsham St. 0245 358702

Clacton-on-Sea
Clacton Computer Centre
Pier Avenue 0258 432644

Co. Durham
Knowledge Ltd.
15 North Burns, Chester le Street
035 88014

Colchester
Emprise Ltd
58 East St. 0206 865926

Coventry
Coventry Micro Centre
33 Far Gosford St. 0203 58942

Derby
First Byte Computers
10 Castlefields, Main Centre
London Road 0332 365280

Gloucester
The Model Shop
79 Northgate St. 0452 410693

Great Yarmouth
Criterion Computers
12 George St. 0493 53956

Guildford
The Model Shop
23 Swan Lane 0483 39115

Hastings
The Computer Centre
37 Robertson St. 0424 439190

Haverford West
Business Information Systems
22 Market Courtyard Shops
0437 2776/68228

Hay-on-Wye
The Playpen
Market St. 0497 820129

Hemel Hempstead
Faxminator
25 Market Square 0442 55044

Holyhead
P & K Computers
33 Williams St. 0407 50283

Horsham
Micro Store
131 West St. 0403 52297

Hull
Computer Centre (Humborside)
26 Anlaby Rd. 0482 26297

Ilfracombe
Bits & Bytes
44 Fore St. 0271 62801

Ipswich
Micro Management
32 Princes St. 0473 59181

Kingston-on-Thames
Vision Store
3 Eden Walk 01 549 4900

Lichfield
Fosters
99 Tamworth St. 05432 22341

Liverpool
Beaver Radio
20/22 Whitechapel 051 709 9896

London
Computers of Wigmore St.
87 Wigmore St. W1 01 486 0373

Northampton
Richard Reeves
174 Kettering Rd. 0604 33578

Norwich
Richard Park
Anglia Square 0603 27963

Plymouth
Syntax Ltd
46 Cornwall St. 0752 28705

Sheffield
Tomorrows World
Esplanade, Shetland 0595 2145

Southend-on-Sea
Estuary Software
261 Victoria Ave. 0702 43568

Stenage
Video City
45/47 Fisher Green Rd. 53808

Stirling
Micro Store
3 The Arcade

Stroud
The Model Shop
22 High St. 04536 5920

Surbiton
Computasolve
8 Central Parade, St Marks Hill
01 390 5135

Taunton
LA Gray
1 St James St. 0825 72986

West Bromwich
Bell & Jones
39 Queens Square, Sandwell Centre
021 553 0820

West Croydon
Universal Micro Peripherals Ltd.
233 London Rd. 01 683 0060

Woking
71 Commercial Way
04862 25657

Aquarius

Continued from page 1

ments would appear to be a result of the heavy financial losses incurred by the US parent company. Mattel will continue to support its toy business and Intellivision console.

In an increasingly competitive market, Mattel, being neither a computer designer nor manufacturer, would appear to have been squeezed out.

Radofin, on the other hand, being both the designer and far eastern manufacturer of the Aquarius (and the Intellivision), seems better placed to be competitive — as indicated by the swingeing price cut which it has now imposed, effective within the next few weeks.

By Christmas, it is hoped that Radofin will be the sole supplier of Aquarius computers. Other prices are also to come down — the games cartridges (now licenced from Mattel) will come down to £12.95, home business packs will fall by about £30 to £28.95 and the data recorder comes down £10 to £39.95.

At the same time, Radofin is developing a range of cassette software for the Aquarius and a light-pen will be launched in late November.

Mattel's urgent wish to withdraw from the very competitive home computer market has been prompted by losses for the whole group of \$156.1m for the quarter to July 1. For the same period, Mattel's computer and video game division lost \$166.7m.

Oric

Continued from page 1

form no more than 50 percent of our business."

Under the deal with Edenspring, Oric will — through a shares issue — gain an initial 18 per cent shareholding in the combined group. If, in the two-year period from June 30 1983, Oric turns in a pre-tax profit of more than £2m then, through a further shares issue, Oric will increase its holding in Edenspring to 44.2 per cent.

Shares in Edenspring — suspended at 9p on October 4 — value the Oric takeover at just over £8m.

Additional share issues by Edenspring will satisfy Oric's present outstanding loans of

Microcare supports Flex system

MICROCARE's decision, announced last week, to support the Flex disc operating system on the Dragon is a direct challenge to Dragon which has chosen to support the OS9 disc system (see *Popular Computing Weekly*, October 6).

"We have negotiated with Technical Systems Consultants for the rights to the Flex operating system for the Dragon," said Microcare's Eric Brook.

Any disc operating system — once tailored to a particular machine — allows standard software packages written for the system to be run.

Says Eric: "Flex is much better than OS9, because it has been around much longer and there is more software written for it."

"OS9 has about five year's catching up to do on Flex — OS9 is more complicated than Flex and therefore more difficult to use and Flex is also cheaper."

To begin with, Microcare will offer the following range of software. Languages: TSC *Compiled Basic*, TSC *Compiled Pascal*, Dynasoft *Tiny Pascal*, TSC *Basic Pre-compiler*, Compusense *Cobol*,

M&J *Forth*, Windrush *PL9*. Utilities: *Super Sleuth* processor disassembler, Windrush *Mace*, TSC *De-bug*, OS9 simulator, cross-assembler. Applications: TSC text processor, *Dynastar II* word processor, *Dynaform*, *Dynaspell*, *UDRI Inventory*, *UDRI Database Management System*, *UDRI Accounts*, *UDRI Ledger*, *RMS* record management system, TSC *Sort/Merge*.

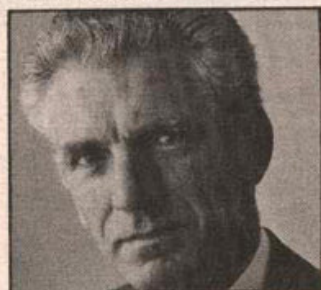
Flex will cost £65 or £90 with an editor/assembler. It will be configured for the Premier Delta disc system, but a version to run on Dragon's own disc system will follow.

Neither Flex nor OS9 will run on a 32K Dragon, but Microcare is offering to upgrade a Dragon 32 to 64K. Dragon has apparently issued seven different circuit boards for the Dragon 32, and the price of the upgrade depends on the board.

Flex from Microcare will be ready at the beginning of November — at the same time as Dragon's 64K machine, but some weeks before Dragon launches its OS9. Details from Microcare, 1 Oakwood Road, Rode Heath, Stoke-on-Trent.

just over £1m and provide a further £750,000.

Another advantage of the takeover for Oric is that, although Edenspring will lose its full stock market quotation in the deal, shares will be available on an over-the-counter basis.



John Tullis

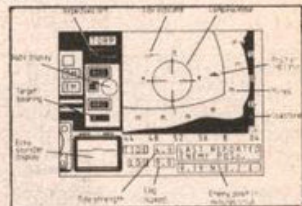
John Tullis and Barry Muncaster will both join the board of Edenspring on the completion of the acquisition.

Edenspring Investments came into being earlier this year, rescued from Pennine Commercial Holdings which ran into financial difficulties.

Stalked and torpedoed by Interface

HUNTER KILLER is the first two-player interactive game to take advantage of the networking facility now offered by the Spectrum.

Edinburgh-based Protek began development of the game well before the ZX Interface 1 was announced — intending to sell its own simple networking device for two 48K Spectrums. Now the game has been adapted to work with the Sinclair unit.



Set in the North Sea during the Second World War, the game is an elaborate simulation of submarine warfare.

Each player, using a 48K Spectrum, must try to stalk and torpedo the other. An accompanying 12-page booklet explains control of the submarines — steering, diving, diesel and electric propulsion, navigation and using the periscope, torpedoes, radar, asdic warning and depth sounder.

Protek's Gordon Hewitt explained: "For the first time, using the networking, you are not tracking a tame target. Instead it is very much alive and each player must play a game of cat-and-mouse."

During the play the positions, speeds and headings of both submarines are constantly exchanged between the players, using the networking on Interface 1.

Hunter Killer, written by Rod Hopkins, will be available before the end of October. The price of £7.95 includes both the one and two-player versions of the game.

week. As in the UK, the machine will initially be promoted for use in education.

The BBC B will sell for \$995 and Acorn is already claiming advance orders for 12,000 units worth \$21m.

Acorn's US subsidiary has so far signed agreements with 14 major American software publishers to develop material for the computer.

No escape from Maggle

NOVEMBER 5 would seem an appropriate enough date to launch an adventure game which "gently knocks the political establishment".

Roger Taylor, author of *Denis Through the Drinking Glass*, explains that his text-only adventure program puts you in the role of Denis, trying to escape the Iron Lady.

The program understands about 300 words, and each of the 80 locations in the adventure is introduced with a small verse which Roger freely admits is pretty appalling.

The program is for the 48K Spectrum and will cost £5.50, available from Applications, 8 St Paul's Road, Peterborough.

Official US launch

ACORN officially launched its BBC computer in the US last

AGF

PROGRAMMABLE JOYSTICK INTERFACE

for Spectrum or ZX81



MICRODRIVE
COMPATIBLE

ABOUT OUR INTERFACE

The AGF Programmable Joystick Interface is a unique design offering the use of any Atari-compatible joystick with absolutely all software, whether it is cassette or ROM cartridge, with the Sinclair Spectrum or ZX81.

The hardware programmable interface requires no additional software and accurately replicates the keys of the computer in a manner which is responsive to absolutely ALL key reading methods, both BASIC and Machine Code.

The interface does not interfere with key operation and can therefore be used simultaneously with the keyboard.

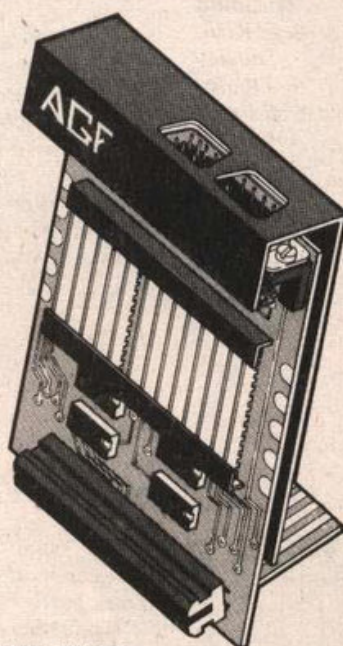
There is no need to remove the interface once fitted as the rear extension connector will accommodate further expansion, i.e. printers or RAM packs etc. This important feature avoids excessive wear to the expansion port.

The key replication principle pioneered by AGF means that your own programs can use eight directional joystick movement by utilising simple key reading BASIC.

Two joystick sockets are provided which share the same keys, for use with the majority of two player games. Several interfaces may be used on the same computer for multiple joystick applications.

The interface is programmed by a two digit code, which is looked up on a programming chart supplied, for each direction and firing button. The two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

Once configured this can be marked on a Quick Reference Programming Card for storing with the game. As the programming is *not* power dependent the interface retains the last configuration made and can be immediately used when next switched on.



KEY FEATURES

- ★ Programmable design gives TOTAL software support.
- ★ Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- ★ Rear extension connector for all other add-ons.
- ★ Free demo program and instructions.

PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE. This can be fixed on to the case of your computer or if preferred the protective backing can be left on. The chart is made of a very durable reverse printed plastic and is extremely easy to read.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements. The card allows you to mark the configuration in an easy to read fashion with space to record the software title and company name.
- Video Graffiti demonstration program which is written totally in BASIC to illustrate how all eight directions and fire can be read. This is also a useful high resolution drawing program.
- 12 months guarantee and full written instructions.

JOYSTICKS

CONTROLLERS

FOR USE WITH OUR INTERFACE Module or VIC 20, Commodore 64, Atari VCS, Atari 400, Atari 800

If you require extra Joysticks for our original interface module mark order 'OLD' Joysticks

ONLY £7.54 inc VAT + P&P

FROM: MR/MRS/MISS			
ADDRESS			
SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT. PW,			
FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR			
QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	33.95	
	JOYSTICK(S)	7.54	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ONE	VIDEO GRAFFITI	FREE	
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/> Please tick		FINAL TOTAL	
DEALER ENQUIRIES WELCOME		EXPORT PRICES ON APPLICATION	

LETTERS

A wee beastie

I write more in sorrow than in anger — to remind you of the many people who have remained faithful to our ZX81s, that versatile little black box. I value your magazine highly, but haven't seen even a mention of my wee beastie for weeks.

Take no notice of these Johnny-come-lately Spectrum owners and their cries for machine code articles. Devote a corner, instead, to the sinewy little Sinclair and win our undying gratitude.

John Booker
26 Moorside Road
Stockport
Cheshire SK4 4DT

Don't worry, we haven't forgotten the ZX81, though it has been a little neglected of late. The micro that launched a million users is very much alive.

Domestic hint

No doubt thousands of people like myself are fighting a battle with their *Vic20 Programmer's Reference Guide*. The problem is that the pages seem to stick on the plastic spine. They tear and make the book unpleasant to use (the pages won't lay flat).

However, the problem is easily solved. Spray the spine with furniture polish. The pages turn more easily, making the book much more manageable.

Dave Stamp
22 Fir Rigg Drive
Marske
Redcar
Cleveland TS11 6BT

An easy solution

With reference to Sinclair Spectrum series 3 problems with *In* command, (PCW, 15-21 September), I have an easy solution provided that the program is written in Basic (machine code programs of a commercial origin are generally not alterable by your readers).

For example: 10 Print In

57342: Goto 10 will give the result 255 with issue 1 and 2 machines — and 191 with issue 3 machines.

At each occasion that an *In* command is needed, a preceeding *Out* command will reset the lists set by the ULA. For example: 10 Out 57342,255: Print In 57342: Goto 10 will now give the result with both issue 1, 2 and 3 machines.

So, the solution to Basic programming is quite simple — proceed an *In* command with an *Out* 255 command and any Basic program will work on any Spectrum issue 1, 2 or 3.

W. Smith
25 Swallowfield Road
Sedgley
Dudley
West Midlands
DY3 3TR

What is time?

I have just had the oddest I phone conversation with a Sinclair Research lady. It went like this:

Me — I ordered a Microdrive a little over a month ago and I haven't received it yet.

Her — It does take 28 days to deliver.

Me — But it's more than 28 days since I ordered it.

Her — It takes 28 working days to deliver.

Me — What's the difference between 28 working days and 28 days on the calendar?

Her — I don't know.

Me — I ordered a Microdrive a little over a month ago and I haven't received it yet.

Her — Did you send the order form by Freepost?

Me — Yes.

Her — Ah, well, it takes two weeks before we get the Freepost mail, and it is 28 days after that that you will get your Microdrive.

Me — So the ads that say allow 28 days should say allow 28 days and two weeks?

Her — Yes.

Me — So the ads are being a bit naughty saying 28 days?

Her — Yes.

Me — But it was only a week after I ordered it that I got an acknowledgement of order.

Her — Ah, well, you should get your Microdrive next week.

What is time?

Chris Timson
47B Goldsmith Avenue
London E12

Which Computer

I bought your magazine this week in an effort to try to understand the world of home computers with a view to purchasing one for my 11-year-old daughter for Christmas. In view of the financial outlay involved, I want to purchase one which will not be too restrictive and which I would be able to use too.

Your magazine gave me a lot of jargon, programs and I'm sure when I purchase a computer, will give me a lot of help. But, unfortunately, I still don't know which computer to buy. Could you therefore help a future (I'm sure *avid*) reader, and give some advice on what computer to buy.

My daughter uses a BBC model B at school, but I couldn't afford one of those. She has her own 12in portable black and white tv, which I presume could be used as a screen. I have been told by various computer 'buffs' to get at least a 16K micro, to enable it to be used for other things apart from games, as my daughter and, I hope, I become more proficient.

To further complicate matters, my firm (where I am employed) is to purchase a package including ICL DRS 20 model 10 computers, which I am expected to learn to use and to program in Basic as part of my job as an office administrator. So, naturally, I would like to buy a home computer which would be similar in the language used, although I realise that I couldn't expect a direct comparison.

I realise I may have asked the impossible, but I fear I may become the prey of a clever salesman if I venture into a computer shop to get this advice. I could pay no more than £150 for a complete package, but if I were to choose the wrong thing I could ill afford to waste this amount. I look forward to hearing from you in this matter and, as an aside, would add that even for a complete novice your maga-

zine is interesting and informative; even if at this stage, it does only serve to show just how much there is to know and how little I know about where to start!

S Rae
26a Melrose Avenue
Yate
Bristol
BS17 5AL

This is one of the commonest questions we are asked, but it is also one of the most difficult to answer. The choice of computer depends on how much you have to spend and what facilities you want.

With an upper limit of £150 you are automatically excluding the Acorn Electron, the Commodore 64 and Dragon 32 as well as the BBC machine. This leaves you with the Sinclair ZX81 and Spectrum, 16K Oric and Commodore Vic20 to name but a few. Each machine has its own advantages and disadvantages. You would be well-advised to try and get some 'hands-on' experience, either at a computer store or a local user club, before making a final decision.

New Improved version?

Further to the somewhat governessy letter from Sinclair Research, published in your current issue (PCW October 6-12), if "In accordance with our policy of constantly improving our products, we have from time to time made changes to the Spectrum", what about:

(1) The faulty bit at 006D of the Rom which prevents the use of the non-maskable interrupt?

(2) the dog-end of ZX81 code which got left in between 04AA and 04C1?

(3) The 913 empty bytes between 386E and 3CFF?

Why not put something useful into the last two, like a line renumbering routine?

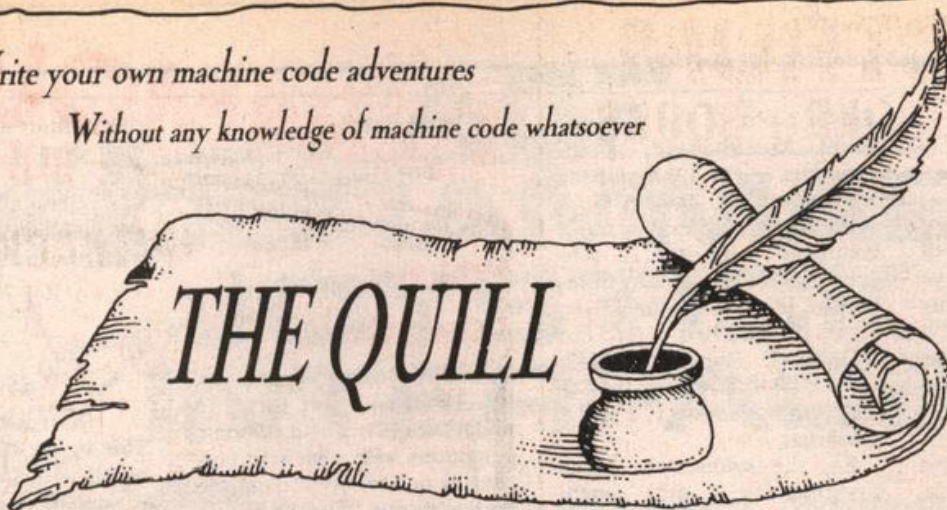
Perhaps these have been put right in the series 3, I don't know. Luckily I still have a series 2 — which also puts the picture in the centre of the tv screen, unlike the new improved version.

John Durst
Coltscombe Barn
Swerford
Oxon OX7 4AS

Write your own machine code adventures

Without any knowledge of machine code whatsoever

THE QUILL



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

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

THE QUILL is provided with a detailed tutorial manual which covers every aspect of its use in writing adventures. It is impossible to describe all the features of this amazing program in such a small space so we have produced a demonstration cassette which gives further information and an example of its use.

This demo-cassette is available at £2.00, and *THE QUILL* itself at £14.95.

FOR THE 48K SPECTRUM AT £14.95

Our Software is now available from many computer shops nationwide, or direct from us by post or telephone.

SAE for full details of our range.

Dealer enquires welcome.

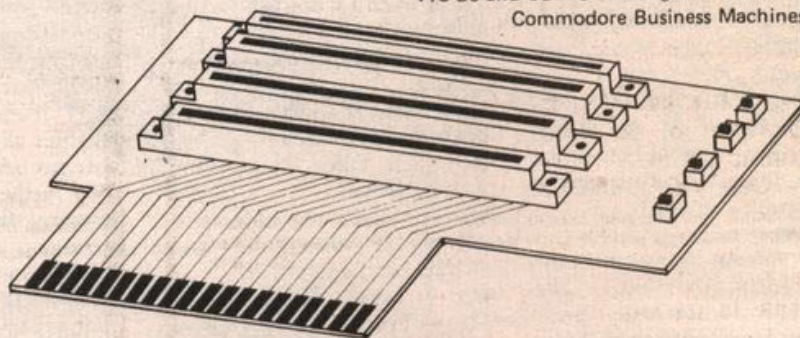
GILSOFT

30 Hawthorn Road
Barry
South Glamorgan
CF6 8LE
☎(0446) 736369

TELEPHONE YOUR ORDER
WITH



29 Millcroft, Crosby, Liverpool L23 9XJ



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

- VIC 20 16K STANDARD RAM PACK — £28.95
- VIC 20 16K SWITCHABLE RAM PACK — £35.95
- VIC 20 32K SWITCHABLE RAM PACK — £49.95

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

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

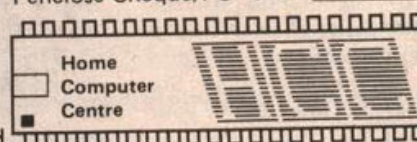
PLEASE SEND ME

Qty

- | | | |
|---------------------------------|---------------------------------------|--|
| <input type="checkbox"/> VIC 20 | <input type="checkbox"/> Dragon 32 | <input type="checkbox"/> 16K Std. Ram Pack |
| <input type="checkbox"/> CMB 64 | <input type="checkbox"/> TI99/4 | <input type="checkbox"/> 16K Switchable Ram Pack |
| <input type="checkbox"/> BBC | <input type="checkbox"/> ZX Spectrum | <input type="checkbox"/> 32K Switchable Ram Pack |
| <input type="checkbox"/> Lynx | <input type="checkbox"/> Electron | <input type="checkbox"/> VIC 20 4 Slot Motherboard |
| <input type="checkbox"/> Oric | <input type="checkbox"/> Colour Genie | <input type="checkbox"/> CBM 64 4 Slot Motherboard |

Name _____
Address _____

I enclose Cheque/PO for £ _____



SPECTRUM BOOKS BOOKS BOOKS

Bored with Playing Games? Ready to Write Your Own Programs?
Learn how far you can go with your Spectrum with these LATEST
publications from the experts!

Tick

MELBOURNE HOUSE

<input type="checkbox"/>	** Spectrum Microdrive Book **	NEW	£5.95
<input type="checkbox"/>	** Supercharge Your Spectrum **	NEW	£5.95
<input type="checkbox"/>	The Complete Spectrum ROM Disassembly		£9.95
<input type="checkbox"/>	Understanding Your Spectrum	NEW LOW PRICE	£6.95
<input type="checkbox"/>	Over The Spectrum	NEW LOW PRICE	£4.95
<input type="checkbox"/>	Spectrum Hardware Manual		£5.95
<input type="checkbox"/>	Spectrum Machine Language for the Absolute Beginner	NEW LOW PRICE	£5.95

GRANADA PERSONAL COMPUTING TITLES

<input type="checkbox"/>	The ZX Spectrum and How to Get the Most From It	£5.95
<input type="checkbox"/>	The Spectrum Programmer	£5.95
<input type="checkbox"/>	The Spectrum Book of Games	£5.95
<input type="checkbox"/>	Introducing Spectrum Machine Code	£7.95

Send to: MFM DATA SERVICES LTD, Dept PCWK1, Ightham,
Sevenoaks, Kent TN15 9BD.

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

Name Address

Postcode

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

ORDERS DESPATCHED WITHIN 24 HOURS WHEREVER POSSIBLE

m.f.m. data services ltd.

VIDEO SOFTWARE LTD

NEW VIDEO-INDEX NEW

Q. How do you store 57,000
characters in a 16K RAM?

A. Use VIDEO-INDEX.

Catalogue your cassettes, your record collection, references to magazine
articles. Amazingly versatile. Capacity for 1,000 individual references each
of which can generate 57 characters of text. Powerful search facilities once
the index has been created.

How is it done?

The system cannot really fit 57,000 characters in a 16K RAM. It gives the
illusion of doing so by eliminating duplicates. For instance in an index of
articles in computer magazines about the ZX81 certain words occur time
and again. VIDEO-INDEX detects these duplications and thereby con-
serves space.

What do you get?

1. A machine code master program which sits at the top of RAM. This is
initially loaded like a BASIC program.
2. A demonstration index containing 1,000 references to articles about the
ZX81 in the popular magazines.
3. A detailed instruction manual.

You may then proceed to create your own catalogues and indexes and
save them on cassette. This program is fast, efficient and ingenious and is
by far the best product we have introduced for the ZX81.

N.B. There isn't room for a commentary on this cassette so you'll have to
read the manual. ZX81 or ZX80+8K ROM. ZX printer is useful but not
essential. Price £9.95



STONE LANE,
KINVER,
STOURBRIDGE,
WEST MIDLANDS,
DY7 6EO,
ENGLAND.

VIDEO
SOFTWARE LIMITED

TEL: KINVER 2462

Std. 038-483-2462

PARAMOUNT SOFTWARE

67 Bishopton Lane, Stockton, Cleveland.

OUTBACK £5.50

For any VIC 20 (Joystick).



Trouble is about to drop in on the occupants of 'Hoppy Valley'
in the form of rather cunning swagmen. 'Ma Hoppy' has a very
sophisticated defence set-up and, with your help, could win
the day. Which is it to be— a tranquil Hoppy Valley or a
swagmen takeover? How long will you survive? It gets tough
and hot in the OUTBACK.

Pure Machine Code action. A game which pulls out all the stops
on the VIC 20 to give you a deceptively aggressive and addictive
challenge. It's a laugh too!

*5 skill levels. *6 Bonus Score symbols. *2 Bonus Life levels.
*Running score on screen. *Hi Score display. *Superb Sound
with 3 different tunes. *Extensive use of colour and graphics.

COUNTDOWN £5.50

For VIC 20. 8K or 16K expansion — Joystick or Keyboard.

Your next assignment is to
assist the government of a
friendly power in averting
a holocaust. TIME is imp-
ortant. ACCURACY is
essential. COURAGE man-
datory. But, above all,
NERVE is the prime
attribute needed for your
mission as an agent in the
crack S.M.U.

*Multi Skill/Time levels.

*On Screen score display.

*Bonus for each screen.

*'Mission Accomplished'

Bonus.

*Bonus Life feature.

*Hall of Fame.

*Realistic Sound Effects.

*Superb use of Colour and
Graphics.

*Keyboard or Joystick option.

PARAMOUNT is a registered
trading name of Workstations Ltd



**WRITING
MARKETABLE
PROGRAMMES?**

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

TRADE
ENQUIRIES
Tel.
0642 604470

To: PARAMOUNT SOFTWARE, 67 BISHOPTON LANE,
STOCKTON, CLEVELAND, TS18 1PU (ENGLAND)

Please supply 'Outback' at £5.50 each

..... 'Countdown' at £5.50 each

Name

Address

Post Code

I enclose cash/cheque/P.O. for £.....

(Overseas orders add £1.50 for airmail.)

Space Invaders

A new game for 16K Spectrum by Gordon Cooper

This game is great fun to play. It gives invaders which move side to side and come down to get you. You have a single laser cannon to shoot them. As they come lower, their colour becomes darker and more menacing. Let one land and that's the end of that run.

If you blast all the invaders in the first wave, you get a single shot at the mother ship for extra points. Once the ship has passed, prepare for the next wave which comes at even greater speed.

Play against your friend. Your score is shown, together with the highest score so far, at the top of the screen.

The program is written almost entirely in Basic, and uses several tricks to keep its speed up. If you find it too fast, slow it down by adding the *Beep* command. For example, change statement 40 to *Beep .05, -10: Return*.

The key to the program lies in the subroutine at statements 20, 30, and 40. This is dynamically modified whilst the

program is running by statements 2060 and 2070, which blank out hit invaders, and statements 5370 to 5390, which restore the invaders back into the print statements 20 and 30 just before each new wave.

This key subroutine has been placed at the beginning of the program for two reasons. Firstly, it runs faster. Every subroutine call causes the computer to scan from the beginning of the program, looking for the correct line number. If it's found quickly at the beginning of the program storage, the whole game plays faster. The second benefit is that the program may be modified, without moving the storage address of the subroutine. This is vital if the *Poke* statements are to work correctly.

The *Poke* statements work by using the variable *p* to point to the first print character position in statement 20. This is set up by statement 5310. This works by *Peeking* the Spectrum's system variables to find the program start, and then adding 68.

Sixty eight is the number of bytes occupied by statements 20 and the beginning of 30. For this to hold true, you must enter statements 20 and 30 *exactly* as shown. Note that the *Rem* in statement 20 has seven blanks between *past* and *invader*, to make the printout easier to read. An alternative is to remove the *Rem* from statement 20 and change statement 5310 to add only 30 to the *Peeked* value.

The remainder of the program is slightly easier to understand. When initially run, control goes straight to statements 4000 and following. These set up five special characters. You should be able to see their outline in the binary pattern. It's a good idea to enter these first, and run that part of the program to define your characters. Once run, you can enter the remainder of the program, the special characters being entered using graphics mode, and *a*, *b*, *c*, *d*, or *e*.

When the program is running, the next function it performs is to set up a flashing



logo by calling subroutine 9000. This may seem to use rather complex graphics, but gives an amazing display of two flashing coloured invaders. To make it easier to enter, you will find that each print statement is repeated. Thus you may enter each block of graphics once, then edit the line number and print at position to produce the next statement.

While the logo remains flashing, the program then interrogates for name of player, offers instructions and initialises variables. During this set up, statements 5412 to 5419 are skipped over as *m* has been set to 0. This prevents the mother ship being plotted until after the first wave of invaders has been annihilated. Statement 6000 passes control to 375, which calls the subroutine to start the invaders descending.

If the fire button, or the *O* key, have been depressed, statement 360 passes control to 400, the beginning of the laser gun firing routine. A hit is detected by statements 400 and 415. If no hit occurs, control goes from 490 to 310 to continue the invaders descending.

If the gunfire hits an invader, control goes to statement 2000. Statement 2010 flashes an exploding invader, while 2016 gives sound effects. Line 2020 updates the score, dependant upon the height of the invader. Lines 2060 and 2070 blank out the invader from the relevant print statement 20 or 30. Line 2080 checks to see whether all the invaders have been hit and, if not, loops back to the invader descent routine. If all invaders have been hit, control goes to 5410, after setting the flag *m* to 1.

Statement 5410 was used during the initialisation, but this time has the flag *m* set. This causes statements 5412 to 5418 to fly a mother ship across the screen. Statement 5415 checks for the fire button. When firing at the mother ship, the fire subroutine at 400 and the hit routine at 2000 are used as for the earlier invaders. These routines run an inline code when the invaders are descending, to speed their execution. At this later phase of the game they are used as subroutines, by the *m* flag bringing in *Return* instructions at 485, and 2050.

Once the mother ship has passed, control goes via 5418 to 5350, which initialises for another invader wave as at the beginning. However, this time statement 5440 has added another .05 to variable *n*, causing the invaders to come down faster. Eventually an invader hits the base line, detected by statement 390, and control goes to 8000. This flashes the logo as at the beginning, updates the high score if appropriate, and restarts the game.

Before you run the program, it is a good idea to Save it at least once onto tape, as any mistake in the *Poke* statements can destroy your precious program. You can test the *Poke* statements as follows. Run the program, and start the invaders descending. Don't fire at any of them. Press *Break* to stop them, then enter as a direct command *Poke p + 11,143*. Now list the program. You should find the third invader of statement 30 changed to a black square. If the black square is elsewhere, correct statements 10,20 or 5310 until the above test is correct. You're now ready to play. Good shooting. ■

```

10 GO TO 4000: REM Skip past
   invader plot routine
20 PRINT INK i; AT e,f; " " " "
   " " " " " " " "
30 IF c THEN PRINT INK j; AT e+
   3,f; " " " " " " " "
40 RETURN
300 REM Gun mover
310 PRINT AT 21,a; " "
320 IF INKEY$="8" AND a<31 THEN
   LET a=a+1
330 IF INKEY$="5" AND a THEN LE
   T a=a-1
340 PRINT AT 21,a; " "
350 IF INKEY$="0" THEN LET g=1:
   REM Gun firing
360 IF g THEN GO TO 400
365 IF f=0 THEN LET d=1: BEEP .
   02,-10
370 IF f=5 THEN LET d=-1: BEEP
   .02,-3
375 OVER 1: GO SUB 20: REM Rubo
   ut
380 LET f=f+d
382 LET e=e+n
385 OVER 0: GO SUB 20: REM New
   print
386 IF e>=3 THEN LET i=6: LET j
   =3: REM 1st.colour change
387 IF e>=6 THEN LET i=3: LET j
   =1
388 IF e>=9 THEN LET i=1: LET j
   =0
389 IF e>=12 THEN LET i=j
390 IF e>21 OR e>18 AND c THEN
   GO TO 8000: REM Hit bottom
395 GO TO 310: REM Loop back to
   gun move routine
400 IF SCREEN$ (20,a)<>" " THEN
   LET b=20: GO TO 2010: REM Inv
   immediately in front of gun,skip
   fire routine following
402 PRINT AT 20,a; " "
405 BEEP .01,10
410 FOR b=19 TO 1 STEP -1
415 IF SCREEN$ (b,a)<>" " THEN
   GO TO 2000: REM Invader hit
420 OVER 1: PRINT AT b+1,a; " "
   PRINT AT b,a; " "
430 NEXT b
440 OVER 0
450 BEEP .01,20
455 LET g=0
460 LET s=s-1
470 PRINT AT 0,26; " " : PRINT
   AT 0,27; s: REM Update score
480 PRINT AT 1,a; " "
485 IF m THEN LET g=2: RETURN :
   REM Goes to 5416 to allow only
   one shot at mother ship
490 GO TO 310: REM Loop back to
   gun mover
1990 REM Invader hit routine
2000 OVER 0: PRINT AT b+1,a; " "
2010 PRINT FLASH 1; AT b,a; " "
2012 IF m THEN FOR g=10 TO 30
2014 IF NOT m THEN FOR g=10 TO 3
   0 STEP 3
2016 BEEP .02,g: NEXT g
2020 LET s=s+21-b: REM Increase
   score dependant upon height
2030 PRINT AT 0,26; " " : PRINT
   AT 0,27; s: REM Print new score
2035 LET g=0: REM Reset gun flag
2040 PRINT FLASH 0; AT b,a; " "
2050 IF m THEN LET g=2: RETURN :
   REM Returns to 5416 to allow
   only one shot at ship
2060 IF b-e<=2 THEN POKE p+a-f,3
   2: LET u=u-1: REM Blank out inv
   ader if on upper row
2070 IF b-e>=2 THEN POKE 54+p+a-
   f,32: LET c=c-1: REM Blank out
   invader if on lower row
2080 IF NOT c AND NOT u THEN LET
   m=1: GO TO 5410: REM All invs.h
   it
2220 GO TO 365: REM Loop back to
   inv.shifter
4000 REM Sound gen machine code
4005 RESTORE
4010 FOR a=32640 TO 32659
4020 READ n: POKE a,n
4030 NEXT a
4040 DATA 33,33,3,17,1,0,229,205
   ,181,3,225,43,43,43,43,43,16,
   240,201
4990 REM 5 special chars.
5000 POKE USA "a"+0,BIN 001111100
5010 POKE USA "a"+1,BIN 011111110
5020 POKE USA "a"+2,BIN 100110001
5025 POKE USA "a"+3,BIN 100110011
5030 POKE USA "a"+4,255
5035 POKE USA "a"+5,BIN 01100110
5040 POKE USA "a"+6,BIN 11000011
5050 POKE USA "a"+7,BIN 11000011
5060 POKE USA "b"+0,BIN 01100110
5070 POKE USA "b"+1,BIN 01100110
5080 POKE USA "b"+2,BIN 01100110

```

Continued on page 13

FINSBURY COMPUTER CENTRE

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

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



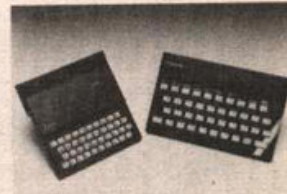
COMMODORE VIC20 £149.99
INCLUDING STARTERPACK
COMMODORE 64 £229.00



DRAGON 32 £175.00



ATARI 400 £149.00
ATARI 800 £299.99



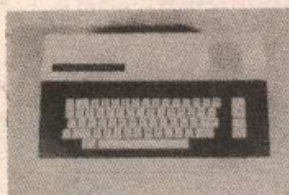
SINCLAIR ZX81 £45.00
SPECIAL OFFER
SPECTRUM 16K £99.95
SPECTRUM 48K £129.95



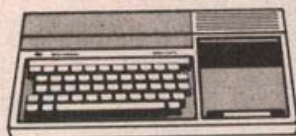
ORIC-1 48K £139.99



LYNX 48 £225.00



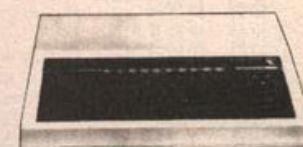
COLOUR GENIE 32K £168.00
SPECIAL OFFER



TEXAS TI 99-4A
£159.95



JUPITER ACE £69.95



BBC MODEL B £399.00

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

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

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

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

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

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

Please supply

Please add £3 for p&p to cost

I enclose my cheque for £.....

or charge my
Access/Barclaycard No.

NAME

ADDRESS

..... SIGNATURE


```

5090 POKE USR "b"+3,BIN 01100110
5100 POKE USR "b"+4,255
5110 POKE USR "b"+5,255
5120 POKE USR "b"+6,255
5130 POKE USR "b"+7,255
5140 POKE USR "c"+0,BIN 01000000
5150 POKE USR "c"+1,BIN 11100000
5160 POKE USR "c"+2,BIN 01000100
5170 POKE USR "c"+3,BIN 01001110
5180 POKE USR "c"+4,BIN 11100100
5190 POKE USR "c"+5,BIN 11100100
5200 POKE USR "c"+6,BIN 00001110
5204 POKE USR "c"+7,BIN 00001110
5204 POKE USR "d"+1,BIN 00000111
5206 POKE USR "d"+2,BIN 00011111
5208 POKE USR "d"+3,BIN 01100110
5210 POKE USR "d"+4,255
5212 POKE USR "d"+5,BIN 00111111
5214 POKE USR "d"+6,BIN 00001111
5215 POKE USR "e"+1,BIN 11100000
5216 POKE USR "e"+2,BIN 11111000
5218 POKE USR "e"+3,BIN 01100110
5220 POKE USR "e"+4,255
5222 POKE USR "e"+5,BIN 11111100
5224 POKE USR "e"+6,BIN 11110000
5226 GO SUB 9000: REM Logo print
5228 OVER 0: BORDER 1: PAPER 1:
INK 7
5230 PRINT AT 0,12;"INVADERS"
5232 PRINT AT 20,0;"Hello, whats
your name?"
5234 RANDOMIZE USR 32640
5236 IF INKEY$<>"" THEN GO TO 52
40
5238 GO TO 5234
5240 INPUT n$
5250 PRINT AT 20,0;"Hello ";n$;"
need instructions?"
5260 INPUT "(y/n)";a$
5270 IF a$<>"y" AND a$<>"Y" AND
a$<>"yes" THEN BEEP .5,30: GO TO
5305
5280 PRINT AT 16,0;"OK ";n$;" we
're after you!"
5285 PRINT AT 18,0;"Press 5/8 to
move gun left/right"
5290 PRINT AT 20,0;"Press 0 to f
ire the gun";
5292 INPUT "Press enter for scor
ing details";a$
5294 PRINT AT 15,0;"Each time yo
u fire gun the score "
5295 PRINT AT 17,0;"is reduced b
y one, Invaders hit "
5297 PRINT AT 19,0;"score more p
oints near top. Only"
5298 PRINT AT 21,0;"1 shot is al
lowed at mother ship"
5299 INPUT "Press enter to start
";a$
5300 REM Init for new game
5305 LET a=15: LET g=0: LET h=0:
LET m=0: LET n=.05: LET s=0
5310 LET p=256*(PEEK 23636)+PEEK
(23635)+68: REM point to 1st.pr
int posn.of stmt.20
5320 LET h$=""
5350 REM Init for next invader
5360 BORDER 1: PAPER 5: INK 0
5370 FOR i=1 TO 26 STEP 5
5380 POKE p+i,144: NEXT i: REM
Reset statement 20
5390 FOR i=1 TO 26 STEP 5
5400 POKE p+54+i,144: NEXT i: RE
M Reset statement 30
5405 CLS
5410 LET c=6: LET d=1: LET e=1:
LET f=0: LET i=7: LET j=6: LET u
=6
5411 IF NOT m THEN GO TO 5420: R
EM Skip over mother ship plotter
5412 FOR m=0 TO 29
5413 PRINT INK 2;AT 4,m;" "
5415 IF INKEY$="0" THEN LET g=g+
1
5416 IF g=1 THEN GO SUB 402
5417 NEXT m
5418 LET m=0: LET g=0: REM Reset
firing flags for next wave
5419 GO TO 5350
5420 PRINT AT 0,1;"High Score
";h
5425 PRINT AT 0,1;h$: REM Name
of leader over word "High"
5430 PRINT AT 0,20;"Score ";s
5440 LET n=n+.05: REM Increase
inv.drop speed each wave
5000 GO TO 375
8000 REM Been got
8010 GO SUB 9000: REM Logo print
8020 PAPER 1: INK 7
8030 PRINT AT 0,12;"GOT YOU!"
8040 PRINT AT 18,0;"Well done ";
n$;"you scored ";s
8050 LET i=0
8060 IF s>=h THEN PRINT AT 20,0;
"Thats the highest so far!": LET
i=1
8070 IF i THEN FOR i=1 TO 5: FOR
j=10 TO 30 STEP 3: BORDER i: BE
EP .05,j: NEXT j: NEXT i: REM Vi
ctory roll
8075 IF NOT i THEN BEEP 1,-10: R
EM Fail
8080 IF i THEN LET h=s: LET h$=n
$
8085 PRINT AT 20,0;"Who's playin
g this time?"
8090 BORDER 1: PRINT "Just press
enter if same player"
8095 RANDOMIZE USR 32640
8097 IF INKEY$<>"" THEN GO TO 81
00
8098 GO TO 8095
8100 INPUT a$
8105 IF a$<>"" THEN LET n$=a$
8110 PRINT AT 20,0;"Starting aga
in in a 2 secs. "
8120 BEEP 2,30: LET n=.05: REM R
eset speed
8130 LET s=0: LET a=15
8140 GO TO 5350
8990 REM Flashing logo printer
9000 BORDER 1: PAPER 2: CLS
9005 PRINT PAPER 1;"
"
9010 FLASH 1: INK 1: PAPER 5
9020 PRINT AT 5,5;" "
9025 PRINT AT 5,23;" "
9030 PRINT AT 6,4;" "
9035 PRINT AT 6,22;" "
9040 PRINT AT 7,3;" "
9045 PRINT AT 7,21;" "
9050 PRINT AT 8,2;" "
9055 PRINT AT 8,20;" "
9060 PRINT AT 9,2;" "
9065 PRINT AT 9,20;" "
9070 PRINT AT 10,5;" "
9075 PRINT AT 10,23;" "
9080 PRINT AT 11,4;" "
9085 PRINT AT 11,22;" "
9090 PRINT AT 12,3;" "
9095 PRINT AT 12,21;" "
9110 FLASH 0
9120 FOR f=16 TO 21
9130 PRINT PAPER 1; INK 1;AT f,0
;"
"
9140 NEXT f
9150 RETURN
9500 REM
Variables
a Left to right of gun
b Laser bolt vert posn
c Lower row inv count
d +1 or -1 inv go R/L
e Invader drop
f L/R invader wobble
g Flag for laser fire
h Highest score
i/j Ink for invaders
m Flag for mother ship
n Vert increment
p 1st inv.char.stmt 20
s Current score
u Upper row inv count
© G.Cooper 1982

```


Timex v Spectrum

Ian Logan looks at the US answer to the Spectrum — the Timex-Sinclair 2068

At last, eighteen months after the launch of the Spectrum in the UK, the Timex Corporation of Waterbury, Connecticut, has launched its "personal colour computer — the Timex/Sinclair 2068". With this computer Timex hopes to capture a large part of the home computer market in the US, which is still very underdeveloped in comparison to the UK.

Over the last two years Timex has been selling the ZX81 — repackaged as the TS1000 — on a royalty basis with Sinclair Research Ltd. But, Timex wants to become a computer designer and manufacturer in its own right. It has a large workforce and many factories that are having to diversify as the Timex watch business continues to shrink. The TS1000 gave Timex its first experience of the home computer market and the company decided that continuing investment should be made in the computing business.

When the Spectrum was launched in the UK (April 1982), the management of Timex made the decision — rightly or wrongly — not simply to repackage the Spectrum to American standards, but to modify the computer. There is no doubt that the TS1000 is a nice machine. But can Timex still make sufficient profit when relatively

unsuccessful machines are being 'dumped' in large quantities?

Instead of the functional and economic appearance of the Spectrum, the Timex machine has a silvered case (38x19x4 cm) with finely designed lines and mouldings. The keyboard has full-travel solid keys that are certainly easier to use for a typist. To the right hand side of the keyboard is a Rom cartridge compartment — with a lid — into which games cartridges and language cartridges can be slotted and a joystick port.

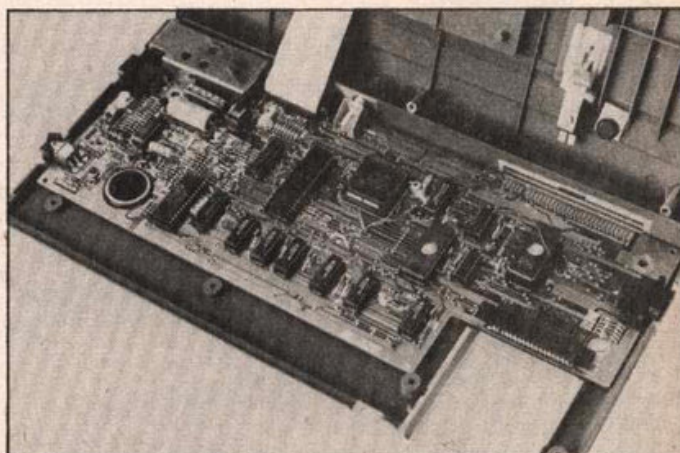
On the left-hand side of the casing is a 'rocker' On/Off switch and a left joystick port. On the rear of the machine are the tv outlet, the power socket, ear and mic sockets for the cassette player, a monitor output and, finally, the familiar edge connector for the printer, etc.

Underneath the machine is a small tv channel selector and

There are three definite ways in which the hardware of the Timex machine is different to that of the Spectrum. Firstly, the sound chip. The Timex computer retains the single loudspeaker of the Spectrum but, in addition to being able to 'toggle' the loudspeaker on and off — using *Beep* or *Out* — it is possible to control the output by programming an AY-3-8912 sound chip using *Sound*.

Secondly, the display modes. The hardware of the Timex 2068 allows for four distinct display modes but, apart from Mode 1 (Normal) they are only available from machine code:

Mode 1 — Normal —
one display file of 6K.
one attribute file of 3/4K.
Mode 2 — 64 characters c 2 colours
—two display files of 6K. (the characters are taken from each display file in turn)



Mode 3 — Second screen
—uses the second display file and the second attribute file.
Mode 4 — Ultra-high colour resolution
—one display file of 6K. to hold 768 characters (normal number).
—uses the second display file to hold an attribute byte for each pixel of the characters.

There is no doubt that Rom cartridge programmers will try to make the best of these different display modes.

Finally, the bank switching. The Timex 2068 has been designed with 'extendability' in mind, and this is best shown by the provision for 'bank switching'. In this machine it is possible to use, at any single moment in time, any 8K 'chunk' of memory from any of 256 memory banks — provided that the area 6000-7FFFh is always left alone.

At the moment, only the Rom cartridges use the bank switching, but in time 'intelligent' devices are expected to become available — these will be serviceable without taking up valuable user Ram.

The memory bank 254 is unavailable for use by external devices as it is this bank that contains the Basic extension Rom. This Rom contains code that proved to be impossible to fit in the normal 16K Rom. Therefore, it can be considered that the Timex 2068 has a 24K Basic operating system.

The Timex 2068 uses Sinclair Basic — it

a grill through which one can see the loudspeaker.

Initially, therefore, the Timex 2068 might be considered very different in appearance from the Spectrum, but bear in mind that the keyboard area is exactly the same size on both machines. It is nice though, to have the facilities of the ZX Interface 2 — the Rom slot and the joystick ports — built into the machine.

Like the Spectrum, the Timex 2068 computer uses a Z80A microprocessor running at 3.5 mhz. Also, the tv monitor display is generated, for the most part, by a custom-built ULA — which in the Spectrum is the familiar chip shape, but in the Timex 2068 is one of the 'new' square ones.



is certainly a surprise at first to find a microcomputer that does not look like a Spectrum coming alive with the message:

© 1982 Sinclair Research Ltd

even if it is followed by:

© 1983 Timex Computer Corp

Thereafter, the Timex 2068 acts like a Spectrum. All the familiar keywords are available and the syntax checking, that makes Sinclair Basic so nice to use, works as well as ever.

The Basic has, however, been slightly modified. There are four extra command words and two extra function words. *Delete m,n* (where *m* and *n* must be specified but can be the same) — this command allows for a block deletion of lines from a Basic program. If there is no line in the block then the report *Nonsense in Basic* is given.

It is interesting to note that pressing the *Delete* key in K-mode writes *Delete*, but in L-mode it deletes characters — this makes deleting a line number rather strange (keep the key pressed and *Delete* appears and disappears).

On Err (optional followed by *Goto*, *Cont*, or *Reset*) — an interesting command (taken from Apple Basic?) that allows the user to write error handling routines. Initially, one uses — *On Err Goto line no* — which on execution makes most errors (including *Stop* and *Break*, but not *Goto* past the program) lead to the error handling routine. In this routine one can test the system variables, to determine the error-

register number and *n* a value) — the sound chip has three output channels, and on each channel there can be either a tone or noise. The volume of each channel can be altered independently, as can the frequency of any tone on a channel. The channels can be synchronised by enabling them at the same time. For example, on the BBC microcomputer, all the outputs can be produced with 'attack', 'hold' and

fair estimate of the free user Ram. The Timex 2068 has 48K of Ram, but *Print Free* by itself, gives the result 38652, ie 37¾K available for Basic programs.

The other function word addition is *STICK (m,n)* (where *m*=1 for joystick or *m*=2 for pushbutton, *n*=1 or *n*=2, for left or right joysticks). This function returns a value in the range 0-15, depending on the input from the appropriate joystick.



There is almost total compatibility between the two machines, but care has to be taken with respect of the new commands and functions on the Timex machine. Also, the Basic program area starts at location 23755 in the Spectrum and location 27610 in the Timex 2068. Most machine code programs, of course, will not translate from one machine to the other.

In conclusion, the Sinclair Spectrum is an excellent microcomputer — its popularity proves that — but to be successful, it has had to be produced cheaply. It lacks a respectable keyboard and peripherals have to be attached to a single edge connector.

As to the Timex 2068 ... well, it is a 'pretty' machine. It has a more reasonable keyboard, but it does clatter. It has better sound, but it is difficult to program and the volume is low. It has less 'bugs' than the Spectrum — many of the easy ones have been corrected (division, *Screen\$*, *Str\$ "a"+0.1*, etc), but not all *Print Int -65536* is still '-1'.

The Timex 2068 is worthy of the accolade Spectrum Mark II, but it will be in short supply for a long while yet, as will good software to use with it. I have no doubt that Timex will succeed with its venture, but this country, and especially Sir Clive's Sinclair Research, is still a long way in front.

type and error-statement, before correcting the error and using *On Err Cont* to try the erroneous statement once again.

On Err Reset simply cancels the *On Err Goto* state. There is nothing like using *On Err* for making your Timex 2068 hang-up — definitely a case for saving your valuable program before pressing Run.

Reset — a command that clears streams and buffers for peripheral devices.

Sound m,n;m,n; ... (where *m* is a

'decay' phases.

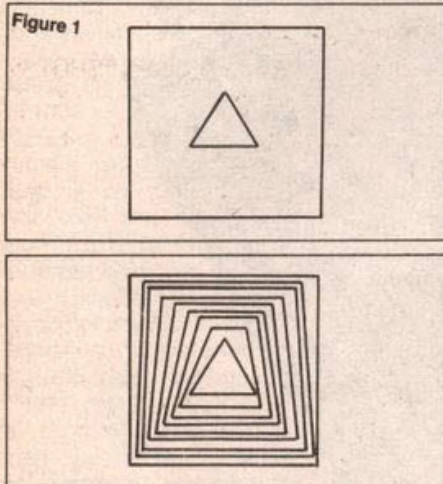
The *Sound* command leaves the programmer with a lot of work to do, as there is no help from the Basic in the formulation of the appropriate values of *m* and *n*. A last point to be made about the sound chip is that, at least on the review Timex 2068, the sound output is very, very quiet — will this please parents?

The first extra function word is *Free*. This new function returns a value that is a

Contoured patterns

Bryan Skinner shows how 'contour mapping' can produce visual displays

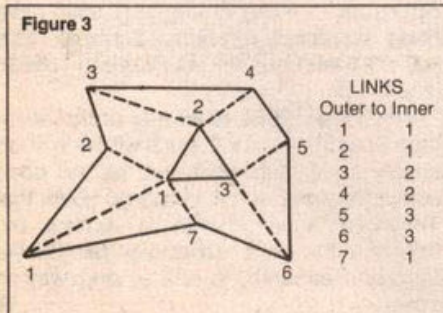
'Contour mapping' can provide some very pleasing visual displays. This program draws one shape within another, then 'fills' the gaps between with 'contour' lines. For example, given a triangle within a square (Figure 1), the program will produce a pattern as in Figure 2.



The program may appear somewhat complicated, but this is more because of the necessary use of parentheses than much else. In fact, it may be broken down into about seven modules with relatively simple functions.

Three dimension or numeric arrays are used: *X*, *Y* and *D*. Array *X* holds the x-coordinates of the two figures — *X*(1,1) refers to the 'first' 'X' point of the other shape and *X*(2,3) gives the third 'X' point of the inner shape. Array *Y* behaves similarly for the Y-coordinates of the two shapes. The two DATA statements at the end of the program define the outer and inner polygons in that order. The data is in the form: *X*₁, *Y*₁, *X*₂, *Y*₂, ..., *X*_{*N*}, *Y*_{*N*}. Line 20 specifies the number of points of each shape, *N*₁ being the outer. Lines 40-70 simple READ the Data into arrays *X* and *Y* and draw the two polygons.

The array *D* is used to hold the number of the nearest point of the inner shape to each point of the outer shape. This is best explained by means of a diagram (Figure 3).



The 'nearest point' of the inner shape to an outer point is determined by three routines:

- (i) lines 90-110
- (ii) lines 130-170
- (iii) line 250

(i) line 100 calculates the absolute value of the sum of the differences between the x and y coordinates of a given inner and an outer point. It thus provides a measure of the relative distance of one point from another, ie:

$$ABS(X_i - X_o) + ABS(Y_i - Y_o)$$

where *X_i* stands for the X-coordinate of an inner point.

Lines 90 and 110 calculate this value for each inner point relative to each outer point, the results being put into array *D*. The outcome of this process is shown in Figure 4.

Figure 4

	1	2	3	Inner points
1	160	210	200	
2	70	80	110	
3	190	180	230	
4	116	106	156	
5	180	130	140	
6	140	130	100	
7	150	160	110	
8	60	70	60	

Representation of the contents of array *D*, after calculating the 'distance' of each outer point to each inner point.

(ii) This routine alters the contents of array *D* by replacing the 'differences' with reference numbers, the smallest difference being given the lowest number.

This is shown in Figure 5.

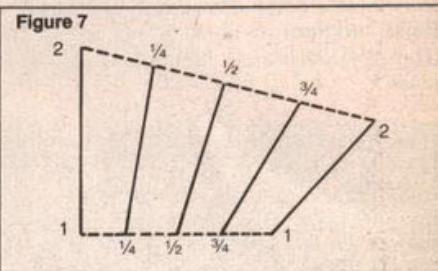
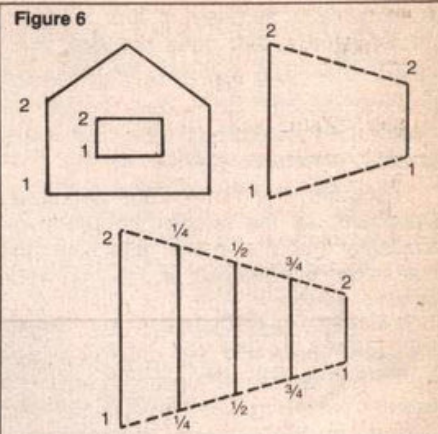
Figure 5

	1	2	2	Inner points
1	1	3	2	
2	1	2	3	
3	2	1	3	
4	2	1	3	
5	3	1	2	
6	3	2	1	
7	2	3	1	
8	2	3	1	

Representation of array *D*, after ranking the differences in fig 4 by row.

(iii) line 250. This allocates the nearest point of the inner shape to the variable *J* for line drawing, omitting this line gives some interesting results.

The main part of the program is contained in lines 190-320. To understand these, more diagrams are necessary. Figure 6 shows that the goal is to construct imaginary lines between two points, to divide these in ratios and to link the resultant points. Note that the lines thus drawn will not necessarily be parallel, see Figure 7. The step size is given by line 200 — set at 30, but higher values will increase the 'density' of the pattern by plotting more lines.



The division of the imaginary lines 1-1 and 2-2 is calculated in line 220, to set it to 3/4, 1/2, 1/4, etc, so that the halfway point of line 1-1 may be linked to the halfway point of line 2-2 and so on.

Lines 270 — 320 function as follows: 270 — calculates *A* (the next X coordinate) by defining the difference between an outer point's x-coordinate and the corresponding inner point's x-coordinate (*X_i* - *X_o*). It then multiplies this difference by the current division factor (1/4, 1/2, 3/4, etc) and finally adds this to *X_o*. Line 280 simply rounds the value of *A*. Lines 290 and 300 perform similar calculations for the points' Y coordinates to define the next Y coordinate as ((*Y_i* - *Y_o*) * *ST*) + *Y_o*.

A and *B* thus define the next point to which a line is to be drawn. Line 310 uses the Dragon command *Line*, missing the first parameter, which causes a line to be drawn from the end of a previous line to the coordinates given.

You should be able to create some interesting patterns by altering the shapes defined by the Data statements in 340 and 350 — but don't forget to alter *N*₁ or *N*₂ in line 20 if you change the number of points of either figure. Note that the inner shape must have fewer points than the outer and that the points must be given in the Data statements in clockwise order, or odd effects will occur.

As mentioned above, altering the value of *S* in line 200 will alter the closeness of the contour lines drawn. Finally, changing the *Pmode* and *Screen* variables in line 10, and perhaps adding: *Color Rnd(4), Rnd(4)* to line 310 should yield some colourful results.

Some users might find alternative uses for some of the modules; for example, the routine in lines 130-170 could be used to rank a set of data prior to some statistical calculations.


```

10 PMODE 4,1 : PCLS : SCREEN 1,1
20 N1 = 8 : N2 = 3
30 DIM X(2,N1), Y(2,N1), D(N1,N2)
40 FOR I = 1 TO N1 : READ X(1,I) : READ Y(1,I) : NEXT
50 DRAW "BM" + STR$(X(1,1)) + "," + STR$(Y(1,1)) : FOR I = 2 TO N1 :
LINE - (X(1,I),Y(1,I)),PSET : NEXT : LINE - (X(1,1),Y(1,1)),PSET
60 FOR I = 1 TO N2 : READ X(2,I) : READ Y(2,I) : NEXT
70 DRAW "BM" + STR$(X(2,1)) + "," + STR$(Y(2,1)) : FOR I = 2 TO N2 :
LINE - (X(2,I),Y(2,I)),PSET : NEXT : LINE - (X(2,1),Y(2,1)),PSET
80 REM DIFFERENCES
90 FOR NO = 1 TO N1 : FOR IN = 1 TO N2
100 D(NO,IN) = ABS(X(1,NO)-X(2,IN)) + ABS(Y(1,NO)-Y(2,IN))
110 NEXT : NEXT
120 REM RANK DIFFERENCES
130 FOR R = 1 TO N1 : FOR B = 1 TO N2
140 BN = 0 : FOR C = 1 TO N2
150 IF D(R,C) > BN THEN BN = D(R,C) : CN = C
160 NEXT : D(R,CN) = N2 - B + 1
170 NEXT : NEXT

180 REM START AND SET DIVISION FACTOR
190 DRAW "BM" + STR$(X(1,1)) + "," + STR$(Y(1,1))
200 S = 30
210 FOR I = 1 TO S
220 FOR F = 0 TO I-1 : ST = ST + I/S : NEXT
230 FOR EP = 1 TO N1
240 FOR SS = 1 TO N2
250 IF D(EP,SS) = 1 THEN J = SS
260 NEXT
270 A = X(1,EP) + (ST*(X(2,J)-X(1,EP)))
280 A = INT (A + .5)
290 B = Y(1,EP) + (ST*(Y(2,J)-Y(1,EP)))
300 B = INT (B + .5)
310 LINE - (A,B),PSET
320 NEXT : ST = 0 : NEXT
330 GOTO 330
340 DATA 10,170,60,90,10,20,100,40,200,20,240,100,200,170,130,150
350 DATA 110,110,130,80,150,110

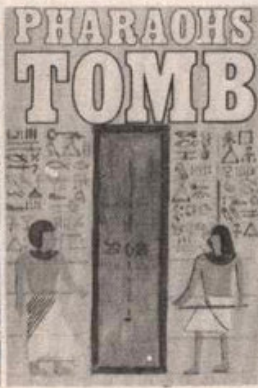
```

ADVENTURE GAMES

48K SINCLAIR ZX SPECTRUM



You are a Knight of Camelot, searching for Merlin's lost treasure. On your way you will discover the Witches' Tower, rescue a Princess held by the wicked Wizard of Trill. **£5.95**



You discover the entrance to an ancient pyramid blocked by a rock. Once inside, you discover fire rooms, ice rooms and other traps set by the builders to protect the Pharaoh. **£4.95**



A rope above a rock fissure is the only way into this Magic Mountain, or is it? Legends tell of vast stores of treasure but also of poisonous spiders, lizards and magic at work. **£4.95**



You are Spectrasses, battling in the arena with Gorgon, whose stare can turn you to stone. To recover the lost chalice, you must also win a swordfight with Grang, inside his cave. **£4.95**



To find the Black Planet you need 7 pieces of the key each hidden on different planets, and requiring different puzzles to be solved. On the journey, you fight off the pirates who get steadily more desperate. **£5.95**

Send SAE for full list.

PHIPPS ASSOCIATES

Prices include postage (outside Europe add £1.00 per item).

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

Access and Visa cards welcome



WALL

48K SPECTRUM



VALHALLA

**MOVi
SOFT**



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

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

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

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

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

MOVISOFT OPERATING SYSTEM UNDER LICENCE

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

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

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

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

Please print name and address

Name.....

Address.....

Credit Card holder's signature.....



PCWK 41



A slice of the pie

Richard Dodd explains how to draw a pie chart on the hi-resolution screen

This program for the Dragon 32 computer draws and labels a pie chart on the high resolution screen. Most of the program is used to store the characters that need to be drawn to the screen.

To draw the characters on the hi-resolution screen, the program uses a small subroutine. The words to be drawn are put in a string which is divided up by the subroutine. Each of the characters is

read and its ASCII code is determined. This code is used to find the appropriate character to be drawn.

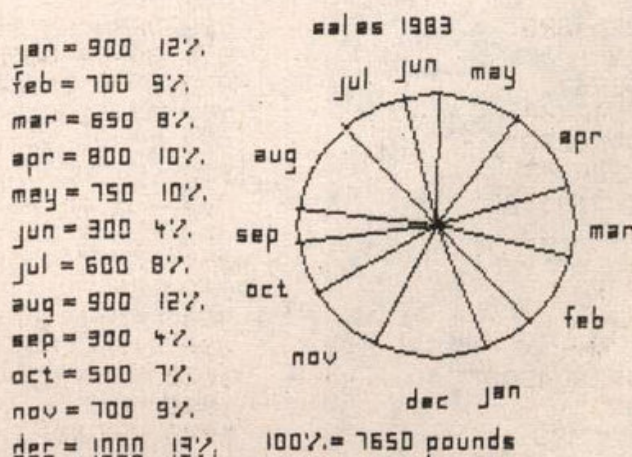
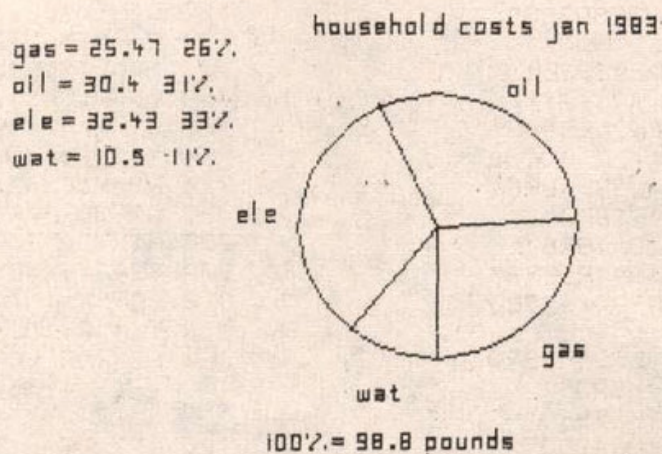
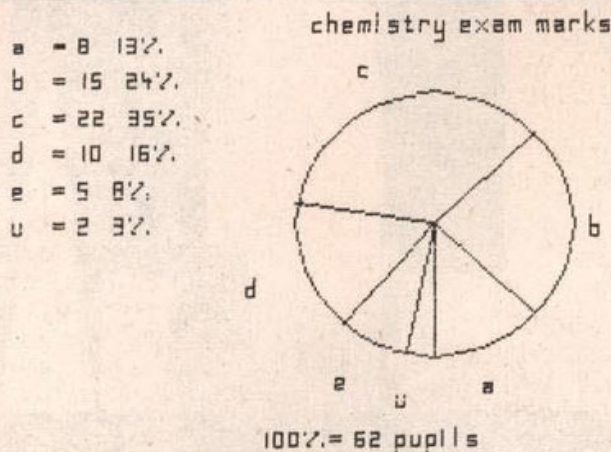
The program uses sine and cosine to work out where to draw the lines and the pie chart. There are 720 points round the circumference of the circle, so two points represent one degree.

The values you enter will be printed on the screen, alongside the percentage of

the total they represent. The total and a title are also printed on the screen.

Notes

10-50	Prints instructions
60-70	Clears string space for the characters
80-110	Special characters
120-220	Numbers
230-480	Letters
490	Waits to continue
510-600	Inputs values and labels
620-790	Draws and labels pie graph
800-870	Prints all the values you entered and the percentage each is of the total
880-890	Prints the title
900-920	Prints the total
930	Freezes screen
940-1020	Subroutine to draw characters




```

10 CLS
20 PRINT TAB(5); "*****"
30 PRINT TAB(5); "*      PIE GRAPH      *"
40 PRINT TAB(5); "*****"
50 PRINT:PRINT"WITH THIS
PROGRAM YOU CAN ENTER UP TO
12 VALUES ,WHICH WILL
BE DRAWN UP AS A PIE
CHART. ALONG WITH THE
CHART ALL THE VALUES
THAT YOU HAVE ENTERED WILL
BE PRINTED AS WELL AS
THE TOTAL AND THE
PERCENTAGE EACH IS OF
THE TOTAL."
60 REM *****CHARACTERS*****
70 CLEAR 5000:DIM LC$(122)
80 LC$(32)="BR4"
90 LC$(37)="BU5U1BR4R1D1G4D
1R1BR5BU1D1BR1"
100 LC$(46)="BR1U1D1R1U1D1BR3"
110 LC$(61)="BR2BU2NR4BU2R4BD
4BR2"
120 REM *****NUMBERS*****
130 LC$(48)="U6R3D6L3BR6"
140 LC$(49)="BR2NU6BR3"
150 LC$(50)="BU6R3D3L3D3R3BR3"
160 LC$(51)="R3U3NL3U3L3BD6BR6"
170 LC$(52)="BU6D3R3BH1D4BR4"
180 LC$(53)="R3U3L3U3R3BD6BR3"
190 LC$(54)="U3R3D3L3U6R3BD
6BR3"
200 LC$(55)="BU6R3D6BR3"
210 LC$(56)="R3U3L3U3R3D3L3D
3BR6"
220 LC$(57)="R3U6L3D3R3D3BR3"
230 REM *****LETTERS*****
240 LC$(65)="BU4R3D4L3U2R3BF
2BR1"
250 LC$(66)="NU8R3U4L3BD4BR6"
260 LC$(67)="U4NR3D4R3BR3"
270 LC$(68)="R3U8D4L3D4BR6"
280 LC$(69)="U2R3U2L3D4R3BR3"
290 LC$(70)="BR1U8NR2D4L1R2BD
4BR3"
300 LC$(71)="BD4R3U8L3D4R3BR3"
310 LC$(72)="U8D4R3D4BR3"
320 LC$(73)="U4BU2U1BD7BR5"
330 LC$(74)="BD4R3U8BD4BR3"
340 LC$(75)="U8D6R1NE2F2BR3"
350 LC$(76)="U8D8BR5"
360 LC$(77)="U4R2ND4R2D4BR3"
370 LC$(78)="U4R3D4BR3"
380 LC$(79)="U4R3D4L3BR6"
390 LC$(80)="R3U4L3D8U4BR6"
400 LC$(81)="BF4U8L3D4R3BR3"
410 LC$(82)="U4R3D1BD3BR3"
420 LC$(83)="R3U2L3U2R3BD4BR3"
430 LC$(84)="BR1U4R1L2R1U2D
6R2BR3"
440 LC$(85)="NU4R3NU4BR3"
450 LC$(86)="BU4D2F2E2N
U2BF2BR1"
460 LC$(87)="NU4R2NU4R2NU4BR3"
470 LC$(88)="E4BL4F4BR3"
480 LC$(89)="NU4R3U4D8L3R3

```

```

U4BR3"
490 PRINT:PRINT"ANY KEY TO
CONTINUE":EXEC 41194:CLS
500 Q=(22/7)/360
510 REM *****INPUT VALUES*****
520 INPUT"HOW MANY VALUES (MAX
12)":N:IF N>12 THEN
CLS:GOTO 520
530 DIM V(N),V$(N)
540 FOR X=1 TO N
550 PRINT"NAME";X;:INPUT"(3
CHAR)";V$(X):IF LEN(V$(X))
>3 THEN GOTO 550
560 PRINT"VALUE(2 DEC)";X;
:INPUT V(X)
570 T=T+V(X)
580 NEXT
590 PRINT:INPUT"TITLE";T$:IF
LEN(T$)<1 THEN GOTO 590
600 PRINT:INPUT"UNITS";U$:IF
LEN(U$)<1 THEN GOTO 600
610 D=720/T
620 REM *****DRAW PIE GRAPH***
630 PMODE 4:PCLS 1:SCREEN 1,1
640 CIRCLE (168,88),55,0
650 FOR Y=1 TO N
660 I=I+V(Y)
670 X=0*(I#D)
680 I1=I-V(Y)/2
690 X1=0*(I1#D)
700 A=(SIN(X)*55)+168
710 B=(COS(X)*55)+88
720 LINE(168,88)-(A,B),PRESET
730 E=(SIN(X1)*70)+160
740 F=(COS(X1)*70)+94
750 DRAW"C0"
760 DRAW"BM"+STR$(INT(E))+",
"+STR$(INT(F))+";"
770 A$=V$(Y)
780 GOSUB 940
790 NEXT
800 X2=2:Y2=2
810 FOR X=1 TO N
820 Y2=Y2+15
830 PE=INT(((V(X)/T)*100)+0.5)
840 V$(X)=V$(X)+"="+STR$(
(V(X)/T)+" "+STR$(PE)+"%"
850 DRAW"BM2,"+STR$(Y2)+";"
860 A$=V$(X):GOSUB 940
870 NEXT X
880 DRAW"BM120,8;"
890 A$=T$:GOSUB 940
900 DRAW"BM100,180;"
910 A$="100%="+STR$(T)+" "+U$
920 GOSUB 940
930 GOTO 930
940 REM *****
950 REM * LETTERS SUBROUTINE *
960 REM *****
970 FOR H=1 TO LEN(A$)
980 K$=MID$(A$,H,1)
990 R=ASC(K$)
1000 DRAW LC$(R)
1010 NEXT
1020 RETURN

```


TOWN NATHAN

Dragon Byte

Home Computers
Software and Games

51a Queen Street
Morley
Leeds

Tel: 0532 522690

ZX SPECTRUM
now under £100

Ring for more information

Last Chance

10 Ash Road
Headingley
Leeds 6
Tel: 744235

Home computers, software
board games, role-playing
games and books

At Last's place we make
you offers you can't refuse

We're worth a visit because:

★ We've probably the best
North — and we're

★ We've

NEW SHOP OPENING SOON!
HIEROMANS DELL
TO SERVE EAST LEEDS
89 PENDA'S WAY, LEEDS 15

model figures for
and adventure games for all ages
PSR, Games Workshop, Avalon Hill, Victory
Games, GDW, Yaquinto, etc, etc.

PROGRAMMERS — Assassin Software needs
your marketable programs. Give us a call

ASTROLOGY

truly AVAILABLE AT YOUR FINGERTIPS

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

THE SIDEREAL TIME OF BIRTH.

THE ASCENDANT AND MIDHEAVEN in Sign, Degrees, Minutes and Seconds for EQUAL HOUSE SYSTEM.

THE SIGNS AND POSITIONS OF THE HOUSE CUSPS in Sign, Degrees, and Minutes for the PLACIDEAN SYSTEM.

THE SUN AND MOON POSITIONS in Sign, Degrees, Minutes and Seconds.

ALL THE PLANETS' POSITIONS in Sign, Degrees and Minutes. THE LUNAR NODE — THE PART OF FORTUNE — THE VERTEX AND A HOST OF OTHER BIRTHCHART INFORMATION AT THE TOUCH OF A KEY.

ZX81 16K

ZODIAC I ONLY £10.00

ZODIAC II ONLY £8.00

GIVES YOU THE ASPECTS AND MIDPOINTS

FOR 48K SPECTRUM AND DRAGON 32

ZODIAC F

Full combined program on one cassette

FOR ONLY £15.00

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

Send orders with cheque payable to:

STELLAR SERVICES

8 FIR TREE VALE, LEEDS LS17 7EY

Tel: (0532) 692770



The best books for the Micro Adventurer



Spectrum Adventures

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



Commodore 64 Adventures

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

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

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

Dealer enquiries: 01-734 3454

Please send me

☐ Spectrum Adventures at £5.95 each

☐ Commodore 64 Adventures at £5.95 each

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

Name _____

Address _____

Signature _____

Or telephone Access Mastercard on 01-734 3454

Accessed functions

A Servini presents a program to access scientific functions from machine code

One of the disadvantages of Basic is that it is so slow, as any serious games programmer should know. Machine code is fine as far as speed is concerned, but lengthy assembler or hex coding can be tedious.

To overcome both problems, I recently bought one of the Basic compilers currently available on the market. However, these have the disadvantage of not being able to handle scientific functions, as they are integer compilers.

So, here I have dipped into machine code, to develop a small routine to interface between compiled Basic and the scientific functions handled by the calculator subroutine within the Spectrum Rom.

The compiler is only able to handle integers between -32768 and 32767. This data, when converted to its binary format, occupies two eight bit bytes. To access this from machine code, the data must first be Poked into a two byte area of Ram.

The machine code routine then Loads the data into the C and D registers. The C register is then tested for either a set or reset sign bit — and, accordingly, the E register is Loaded with either 255 for a set bit (255 is two's complement for -1), or zero for a reset bit. This is done because of the way the Spectrum holds integers within its calculator "stack", as these are held as five bytes on the "stack" (floating point numbers are also held as five bytes).

The order in which these are held is:

BYTE	INTEGER FORMAT
A	Always zero
B	Always zero
C	High byte (holds the sign bit)
D	Low byte
E	Either zero or 255

These correspond to the A, B, C, D and E registers, which are Loaded with these bytes, and passed to the "stack" via the Rom "stack-store" subroutine (2AB1 hex).

In the following machine code routine, the first number represented in integer format is the constant 32767 — after this is the data and finally the constant 1000.

The five byte numbers are stacked in this order because the calculator "stack", operates on a last in, first out basis. When the calculator performs an operation on the two top numbers on the "stack", the stack decreases by one, and the result is put on top of the stack.

The calculator is then called up by the RST 0028h instruction. The five literals which follow in the machine code routine call up the calculator functions (such as — Add, Divide, Sin, To Power, etc). The calculator is terminated by the literal 38h, and the result (now on the top of the calculator "stack") is retrieved via the "stack-fetch" subroutine (2BF1h) which passes the result to the A, B, C,

D and E registers.

Only the C and D registers are required, however, as the A and B registers always hold zero for integers. Also, the E register is not required, as compiled Basic will automatically assign a negative value to the final result if it is greater than 32767.

The two constants are used to manipulate data to and from the machine code routine, because the compiler does not handle fractional values. So, if significant places are not to be lost after the decimal point, a number such as 3.786 can be input as 3786, and divided by 1000 from within the machine code — this is then presented to the Sin function as 3.786. The final result is also passed to Basic as a number between -32767 and 32768 which represents a number between -1 and +1.

The machine code routine as it stands can only perform one function, namely Sin

x. However, further modification could be done where the literals are stored in a table, and loaded as required into the address which corresponds to the required literal. For example, the literal 20h could be substituted for 1Fh and the routine would perform Cos X, etc.

The routine as written, loads into the printer buffer area in Ram (5B00h). For those who want to move the routine into the user graphics area, change the start address to 7F58h, Loop to 7F70h, First and DOUT to 7F8Eh. In the following Basic routine, change 23350 to 32654, 23351 to 32655, and 2396 to 32600.

Finally, here is the Basic routine required to Poke the input data to the machine code routine, and also to Peek from machine code the result of the calculation:

```
100 INPUT "number?";B
110 IF B<0 THEN LET B = B + 65536
120 LET A = INT (B/256)
125 LET B = B - A*256
140 POKE 23350,A
150 POKE 23351,B
160 LET MC =USR 23296
170 LET A = PEEK 23350
180 LET B = PEEK 23351
190 LET A = A*256 + B
200 PRINT A:STOP
```

An assembler listing of the machine code routine.

ADDR	HEX	OP	OPERANDS	COMMENT
5B00	3E00	LD	A,0	
5B02	0600	LD	B,0	
5B04	0E7F	LD	C,127	put the
5B06	16FF	LD	D,255	constant 32767
5B08	1E00	LD	E,0	on the stack.
5B0A	CDB12A	CALL	2AB1h	
5B0D	21365B	LD	HL,FIRST	
5B10	4E	LD	C,(HL)	take data from
5B11	CB79	BIT	7,C	the 2 byte area
5B13	CA185B	JP	Z,LOOP	and
5B16	1EFF	LD	E,255	put it onto
5B18	23	LOOP:	INC HL	the stack.
5B19	56	LD	D,(HL)	
5B1A	CDB12A	CALL	2AB1h	
5B1D	0E03	LD	C,3	put the
5B1F	16E8	LD	D,232	constant 1000
5B21	1E00	LD	E,0	onto the stack.
5B23	CDB12A	CALL	2AB1h	
5B26	EF	RST	0028h	call calc.
5B27	05	DEFB	05h	literal divide.
5B28	1F	DEFB	1Fh	sine.
5B29	04	DEFB	04h	multiply.
5B2A	3A	DEFB	3A	truncate.
5B2B	38	DEFB	38h	end calc.
5B2C	CDF12B	CALL	2BF1h	
5B2F	21365B	LD	HL,DOUT	
5B32	71	LD	(HL),C	pass result back
5B33	23	INC	HL	into the 2 byte
5B34	72	LD	(HL),D	area.
5B35	C9	RET		
FIRST: EQU 5B36				
DOUT: EQU 5B36				
LOOP: EQU 5B18				

Displayed text

David King explains how to write a titles program for video

As explained in Andrew Homer's article *Letters of Credit* (PCW, 15-21 September), time and money can be saved by using a computer connected to a video recorder to record captions or messages rather than adhesive lettering in front of a camera. Using a computer program can also make synchronisation with music particularly simple: the operator can listen to the chosen music and press a key on the appropriate beat, causing either a number of lines to reveal or the page to change.

The program in Listing 1 is well suited to this use. Starting with a blank screen, lines of data are shown whenever the space-bar is pressed. Looking at how the data is stored reveals at line 500 the number of complete pages in the sequence, which is read and used at lines 40 and 50. The following lines of data are read at line 80. Variables X and Y represent the horizontal and vertical position at which the lines of text stored in the variables *Words\$* will be printed. If *Pause\$* is "Y" then the display will pause until the space-bar is pressed; if *Pause\$* is "N" then the next line of that page will be printed. If *Double\$* is "Y" then that line will be printed at double height.

What does take time with a program like this is calculating the values of X and Y for

each line. This normally entails breaking into the program several times to alter the values. One way round this is to have a program that works out the values for you. This week we will look at two procedures that quickly make these calculations. Next week we will fit the programs into a master program which, after evaluating your inputs, creates and records a new program on to cassette or disc. The generated program will be the same as Listing 1, but with your own data recorded.

The cursor control keys with their clearly marked arrows are the obvious ones to use for positioning text on the screen, but they do not normally give a code when pressed that is recognisable to a Basic program waiting for an input. The inclusion of the command **FX 4,1* in the program will make the cursor keys give ASCII numbers: 138 for down, 139 for up.

The procedure in Listing 2 starts by positioning the cursor at *Tab(4,10)*, where we can see it clearly. Pressing the arrows for up and down either adds to or subtracts from the value of Y. If you try to go off-screen, the computer makes a noise (VDU 7). The computer ignores other pressed keys, except the <RETURN> key (ASCII value 13) which terminates the procedure.

Now the vertical position (variable Y) is finalised, the second procedure (Listing 3) calculates the value of X. All users have to do is type in whatever they want to see displayed. The procedure automatically prints the line in the centre of the screen, producing the rather entertaining effect of words growing out from the middle of the line as you type. The variable line indicates the number of the text line being created.

The variable max at line 490 should contain the maximum number of letters per line: this is 39 in mode 7 and 19 in mode 5. Although we are dealing with text, line 530 produces the ASCII number of the key pressed rather than a string. This is so that the procedure can detect the return key (13) or delete key (127) being pressed.

Line 560 copes with stripping *Words\$* of the last character when the DELETE key has been pressed. When appropriate, line 570 adds a character to *Words\$*. The line of text being processed is kept in the centre of the screen by lines 580 and 610.

We now have two procedures for positioning text: the end of the second procedure sets the reveal delay variable *Pause\$* for the line. Next week, we look at *PROC-saver*, how it creates and records the display program, and provide a listing of the whole of the master program. ■

David King
Computer Based Learning Centre
Dudley College of Technology
Dudley
West Midlands DY1 4AS

Listing 1

```
10 MODE 7
20 VDU23;11,0;0;0;0
30 PROCspace
40 READ P
50 FOR page=1 TO P
60 CLS
70 REPEAT
80 READ X,Y,words$,Pause$,Double$
90 IF X=90 THEN 120
100 IF Double$="Y" THEN PROCDBL(X,Y,words$)
ELSE PRINTTAB(X,Y);words$
110 IF Pause$="Y" THEN PROCspace
120 UNTIL X=90
130 PROCspace
140 NEXT page
150 CLS:PROCspace:VDU23;11,255;0;0;0
160 END
200 DEFPROCspace:*FX15,0
210 REPEAT UNTIL GET=32:ENDPROC
250 DEFPROCDBL(X,Y,words$)
260 PRINTTAB(X,Y)CHR$141;words$
270 PRINTTAB(X,Y+1)CHR$141;words$
280 ENDPROC
500 DATA 2:REM no. of pages
505 DATA 7,6,"TESTING TELETXT CAPTIONS",N,
N
510 DATA 11,10,"PROGRAM GENERATOR",Y,N
515 DATA 15,16,"PAGE ONE",N,Y
520 DATA 90,0,"0",N,N
525 DATA 15,5,"PAGE TWO",Y,N
530 DATA 17,10,"THE ",N,Y
535 DATA 17,14,"END ",N,Y
540 DATA 90,0,"End",N,N
595 REM DK DCT caption program
600 REM generator <C> dk 1983
```

Listing 2

```
390 DEFPROCpos_curs
400 X=4:Y=10:GOTO450
410 key_pressed=GET
420 IFkey_pressed=138THENY=Y+1:IFY>24THEN Y=24:VDU7
430 IFkey_pressed=139THEN Y=Y-1:IFY<1THEN Y=1:VDU7
440 IFkey_pressed=13 THEN460
450 PRINTTAB(X,Y);GOTO410
460 X(line)=X:Y(line)=Y
470 ENDPROC
```

Listing 3

```
490 DEFPROCline(max)
500 PRINTTAB(0,0) " ":PRINTSTRING$(38," ")
510 PRINTTAB(0,0)"Words then RETURN":len=0
520 *FX15,0
530 key_pressed=GET
540 IFkey_pressed=13 THEN 630
550 IF len>max AND key_pressed<>127 THEN VDU7:GOTO52
0
560 IF key_pressed=127 THEN words$(line)=LEFT$(words$(line),len-1):GOTO580
570 words$(line)=words$(line)+CHR$(key_pressed)
580 len=LEN(words$(line))
590 PRINTTAB(0,Y(line)) " ":PRINTSTRING$(39," ")
600 :
610 X(line)=(max DIV2)-(len DIV2):PRINTTAB(X(line),Y(line));words$(line)
620 GOTO530
630 PRINTTAB(0,0) " Delay (Y/N) " ":PRINTSTRING$(20," ")
640 key_pressed=GET$
650 IFkey_pressed<>"Y"AND key_pressed<>"N"THEN640
660 Pause$(line)=key_pressed$
670 ENDPROC
```


LOOK
FOR THE
'ULTIMATE' NAME
'ULTIMATE' GAMES

JET PAC for the 16/48K Spectrum.
JET PAC — The Ultimate Space game.
Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution colour visual graphics, the totally new addictive concept and those extra features you expect from the ULTIMATE GAME people.
Design: The ULTIMATE PLAY THE GAME Design Team.

'JET PAC'

PSSST for the 16/48K Spectrum.
PSSST — Go grow yourself a real game.
Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution colour visual graphics, the totally new addictive concept and all those extra features you expect from the ULTIMATE GAME people.
Design: The ULTIMATE PLAY THE GAME Design Team.

'COOKIE'

COOKIE for the 16/48K Spectrum.
COOKIE — Charlie Chef and the Ingredients vs Bin Monster and the Nasties.
Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution colour visual graphics, the totally new addictive concept and all those extra features you expect from the ULTIMATE GAME people.
Design: The ULTIMATE PLAY THE GAME Design Team.

'PSSST'

Dealership enquiries welcome, phone (0530) 411485.

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

Please send me the following

☐ JET PAC

☐ TRANZ AM

☐ PSSST

☐ COOKIE

I enclose cheque/PO for £

Name

Address

'TRANZ AM'

TRANZ AM for the 16/48K Spectrum.
TRANZ AM — The high speed real time rough driving pursuit race across America.
Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution colour visual graphics, the totally new addictive concept and all those extra features you expect from the ULTIMATE GAME people.
Design: The ULTIMATE PLAY THE GAME Design Team.

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

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

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

THE FABULOUS CASSETTE

50

FROM **cascade**

50 GAMES ON ONE GREAT CASSETTE

**ONLY
£9.95**

DON'T MISS THIS
INCREDIBLE OFFER

50 FANTASTIC
GAMES ON
ONE CASSETTE

ONLY £9.95 (INC P&P and VAT)



EXPRESS DELIVERY - ORDER NOW

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

Name

Address

Post Code

Country

Dealers & Stockists enquiries welcome.

Please send me (tick appropriate box)

Spectrum ☐ VIC ☐



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

CHOOSING A HOME MICRO

WARNING

Choosing a home micro can be a daunting task to the newcomer, and with an ever increasing number of micros emerging on the market, even up-grading, say, from a ZX81 can be a risky and expensive exercise if the wrong decision is made. It is important to look at the real facts and specifications, and check exactly what you get for your money before choosing your micro-computer system.

THE PITFALLS

"DON'T LET THE ADD ONS ADD UP"

A number of large companies are offering packages that seem to be good value and low cost. These offers usually have a hidden sting inasmuch as the essential accessories such as connection leads, peripherals and software often carry very high cost premiums. e.g. software for low cost hardware usually costs between £29 and £49 for a ROM cartridge!!

CHECK THE QUALITY OF THE PRODUCT.

Raw materials are now an area where corners can be cut, and shoddy workmanship during 'building' can effect the 'up-time' of your unit. Areas to watch out for are unreliable edge connectors, corrosion and poor quality P.C.B.s. Low quality components and bad design will seriously effect the reliability of the end product, and can lead to false economy.

DON'T BUY A GAMES MACHINE

Unless you want just games and nothing else! With a games computer you are limited. Some computers, however, have the advantage of both games facility plus the whole world of computing to explore, as your interest and skills develop. A real computer system will allow you to expand your knowledge of the Hi-Technology world, and help earn its keep with its added uses in the field of education, communication and home business use.

SOFTWARE

Make sure the system you choose has a growing library of support software, to enable you to realize the full potential of your machine.

KEY POINTS TO LOOK FOR

● High Resolution Colour

In general most home computers have a poor graphics resolution (or detail). Check on the vertical and horizontal resolution in graphic mode and multiply the two numbers together. If the result is less than 35,000, then the graphics can hardly be considered high resolution. Without high resolution graphics displays such as those used in games tend to be "Chunky" in appearance.

● High Quality Sound

Some computers claim to provide a sound channel when in reality all that can be found inside the computer is a small buzzer controlled by electronic pulses. At the very least a sound facility should provide more than one channel and a raise channel as well (for gun shot effects in games for example). The best systems also provide envelope control of the sound channels to produce very sophisticated effects; very important for generating music. Also look for the ability to connect to external amplifiers.

● Keyboard

For accurate entry of programs and data into a computer it is important that the keyboard has a good tactile feel in operation. Coupled with acoustic feedback the user is fully aware when the computer has accepted his/her actions. Also of importance in a keyboard is layout. A standard computer keyboard layout will familiarise the user with the vast majority of computers used in the world of business and professional applications; very important if the purpose of purchasing a computer is educational.

● RAM

One of the most important features of a computer is the amount of RAM, or memory, included. In general the more powerful and exciting a computer program is the more RAM it requires. But take care, all computers are advertised quoting the total RAM used in the system. Computers use up a great deal of their own RAM for storing essential data and particularly in supporting the graphics display and the CPU. If it is less than 32K think again. Is it enough?

● Computer Language

It is too difficult to program a computer in its own binary language so high level languages are used, the most popular being BASIC. However, there are a number of BASICs, some being very different from the rest. A de facto standard in the computer industry is Microsoft BASIC. Learn this one and you will be able to program in the majority of computer BASICs; such an important point if a home computer is to be used to educate your children to face the technology of the future.

● Expansion

As your interest and knowledge of computing grows, you will need a



Choosing the right system carefully will save you from throwing your money away. Check full specification, plus peripherals and software prices, before you buy. Preferably choose a Real computer system that can expand to meet your needs.

computer system that will grow with you; able to accommodate Printers, Disk-drives, Joysticks, Communications Modem, and Colour Monitor, as well as produce HI-FI sound effects.

● Software

The computer you choose should have a growing selection of utility

software to make the most of its capability.

Remember, computing is here to stay. You can't learn to compute on a toy, or a device which does not behave like a real computer. In short, look out for a computer which offers all the points above, and you will be sure of getting the best value for money.

To find out which company offers you the right choice, with:-

- Good value, high specification, quality micros.
- A quality, 4 colour, plain paper printer/plotter.
- Communications Modem.
- Micro Disk Drives.
- Comprehensive and growing range of software

TURNOVER... →

ORIC-1



The Growing System

ORIC 3" MICRO FLOPPY DISK DRIVE

Coming soon the incredible new 3" Oric Micro Drives. Small size, Compact, High precision disks with storage capabilities from 100K Bytes to in excess of 1 Megabyte unformatted. With their own built-in power supply, these easy to use units will add big system capability to your home micro.

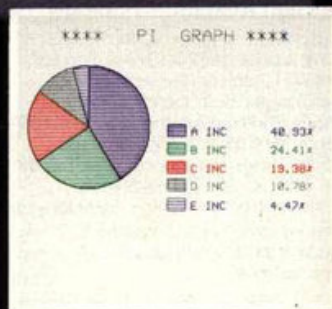


ORIC MCP 40 COLOUR PRINTER/PLOTTER

The Oric Colour Printer is quality engineered to provide 4 colour hard copy on plain paper, with superb graphics and text capability, printing either 40 columns or 80 columns. It prints in red, green, black and blue, onto a 4½" width standard paper roll. With a print speed of 12 characters a second, the MCP 40 comes with its own power supply and all necessary leads to connect straight into your Oric or to any standard Centronics interface.



This superb printer represents excellent value at just **£169.95 including VAT.**



The right choice for real computing

ORIC-1

Before making your final choice, check any other home micro in the same price bracket, against the incredible specification of the ORIC-1.

● Quality of build and materials		● Real computer keyboard layout and moving keys	
● Superb styling / Full colour display		● High Resolution colour graphics 240 x 200 pixels	
● Choice of 16K or 48K RAM		● Real computer language programming – Basic / Forth	
● Latest design technology and circuitry		● Teletext/Viewdata compatible graphics (28 rows x 40 characters)	
● Real sound – 8 octaves plus Hi-Fi output		● Cassette Port & R.G.B. output.	
● Centronics printer interface		● Fully supported and growing software library	
● Colour printer / Disk Drives		● A fully expandable system for home, education & small business use	
● Communications Modem		● Full range of peripherals to support your system...	

ORIC-1 Setting today's standard in Quality and Price.

ORIC-1 48K £139.95 inc. VAT **ORIC-1 16K £99.95 inc. VAT**

All ORIC computers purchased before 31st December 1983 come with a £40 voucher off the M.R.P. of the MCP 40 Colour Printer.

MCP 40 COLOUR PRINTER £169.95.
OFFER PRICE £129.95

TANSOFT ORIC Software

The fast growing success of ORIC-1 means that an incredible number of software titles are becoming available for your Oric. With many well known titles from independent software houses, plus exclusive ORIC SOFTWARE from TANSOFT, you can now drive your Oric towards its full potential. Below is a small selection from Tansoft's range, all of which offer superb value.

BUSINESS

ORIC BASE, ORIC CALC, AUTHOR.

MACHINE LANGUAGES

FORTH, ORIC MON.

COMPUTER GAMES

ZODIAC, HOUSE OF DEATH, ORIC MUNCH, SUPER BREAKOUT, ULTIMA ZONE, DEFENCE FORCE.

TOURING LANGUAGES

GERMAN, SPANISH, ITALIAN, FRENCH.

GENERAL INTEREST

ORIC CHESS, MULTIGAMES 1, MULTIGAMES 2, ORIC CAD, THE NOWOTNIK PUZZLE.

TANSOFT ORIC SOFTWARE available from your ORIC supplier and all good software dealers. For full list of further information contact:-

NEWS FLASH
LATEST RELEASE
THE HOBBIT



TANSOFT LIMITED – 3 CLUB MEWS, ELY, CAMBS CB7 4NW TEL (0353) 2271/2/3/4



PRESTEL NLX 2000

offers the most speed under the Spect

"Prestel and the Prestel symbol are trademarks of British Telecommunications.
*Subscribers are responsible for quarterly Micronet 800 and Prestel subscription charges.

Micronet 800. The spectacular service that gives micro-users access to a huge database of information, hundreds of software programs, and communication with other users.

Sinclair ZX Spectrum. The home computer that's out-shone all its rivals.

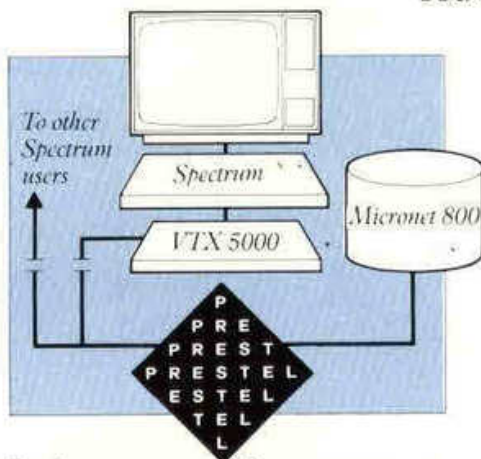
Bring the two together and it's a combination that opens up a breathtaking new world of microcomputing possibilities.

Suitable for either the 16K or 48K versions, the Prism VTX 5000 modem was designed specifically for the Spectrum and fits neatly under the micro.

Plug the other end into the outside world via your telephone and your system will give you more than you ever dreamed possible.

Micronet 800 is fun, friendly and inexpensive to run. Choose from hundreds of free games, download and use them on your Spectrum whenever you like, play on-screen games (as easy – and inexpensive – as a local phone call), and compete in Big Prize games and quizzes. There's also a range of downloadable games you can buy for less than over-the-counter prices.

Learn through up-to-date education packages, and help run the household with simple business packages.



And if you need fast facts about the world of computers, Micronet 800 provides constantly up-dated product comparisons, reviews, prices, dealership and 'best-buy' information – 24-hours a day, 7-days a week.

You can also access the full range of PrestelTM information covering news, travel, holidays and entertainment, together with an electronic booking service.

Keep in touch – you can send electronic mail to any other Micronet 800 or Prestel user.

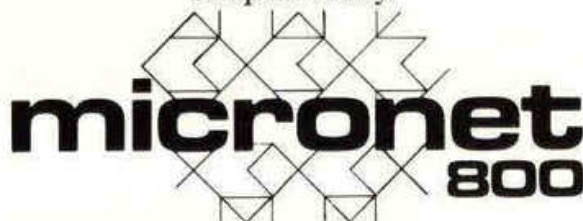
The VTX 5000 provides a full Prestel screen with graphics, and an off-line message composition facility for speedy transmission when you go on-line.

You can use the Sinclair printer to print frames and messages, or save them on tape for future use.

All this – and even more as the service grows – retails at the low price of £99.95 inc VAT.

Plus, as a special offer to early users, we will provide you with a jack-socket installation (should you need one) completely free of charge.

So don't delay – send the coupon today.



Micronet 800.... Spectacular add-on Spectrum.

<input type="checkbox"/> Please send me a complete Micronet 800 information pack containing details of Micronet 800 and the VTX 5000, and including a Micronet subscriber's application form.		POC 10
<input type="checkbox"/> Please send me (No.) VTX 5000 modem(s) at £74.95 each inc. VAT:		
<input type="checkbox"/> I enclose a cheque made payable to Telemap Ltd. for £		
<input type="checkbox"/> I wish to pay by credit card: Visa, Access, Diners Club, American Express. (Delete as applicable) Amount £		
My credit card No. is	Signed	
Name	Address	Tel:

One of the many faces on Prestel Micronet 800, Scriptor Court, 155 Farringdon Road, London EC1R 3AD. Tel: 01-278 3143.



Original and Challenging Games from...

BEYOND

CHALLENGING SOFTWARE

UP PERISCOPE

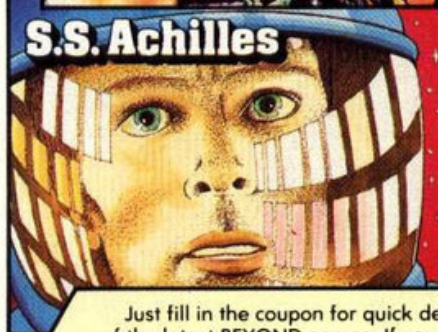
These games will be available in leading retail outlets, or by mail order.



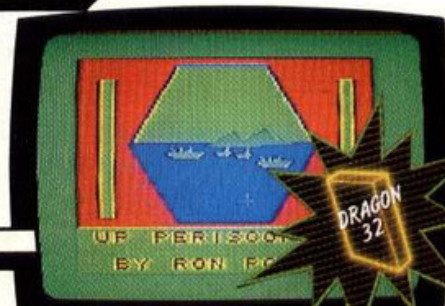
GOODNESS GRACIOUS



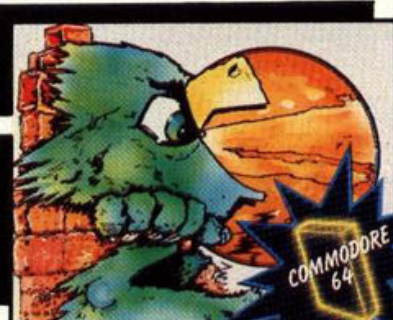
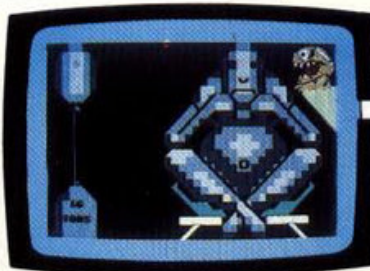
S.S. Achilles



IT'S A HIT

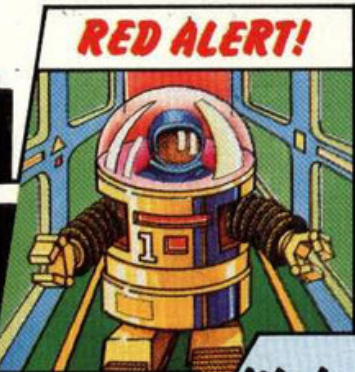


DEPTH CHARGE!



COMMODORE 64

RED ALERT!



ATARI 400/800 with 48 K

Just fill in the coupon for quick delivery of the latest BEYOND games. If you have any problem in getting hold of a BEYOND game, please phone: **BEYOND** — (0858) 34567

It's indestructible!

PLEASE SEND ME

TITLE	£	QUANTITY	TOTAL
UP PERISCOPE	£6.95		
GOODNESS GRACIOUS	£6.95		
S.S. ACHILLES	£19.95		

Send this coupon in a sealed envelope to ...

TOTAL £

I enclose a Postal Order/Cheque payable to BEYOND, OR charge my credit card.

Card Number _____

Visa/Access (Delete as necessary)

Name _____

Address _____

Postcode _____

Signature _____

PCW 10

BEYOND Competition House, Farndon Road, MARKET HARBOROUGH Leicestershire LE19 9NR.

TURN YOUR PROGRAMME UPSIDE DOWN

Now you can add another dimension to your games.
Swap direction, swap functions, confuse your friends.
In fact you can add almost any twist to your games with
Stonechip's Programmable Joystick Interface.

You can also listen to them
with Stonechip's Echo Amplifier.



Programmable Joystick Interface. This also enables any Spectrum software to be used with a joystick, irrespective of which keyboard keys have been chosen for function.

Programming is easy using only a single switch. Switch one way to program and another way to play. No tapes to load or links to worry about — all programming is achieved by hardware. Used with Atari-compatible joysticks. Simply plugs into rear expansion port of ZX-Spectrum. No other connections to make, no additional power supply required.



Echo Amplifier. How would you like to listen to the sound output from your ZX-Spectrum without ear strain? The Stonechip Echo amplifier can do this for you as well as easing the tedium of saving or loading of tapes and enlarging the range of tape recorder compatibility with the computer. The amplifier has volume control over a range adequate for most uses, and a tone control for harsh or mellow sounds. A switched interface removes the need to swap leads during 'SAVE'ing or 'LOAD'ing. Leads are left connected all the time and the desired function is selected on the three position switch by the user. Use of the 'CUE' facility enables an audio cue to precede the program being 'SAVE'd' on tape, a decided advantage when searching through a multi-program tape. The Echo simply plugs into the Ear, Mic and Power sockets of the computer and does not require an additional power supply. The expansion port at the rear of the computer is left free for use with other peripherals and the unit is housed in an attractive case custom designed to complement the ZX-Spectrum.

**STONECHIP
ELECTRONICS**

Stonechip Ltd, Brook Trading Estate Deadbrook Lane Aldershot Hants. GU12 4XB. Tel (0252) 318260

13-19 OCTOBER 1983

To: Stonechip Electronics, Unit 9, The Brook Industrial Estate, Deadbrook Lane, Aldershot, Hants.
Telephone: (0252) 318260.

Please forward me the following products:

All prices are inclusive of VAT, Post & Packing for U.K. deliveries (overseas add 15%).

Name: _____ Address: _____

DEALER ENQUIRIES WELCOME
Delivery approx. 14 days



Mathematical quiz

Les Allan presents a program to test your mathematical skills — Little Professor

Little Professor for the Commodore 64 uses the hi-res screen to draw the face of a 'professor' and text for the questions on arithmetic.

The menu at the start of the test allows the 'pupil' a choice of 10 questions from one of the four functions and nine skill levels available. Three attempts are allowed at each of the 10 questions — the correct answer is given should the 'pupil' still fail to answer correctly.

Upon completion of all 10 questions, the menu gives the following options:

F1..... further test on same function
F7..... change function and/or skill level
F8..... selects cold start

In selecting F1, the skill level is increased up to a maximum of 25 for each time 10 correct answers have been made.

Answers should be made to each question in the same manner as the 'pupil' would enter them into text books. These are from right to left and as 'units', 'tens', 'hundreds' etc. Should an incorrect entry be made, the number can be deleted by pressing the *Del* key — the sum is entered with the *Return* key.

The choice of a hi-res screen was made so as to provide some initial interest in watching the make up of the face; it also allows ease of controlling the size of the character set and makes a more presentable program. Text commands are repeated, so as to allow the information to be written and then erased. A simple screen clear would entail redrawing the original face again.

As the level of difficulty increases, the location of the question is moved to the right by one pixel for each skill level. Also, it is only possible to enter as many digits as there are numbers in the correct answer.

The *Run/Stop* and *Restore* keys are disabled during the program in order to prevent accidental stoppage of the completed program — it takes several minutes to fully set up the initial screen. I strongly recommend that *Poke 808,225* be omitted from line 16 until the program is fully working and saved. However, during the operation of the program, selection of F8 after 10 questions have been answered will enable a break to be made. This will of course reset the computer, but 'olding' prior to a new line number being entered will retain the original listing. You have been warned!

Notes

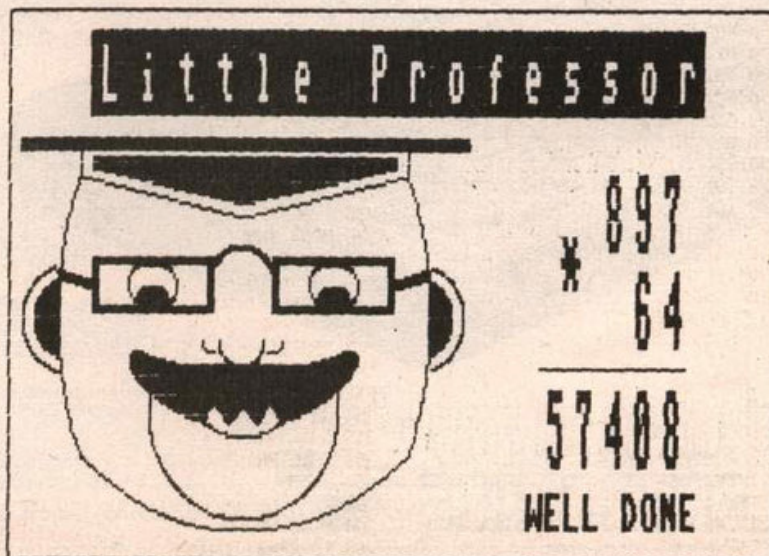
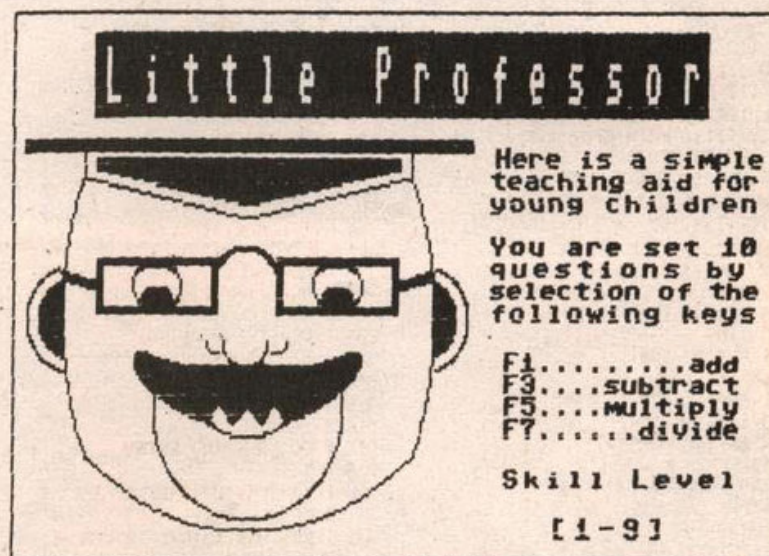
16 clear screen: disable run/stop and restore keys: clear variables
18 selects hi-res screen, colour cyan with blue plotting colour
20-74 draws picture of 'professor'
80-104 introduction text
112-124 select required function
130-150 select skill level

156-172 select random questions
174 checks number of questions answered
176 calculates number of digits in answer
182-190 print X
196-202 print Y
204 print function
206 draw line to length of maximum number
208 check to see if screen is being cleared
210 clear keyboard buffer
216-232 keyboard entry
220 deletes last number entered
222 executes sum of entered answer
228 checks length of keyboard entry against answer
230 print keyboard entry
238-244 calculate answer and check if correct
246-254 print 'WELL DONE' for 2 sec.
256-258 update number of correct answers: clear screen
264-274 print 'WRONG TRY AGAIN' for 1 sec.
276-278 update number of wrong attempts: retry if less than 3
280-290 print correct answer if number of attempts is greater than 3 for 1 sec.
292 clear screen
298-320 print result of 10 questions for 5 sec.
324 increase skill level if all 10 correct
326 reset variables

328-342 print menu at end of each 10 questions.
360-366 perform outcome of menu
372-378 delete character routine

Variables

K number of entries
P function key pressed
X initial value of QX
Y initial value of QY
AN initial value of XT
CA number correct answers
CC counter in printing result
CP initial value of CA
CS clear screen
LL length of line used during printing of question
OP poke code for function required
QA number of questions answered
QT initial value of XT
QX random value for first part of question
QY random value for second part of question
RP repeat an operation
SK range of random numbers from O-SK
SL skill level value
SU SUM of question by 'pupil'
VR variable used in multiplication and division
WR number of wrong numbers
XX counter in printing QX
XT answer to question set
YY counter in printing QY
C1 LSB of CP
X1 LSB of X
X2 LSB of QT
X3 counter in printing correct answer
K\$ keyboard entry
SL\$ skill level entry
N(K) used in printing keyboard entry



COMMODORE 64

```

10 :
12 REM **** CLEAR SCREEN & DISABLE
   RUN/STOP RESTORE KEYS ****
14 :
16 PRINTCHR$(147):POKE808,225:CLR
18 HIRE86,3:COLOUR3,3
20 REC0,0,319,199,1
22 TEXT38,13,"LITTLE PROFESSOR"
   ,2,3,16
24 BLOCK34,8,288,38,2:BLOCK5,
   47,191,51,1
26 LINE30,51,30,61,1:LINE166,51,
   166,61,1:LINE30,61,98,75,1
   :LINE166,61,98,75,1
28 LINE35,54,35,58,1:LINE161,54,
   161,58,1:LINE35,58,98,70,1:LINE
   161,58,98,70,1
30 LINE35,54,161,54,1:PAINT40,56,1
32 ARC26,111,70,110,1,150,150,
   1:ARC98,89,137,223,1,100,100,1
34 ARC170,111,250,290,1,150,150,1
36 BLOCK35,90,85,110,1,1
   BLOCK38,93,82,107,2
38 BLOCK110,90,160,110,1
   :BLOCK113,93,157,107,2
40 LINE20,95,34,98,1:LINE20,98,
   34,101,1:PAINT22,97,1
42 LINE175,95,161,98,1:LINE175,98,
   161,101,1:PAINT174,96,1
44 ARC97,100,270,90,1,15,15,1:ARC97,
   100,270,90,1,14,14,1
46 CIRCLE60,100,11,8,1:CIRCLE60,100,
   11,9,1:CIRCLE60,105,7,5,1
   :PAINT60,105,1
48 CIRCLE135,100,11,8,1:CIRCLE135,
   100,11,9,1:CIRCLE135,105,7,5,1
   :PAINT135,105,1
50 ARC25,112,190,342,1,20,20,1:
   ARC170,112,20,160,1,20,20,1
52 ARC25,112,200,342,1,15,15,1:
   ARC170,112,20,160,1,15,15,1
54 PAINT20,111,1:PAINT176,111,1
56 ARC97,120,90,270,1,10,10,1
58 ARC85,120,160,270,1,5,5,1:
   ARC110,120,90,210,1,5,5,1
60 ARC80,70,160,205,1,60,60,1:ARC90,
   100,190,233,1,50,50,1
62 ARC115,70,155,192,1,60,60,1
   :ARC105,100,125,170,1,50,50,1
64 LINE86,143,92,150,1:LINE109,
   143,104,150,1
66 LINE86,143,82,148,1:LINE109,
   143,113,148,1
68 LINE90,144,92,150,1:
   LINE98,144,104,150,1
70 ARC54,127,240,45,1,4,4,1
   :ARC142,127,340,110,1,4,4,1
72 ARC98,145,80,280,1,40,40,1
   :ARC98,125,140,220,1,30,30,1
74 PAINT98,140,1
76 :
78 :
80 PROC INTRODUCTION
82 FORRP=0T01
84 TEXT200,50,"HERE IS A SIMPLE",2,1,7
86 TEXT198,58,"TEACHING AID FOR",2,1,7
88 TEXT198,66,"YOUNG CHILDREN",2,1,8
90 TEXT198,82,"YOU ARE SET 10",2,1,8
92 TEXT198,90,"QUESTIONS BY",2,1,9
94 TEXT198,98,"SELECTION OF THE",2,1,7
96 TEXT198,106,"FOLLOWING KEYS",2,1,8
98 TEXT204,124,"F1.....ADD",2,1,7
100 TEXT204,132,"F3.....SUBTRACT",2,1,7
102 TEXT204,140,"F5.....MULTIPLY",2,1,7
104 TEXT204,148,"F7.....DIVIDE",2,1,7
106 IFRP=1THENCALL PRINT SKILL LEVEL
108 :
110 :
112 PROC OPERATOR
114 P=INKEY
116 IFCP=1ANDP<3ANDP<7THENCALL OPERATOR
118 IFP=1THENOP=43
120 IFP=3THENOP=45
122 IFP=5THENOP=42
124 IFP=7THENOP=47

126 :
128 :
130 PROC PRINT SKILL LEVEL
132 TEXT204,166,"SKILL LEVEL",2,1,9
134 TEXT224,184,"[1-9]",2,1,10
136 IFRP=1THENRP=0:CALL RANDOM NUMBERS
138 POKE198,0
140 :
142 :
144 PROC SKILL LEVEL
146 GETSL$:SL=VAL(SL$)
148 IFSL$=""ORSL$<"1"ORSL$>
   "9"THENCALL SKILL LEVEL
150 NEXT
152 :
154 :
156 PROC RANDOM NUMBERS
158 IFOP=43OROP=45THENVR=1:ELSE:VR=SL
160 SK=10*SQR(SL)
162 QX=INT(RND(1)*SK)
164 QY=INT(RND(1)*SK/VR)+1
166 IFOP=42THENTX=QX*QY
168 IFOP=43THENTX=QX*QY
170 IFOP=45THENTX=QX-QY:IFXT
   <0THENCALL RANDOM NUMBERS
172 IFOP=47THENTX=INT(QX/QY):QX=QY*XT
174 QA=QA+1:IFQA>10THENCALL FINISH
176 LL=0:AN=XT:REPEAT:
   AN=INT(AN/10):LL=LL+1:UNTILAN=0
178 :
180 :
182 PROC PRINT 'X'
184 K=0:WR=0
186 X=QX:REPEAT
188 X1=X-(INT(X/10)*10)
   :X=(X-X1)/10:XX=XX+1
190 CHAR275+SL-XX*12,60,
   48+X1,2,4:UNTILX=0
192 :
194 :
196 PROC PRINT Y
198 Y=QY:REPEAT
200 Y1=Y-(INT(Y/10)*10):Y=(Y-Y1)
   /10:YY=YY+1:IFXX<YYTHENXX=YY
202 CHAR275+SL-YY*12,95,
   48+Y1,2,4:UNTILY=0
204 CHAR257+SL-XX*12,78,OP,2,4:IFXX<LL
   THENXX=LL
206 LINE272+SL,130,272+SL-XX*12,130,
   2:XX=0:YY=0
208 IFCS=1THENCN=0:CALL
   RANDOM NUMBERS
210 POKE198,0
212 :
214 :
216 PROC KEYBOARD ENTRY
218 GETK$
220 IFK$=CHR$(20)ANDK<0THENEXEC
   DELETE NUMBER
222 IFK$=CHR$(13)ANDK<0THENCALL
   SUM
224 IFK$=""ORK$<"0"ORK$>"9"THENCALL
   KEYBOARD ENTRY
226 K=K+1
228 IFK<LL+1THENN(K)=VAL(K$)
   :ELSE:K=K-1:CALL SUM
230 CHAR275+SL-K*12,138,
   48+N(K),2,4
232 CALL KEYBOARD ENTRY
234 :
236 :
238 PROC SUM
240 SUM=0
242 FORS=0TOK-1:SUM=SUM+10*SN(S+1):NEXT
244 IFABS(XT-SUM)>.5THENCALL WRONG
246 FORRP=0T01
248 TEXT215,175,"WELL DONE",2,2,8
250 PAUSE2-RP*2:NEXT
252 REPEAT:EXEC DELETE NUMBER
254 UNTILK=0
256 CA=CA+1:CS=1
258 CALL PRINT X
260 :
262 :
264 PROC WRONG
266 FORRP=0T01

268 TEXT175,175,"WRONG TRY AGAIN",2,2,8
270 PAUSE1-RP:NEXT
272 REPEAT:EXEC DELETE
274 UNTILK=0
276 WR=WR+1
278 IFCR<3THENCALL KEYBOARD ENTRY
280 FORRP=0T01
282 TEXT180,175,"CORRECT ANSWER",2,2,8
284 QT=XT:REPEAT
286 X2=QT-(INT(QT/10)*10):QT=
   (QT-X2)/10:X3=X3+1
288 CHAR275+SL-X3*12,138,48+X2,2,4
   :UNTILQT=0
290 PAUSE1-RP:X3=0:NEXT
292 CS=1:CALL PRINT X
294 :
296 :
298 PROC FINISH
300 FORRP=0T01
302 IFCR<6THENTEXT175,175,"NOT VERY
   GOOD !!",2,2,8
304 IFCR<5ANDCA<10THENTEXT175,175,"A
   VERY GOOD TRY",2,2,8
306 IFCR=10THENTEXT172,175,"EXCELLENT
   RESULT",2,2,8
308 IFCR<10THENOS=6:ELSE:OS=0
310 CP=CA:REPEAT
312 C1=CP-(INT(CP/10)*10):
   CP=(CP-C1)/10:CC=CC+1
314 CHAR265-CC*12-OS,65,48+C1,
   2,4:UNTILCP=0
316 TEXT241,118,"10",2,4,12
318 LINE239,105,263,105,2
320 PAUSE5-5*RP
322 CC=0:NEXT
324 IFCR=10ANDSL<26THENSL=SL+1
326 CA=0:QA=0
328 FORRP=0T01
330 TEXT192,72,"YOU HAVE ANSWERED",2,1,7
332 TEXT192,80,"ALL TEN QUESTIONS",2,1,7
334 TEXT195,104,"PRESS THE
   FOLLOWING",2,1,6
336 TEXT195,112,"KEYS TO CONTINUE",2,1,7
338 TEXT205,136,"[F1]....SAME",2,1,8
340 TEXT205,148,"[F7]..CHANGE",2,1,8
342 TEXT205,160,"[F8]....QUIT",2,1,8
344 IFRP=1THENCALL START
346 :
348 :
350 PROC RE-START
352 P=INKEY:IFP<1ANDP<7ANDP<8THENCALL
   RE-START
354 NEXT
356 :
358 :
360 PROC START
362 IFP=1THENCALL RANDOM NUMBERS
364 IFP=7THENCALL INTRODUCTION
366 IFP=8THENNRM:COLD
368 :
370 :
372 PROC DELETE NUMBER
374 CHAR275+SL-K*12,138,48+N(K),2,4
376 K=K-1
378 END PROC
380 :
382 :
384 :
386 :
388 REM *****
390 REM *****
392 REM *****
394 REM ***** LITTLE PROFESSOR *****
396 REM *****
398 REM ***** SIMON'S BASIC *****
400 REM *****
402 REM ***** COMMODORE 64 *****
404 REM *****
406 REM ***** LES ALLAN *****
408 REM *****
410 REM ***** 9TH SEPTEMBER 83 *****
412 REM *****
414 REM *****
416 REM *****

READY.

```


At last... A joystick that works!

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

The
intelligent
Joystick

£29⁹⁰

JOYSTICK, INTERFACE
AND TAPE COMPLETE

Interface

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



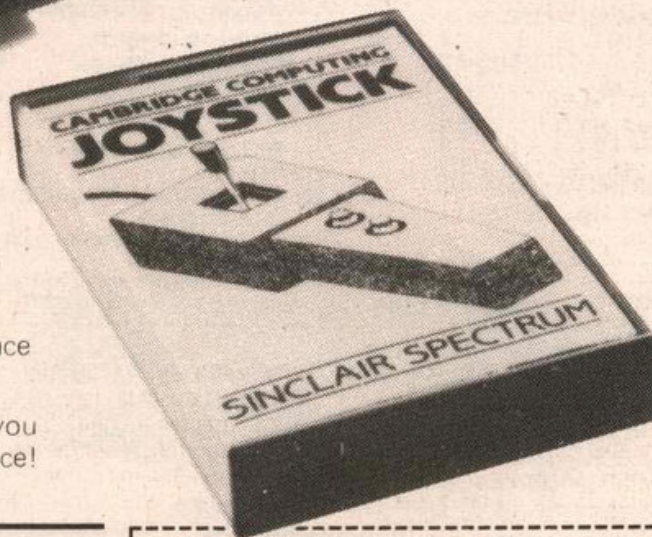
Joystick

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



Tape

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



CAMBRIDGE COMPUTING

1 Benson Street, Cambridge CB4 3QJ
Telephone 0223 322905

Please send me:-

Joystick, Interface and Tape at £29.90

Interface and Tape at £24.00

Joystick only at £7.00

For Spectrum

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

*delete as necessary.

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.

Hangman

on Dragon 32

Although only twenty words have been included to demonstrate the programme,

words may be added by changing the 10 in lines 10, 20 and 100 to the number of words in the data lines from 2000 onwards. To aid the younger players the alphabet is displayed and the letters are deleted as guessed.

Program notes

Lines	
10-30 and	
2000-	Set up dictionary.
100-200	Select word and set up screen.
300-340	Input letter and check if already used.
350-360	Clear letter from alphabet display.
390-460	Check for letter in word and check if word complete.
500-1020	Letter incorrect, draw next part of hangman.

```

10 DIM D$(10)
20 RESTORE FOR D=1 TO 10
30 READ D$(D):NEXT D
100 N=RND(10):M=0:F=0:B$=""
110 A$=D$(N)
120 CLS6
130 PRINT@12,"hangman";
140 FOR N=65 TO 90
150 PRINT@N-30,CHR$(N);
160 NEXT N
170 L=LEN(A$)
180 PRINT@366,STRING$(L,45);
190 PRINT@416:PRINT@448,
"      GUESS A LETTER"
200 FOR P=1504 TO 1535:P
OKE P,143:NEXT P
300 G$=INKEY$:IF G$="" G
OTO 300
310 IF G$<"A" OR G$>"Z"
THEN 300
320 Z=INSTR(1,B$,G$)
330 B$=B$+G$
340 IF Z<>0 GOTO 300
350 N=ASC(G$)
360 PRINT@N-30,CHR$(143)
;
370 X1=1:C=0
380 X=INSTR(X1,A$,G$)
390 IF X=0 GOTO 450
400 SOUND200,1
410 PRINT@365+X,G$;
420 X1=X+1

```

```

430 C=1:M=M+1
440 GOTO 380
450 IF C=0 GOTO 500
460 IF M=L THEN 1080 ELS
E 300
500 SOUND1,1
510 F=F+1
520 ON F GOTO 600,650,70
0,750,800,850,900,950,1
000
600 PRINT@389,STRING$(7,
175);
610 FOR P=360 TO 45 STEP
-32
620 PRINT@P,CHR$(175);
630 NEXT P:GOTO 300
650 FOR P=169 TO 107 STE
P -31
660 PRINT@P,CHR$(175);:N
EXT P
670 FORP=73 TO 82
680 PRINT@P,CHR$(175);
690 NEXT P:GOTO 300
700 PRINT@114,CHR$(218);
710 GOTO 300
750 PRINT@146,CHR$(128)+
CHR$(213);
760 GOTO 300
800 PRINT@178,CHR$(218);
810 PRINT@210,CHR$(218);
820 PRINT@242,CHR$(219);
830 GOTO 300
850 PRINT@177,CHR$(220)+

```

```

CHR$(216)+CHR$(220)+CHR
$(221);
860 GOTO300
900 PRINT@209,CHR$(213);
910 PRINT@212,CHR$(213);
920 GOTO 300
950 PRINT@241,CHR$(222)+
CHR$(216)+CHR$(220);
960 GOTO 300
1000 PRINT@273,CHR$(218)
;PRINT@275,CHR$(218);
1010 PRINT@305,CHR$(218)
;PRINT@307,CHR$(218);
1020 PRINT@416,"I WON MY
WORD IS ";A$:PRINT
1030 FOR I=1 TO 5000:NEX
T I
1040 PRINT@416,"DO YOU W
ANT ANOTHER GAME (Y/N)
1050 Q$=INKEY$:IF Q$=""
GOTO1050
1060 IF Q$="Y" GOTO 100
1070 END
1080 PRINT@422,"YOU WON
THAT GAME":PRINT
1090 FOR I=1 TO 2000:NEX
T I
1100 GOTO1040
2000 DATA ABRUPT,CASSETT
E,PROFILE,COMPARE,GRAVI
TY
2010 DATA MODIFY,DIVERSI
ON,THOUGHT,GRAPHIC,CONJ
URE

```

Hangman
by Brian Beesley

Pounds

on BBC Micro

This small program is for those people who own a BBC Micro and a Tandy CGP-115

Colour Graphic Printer, and who need an adequate pound sign without resorting to a special graphic routine.

The important features are as follows:
Line 10 enables the printer.
Line 30 prints a left square bracket, back-

spaces, prints an equal sign, back-spaces again and finally, underlines.

The rest is for the lucky pools winner or dreamer only!

The final effect is a quite convincing pound sign.

LIST

```

10 VDU2
20 PRINT""ONE MILLION POUNDS""
30 VDU1,91,08,61,08,95
40 PRINT"1,000,000.00p"
50 VDU3

```

RUN

```

"ONE MILLION POUNDS"
£1,000,000.00p

```

Pounds
by M J New

City Bomber

on Oric

This program was developed from an original version of the Vic20. The object of the game is to destroy the buildings before you are destroyed.

Every time you succeed in landing, a flag will be displayed at the bottom of the screen. Additional points can be accrued by using as few bombs as possible.

There is a high score facility as well as full colour and sound effects.

Variables

H Height of plane

X Horizontal position of plane
Y Vertical position
B Set whilst bomb drops
S,V Horizontal fix, Vertical fix of bomb.

Pokes

BC49,0 Sets foreground colour to black
BC99,7 Sets foreground colour to white
B7E0-B7E7 Stores graphic characters

PROGRAM OF THE WEEK

```

0 CLS:RESTORE:GOSUB1500
10 REM #####
20 REM ##
30 REM ## CITY BOMBER ##
40 REM ##
50 REM ## By P.M.Stracey ##
60 REM ##
70 REM #####
80 FORY=HTO20:FORX=1TO34:PLOTX,Y," J"
90 IFSCRN(X+2,Y) < 32THENSOUND1,1,0:PLAY4,
  5,1,2000:GOTO 110
100 GOTO 120
110 FORE=YTO20:PLOTX+1,E," ":PLOTX+1,E,"^
  :PLOTX+1,E-1," ":NEXT:WAIT2:GOTO1000
120 IFB=1THENGOSUBBOMBS:GOTO150
130 IFB=2THENGOSUB610:GOTO150
140 S=Y+1:V=X:K$=KEY$:WAIT7:IFK$ < ">"THEN
  PLAY1,0,7,0:CO=CO+1:GOSUB BOMBS
150 IFY=20ANDX=32 THENGOSUB LA
160 PLOTX,Y," ":NEXT X,Y
500 REM #####
510 REM ## ---BOMBS--- ##
520 REM #####
530 B=1:S=S+1:IFS)24THENB=0:RETURN
540 S1=(S*2)+.90:SOUND1,S1,5
550 PLOTV,S," ":PLOTV,S-1," "
560 IFSCRN(V,S+1)=127THENB=0:PLOTV,S," "
  :PLAY0,0,0,0:RETURN
570 IFSCRN(V,S+1) < 32THENPLAY4,3,1,1000:
  GOTO590
580 RETURN
590 C1=C1+2
600 PLOTV,S," ":PLOTV,S+1," ":PLOTV,S+2," "
  :PLAY0,0,0,0:GOSUBADD:B=2:RETURN
610 DL=DL-1:IFDL=0 THENB=0:DL=2:RETURN
620 WAIT9:RETURN
800 REM #####
810 REM ## ---LANDED--- ##
820 REM #####
830 H=H+1:ZX=ZX+1:PLOTZX,25,"I":POKE#BF91
  ,3:IFH)13THEN H=13
840 C3=C3+1:GOSUBADD:PLOTX,Y," ":IFCO
  ((P/2+11) THEN880
850 WAIT100:FORY=0TOHSTEP-2:FORX=1TO36:
  PLOTX,Y," J"
860 NEXTX:PLOTX,Y," ":NEXTY:IFZX)
  37THENZX=1
870 GOSUB BUILDINGS:CO=0:RETURN
880 IFCO)INT(P/2)+2 THEN 930
890 POKE#BC49,0:PLOT12,4,"WELL DONE":POKE
  #BC99,7:POKE#BC9A,12:PLOT14,6,"EXTRA"
900 FORT=0TO600:PLOT8,8,"2000 BONUS
  POINTS":NEXT:PLOT8,8,"
910 POKE#BC49,5:POKE#BC99,5:POKE#BC9A,32:
  PLOT12,4," "":PLOT14,6," "
920 C4=C4+2:GOSUB ADD:CO=0:WAIT100:
  GOTO 850
930 FORT=0TO400:PLOT8,8,"1000 BONUS
  POINTS":NEXT:PLOT8,8,"
940 4=C4+1:GOSUB ADD:CO=0:WAIT100:GOTO 850

```

```

1000 REM #####
1010 REM ## CRASHED ETC ##
1020 REM #####
1030 WAIT120:PLAY0,0,0,0:GOSUB HIGH
1040 ZX=1:H=5:GOTO OPT
1200 REM #####
1210 REM ## SCORE TITLES ##
1220 REM #####
1230 POKE#BB81,1
1240 FORD=#BB82TO#BB8C:READDTA:POKED,DTA
  :NEXT
1250 FORD=#BB93TO#BBA1:READDTA:POKED,DTA
  :NEXT
1260 RETURN
1300 REM #####
1310 REM ## -SCORE ADD- ##
1320 REM #####
1330 REM
1340 IFC1)57THENC1=48:C2=C2+1
1350 IFC2)57THENC2=48:C3=C3+1
1360 IFC3)57THENC3=48:C4=C4+1
1370 IFC4)57THENC4=48:IFC5)48THENC5=48
  :C5=C+1
1380 POKE#BBDC,C1:POKE#BBDA,C2:POKE#BBDB,
  C3:POKE#BBDD,C4:POKE#BBDD,C5
1390 POKE#BBDD,0:RETURN
1490 REM #####
1500 REM ## INITIALISATION ##
1505 REM #####
1510 A=32:FORC=#BBA2TO#BBA7:POKEC,A:NEXT:
  OPT=2000:HELP=2200:Y=0:X=0
1520 H1=A:H2=A:H3=A:H4=A:H5=A:E$=" "+CHR$
  (27):POKE#BFB9,A:ZX=1
1530 INIT=1590:TITLES=1200:BOMBS=500:LA=
  800:H=5:POKE#BBDD,0:PRINT
1540 BUILDINGS=3000:ADD=1300:HIGH=1700:
  GRAPHICS=1900:MAIN=10:PAPER4:INK5
1550 PRINTCHR$(4);E$;"@";E$;"J CITY BOMBER";
  CHR$(4);CHR$(10);CHR$(10)
1560 PLOT8,20,"Written by P.M.Stracey":
  PLOT8,22,"Date: 17-APR-83":POKE618,14
1570 PRINTSPC(236)"INSTRUCTION"E$;"L?":GETI
  $:IFI$="N"THEN1580ELSEGOSUB2200
1580 POKEBBA4,A:POKE#BBA5,A:POKE#BBA6,A:
  POKE#BBA7,A:GOSUBGR:GOSUBTITLES
1590 C1=48:C2=48:C3=48:C4=48:C5=32:CLS:M=
  FRE(""):S=0:V=0:B=0:DL=3
1600 POKE#BBDC,C1:POKE#BBDA,C2:POKE#BBDB,
  C3:POKE#BBDD,C4:POKE#BBDD,C5
1610 POKE#BBF0,H1:POKE#BBEE,H2:POKE#BBEC,
  H3:POKE#BBEA,H4:POKE#BBEB,H5:CO=0
1620 GOSUB BUILDINGS:GOSUB ADD
1630 RETURN
1640 GOTOMAIN
1700 REM #####
1710 REM ## HIGH SCORE ##
1715 REM #####
1720 U$=CHR$(H5)+CHR$(H4)+CHR$(H3)+CHR$
  (H2)+CHR$(H1)
1730 T$=CHR$(C5)+CHR$(C4)+CHR$(C3)+CHR$

```



```

(C2)+CHR$(C1)
1740 IF T$)U$ THEN 1750 ELSE RETURN
1750 H1=C1:H2=C2:H3=C3:H4=C4:H5=C5
1760 POKE#BBF0,H1:POKE#BBEE,H2:POKE#BBEC,
H3:POKE#BBEA,H4:POKE#BBE8,H5
1770 PRINTCHR$(10);CHR$(10);CHR$(10);
CHR$(17)
1780 INPUT" Enter your name upto SIX
characters long :- ";K$:Y=0:
PRINTCHR$(17)
1790 I$=" "+K$:IFLEN(I$),7THEN1760
1800 FORI=1TOLEN(I$):Y=Y+1:S=ASC(MID$(I$,
I,1)):POKE#BBA0+Y,S:NEXT
1810 Y=0:RETURN
1890 REM #####
1900 REM ## GRAPHICS ##
1905 REM #####
1910 FORD=#B6D8TO#B6FF
1920 READ DTA:POKED,DTA:NEXT: FORD=#B7E0T
O#B7E7:READDTA:POKED,DTA:NEXT:RETURN
1930 DATA 45,63,45,63,45,63,45,63
1940 DATA 0,12,30,63,45,63,45,63' ROOF
1950 DATA 0,0,0,31,4,46,63,4 ' PLANE
1960 DATA 0,0,0,14,21,46,63,4' BROKEN
1970 DATA 0,0,0,8,8,0,0,0 ' MISSILE
1975 DATA 28,30,31,30,28,16,16,16' FLAG
1980 DATA 89,79,85,82,32,32,83,67,79,82,
69 ' YOUR SCORE
1990 DATA 72,73,71,72,32,32,83,6,79,82,69,
32,66,121,32 ' HIGH SCORE
2000 REM #####
2008 REM ## OPTIONS ##
2020 REM #####
2030 PRINTCHR$(12);CHR$(10);CHR$(10):E$="
"+CHR$(27)
2040 PRINTSPC(10);E$"ACTIONS";CHR$(10)
2050 PRINTE$"B Do you want another game"
E$"L?"
2060 GETK$:IFK$="N"OR K$="n"THEN PRINTCHR$
(12):CALL#F420
2070 GOSUB INIT:GOTO MAIN
2200 REM #####
2210 REM ## INSTRUCTIONS ##
2220 REM #####
2230 CLS:E$=" "+CHR$(27):PRINTCHR$(10)
2240 PRINTSPC(11);E$"ACTIONS";SPC(27)
; "-----";CHR$(10);CHR$(10)
2250 PRINTE$"BThe aim of this game is to
bomb"
2260 PRINTE$"Bthe city without crashing
into the"
2270 PRINTE$"Bbuildings.";CHR$(10)
2280 PRINTE$"BYou can use ANY KEY to drop
your"
2290 PRINTE$"Bbombs.";CHR$(10)
2300 PRINTE$"BYou will get BONUS POINTS
if you"
2310 PRINTE$"Bmanage to destroy the
buildings"
2320 PRINTE$"Bby using the least amount of
bombs.";CHR$(1)
2330 PRINTSPC(10);E$"L";E$"EGOOD LUC<!"
;CHR$(10);CHR$(10)
2340 PRINTSPC(2);CHR$(10);CHR$(10);E$"T"
;E$"@PRESS ANY KEY TO CONTINUE"
2350 GETK$:IFK$("<")THENRETURN
3000 REM #####
3010 REM ## BUILDINGS ##
3020 REM #####
3030 P=0:T=21:REPEAT
3040 FORI=1TO34:PLOTI,T,127:NEXT:T=T+1:
UNTILT=24
3050 POKE#BEF1,2:POKE#BF19,2:POKE#BF40,2
3060 FORF=4TO30 STEP2
3070 FORG=20TO20-((RND(1)*(0.5+6)))STEP-1
3080 PLOTG,G,91:P=P+1:NEXT:PLOTG,G,92:
NEXT:P=P+14:RETURN

```

City Bomber
by P Stracey

Days

on ZX81

This is an educational program for all the

tiny-tots who get big ideas about computers and galactic invaders, and need to be brought back down to earth — it asks for a number between 1 and 7, and then tells

the user which day of the week that number refers to — ie, Day 1 is Monday etc.

```

5 REM DAY OF THE WEEK
10 DIMD$(7)
15 D$(1)="MONDAY"
20 D$(2)="TUESDAY"
30 D$(3)="WEDNESDAY"
40 D$(4)="THURSDAY"
50 D$(5)="FRIDAY"
60 D$(6)="SATURDAY"
70 D$(7)="SUNDAY"
80 PRINT"TYPE IN A NUMBER BETWEEN 1 AND 7"
90 INPUTZ
100 IF Z<1 OR Z>7 OR Z<>INT(Z) THENGOTO 80
110 PRINT"DAY ";Z;" OF THE WEEK"
120 PRINT"IS CALLED ";D$(Z)
130 PRINT
140 PRINT
150 PAUSE 100
160 RUN
READY.

```

Days
by M Valentine

Action Packed 100% Machine Code Arcade Software for DRAGON 32

J. MORRISON
MICROS **Droids**



£6.95

J. MORRISON
MICROS **Chess**



£7.95

J. MORRISON
MICROS **Crusader**



£6.95

J. MORRISON
MICROS **Vultures**



£6.95

J. MORRISON
MICROS **Bonka**



£7.95

"Excellent machine code programs for the Dragon". *Personal Computer News*
"A different class altogether". *Popular Computing Weekly*

"Good investment for the home arcade player". *Dragon User*
"Fast moving and addictive — high recommended". *Which Micro and Software Review*

"My word they are addictive". *Dragon's Teeth*
"The sound is very good indeed and the graphics are outstanding". *Popular Computing Weekly*

J. MORRISON
MICROS **Dragon2**



3 games for £6.95

LATEST RELEASE — AVAILABLE NOW
MAURICE MINOR

Out for a quiet drive in your Morris Minor when, you inadvertently wander on to a race track and find yourself in the middle of a Grand Prix. To turn back against the other cars would be suicide. The only thing to do is grit your teeth, grip the wheel, put your foot down and make for the finishing line and safety. If you can avoid the crash barriers and oil slicks, drive fast enough to avoid being run over by Mario and Nelson behind you, then you can think about overtaking the cars in front. Can you make it before your car falls to pieces? Another superb Arcade style game with animated high resolution colour graphics and sound. Requires one joystick.
A very fast action with accelerator, damage report, timer, six levels of skill and hall of fame.
SUPPLIED ON CASSETTE..... £6.95

All orders despatched by return 1st class post

Callers and Trade enquiries welcome

Available from SPECTRUM and other good software dealers

J. MORRISON
MICROS **Dragon4**



3 games for £6.95

J. Morrison (Micros) Ltd

DEPT PCWK11, GLENSDALE STREET, LEEDS LS9 9JJ
TELEPHONE (0532) 480987



The best books for the Dragon 32



The Working Dragon 32

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

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



The Dragon Trainer

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

Dragon 32 Games Master

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

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

Advanced Sounds & Graphics for the Dragon Computer

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



Plus Sunshine Software



Cruising

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

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

Dealer enquiries:
01-734 3454.

Please send me

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

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

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

Name _____

Address _____

Signature _____

Or telephone Access Mastercard on 01-734 3454

OPEN FORUM

Galactic Intruder

on Atari

This program puts you in charge of a

missile base armed with ten shots. An animated invader moves across the screen moving downwards.

Each time you hit the invader your score will increase by ten, but beware — one hit from the invader is lethal.

```

10 REM * GALACTIC INTRUDER by STEVEN MAC
ILWEE member of the M.A.C.C *
20 DATA 16,56,124,254,254
30 DATA 60,126,90,255,165,153,165,165
40 DATA 60,126,108,255,165,153,90,90
50 REM * LINE 20 IS DATA FOR MISSILE BASE
LINE 30-40 ARE DATA FOR THE TWO POSITIO
NS OF THE INVADER FOR ANIMATION*
60 X0=100:X1=80:REM * HORIZONTAL POSITIO
NS FOR BOTH P/M
100 GRAPHICS 7:B=70:DIF=1:SCORE=0:SHOTS=
10:SOUND 1,0,0,0:TP=30:POKE 752,1:REM *
SET VARIABLES AND GRAPHICS MODE *
110 POKE 704,88:POKE 705,200:REM * THE C
LOURS FOR BOTH P/M *
120 A=PEEK(106)-24:REM * 'A' IS RAMTOP
130 POKE 54279,A:MYPMBASE=256*A:POKE 559
,46:POKE 53277,3:REM * 'MYPMBASE' FINDS
PAGE NUMBER TO STORE P/M *
140 HOZ0=53248:HOZ1=53249
150 FOR I=MYPMBASE+384 TO MYPMBASE+1024:
POKE I,0:NEXT I:REM * CLEARS P/M RAM *
160 FOR I=MYPMBASE+603 TO MYPMBASE+607:R
EAD D:POKE I,D:NEXT I
170 FOR I=MYPMBASE+670 TO MYPMBASE+677:R
EAD D:POKE I,D:NEXT I
200 POKE HOZ0,X0:POKE HOZ1,X1:REM * HORI
ZONTAL POSITIONS FOR BOTH P/M *
205 IF INFIRE=1 THEN GOTO 210:REM * MAKE
S INVADERS BULLET GO STRAIGHT *
207 INSHOT=X1-45
210 SOUND 1,122,10,8
215 GOSUB 2000:REM * KEEP TRACK ON SCORE
AND SHOTS *
220 IF SHOTS=0 THEN GOTO 6000
300 IF BFIRE=1 THEN GOTO 330:REM * MAKES
BASES BULLET GO STRAIGHT *
310 BSHOT=X0-45
330 IF STICK(0)=7 AND X0<190 THEN X0=X0+
3
340 IF STICK(0)=11 AND X0>60 THEN X0=X0-
3
350 IF STRIG(0)=0 THEN BFIRE=1
355 IF X1>=215 THEN X1=35:REM * PUT INVA
DER ON THE LEFT OF THE SCREEN WHEN IS GO
ES OF THE RIGHT *
360 IF BFIRE=1 THEN GOSUB 1000
361 IF TP>=94 THEN INFIRE=0
362 INFIRE=0
363 IF X1>60 AND X1<185 THEN INFIRE=1:RE
M * 363-365 MAKES SHORE THAT THE INVADER
DOESN'T FIRE WHEN OF THE SCREEN *
364 IF H=1 THEN GOTO 366
365 IF INFIRE=0 THEN COLOR 0:PLOT INSHOT
,5:DRAWTO INSHOT,90:H=H+1
366 IF INFIRE=1 THEN GOSUB 4000
370 X1=X1+DIF:IF D=90 THEN RESTORE 30
375 SOUND 1,0,0,0
380 GOTO 170
1000 REM * ROUTINE FOR BASES BULLET *
1010 COLOR 1
1020 PLOT BSHOT,B:DRAWTO BSHOT,B-3:REM *
DRAW BULLET *
1030 B=B-4:REM * MAKE BULLET GO UP

```

```

1040 COLOR 0
1050 PLOT BSHOT,80:DRAWTO BSHOT,B+5:REM
* BLANK OUT TRAIL *
1060 IF B<=6 THEN COLOR 0:PLOT BSHOT,80:
DRAWTO BSHOT,3:BFIRE=0:B=70:SHOTS=SHOTS-
1:REM * END OF BULLET *
1070 IF PEEK(53253)<>0 THEN GOSUB 3000:R
EM * CHECK FOR COLLISION WITH BASE TO BU
LLET *
1080 RETURN
2000 REM * SCORE *
2010 POKE 656,1:? "SCORE=";SCORE,"SHOTS
LEFT=";SHOTS;" "
2020 RETURN
3000 REM * INVADER HAS BEEN SHOT *
3010 FOR CS=0 TO 200 STEP 4:SOUND 1,CS,8
,8:POKE 705,CS:NEXT CS:POKE 705,200:SOUN
D 1,0,0,0:SCORE=SCORE+10
3015 DIF=DIF+1:REM * INCREASE DIFFICULTY
TO MAKE INVADER MOVE FASTER *
3030 COLOR 0:PLOT BSHOT,70:DRAWTO BSHOT,
0:BFIRE=0:B=70:SHOTS=SHOTS-1:REM * END O
F BULLET *
3040 POKE 53278,0:REM * CLEARS COLLISION
REGISTER *
4000 REM * INVADERS SHOT *
4010 COLOR 1:PLOT INSHOT,TP:DRAWTO INSHO
T,TP-3
4015 TP=TP+4
4020 COLOR 0:PLOT INSHOT,15:DRAWTO INSHO
T,TP-8:H=0
4025 IF PEEK(53252)<>0 THEN GOSUB 5000
4030 IF TP>=80 THEN COLOR 0:PLOT INSHOT,
15:DRAWTO INSHOT,95:TP=30:INFIRE=0
4040 RETURN
5000 REM * BASE HAS BEEN SHOT
5010 POKE 704,222
5015 FOR LQ=0 TO 60
5020 FOR S0=10 TO 50:SOUND 1,S0,6,10:IF
S0>40 THEN S0=10:NEXT S0
5025 NEXT LQ
5027 COLOR 0:PLOT INSHOT,10:DRAWTO INSHO
T,90
5030 SOUND 1,0,0,0
5040 GOTO 6000
6000 REM * END ROUTINE *
6005 ? ">":REM TO DO THE ARROW PRESS THE
'ESC' KEY THEN PUT YOUR FINGER ON THE
CTRL' AND PRESS THE 'CLEAR' KEY
6010 POKE 656,1:? "PRESS START T
O BEGIN":SOUND 1,0,0,0:POKE 53278,0
6011 IF SCORE>HIGH THEN HIGH=SCORE
6012 POKE 656,2:? "HIGH SCO
RE=";HIGH
6013 COLOR 0:PLOT INSHOT,5:DRAWTO INSHOT
,90:PLOT BSHOT,5:DRAWTO BSHOT,90:REM * C
LEARS BULLETS *
6014 POKE 656,3:? "by STEVEN MACILWEE me
mber of M.A.C.C"
6020 IF PEEK(53279)=6 THEN RUN
6030 GOTO 6020

```

Galactic Intruder
by Steven Macilwee



48k

WIN THE POOLS?

SPECTADRAW 2 — THE BEST SELLING POOLS PREDICTION PROGRAM FOR THE 48K ZX SPECTRUM

The program looks at the recent form of the teams playing in each week's English and Scottish football league matches and then refers to a large database to see what has happened in the past when teams with similar form met. By combining the lessons learnt from the past with the teams' current league position, the program generates a draw probability factor for each match. It can then identify the matches which are likely to yield draws and output suitable predictions. It will also output the least likely draws for the benefit of those who prefer the fixed odds lines on coupons.

Program, 8000 match database (both on high quality cassette) and instruction manual £12.95 inclusive.

NEW!!! SPECTASORT — THE PERM GENERATION PROGRAM

Spectasort takes the 14 most likely and 10 least likely draw predictions and produces ten 8 from 10 full over perms, enabling you to complete your pools coupon directly from the screen. The program will run on its own in 16K, using your own predictions, or has the unique feature of being able to merge with SPECTADRAW 2 to provide a complete Pools Prediction package!!

Spectasort program on high quality cassette £4.95 inclusive.
(Chequest/POs payable to B.S. McAlley)

SPECTADRAW

1 Cowleaze, Chinnor, Oxford OX9 4TD



ALTROSFT

BETTER SOFTWARE AT BETTER PRICES

MAIL
ORDER
ONLY

OLTRO HOUSE (DEPT PCW)
31 KEITH PARK ROAD, UXBRIDGE, MIDDLESEX

DRAGON

MICRODEAL
ANDROID ATTACK, THE KING,
DEFENSE, COSMIC ZAP

New INTERGALACTIC FORCE,
KEYS OF THE WIZARD, CRAZY
PAINTER, FROGGER
RRP £8.00 Our Price £7.75

CBM 64

LLAMASOFT
LAZERZONE, MUTANT CAMEL,
MATRIX, HOVER BOVER
RRP £7.50 Our Price £6.50

INTERCEPTOR
FROGGER, SPRITEMAN, PANIC,
CRAZY KONG, SCRAMBLE
RRP £7.00 Our Price £6.00

TERMINAL
SUPER SKRAMBLE, GRIDDER
RRP £9.95 Our Price £8.95

SPECTRUM

IMAGINE
ARCADIA, JUMPING JACK, AH
DIDDUMS, SCHIZOIDS

New ZIPZAP 48K, Zzoom 48K
RRP £5.50 Our Price £4.95

ULTIMATE
JETPAC, TRANZ AM, COOKIE, Pssst
RRP £5.50 Our Price £4.95

QUICKSILVA
XADOM, SMUGGLERS COVE,
AQUAPLANE, VELNORS LAIR
RRP £6.95 Our Price £6.25

VIC20

IMAGINE
ARCADIA, CATCHA SNATCHA,
FRANTIC, WACKY WAITERS
New BEWITCHED (now available)
RRP £5.50 Our Price £4.95

QUICKSILVA TRADER
RRP £14.95 Our Price £12.95

SPECIAL OFFER

Order two tapes to the value of £10.00 or more and deduct an extra 50p off the total of your order.

SEND CHEQUE OR POS. OR SEND 12½p STAMP FOR OUR NEW
12-PAGE CATALOGUE. OUT NOW! FREE CATALOGUE SENT WITH
EVERY ORDER

Dragon Dungeon



DRAGON USERS CLUB

Why is the Dragon Club at the Dungeon the largest independent D32 User Group, with members scattered through 24 countries? What do you get for your subscription?

- ★★ The monthly club magazine 'Dragon's Teeth', with 28 pages of solid information. News, views, advice and the latest reviews. Competitions with worthwhile prizes (fancy a year's free software?), special offers, machine code info and news of the US 6809 scene.
- ★★ Free members' advertising in 'Dragon's Teeth'.
- ★★ Free copies of all Dungeon catalogues.
- ★★ Big savings on both software and hardware.
- ★★ Free advice service.
- ★★ Publishing service for hot-shot programmers.
- ★★ Free listing service for members without a printer.

ANNUAL SUBSCRIPTION:..... UK £6.00
Overseas £8.00

DRAGON STICKS

If you want the latest switch-type, self-centring joysticks (best for the up/down, left/right arcade games), we've got them at £19.95 per pair.

If you want the famous "Quick-Shot" aircraft-type sticks (no expensive adapter required), we've got them at £15.95 each.

But if you want the ultimate analogue sticks, with the best fire button available, then you have to get DD Dragonsticks (£19.95 per pair). Quotes from satisfied customers:

"Already my top score on Ghost Attack has almost doubled!" — Dr R. P. D.

"Miles better than my previous joysticks" — Mr J. M.

"My other analogue sticks seem crude by comparison!" — Miss R. T.

LATEST BEST SELLERS FOR THE DRAGON 32

PACDROIDS (Programmer's Guild) £8.95. Combine 'Pacman' with 'Defender' and add destructo mines and superbombs and you begin to get some idea of this 100 per cent machine game. Money-back warranty.

DRAGRUNNER (Cable) £8.75. Our favourite 'Frogger'-type game (this one fires back).

CAVE FIGHTER (Cable) £8.75. At last a good 'Skramble'-type game for the Dragon! 100 per cent machine and miles and miles of caves. Force fields, bombs, laser cannons, fuel dumps, contra-rockets and the classic problems!

CRUSADER (J. Morrison Micros) £6.95. Now UK machine programs have Tom Mix standard graphics! Morrison's best arcade game yet, unique, but with a 'Hunchback' flavour. Eight screens, but nobody at the Dungeon has got beyond six yet! We are torn between this and 'Ninja Warrior' as our favourite arcade game! (But THE best sellers are still 'Pimania' and 'Ring of Darkness'.)

CRYSTAL CHALICE (Dungeon) £7.95. Mike Meineck's epic adventure in the doomed Kingdom of Quorum. Much cunning required (clue-sheet available on request).

DRAGON DUNGEON, MILTON HOUSE, ST. JOHN STREET, ASHBOURNE, DERBYSHIRE DE6 1GH
Telephone: Mail Order (0335) 42529. Trade/Retail (0335) 42659.

OPEN FORUM

3-D View

on BBC

This program draws a three-dimensional surface. Interesting results can be obtained by changing the function in line 80 or the vertical scaling in line 90.

Variables

XS Horizontal step.

YS Vertical step.

A 1/2 of horizontal co-ordinates range.

C 1/2 of vertical co-ordinate range.

```
10 MODE0:VDU29,640:512::XS=2:YS=4
20 A=640:B=AXA:C=512
30 FORX=0 TO A STEPXS:C=XXX:P=SQR
(B-S)
50 FORI=-P TO P STEP6*YS
70 R=SQR(S+I*I)/A
80 Q=(R-1)*SIN(24*X)
90 Y=I/3+Q*C
95 IF I=-P:M=Y:GOTO110
100 IF Y>M:M=Y:GOTO130
105 IF Y>=N GOTO140
110 N=Y
130 PLOT69,-X,Y:PLOT69,X,Y
140 NEXT:GOTO110
150 END
>
```

3-D View
by Justin Keely

MICRO RADIO

This is the first in a series of articles 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.

GW6JJN



With two or three million home computers in the UK, it is reasonable to assume that microcomputing as a hobby is here to stay. An older, but equally hi-tech hobby, is amateur radio and short wave listening (SWL). When citizens band radio was made legal two years ago, the number of people with radio equipment soared into the millions.

Radio and computers complement each other in so many ways that it was obvious that many radio enthusiasts would turn to the home computer to enhance their hobby. With the possibilities of networking and the transmission of programs and data over noise-free amateur radio frequencies, computer enthusiasts will hopefully turn to amateur radio to enhance their interests.

The purpose of this column

is to provide a forum for those interested in radio and computing. It is also hoped to be an introduction to radio and the exciting world of satellites and moonbounce — making sense of all of those strange noises that can be heard on a radio receiver.

In this column we shall discover how to track the moon and plot the course of the space shuttle. We shall make sense of amateur and information satellites and find out how to send amateur television on a microcomputer.

As I have said, the column is in the style of a forum for you to send in your ideas, your questions and your routines. I shall be looking at morse code, RTTY, satellites and even the possibilities of sending your own personal teletext pages to your friends. There will be reviews of relevant software, hardware and books. There will be information about radio-computing user groups and much much more. This is the column that will take you and your computer into the space age. See you next week on this frequency.

Ray Berry GW6JJN

6,000 FREE TAPES TO BE GIVEN AWAY

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

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

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

Rules

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



is left may be a corridor, to his right a wall and before him, a door. He can't, of course, go to the right, but he may choose to go left along the corridor, in which case the screen will clear, and the player find himself at the next location. Should he choose to go forward to the door, he (or she) will be given the choice to either open the door, or listen at the door.

The first option is for the brave or bold — the more cautious go for the second option, in which case, the player will be given information about what lies in

him from dungeon to dungeon, and so on. (3) Brian Foote, who reckons his 97.5 percent is a record. Apart from the odd, rogue 215 percent, I think he may be right (unless you know better), and he included a data tape to prove it.

(4) George Findlay

(5) Christopher Kenworthy

(6) Bret Sampson, who then wrote 83 after his name — whether this is an allusion to his age, or the year, I know not!

(7) Russell Lewins, who had to work very hard!

(8) Tony Aspinall

stuck.

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.

NEW

The complete speech synthesis system

For use with
DRAGON 32
COMPUTER

SPEECH SYNTHESIS MODULE for the Dragon 32 computer

- Fully cased module plugs into cartridge port
- Unlimited vocabulary, using allophone-type, dedicated speech chip
- Approximately 250 words predefined; accessed by entering word required
- Complete control using five new BASIC commands
- Speech can easily be incorporated into existing BASIC programs
- Up to 40 words spoken from one command; speech can occur simultaneously with graphics
- **£37.95 inclusive**

Also available: SOUND EXTENSION MODULE for use with the Dragon computer — provides facility to play chords and harmonies over five octaves — easy to use via BASIC — built-in sound effects — music and graphics can occur simultaneously — two I/O ports — user manual — **ONLY £34.95 inclusive**

ACCESS/Cheque/PO to:

J.C.B. (MICROSYSTEMS)

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

Write or phone for further details

RED SHIFT

APOCALYPSE

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

£9.95

inc. VAT
and P&P

Apocalypse

THE WAR GAME

SPECTRUM 48k

BBC Model B 120K

Coming soon:

VOLUME 1 — 6 new maps.

VOLUME 2 — 4 historical scenarios — specialist rules cover the collapse of the Roman Empire, WW II, 1984 and the Napoleonic Wars.

Available from

RED SHIFT Ltd, DEPT BRENDIA

12c Manor Rd, Stoke Newington, London N16. Tel: 800-1333

Produced under licence from Games Workshop Ltd, London



VIC20

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

£49.95 inc. VAT

16K SWITCHABLE TO 3K

£34.95 inc. VAT

16K STANDARD

£27.95 inc. VAT

All units guaranteed 2 years. Add £1 P&P

Overseas orders add £2 P&P

- info and news of the US 6809 scene.
- ★★ Free members' advertising in 'Dragon's Teeth'.
 - ★★ Free copies of all Dungeon catalogues.
 - ★★ Big savings on both software and hardware.
 - ★★ Free advice service.
 - ★★ Publishing service for hot-shot programmers.
 - ★★ Free listing service for members without a printer.

ANNUAL SUBSCRIPTION:..... UK **£6.00**
Overseas **£8.00**

with the best fire button available, then you have to get DD Dragonsticks (£19.95 per pair).
Quotes from satisfied customers:

"Already my top score on Ghost Attack has almost doubled!" — Dr R. P. D.

"Miles better than my previous joysticks" — Mr J. M.

"My other analogue sticks seem crude by comparison!" — Miss R. T.

ASTROLOGY

Self-teaching and Accurate Calculation
Programs for

Sharp MZ80A
Commodore 64
and PET 3000, 4000, 8000

NewBrain
BBC Models A and B
Electron

Sinclair 16K ZX81
and 48K Spectrum

Dragon 32

Colour Genie 16K and 32K

Videogenie/Genie 1, II and III

miles and miles of caves. Force fields, bombs, laser cannons, fuel dumps, contra-rockets and the classic problems!

CRUSADER (J. Morrison Micros) £6.95. Now UK machine programs have Tom Mix standard graphics! Morrison's best arcade game yet, unique, but with a 'Hunchback' flavour. Eight screens, but nobody at the Dungeon has got beyond six yet! We are torn between this and 'Ninja Warrior' as our favourite arcade game! (But THE best sellers are still 'Pimania' and 'Ring of Darkness'.)

CRYSTAL CHALICE (Dungeon) £7.95. Mike Meineck's epic adventure in the doomed Kingdom of Quorum. Much cunning required (clue-sheet available on request).

DRAGON DUNGEON, MILTON HOUSE, ST. JOHN STREET, ASHBOURNE, DERBYSHIRE DE6 1GH

Telephone: Mail Order (0335) 42529. Trade/Retail (0335) 42659.



Hall of fame

Another look at recent Spectrum adventures with a trio of programs from ASP Software. The same people, you may remember, publish a well-known, old-established monthly computer magazine, as well as *The Valley*, for which I still have a soft spot. The first, *Detective*, is really not an adventure, but a cerebral game, with its basis in *Cluedo*. It is very colourful, and can be played by 1 to 6 players. The mechanics of play are quite simple — dice are thrown, and the players move around a small, 3 x 3 area, picking up clues as to the scene of the crime, the perpetrator, the murder weapon, and the motive.

In *Mastermind* fashion, the information is put together, and a process of elimination should, in the end, reveal all the answers. A good program for the kids.

The second tape I have from ASP is *Cells*. This is from the *Wumpus* branch of adventure, in which the player moves around a Dungeon complex, usually listening at doors for monsters, and picking up gold pieces and other treasure. In the original *Wumpus*, all the player had to do was to triangulate on the Wumpus, a mythical monster, with the aid of tactile clues as to his whereabouts. Later versions allowed the player to flash a torch before him, to discover what was in the neighbouring rooms, or fire an arrow to clear a path.

Now the details have become ever more distanced from the original — first published, as far as I know, by David Ahl's *Creative Computing* magazine, back in 1980 or thereabouts.

In the present game, the player is presented, at each turn, with the layout of neighbouring locations. So, for instance, to his left may be a corridor, to his right a wall and before him, a door. He can't, of course, go to the right, but he may choose to go left along the corridor, in which case the screen will clear, and the player find himself at the next location. Should he choose to go forward to the door, he (or she) will be given the choice to either open the door, or listen at the door.

The first option is for the brave or foolhardy — the more cautious go for the second option, in which case, the player will be given information about what lies in

wait on the other side of the door. Before opening the door, he may see his present status — this is a table of treasure held, hit points, monsters slain so far, and so on. Basing his choice on this table, the player may open the door and do battle, or leave well alone.

Another choice awaits the player on opening the door, and this is — fight or retreat? In my experience, the monster will attack whatever is decided, and much of the time will be beaten, no matter how weak the player is (could be pure luck). The program is in Basic, so the responses are a touch slow, but the screen display has had a bit of thought put into it and is quite colourful.

The last ASP program is *Demon Knight*. This is a text adventure in the traditional mould. Again in Basic (incidentally, I certainly don't hold with the idea that Basic games are not worth looking at — a well-written Basic program should suffice for a text adventure). This program, however, is very badly presented, being full of elementary spelling mistakes that ought to have been found out by the game-testing stage. The text is badly justified, and the screen layouts are generally messy. The player is even asked to set the *Caps Lock* before playing! Have a *Peek* at 23658 some day, fellows!

The adventure itself is set in a castle, and is the usual mix: "You are in the Throne Room — you see . . ." etc. Only two word commands are accepted, although *Help* will elicit a response. No doubt the inherent puzzles (how to get to the secret of the rubbish pile and so on) are diverting, but the incorrigible cheat can easily break into the program, and find many of the answers displayed.

All in all, not a very exciting release from ASP and they all have the flavour of old ZX81 games — the three programs together on a compendium tape would be good value, however.

On to The Hobbit Hall Of Fame, and there are quite a few new names to be blazoned on the shield:

- (1) John Zimmerman
- (2) Alan King (aged 41, he tells me). Alan's copy of *The Hobbit* is now fighting back in retaliation for being solved! Perfectly behaved until Alan cracked it, the program has since crashed about half of the time, usually when climbing into the Barrel (but see later, Alan), stings Alan to death in previously safe places, transfers him from dungeon to dungeon, and so on.
- (3) Brian Foote, who reckons his 97.5 percent is a record. Apart from the odd, rogue 215 percent, I think he may be right (unless you know better), and he included a data tape to prove it.
- (4) George Findlay
- (5) Christopher Kenworthy
- (6) Bret Sampson, who then wrote 83 after his name — whether this is an allusion to his age, or the year, I know not!
- (7) Russell Lewins, who had to work very hard!
- (8) Tony Aspinall

(9) Bilbo Baggins of Guernsey. So that's where he is now, he seems to get all over the place! He has sent me a complete solution to the program, and all on one sheet of paper too — 85 feet long! Bilbo has done the whole thing in just 50 moves, and says that some (and rather like speeding through Paradise on a motorway!) eight of these may be omitted — surely a record?

(10) Justin Scharvona, who offers a way of overcoming the tendency for the program to crash when climbing into the barrel — *OWJAUIMTPFOONRTBOUBTALRER-RETL* and then type *OJBUAMR-PROENLT*. If you haven't seen this code before, start at the second letter of each sentence, then read off every other letter. When you reach the end, return to the first letter, and repeat the process.

Justin reckons, incidentally, that a Polaroid camera would help in recording Highscores achieved in arcade games (see my comment of a couple of weeks ago) — but the software houses ought to provide the facility.

I agree, however, with his views on *Manic Miner* — certainly the best arcade game around for the Spectrum.

(11) Martin Jones, jointly with Andrew Sweetland, who, like one or two others, has noticed *Hobbitbug No 233*. If you enter "EN DO", the Black River evaporates, Gollum dies and the Sword breaks — not bad for two little words, eh?

(12) Steven Martin

(13) Alan McDonald, who has also solved *Golden Apple*, the new Artic adventure, which took him all of three days (must have been difficult — Adventure C took him a morning!). His friend, Chun Nok Fung, would like it known that he has finally managed to get through the Green Door — with a little help from Gandalf!

(14) Ian Morse

(15) Paul Catterfeld

(16) P Macy, who managed to drown Gandalf in the process!

(17) John Parker

(18) M Bannon

I only have room left now for grovel. I have had pointed out to me by several better adventurers than myself, that the coin in the lake, in Artic's *Planet of Death*, and the computer, are not red herrings. I'm glad about this, as it took me ages to get that coin! Try this (with our decoding procedure mentioned earlier): *EUG-SUEACRODIINNTPORBIRS IOBN* and ask the computer *HTEYLPPE* if you're stuck.

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.

**SIMPLE
TO USE**

You want to program your own Arcade Games?

Software STUDIOS Games Designer

Now you can! Produce your own
SPRITE BASED MACHINE CODE
Arcade Games

NO programming knowledge needed
EIGHT pre-programmed games included

**48K SPECTRUM
£14.95**

Spectrum Software 48K

Wargames

Pacific War £6.00

Refight the aircraft carrier battles of World War 2. The player controls the American forces, your computer the Japanese. Full screen display of task force and aircraft movement.

Management Games

Bankrupt £6.00

For one to four players with one, two or three computer opponents. An absorbing simulation of commercial life in which the solo player is up against not one but three computer controlled companies.

**Cheques or Postal Orders to: K W Software
155 Ringinglow Road, Sheffield S11 7PS**

VIC20

INTELLIVISION

ATARI

COLECOVISION

CARTRIDGE LIBRARY

AUTHORISED DEALER

- ★ Latest computer games from America
- ★ New titles added weekly
- ★ Fast reliable service
- ★ Life membership now £10
- ★ Fortnightly or monthly hire
- ★ 2-way postage included in hire charges — 2 weeks £3, 4 weeks £5
- ★ Discounts on purchases for members (hardware and software)

Join now on money-back approval, or send SAE for details. Please state which computer video games machine

To M.D.M. HOME COMPUTER SERVICES, DEPT 5
20 NAPIER STREET, NELSON, LANCS BB9 0SN
OR PHONE 0282 697305



YAHTZE



For 2 to 6 players

VIC20

+ MINIMUM 3K

CHEQUES/POs to
**HELANA
65 CAMELOT HOUSE
SALISBURY ROAD
LONDON N9 9TE**

NAME
ADDRESS
.....
.....

Enclosed £4.95 inc P&P

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.



LEFT TO RIGHT

Justin Fackrell, of Caswell Drive, Caswell, Swansea, writes:

Q Please can you help me? I have recently been writing some games for my BBC micro. I have learned to *Scroll* the screen up and down for *Asteroids* type games but I cannot *Scroll* from left to right, or right to left. Is it possible?

A What you need to do is use VDU 23 to access the 6845 screen chip directly, using registers 12 and 13. Because the computer only has to change these two registers, you can have some very fast *Scrolling*, and you get the effect of screen wrap-around by setting the start of the screen memory higher than its normal starting position.

TOKENISED INPUTS

Hugh Geddis of Grange Farm Road, Maryport, writes:

Q A few weeks ago you mentioned tokenised inputs for the Vic20. I recently got a Vic20 for my birthday, and would like to know what tokenised inputs do.

A This is in your manual on page 133, appendix D, 'abbreviations for basic keywords'. It is a shorthand form of entering commands.

The Vic stores its Basic words at a series of addresses in the memory. Instead of printing the entire word, we can use the token or abbreviation. Terry Wallbridge, a reader who wrote to me a few weeks ago, supplies this example:

```
100 PRINT "TEST" : POKE 127,
    PEEK (345) : IF I = 0 THEN
    RESTORE : GOSUB 10 : PRINT
    A$ : POKE 1, PEEK (2335) AND
```

```
129 : GOSUB 30 : PRINT W$ :
    NEXT I : NEXTR : LET Q = 9
```

If you tried to enter this as part of a program it would be far too long (I have added a couple of extra spaces for clarity, but even without these it would be too long to be accepted on to the Vic screen display). However, if you try entering the following you will be left with a screen line of 83 characters, which is acceptable to the Vic. All the shifted characters are in italics:

```
100? "TEST" PO 127, PE (345) : IF
    = 0 THRES : GOS10 : ? A$ :
    PO1, PE (2335) AN 129 : GOS
    30 : ?W$ : NEI, R : Q = 9
```

After I pointed out the difficulty of getting upgrades for the issue 1 Spectrum, Paul Rason of Delta Research phoned me to say that his company specialises in just this upgrade. It comes on a single board and costs £33 inclusive. Also included is a diagnostic tape to check the RAM.

Delta Research is at 13 Church Street, Basingstoke, Hants RG21 1QG.

If you want to telephone, the number is (0635) 45373.

COMPUTER ADVICE

A Simmions of Botley Road, Botley, Chesham, Bucks, writes:

Q I am the owner of a TI/99/4a, and am fortunate enough to be starting computer studies at school later this year. I am a keen programmer, but I would be grateful if you could give me some advice as to whether I should keep my computer and add peripherals (which are expensive), or whether it would be better to buy a different computer (no more than £200).

A I do not normally give direct advice about buying computers, because features of the various models are most important to you. However, there are some things you might wish to consider.

For the O-Level syllabus you really need a printer, with a TI/99/4a. It will cost about £130 to get the motherboard extension unit, and another £100 at least to get an RS232 interface to run it (assuming that your school or a friend has

one). For that much money it might be better to look at a 48K Spectrum or Oric, both of which have their own printer.

The other thing about the TI/99/4a is that its Basic is different from that used by the most common school computers. It could be useful to talk to your computer teacher and find out what machine(s) you will be using in class.

UP FOR SALE

Craig Shortland of James Street, Earl Shilton, Leicester, writes:

Q Is it in order for me to convert a program for use on another computer and then offer it for sale? Or would I need prior permission of the author?

Secondly, could you tell me the equivalent of *Left\$, Right\$* and *Mid\$* on the Spectrum.

A I suggest you look at our 1-7 September issue. On the front page we ran a story about the injunction that Century Electronics gained against Superior Software, on the grounds of infringing copyright.

The whole question of copyright is still shrouded in mystery, with no one exactly sure just how the law affects computer programs. However, I think it would be polite to contact the author first.

As to your second question, the Spectrum uses the command *To* for splitting strings.

ITALIAN TV

P Morrow of Darynorton Drive, Greenford, Middx, writes:

Q My company will be sending me abroad soon for three years. Can you tell me if my 48K Spectrum will work on the Italian television system? I still have my ZX81 (16K); would that work too?

Another question concerns the Microdrive. Will it be

possible to record on Microdrive a program that is already on cassette? (Mind you, I shall not bother to get a Microdrive until the first million faulty ones have been returned. I have had enough trouble with my Spectrum already!)

A Most of western Europe is 625 line, 8 MHz, FM UHF, as are we. (The exception being France.) Because of this it should be possible to use your Spectrum in Italy. Problems might occur if you tried to play sound through your television as well. There is a half MHz difference in both the vision bandwidth, and the sound vision spacing. This would make it difficult for both sound and vision to be tuned together. The same applies to your ZX81.

You can transfer a program from tape on to the Microdrive. It is a question of simply loading the program into the memory of the computer, and then simply *Save*ing it into the Microdrive. Your scepticism about the Microdrive is shared by many, not surprising given the problems with the early Spectrums. Conversely the Microdrive is cheap, ingenious and unique and I am sure that demand will exceed supply for many months to come.

Dennis Hutchinson of Melbourne Close, Middlesbrough, has written to tell me of a simple way of replacing a lost header on Spectrum programs.

He used another program on tape that was at least the length of the one he wanted to add the header to. This was *Loaded* as normal, but as soon as the header was *Loaded*, he pulled the ear-plug out. Next, he put the program without a header into the tape recorder and wound to the start of the program, pushed the ear-plug back in and the computer was fooled into *Loading* the program.

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

CLASSIFIED

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

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

GAMES SOFTWARE

ZX SPECTRUM SOFTWARE

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

Telephone or SAE for list.

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

RULE COMPUTERS

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

16/48K SPECTRUM "Raquel" presents her game for age 16 and over only (state age with order), £3.50. I. Brooks, 17 Malvern Coleman Street, Southend, Essex.

SPECTRUM OWNERS. Now you can rent all your favourite video games for just 50p a week. For details and catalogue of latest software available telephone 01-459 0831.

VIC20 (unexpanded). Pinball, Hi-res graphics, three-ball speeds, four flippers, hi-score and only £1.99. D. Spencer, 230 Lowgrange Avenue, Billingham, Cleveland.

ZX SPECTRUM 16/48K PONTOON. Dazzling screen, displays cards and money. Computerised banker, recognises five-card tricks, pontoons, etc. A real opponent. Fruit machine random. Hold on three reels. All score combinations displayed continuously. Byte-man. Move around, Eating Bits, Beware of the Bug and other hazards! All programs feature dynamic colour graphics and sound. Instructions supplied. All for only £3.95. Cheques to: Mark Hill, 18 Russell Close, Saltash, Cornwall.

SPECTRUM TAPE EXCHANGES. Exchange your unwanted Spectrum software for £1 each tape. Send SAE for list. 34 Avondale Road, Nelson, Lancs BB9 0DA.

SPECTRUM PROGRAMS

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

Many others. SAE for list
Prices including p&p
Cheque/POs crossed, payable to:

VYAJY'S-H-K
11 MARGARET AVENUE
ST. AUUSTELL, CORNWALL

WACKY WAITERS and Arcadia for Vic20, £4.50 each — £8.75 per pair — 25p p&p. A. M. Weinrabe, 76 Hillside Gardens, Edgware, Middx. Tel: 01-958 8643.

ZX81 16K WARRIOR KING. Exciting new game from Leon Software. Send cheque/PO for £4.95 to F. MacDonald, 60a Turners Road, Mile End, E3 4LE.

TROGLODITES V. ALIENS, Daredevil, Two-can-play, Derby, Five-a-side, Combat Strategy, Canyon Jumping, Board games, Horserace Gambling. A.C.E. ZX81 Games Vol. 1. Cheques/POs £3.95, to: Amberwood Computer Enterprises, Market Place, Penkridge, Stafford ST19 5DH. Details of other cassettes and competition to be published soon!

MAESTRO MUSIC PROGRAM for 16K ZX81 with memory mapped AY-3-8910/12 P.S.G. Enter and play three-part harmony, variable tempo, demonstration tunes. Machine and Basic £4.50. D. L. Williams, 10 Edward German Crescent, Newport, Gwent.

SPECTRUM COPIER and tape reader on cassette, £2.50. Also your listings taped, £1 each, minimum five. B. Fitton, 211 Lynfield Drive, Bradford BD9 6EY.

SPECTRUM SOFTWARE

Tape 1 £4.00 Kong — 10 sheets, 6 tunes, bonus time. Hogger — cross the road then river. Skiing — split second downhill skiing. Clock — real time, hands, alarm. Surround — strategy game for two.

Tape 2 £3.00 Cassette Copier — takes up no program area, copies all types including headerless, makes multiple copies.

Both tapes £6.00

Cheques to
Swannsoft Tutnall Farmhouse
Tutnall, Bromsgrove, Worcs



ROBOT PANIC for your 16/48K SPECTRUM

Zap the aliens before the walls crush your Robot. Five rooms of escalating infestation — can you keep up? £5 from retailers (ask) or direct (24-hour dispatch)

Soft Mill 20 Station Road
Haddenham Ely, Cambs CB6 3XD

ZX SPECTRUMERS introducing "Gopher" and "Kamikaze Flight" ... just right ... kept me up ... till 3 am ... PCN £3.90 — arcade standard action from Block-Byte Computing, 213 Stainbeck Road, Leeds LS7 2LR.

HI-RES BANDIT with nudge, hold and separate gamble screen for Dragon, £4 payable to S.A.S. Software, 20 Admiralty Road, Mablethorpe, Lincs.

LOADS OF SPECTRUM SOFTWARE for sale. Owner selling up. Nearly 50 titles all at good rates. Send sae for list to John Gowers, 10 Lapworth, Coppies Grove, Friern Barnet, London N11 1NR.

VIC20, unexpanded PacMan. Features hires, graphics, joystick/keyboard movements, sound and colour, £3.99, plus 50p p&p. M. Barker, 50 Long Meadow Road, Knowsley, Merseyside, L34 0HS.

T199/4A + joysticks + cassette lead, £60; Extended Basic, £40; expansion box + RS232, £150; Tombstone City, £10; Invaders, £10; Hustle, £5. Phone Doncaster 842580 after 6.30 pm.

SPECTRUM OWNERS! Secure your Basic programs. Send £1 and sae for listing. To D. Murphy, 20 Knockdarragh Park, Belfast BT4 2LE.

COPY ANY ZX81 self running program m/c or otherwise. Send £1.50 to: Paul Silverman, 181 Adelaide Road, London NW3 3NL for method.

SPECTRUM 48K. The complete bandit plus speech (with fuller orator) amazing graphics includes holds, nudges, gambles and simulated payouts, this one you must see £5. Cheques to N. Bates, 251 Westfield Lane, Wyke, Bradford, Yorks.

ADVENTURE 13 32K BBC

Over 131,313 locations
Many advanced features
SCIENTIFIC SOFTWARE
Old Loom House
Back Church Lane
London E1 1LS

PROBABLY THE BEST

ROBIN HOOD

Can you win an archery tournament? Seize a castle? Follow a forest trail or explore secret passages? Yes — then escape into the Greenwood and rescue Maid Marian from her oppressors with our cassette adventure for the DRAGON 32.

Send cheque or postal orders for £5.95 to **PORTENT ADVENTURES, 6 Portland Row, Edwinstowe, Notts. NG21 9JB.**

UTILITIES

SPECTRUM AUTOKOPY 2

Make backup copies of ANY Spectrum tape (but do not break Copyright laws!)

The most advanced copier yet produced. Copies Basic, Machine Code, Headerless, Long Header and False Headerless Programs.

No protection device too difficult! It copies programs the FULL 16K or 48K LONG!! Only £3.

B. Tidd, 160 Howlands,
Welwyn Garden City, Herts AL7 4RG

BBC/ELECTRON "UNLOCK". Removes locks on locked software allowing back-ups, £4.80. P. Down, 33 Little Gurnes Lane, Upminster, Essex RM14 2JR.

STOP! LOOK! LISTEN!

STOP searching for a TOP QUALITY back-up copier for the SPECTRUM (16/48K).

"TAPE COPIER" we are certain is the MOST ADVANCED package available. Does any other copier come near?

LOOK at ONLY SOME of its options:

★ Copies up to approximately 47.7K (15.7K for 16K Spectrum).

★ Verifies. Repeat Copies, Auto, Abort, and STOPS programs.

★ Loads CONTINUOUSLY (not just one part at a time like most copiers) even without pressing a key!

★ Copies HEADERLESS and ALL programs that we are aware of!

★ Very user friendly and simple to use.

LISTEN to this. We are so convinced you will be delighted with our product that we can offer a FULL MONEY BACK GUARANTEE if not fully satisfied. Cost ONLY £4.50.

LERM, Dept PW, 16 Stonepit Drive, Cottingham, Market Harborough, Leics.

TELETEXT ON YOUR SPECTRUM; create your own 900-page teletext system with "ZXTEXT". Full colour, graphics, flashing, 24-hour clock with alarm, free sample system — it's all here! Cassette £4.95. **26 Puzzle:** 3D version of Sam Loyd's famous "15 Puzzle" with full-colour 3D display. Try to sort the cubes into order. Cassette £4.95. Or both for £7.40. Iain Stewart, 17 Torry Drive, Alca FK12 5NQ.

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

SPECTRUM KOPYKAT

IMPROVED PERFORMANCE

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

Send cheque/PO for £4.95 to:

MEDSOFT

61 Ardeen Road, Doncaster, DN2 5ER

IT CAN EVEN COPY ITSELF

THE KEY

THE ULTIMATE
SPECTRUM
BACK-UP COPIER
FREE HEADERLESS
COPIER

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

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

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

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

DEALER ENQUIRIES WELCOME.

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

SPECTRUM TRADE SECRETS. Explosive revelations including: making programs unlistable, unstoppable, invisible, how to reveal such programs, plus hints/tips, etc. Send £3 to: ZX-GUARANTEED (Ref TS), 29 Chadderton Drive, Unsworth, Bury, Lancs.

SPECTRUM 007 SPY. Copiers from £2. SAE details or send £3.95 for genuine Kopyall KopyKat plus machine-code program stopper, ZX-GUARANTEED (PCW2), 29 Chadderton Drive, Unsworth, Bury, Lancs.

SPECTRUM SOFTWARE

Over 100 titles always in stock.
Over 400 titles available to order for most micros.

P.R.S. SOFTWARE

Croydon Indoor Market, 17 Park Street,
Croydon
(Opposite Grants)

HARDWARE

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

HOME COMPUTER BARGAINS

DRAGON 32 @ £167.99
SPECTRUM 48K @ £127.99
ORIC 48K @ £137.99
LYNX 48K @ £218.99
VIC20 PACK @ £133.99
EPSON HX-20 @ £401.99

EXCESS HP-85
STOCK AT HALF PRICE
Add £5 P&P. Price includes VAT
(Access and Barclaycard welcome)

CALL HEATHER ROTHALLS ANGLIA HOME COMPUTER BARGAINS

88a ST BENEDICT'S STREET
NORWICH NR2 4AB
Tel: (0603) 667036/7
Telex: 975201

IN STOCK NOW DRAGON DISC DRIVE £274

Including VAT

With three free Floppy Discs
P&P Free

WEST DEVON ELECTRONICS
15 STATION ROAD
HORRABRIDGE, DEVON
Tel: Yelverton (0822) 853434

FOR HIRE

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

CLUBS

COMMODORE SOFTWARE EXCHANGE CLUB. Swap your Vic, Pet or 64 software. £1 per swap. Membership free. Send SAE for details to: Comswap, 4 Coed-Y-Pia, The Rise, Llanbadach, Mid Glamorganshire.

SWAPSHOP, swap your BBC/Spectrum and Texas programs. Membership free. Membership and/or details from: M. A. Paris (Swapshop), 38 Wooburn Manor Park, Wooburn Green, High Wycombe, Bucks.

SOFTWARE CITY SOFTWARE CLUB

Massive list of games, tapes and discount card

For Spectrum, Dragon 32, Vic20, BBC, Sharp, Apple
**TRY BEFORE YOU BUY
SAE FOR LIST**

16 THEOBALD STREET
BOREHAMWOOD, HERTS

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

SPECTRUM TAPE EXCHANGES. Exchange your unwanted Spectrum software for £1 each tape. Send SAE for list. 34 Avondale Road, Nelson, Lancs BB9 0DA.

SOFTWARE

DRAGON CRUNCHER

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

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

COMPUTER CASSETTES

High quality at low prices!!!
C10's 25p each (including case)
C15's 29p each (including case)
P&P 10p per cassette, minimum order five

Send cheque/PO to:
S. Boriant, Suite 44, Ivor Court
209 Gloucester Place
London NW1 6BL

EDUCATIONAL SOFTWARE

DRAGON 32 EDUCATIONAL SOFTWARE. Quality software at reasonable prices. For full details send sae to: P. Perris, 88 Poplar Crescent, Shipley, W. Yorks BD18 2HH.

ACCESSORIES

ARDISOFT EDUCATION SOFTWARE requires BBC computer programmers in a wide range of school subjects. Royalties paid. Ardsoft, 101 Potternewton Lane, Leeds LS7 3LW. Tel: (0532) 783349.

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

COMPUTER CARRYING CASE

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

Dealer inquiries welcome

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

5D SOFTWARE

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

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

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

** RADIO SOFTWARE ** DRAGON AND COCO

RTTY TRANSCEIVE. Split screen, type ahead, any Baud rate etc.
MORSE TRANSCEIVE. Decodes and sends morse to 150 WPM.
MORSE TUTOR. Any speed, any spacing. Includes a send practice facility.
AMTOR SYSTEM. Available soon.

Send large SAE for full details and software/hardware price list.

GROSVENOR SOFTWARE (W)
22 Grosvenor Road, Seaford
E. Sussex BN25 2BS
(0323) 893378

DEALERS

SOFT MACHINE

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

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

or send SAE for free catalogue
(state which computer)

COMMODORE 64

£164 (excl. VAT)

64 Programmers Ref Manual £9.00 + £1.50 p&p

Tel: Chris Gurney, Dave Walsh or Floyd Patterson

Tel: 01-969 4658/7527 or send SAE
Image Science Micro Computers Ltd
189 Freston Road, London W10 6TH
or cheques PO (add 15% VAT) and £8 for p&p Securicor delivery
Prestel Frame 4820000 (a) for latest software and hardware information and prices. Full after-sales maintenance on all Commodore Equipment bought from us.

ROCHESTER SOFTWARE AND COMPUTER CENTRE

38 Delce Road
Rochester
Kent

**OPENING
12 September 1983**

TEL: 0634 408 305

**FOR ALL COMPUTERS,
SOFTWARE AND
PERIPHERALS**

CARVELLS OF RUGBY LTD

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

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

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

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

SERVICES

Self-adhesive
CASSETTE LABELS
PRINTED by computer

4p each — min. chg. £2 — £3.50 per 100
Black on white (text only). CWO.
Pamcomms Ltd, 21 Wycombe Lane,
Wooburn Green,
High Wycombe, Bucks HP10 0HD.

SPLAT



**INCENTIVE SOFTWARE LTD — 54 LONDON STREET
READING RG1 4SQ — (0734) 591678**

LOOK WHAT'S TURNED UP!

SPLAT an original 48K ZX Spectrum challenge by the author of *Mined-out*. Objectives: Exploration, survival and eating grass!!

Zippy, Plums, Rivers, A massive 21K play area, 7 levels to explore. User defined controls, also Kempston & AGF joystick compatible, £500 High Score Competition. SPLAT evolution by Ian Andrew and Ian Morgan.

Price: £5.50 — post free

Also available from all good computer shops

Dealer enquiries welcomed

BBC/ELECTRON: Daisywheel print-outs by return. 90p per program. Send cassette, remittance and SAE to Print-out, 17 Porch Close, Godmanchester, Cambs or write for further details.

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, Perry Mount Road, Haywards Heath, Sussex RH16 3DH.

WANTED

URGENT

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

Best prices paid for the right programs

RAINBOW RESEARCH
288 HIGH STREET
PONDERS END, ENFIELD, MIDDX

WANTED

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

Dream Software PO Box 64
Basingstoke, Hants RG21 2AB
Tel: Basingstoke (0256) 25107



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

Sunshine: Publishers of Popular Computing and Dragon User.

RECRUITMENT

RUN YOUR OWN SOFTWARE CENTRE

An opportunity has arisen for a person to manage a

SOFTWARE CENTRE IN KENT

The suitable applicant should be very interested in Computer Software Hardware (preferably qualified) and have a high level of integrity, self motivation and business acumen. Salary by negotiation.

Please apply in writing to:

Mrs G. Burton (Personnel Officer)
T. Denne & Sons Limited
Watermill, Wye
Kent TN25 5DR

PHOENIX SOFTWARE

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

Send your program to

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

01-868 3353
NOW!!!

FOR SALE

VIC20 + 16K + 3K + 3K super expander + machine code, monitor and speech synthesiser + C2N, cassette and £250 of software, still boxed, £300 ono. Tel: 021-453 2662, ask for Colin.
COLCOVISION, plus Turbo Module, Donkey, Kong turbo cartridges. Unwanted boxed gift, cost £200, accept first £155. Tel: Horsham (0403) 67296.
DRAGON 32 and cassette recorder plus extras, £150. Tel: 01-736 5304.
VIC20 + 3K + game cartridge, £100 ono. Tel: 01-785 9414 after 6 pm.
48K SPECTRUM still under guarantee with over £100 software, including Scrabble and The Hobbit, £140 ono. 01-303 2981.

ATARI 800. Brand new, complete with cassette recorder, games books, etc., £300. Tel: Gravesend 64608.

ZX81 plus 16K Ram, unboxed, £35 or over. Tel: Chalfont St Giles 2392 after 5 pm.

CIFER 127 VDU. As new, attractive white case. Upper/lower case characters, 80 x 40 screen, RS232 interface. Ideal for monitor or converting into home micro. Semi-programmable screen (ie, reverse video, flashing characters). One only, genuine reason for sale, £60 ovno. Tel: 021-458 4377.

FOR SALE. Home computer TI-99/4A from Texas-Instruments, £75. Write to Martin, 99 Finsbury Park Road, London, N4.

VIC20 + cassette unit + 8K expansion + Vic-Kit 2 + programmer's reference guide + joystick + £180 worth of software, £160 ono. Tel: 688 1131.

COLOUR GENI 16K, as new, plus two excellent games and user's club magazine, cost £275, accept £125 or nearest. Tel: 0532 562042.

EPSOM PRINTERS, RX80 + FX80, still boxed, one year's guarantee. Prices: £305 and £423 res. Tel: 0494 775850.

ZX81 KEYBOARD. Full size typewriter — 42 full travel Reed magnet keys. Double shift + space bar. ZX81 + power pack, fits inside. 12in x 9in x 3in case, only £25. Tel: 0602 474973.

SPECTRUM SOFTWARE FOR SALE. Tel: (0642) 824885 between 1 pm and 4.30 pm.

SECOND-HAND ATARI software at low prices, adventures, preppie etc, also your games bought. Sae. A. Horton, 5 Ullswater Road, Dewsbury, W. Yorks WF12 7PS.

VIC20 + CZN CASSETTE UNIT + 16K Ram + Introduction to Basic, Parts 1 & 2, + £80 worth of software + joystick, magazines and books, only £160 ono. Tel: Barnsley 383584.

48K SPECTRUM — four months old — over 65 games plus magazines, £114. Weybridge 52941.

16K ZX81 + Fuller keyboard. Seventeen multi games tapes, leads, manuals, magazines. Tel: Crowborough 63373 evenings.

BARGAIN — MATTEL INTELLIVISION — 20 cartridges including Chess, Demon Attack, Dungeon + Dragons, Lock 'n Chase, £250. Tel: 01-203 1104.

48K SPECTRUM, 4 months old, over 65 games plus magazines, £114. Weybridge 52941.

TR500 LEVEL 2 32K, green monitor, sound, almost new recorder + software, £275 ono. Tel: 01-204 7784 eves.

ATARI 400 — 48K, 810 DD 410 recorder, games, Basic/Assem, books, accept £450 ono. Call Redhill 61612 evenings.

BBC with disc interface, £400. Spare 8271 £25. Silentyte Printer with Apple card, £150 or offers. Cannon, 18 Cowslip Bank, Basingstoke, Hants.

ZX81 16K complete. Books, software included, £35. Birmingham 779 3026.

Computer Swap 01-734 3454

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

Spectrums for sale

SPECTRUM 48K. All leads, manuals, etc. Mint condition. Guaranteed. Over 100 programs, £130. Tel: Herne Bay 2401 anytime.

SWAP SPECTRUM, plus printer, plus three packs printer and fuller box plus £165 software for a BBC "B". Tel: Hornchurch 57487 after 6 pm.

SPECTRUM 48K Kempston joystick, Fergusson cassette recorder, ZX printer, Abacus controller, complete with spare rolls of paper, manuals and magazines, over £300 software. All for £200. Tel: Worksop 477053.

SWAP SPECTRUM PROGRAM "Easy Speak" with either Timegate, Space Intruders, Horace and Spiders or Flight simulation. Contact Master, Room 20, Building 50, Methodist International House, 4 Inverness Terrace, London, W2 3HY on Saturdays.

SPECTRUM SOFTWARE FOR SALE or swap. Have got 3D Tanx and Escape and Rocket Raider. Tel: Mansfield 823647. Ask for David.

SPECTRUM 48K with £70 of original software. Must sell due to purchase of bigger machine, £100. Tel: 01-854 3350.

SWAP SPECTRUM 48K plus £100 of software plus fuller synthesiser plus ZX printer for good condition BBC "B" plus software. Tel: Hornchurch 57487 or write to: Vincent A. Goodrum, 19 Cumberland Avenue, Hornchurch, Essex.

SPECTRUM 48K plus masses of software and magazines, £110. Tel: Upminster 29446.

ZX SPECTRUM 48K ZX PRINTER, three months old and over £175 of software. Price £200. Tel: 0793 24895 evenings.

SPECTRUM 48K plus 20 top games plus Kempston joystick, £120. Tel: 01-657 1814 after 5.30 pm.

ZX81s for sale

ZX81 plus Memotech 16K Rampack, still under guarantee, £35 software. Sell £60. Tel: Bourne End 21656 anytime.

COMPUTER SWAP

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

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

Warning: It is illegal to advertise pirated software.

COMPUTER SWAP

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

Name.....

Address.....

Telephone.....

ZX81 16K drawcase to keyboard — analogue to digital board, £60 worth of commercial software including Cecil, encounter with flight simulation. Cost £180 + new, bargain £80 ono. Tel: David, Oxford 735936 after 5 pm.

ZX81 plus 16K Ram plus software. Excellent condition, only three months old. Any offers considered. Tel: 0276 31176.

ZX81 plus 16K, under guarantee plus software, £35. Tel: 021-328 0463 after 4 pm.

ZX81, 16K plus professional keyboard plus books and software, £70 ono. Tel: 0424 425094.

ZX81 16K, 10 games and magazines for £70 ono, and fuller micro keyboard. Tel: Backton 78125 after 5 pm.

ZX81 16K for £60 including games and tape recorder. Tel: Crayford 529325 after 4.30.

16K ZX81, DK'Tronics keyboard, desk consul, tape recorder, high resolution, dozens of books and magazines. Many tapes including Black Crystal, Adventures, Arcade games. All manuals, £95 ono. Tel: 669-0609.

ZX81 plus 16K plus DK'Tronics keyboard and case. Ten games, tapes and other software, magazines and manual. £70 ono. Tel: 0642 563637.

ZX81 (16K) Sinclair-built DK'Tronics keyboard, printer, save load switch, over £100 of software, one machine book. Cost over £300, will sell for £100. Tel: Paul 722-7425 after 6 pm.

Commodores for sale

COMMODORE 64 + cassette + joystick + software + magazines, £200. Tel: 01-251 3769, after 6 pm.

VIC20 + cassette recorder + 8K expansion + joystick + 3 games and 4 education packs, Vic revealed. Reference guide, 1-year guarantee, £150. Tel: 821 0147, after 6 pm.

VIC20 + C2N cassette + introduction to Basic, part 1 + joystick + Gorf and Jelly Monster cartridges + £50 worth of magazines and £50 worth of software. Still under 9 months guarantee. Fully boxed with manual, worth £300, sell for £100 or £80 ono. Tel: 368 0839, after 5 pm.

VIC20 cassette deck, 8K Ram expansion and super expander. Many magazines, tools, £100 worth of software. All worth £350, sell for £195. Tel: 0279 37629.

VIC20 cassette unit, 3K, 8K and 16K Ram pack + joystick + £1,000 worth of software + books and magazines, £300. Tel: 041 5571533.

PET COMMODORE replacement Ram chips normally £15, a bargain at £5 each. Tel: 0742 483587, after 6 pm.

VIC20 + cassette deck + programmer's aid + machine code monitor + 3K, 8K and 16K Ram packs, with joystick and paddle + 4 cartridges + £130 worth software. Introductory to Basic parts 1 and 2. Vic revealed + programmer's reference guide, £160. Tel: 892 8768. Under guarantee.

Acorns for sale

BBC Model "B" 1.2.05 pass 5 Acorn-soft tapes, for program power two Bugbyte and three others. Seven months old, £420 ono. Tel: Newcastle (0632) 737654 anytime.

ACORN DISK DRIVE, 100K, storage, hardly used, plus manual and spare disks, £130 plus Acornsoft view Rom. Still boxed, £30. Tel: 0344 886178.

BBC "B" 1.20S. Ten months guarantee. Prestel/Micronet plus acoustic modern, Basic course with tapes, one year Acorn user, £365 ono. Tel: 03045 5793.

BBC "A" OR "B" WANTED. In good unmodified condition. Tel: Jim 0202 518828.

SWAP/SELL BBC SOFTWARE. Quicksilver, Wizard, Salamander, Dragon Rider, Asp, Valley, P. Power Killer Gorilla, Superior Alien Dropout, Virgin Landfall, £3 each. Also others. Tel: Bourne End 23544, ask for Malcolm.

Dragons for sale

DRAGON 32, two months old, joystick, light pen + Dragon books, £240 ono. Tel: Newcastle 362826 after 5.30 pm.

DRAGON 32, two months old, joystick, £50 software + books, 100+ magazines including Dragon User, 100+ listings, programs, proven cassette recorder, blank cassettes, 20in b/w tv, £225 ono. Tel: 0908 616840.

DRAGON USER, issue one to four, £1.50. Microdeal game, software, music composer, £8, Shuttle Flight, £4. Tel: Gravesend 64608.

DRAGON 32, excellent condition, complete with manuals, leads, joystick, magazines + lots of software and tape recorder, total value £1,250, O.A.N.O. over £220 considered. Tel: 0532 687964.

SELL OR SWAP DRAGON 32, 1 year guarantee with books, games, joysticks, magazines etc, £176 ono or swap for BBC ALB + £200. Tel: Harlow 0297 30665.

DRAGON 32 + joysticks + £80 worth of software, £165. Tel: 237 6222 (after 5 pm), daytime 01-928 6560 (Stacy).

DRAGON 32, swap for Spectrum 48K (issue 2), two months old, software, joysticks. Tel: Stanford Le Hope (0375) 672031.

DRAGON 32, still boxed, all leads etc + cassette deck + joystick + over £140 of software, mostly arcade games + books, worth over £340 all together, sell for £230 ono. Tel: Hengood 816071.

DRAGON 32, boxed, one month old, cassette recorder + some software, manual, leads, £180 ono. Tel: Leighton Buzzard (0525) 379882 after 7 pm.

Ataris for sale

ATARI VCS, paddles + joysticks, 5 cartridges including Space Invaders and Asteroids, £80 ono. Tel: 01-237 7555.

ATARI CONSUL + 11 cartridges for sale, £150; or exchange for Vic20 software. Tel: Southend 0702 710246 daytime.

SWAP ATARI 400 with Basic and new colour Genie, both 16K, with manuals, for 48K Atari 800, still under guarantee. Tel: 06285 20128.

ATARI 400, 48K, + Trickett's 1-6, Invitation to Programming, part 1 and 2, cassette drive, cartridges, cassettes, 2 joysticks, manuals, £400 ono. Tel: Southend (0702) 63332.

ATARI VCS, five cartridges for £50 ono. Tel: 01-328 2075.

ADVENTURE HELPLINE

Micro 48K Spectrum

Adventure Inca's Curse

Problem How do I open the porthole in the sand dungeon and what do I need to take with me when (or if!) I go?

Name David Skipsey

Address 12 Alexandra Drive, Rock Ferry, Birkenhead, Merseyside L42 4PU

Micro ZX Spectrum

Adventure Planet of Death

Problem Getting past room with loudspeaker and force field

Name Graham Hastie
Address 4A Green Drive, Inverness IV2 4EX

Micro ZX Spectrum (48K)

Adventure Artic's Espionage Island

Problem I cannot get past the tank (despite having plastic explosive and a power source with which to detonate it)

Name Roderick MacLachlan
Address 1 Craig Road, Workington, Cumbria CA14 3JU

Micro Spectrum 16K

Adventure Time-line (Gilsoft)

Problem Have reached grandfather clock but I am unable to do anything at all with it

Name Matthew Mason
Address 13 Beaufort Close, Sampford Peverell, Tiverton, Devon

Micro ZX Spectrum

Adventure The Knight's Quest

Problem In the deserted wasteland I can never find the exit. I know the method is to drop things, search and then pick them up again, but it never works. PS: I have the compass

Name Mark Fairclough
Address 54 Eccleston Road, West Ealing, London W13

Micro 48K ZX Spectrum

Adventure The Hobbit
Problem How to cope with Butlers and Goblins who keep on capturing me and throwing me back into dungeons!

Name Greg Turnbull
Address 29 Rockville, Fulwell, Sunderland, Tyne and Wear SR6 9EL

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: 01-734 3454



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 01-734 3454

Name _____

Address _____

Signature _____

We can normally deliver in 4/5 days.

8TH
DAY

ADVENTURE

Dark Lore is a dynamic new text Adventure game with over 100 locations, and many problems to solve on your journey. Can you find the Sacred Talisman, pit your wits against insurmountable problems, and face many perils in your bid to confront the Dark Lord? Have you the courage to do battle with a host of awesome creatures, gamble your final reserves of money, seek a sea passage, soar boldly through the air, all in a desperate struggle for good to triumph over unspeakable evil? Dark Lore is the epic adventure to play for the 48K ZX Spectrum. Send £6.95 to: **Eighth Day Software, 18 Flaxhill, Moreton, Wirral, Merseyside, L46 7UH.**

.16/48K SPECTRUM...

LATEST RELEASE

"Kopy Kat"

Will Make A Duplicate Of Virtually ALL Software. If you have ever bought a program, you need "Kopy Kat" to protect your investment.

ONLY £3.95 (includes a free program examine routine)

SEND TO

**82, CHURCHWARD AVENUE,
SWINDON, WILTS**

Cathedral software

SPACE LANES
A LASER LANDER

DOOR SLAMMER
A FLASH

**ZX81 (16K)
£4.95**

Cheque PO to:
"The Lodge"
Brandon Lane
Brandon
Co. Durham
DH7 8SJ

**SPECTRUM
ONLY £5.95**

TRADE ENQUIRIES WELCOME
GENEROUS DISCOUNT

© Howard Partnership

**software exchange
centre**

**TO ALL SPECTRUM
PROGRAM WRITERS**

We are the fastest-growing home program exchange business and offer you a service with the following benefits:

- ★ All software is evaluated by us before being added to the list.
- ★ You exchange your copied program direct with other program writers on the list which we send out to you monthly.
- ★ Establish your reputation for writing good programs.
- ★ Rules established to give a fair deal to everyone.
- ★ No copyright or royalties on software exchanged.
- ★ Software can be transferred by telephone.
- ★ We will promote via the list "Top programs of the month" which you sell and reap 100 per cent profit.
- ★ Free program with first list (Evaluation fee 50p per K 0-16K programs, 40p per K 17-48K programs, minimum £2). Annual registration £10 or £1 per list/month

For application form send SAE to: **1C WEST ST. SOUTHGATE CRAWLEY W. SUSSEX**
or Tel: 0293 544322 after 6 pm

**SPECTRUM
POOLS
PREDICTOR**

An easy to use, but very powerful Football Pools Prediction program for the 48K Spectrum. It combines six different techniques of forecasting based on a comprehensive analysis of current form. The program can easily be 'tuned', without any reprogramming, to improve forecasts as the season progresses. Also available for the BBC micro.

£4.99

MAYDAY SOFTWARE **181 PORTLAND CRESCENT
STANMORE, MIDDX HA7 1LR**

C.C.S. LTD.

SAFFRON

SOFTWARE

**URGENTLY REQUIRE
GAMES PROGRAMS OF THE HIGHEST QUALITY
FOR THE SPECTRUM, ORIC, VIC20, COMM 64, BBC**
Cash payments or royalties

Send your superfast, machine code masterpiece, in the strictest confidence to: **C.C.S. Ltd, Saffron, 174a High Street, Hornchurch, Essex RM12 6QP. Tel: (04024) 75613.**

PROGRAMMERS!!
Are you hell bent for recognition? Then contact Saffron

THE

Ω

RUN

..... IS COMING

**ZX81 (16K)
SUPER VALUE GAMES CASSETTES**

GAMES 1	GAMES 2
★ Maze Challenge — 9 levels of play	Goblin Adventure
★ Jackpot — fruit machine with gamble and nudge facilities	625 "Caves"
★ Road Race — very fast	Hours of adventure; almost impossible; uses nearly all 16K; on-screen and printed instructions.
★ Hangman — 2 players	£3.50 including post
£3.50 including post	

Or **GAMES 1 AND 2 CASSETTES £6 ONLY**

H.G.F. SOFTWARE
**14 NEWTON COURT, OUTWOOD
WAKEFIELD WF1 3DW**

RGB MONITOR INTERFACE
for the
Z X Spectrum

The MI3, designed by an ex-Sinclair Research engineer, is the add-on that brings you an ARCADE QUALITY display, amplified SOUND, and simpler tape SAVEing. Please write for details of the MI3 to:

MIRACLE SYSTEMS LTD
6 Armitage Way
Kings Hedges
CAMBRIDGE
CB4 2UE

☎ (0223) 312886

RGB MONITOR

MI 3

ZX SPECTRUM

NEW RELEASES

ELEPHANTS



Steeple Jack is an infuriating new arcade game for the Atari. Your seemingly simple task is to send Jack climbing higher and higher up a series of chimneys.

Occasionally, Jack is thwarted in his climb by a break in the ladder and he must jump to another nearby. The problem is that someone is dropping various strange objects on top of him — elephants for example.

Needless to say, Jack must avoid such hazards, while still trying to rise as high as possible up into the stratosphere.

Program *Steeple Jack*
Price £14.95
Micro Atari (16K\$Disc)
Supplier English Software
Box 43
Manchester
M60 1BW

SECRET CODE

Quick as a flash comes *Computer War* in which you must destroy incoming missiles by cracking a secret code before world obliteration follows — remind you of anything? After the movie and the book comes the game based on *War Games*.

The plot of the game closely follows that of the film — you must first gain entry to the battle computer by cracking a secret code, then you must track the simulated enemy missiles and finally destroy them in a duel to the thermo nuclear death.

Being cartridge based, this

must be one of the few epic games to be announced recently that you won't be able to run on your Spectrum, despite Thorn's moves in that direction.

Program *Computer War*
Price Atari/Texas £28 (average)
Vic20 £20 (average)
Micro Atari/Texas
T199 4a/Vic20
Supplier Retail/Thorn EMI
Thorn EMI House
Upper St Martin's Lane
London WC2H 9ED

CARTOON

And still they keep on coming. Hyperion Software is yet another new company selling Spectrum software.

In *Roadracer*, you are a coyote desperately trying to catch a road runner.

The program sticks quite closely to the sublime cartoons — in the first screen you try to drop an anvil on the bird as it moves past — if you miss, the anvil bounces on the ground and comes up to flatten you. Squashing the roadrunner gets you on to the next screen, where you stand on top of a cliff with the anvil waiting to swing it down and so on.

It's a great idea (always was) and graphically the game is not bad but the whole thing is spoilt (except for very young children perhaps) by being almost entirely in Basic. This means that movements are very clumsy indeed — the coyote moves as though he were on wheels with his feet tied together.

More time and trouble over the animation, plus a few machine code splats, could have made the game a winner. Still, I suppose young children might, as with the cartoon, be entertained by the coyote's inevitable and violent demise.

Program *Roadracer*
Price £5.95
Micro Spectrum 48K
Supplier Hyperion Software
145 Hanover Street
Swansea SA1 6BR

MONOPOLY

Twelve games is a fairly sizable way to launch yourself on to the software market.

Temptation Software comes in a rather interesting cassette box with a silvery cover and a cut out section showing the actual game illustration.

Of the 12 titles, one of the most welcome will be *Micropoly* which allows you to play monopoly on your Vic or Dragon with the computer acting as board and banker.

In an unusual move, both versions are on one cassette. The Vic version requires 16K.

Program *Micropoly*
Price £5.95
Micro Vic20/Dragon 32
Supplier Temptation Software
27 Cinque Ports Street
Rye
East Sussex

SIMPLETON



Quest is an adventure game that seems to include just about every feature of every adventure game you've ever heard of. Taking the role of either wizard, cleric, rogue, fighter or simpleton (does anyone ever choose simpleton?), each with their own strengths and weaknesses, you must locate a special map.

On your way you will meet dozens of gruesome monsters whom you will have to fight for treasure, or simply to continue on your quest. The victor is decided by a complex comparison of combat points, weapons, defence and, of course, luck.

The press release on this game gives a number of helpful clues in playing the game. For example, when you start you should go... (we're not having that — the Elf Most High).

Program *Quest*

Price £5.95
Micro Spectrum 48K
Supplier Hewson Consultants
60A St Mary's Street
Wallingford
Oxfordshire OX10 0EL

FILED

The latest addition to Kenema's range of serious packages for the Oric is *Oric Filestar*.

The program, which is roughly equivalent to *Vu-File* on the Spectrum, enables you to use your computer as a filing system. For example, if you have a list of names and addresses and all you know about someone is the name of their street, the computer should be able to find the file given only this information.

The program comes with a manual which illustrates how to use the chief feature of the program.

Program *Oric Filestar*
Price £12.00
Micro Oric 1 (48K)
Supplier Kenema Associates
1 Marlborough Drive
Worle, Avon
BS22 0DQ

GHOSTLY

Texas owners must be grateful for all the software they can get, since the machine is short of good programs from independent suppliers.

Stainless Software offers nothing but Texas Instruments, programs for both the Basic and enhanced machines. *Zombie Mambo* is a two program pack containing a creepy maze/chase game.

In the first section you must dig up three keys hidden in the graves. Should you pick an inhabited grave, its recently deceased occupant will come after you — you must avoid his touch.

Having found the keys, you will be able to enter the labyrinth in part 2. Here you find your way around the vaults looking for treasure and avoiding more monsters. Finally, you have to find your way out.

Program *Zombie Mambo*
Price £15.00
Micro TI994a
Supplier Stainless Software
10 Alstone Road
Stockport
Cheshire SK4 5AH

NEW RELEASES

MINED



SAS is the follow up to the very successful *Champions* on the Dragon 32.

Although a more conventionally arcade style game than its predecessor, SAS has an elaborate series of instructions and a complex plot.

You are the last survivor of a raiding party whose rescue copter has been shot down. To rejoin your unit you have to cross nine minefields of increasing difficulty. Helicopter gunships are searching for you

and the minefields have patrolling armed guards.

With the aid of a mine detector and a limited supply of grenades, you must cross the mines and get back to base.

Program SAS
Price £5.00
Micro Dragon 32
Supplier Peaksoft
7 Hawthorn Crescent
Burton-on-Trent

DATABASE

Despite it being (relatively) cheap, Commodore is still keen to promote the idea that the 64 is an effective business machine. The promotion of this view may be aided by a sophisticated package from Audiogenic called *Magpie*.

Magpie is a database that uses a series of overlapped menus to enable you to create records of up to 6,000 characters. You can program a series of operations for *Magpie* to extract any given piece of information and then perform complex mathematical calculations upon it.

The program, which is written in machine code, is also compatible with *Wordcraft 64*.

Program *Magpie*
Price £99.95
Micro Commodore 64
Supplier Audiogenic
PO Box 88
Reading

AT LAST, VALHALLA

After what seems like eons, *Valhalla* has arrived.

Roughly a year ago, we saw the first reviews of *The Hobbit* — the game that has stayed at the top of almost everybody's list of the best Spectrum games. Little wonder then that the first question everyone asks about *Valhalla* is: "Is it as good as *The Hobbit*?" The answer is... it all depends.

For those who don't yet know it, *Valhalla* is an animated graphics adventure game with over 100 different locations and 36 characters, all of whom have different personalities.

At first glance, a comparison with *The Hobbit* looks useful. As the program finishes *Loading*, after the excellent title screen, the computer draws an impressive castle in a picturesque setting — *Valhalla* — but you may not enter until you have completed six tasks.

However, a few moments later you realise that something new is happening, objects appear closely followed by figures who wander around and talk to one another.

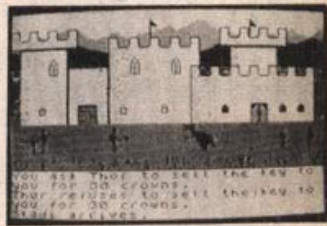
Gradually, as you move around *Valhalla*, you meet the entire cast and begin to recognise the different personalities and start to understand which characters are likely to help you achieve the first of your quests.

There are no words or phrases to be guessed in *Valhalla*, the manual lists them all and the syntax editor won't let you enter anything which is not in its vocabulary. Neither does *Valhalla* have the kind of logical puzzles that were the bane and pleasure of *Hobbit* players everywhere.

The only way to start to master *Valhalla* is to live in its world, talk to all the characters, ask them questions, ask them for help just as they ask each other to do things and ask each other for help. Gradually you can earn the respect of those influential characters

like *Odin* and *Saga* who can help you find the more elusive objects.

I spent a day with *Valhalla* and didn't even master the first quest, this is not just because I am an incompetent adventurer, it's simply that *Valhalla* is so... watchable. Just because you are doing nothing this is no reason for the other characters to interrupt their business. Even if you start alone at a location, you will soon be joined by various goodies and baddies who will fight, eat, pick up objects, and talk.



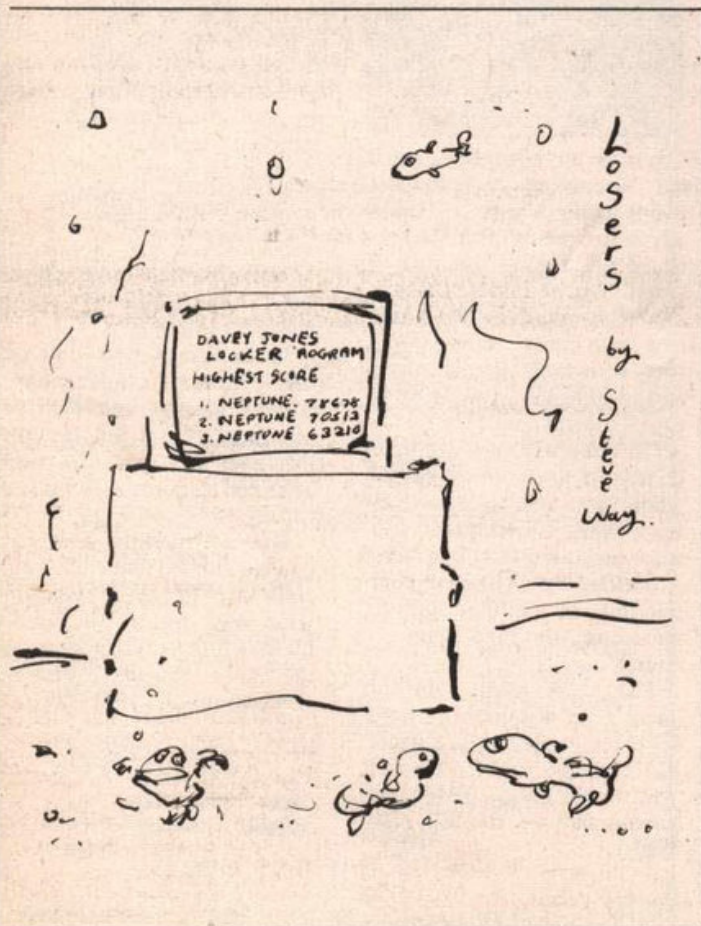
The problem with simply watching *Valhalla* is that you may forget to let your character eat, and unless you eat you die. Dying definitely loses you credibility amongst your friends, but it is not the end of the game. Death in *Valhalla* simply transports you to a god-forsaken wasteland in Hell where you start again, minus many of the useful objects you may have acquired.

Valhalla is really a different ball-game from *The Hobbit*. *Hobbit* could always be described as an adventure in the classic mainframe form, except that it understood sophisticated sentences and had impressive graphics, the rules and puzzles were similar.

Valhalla isn't like anything else. Rather, I suspect, it's the first attempt at something different — liveable movies. Play it for yourself, I don't think you'll regret the £15.

Program *Valhalla*
Price £14.95
Micro Spectrum 48K
Supplier Legend
Freeport
1 Milton Road
Cambridge CB4 1UY

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.



Ziggurat



Intelligence test?

Lately I have been considering what it is to be "intelligent", and what constitutes "intelligent" behaviour.

The idea of trying to gauge what it is to be intelligent, and how we could establish in what way an intelligent being would behave, is symptomatic of our insecurity when faced with the thought of an intelligent machine.

A typical test of intelligence was propounded by Alan Turing. Turing's test of intelligent behaviour has now been used as the reason behind yet another book containing a collection of computer games. I cannot remember too much about the book, but I do remember that the games were given as an example of potential intelligence.

At the time, I thought that the book said more about the potential intelligence of the authors, and their eye for the main chance, than about the possible intelligence of their games. This book's authors thought that Turing and his test added some kudos to their efforts. So, what is his test?

At the simplest level, you sit at a terminal. The person at the other end is either male or female — purely by questioning, you have to decide which he or she is. Turing's test was: could you tell whether the person at the other end was male, female, or realise that it was a computer?

A truly intelligent computer would be able to bluff its way, and convince you that it was either male or female.

An early attempt to try out something like this was Joseph Weisenbaum's *Eliza* program, also called the *Doctor* program. The nature of this program is well known — the computer is programmed to ask empty questions (ie questions which do not require any personal informa-

tion), and not to give any answers.

An empty question might be "What is your problem?", to which an answer might be "Computers". The program searches through the reply, recognises the keyword *computers*, and so answers "Do computers worry you?". Some people can get very carried away talking to *Eliza*.

Weisenbaum tried out *Eliza* on his secretary. She knew that it was only a program, but after a while she turned to Weisenbaum and asked him to leave, because the conversation was private. This story is often used to show how even simple programs have some intelligence.

But, this argument fails totally. If the feeling of personal empathy the secretary felt with the program is taken to indicate intelligence on the part of the program, a child's doll is intelligent — the same empathy exists.

Part of the human condition, and a true measure of the creative intelligence of humanity, is the ability to suspend belief and to become part of the action. If intelligence consists of the ability of the non-human agent to convince the human of its reality, then the film *Love Story* is intelligent, given the reaction of cinema goers.

Mechanical devices, and computers far more than any other device, capture the imagination of the human. The human, by use of his imagination, can make the machine a real part of his world.

The reaction of the secretary is no different to the mindless subservience of many (young and old) to video and computer games. The desire to make the game live, or pour out one's heart to *Eliza*, is the same mysticism which produced totemism in primitive societies.

In some primitive societies, each grouping was known by the name of a living object — animal or vegetable — and in some cases the identification with that object made it into a religious item. Are we beginning to treat computers in a similar way?

The bleary-eyed child who worships his Spectrum does not prove the potential intelligence, or otherwise, of computers. He proves that humanity is blessed (or damned) with a powerful imagination.

The Turing test does not show intelligence, it shows the ability of humans to transcend reality — just as the bleary-eyed child is actually fighting his way through the caverns and lairs. ■

Boris Allan

Puzzle

A dicey proposition

Puzzle No. 77

Artful 'arry, the confidence trickster was up before the magistrates again!

"But yer 'onour," pleaded Harry, "I was only inviting punters to win a few bob in an 'onest wager."

"And how was the wager arranged?" queried the magistrate.

"Well, me lud, let's say you puts down a quid, an' then I puts down a quid. Then you takes these 'ere four dice — and they are 'onest dice, on me 'onour, your 'onour. As I was sayin', you throws these four dice, an' we multiply together the numbers thrown. Then, we adds together the numbers in the answer — that's if there is more than one number — and if the answer 'ad more than one number still we keeps on addin' until only a single figure remains. If this is even then you win the two quid, if it's odd then you lose.

"You see, your worship, it's an evens bet. Dead 'onest!"

Well, is it? How would you rate the odds?

Solution to Puzzle No. 72

We know that the price of chips is less than 75p so the program assigns values from 1 to 75 to variable *C*, and tests the other prices from the menu. Then when a value is found that agrees with all the prices, we have the correct answer.

```
10 FOR C = 1 TO 75
20 LET S = 100 - C
30 LET E = 110 - S
40 LET B = 100 - E
50 LET T = 95 - B
60 IF T + C = 75 THEN PRINT "THE PRICE OF
CHIPS IS":C
70 NEXT C
```

Once we have this value we can find out the prices of all the other items.

The answers are: chips 35p, sausage 65p, eggs 45p, bacon 55p, tomatoes 40p and chicken £1.30.

Winner of Puzzle No. 72

The winner is: Mike Warren, Capell Avenue, Chorleywood, Herts, who receives £10.

Top 10

- Spectrum**
- (1) Scrabble (Psion)*
 - (2) The Hobbit (Melbourne House)*
 - (3) Jet Pac (Ultimate)
 - (4) Flight Simulation (Psion)*
 - (5) Horace and the Spiders (Psion/Melbourne House)*
 - (6) Tranz Am (Ultimate)
 - (7) An Diddums (Imagine)
 - (8) Super Spy (Richard Shepherd)*
 - (9) Horace Goes Skiing (Psion/Melbourne House)
 - (10) 3D Desert Patrol (Computer Rentals)
- *Requires 48K.
(Figures compiled by W H Smith and Son, (Adventure International)†)

ZX81*

- (1) Flight Simulation (Psion)
 - (2) Space Raiders (Psion)
 - (3) Espionage Island (Artic)
 - (4) IK Games (Artic)†
 - (5) Fantasy Island (Psion)
 - (6) Defender (Quicksilva)
 - (7) QS Scramble (Quicksilva)
 - (8) Football Manager (Addictive Games)
 - (9) Ship of Doom (Artic)
 - (10) IK Chess (Artic)†
- *All run in 16K except where shown
(Figures compiled by Boots & Co, London)

Top 10

- Dragon**
- (6) Ring of Darkness (Winterson)
 - (7) Night Flight (Salamander)
 - (4) Taking Android Attack (Microdeal)
 - (1) Frogger (Microdeal)
 - (5) Mined Out (Quicksilva)
 - (3) Cuthbert Goes Walkabout (Microdeal)
 - (2) Shuttle (Microdeal)
 - (8) The King (Microdeal)
 - (9) Space War (Microdeal)
 - (10) Champions (Peaksoft)
- (Figures compiled by Boots & Co, London)

Books

- (1) Advanced User Guide for the BBC Micro, Bray, Dickens and Holmes (Cambridge Micro Centre)
 - (4) Complete Spectrum Rom Disassembly, Logan and O'Hara (Melbourne House)
 - (2) Commodore 64 Programmer's Reference Guide, Commodore (Commodore)
 - (3) Advanced Graphics on the ZX Spectrum, Angell and Jones (Macmillan)
 - (5) Z80 Assembly Language Subroutines, Leventhal (Osborne)
 - (6) BBC Micro Book, Basic, Sound and Graphics, McGregor and Watt (Addison-Wesley)
 - (8) 36 Challenging Games for the BBC Micro, Hartnell (Interface)
 - (9) Spectrum Hardware Manual, Dickens (Melbourne House)
 - (10) Supercharge Your Spectrum, Webb (Melbourne House)
 - (9) Programming the 6502, Zaks (Sybex)
- (Figures compiled by Watford Technical Books, Watford 0923 23324)
(Last week's position in brackets)

Top 10

- Vic20**
- (1) Arcadia (Imagine)
 - (2) The Wizard and the Princess (Melbourne House)
 - (3) Hover Bover (Llamosoft)
 - (4) Grid Runner (Llamosoft)
 - (5) Frogger (Interceptor Micros)
 - (6) Sky Hawk (Quicksilva)
 - (7) Wacky Waiters (Imagine)
 - (8) Crazy Kong (Interceptor Micros)
 - (9) Attack of the Mutant Camels (Llamosoft)
 - (10) Escape MCP (Rabbit)
- (Figures compiled by Boots & Co, London)

Top 10

- Atari**
- (1) Miner 2049er (Big Five)*
 - (7) Pooyan (Datsoft)†
 - (3) Stone of Sisyphus (Adventure International)†
 - (9) Arcade Machine (Broderbund)†
 - (8) Combat Leader (SSI)†
 - (6) Paris in Danger (Avalon Hill)†
 - (5) Close Assault (Avalon Hill)†
 - (4) Orc Attack (Thorn EMI)†
 - (10) Ultima II (Sierra On-line)†
 - (2) Empire of the Overmind (Avalon Hill)†
- *Cartridge. †32K cassette. ‡48K cassette. §32K disc. †48K disc.
(Figures compiled by Callisto Computers, Birmingham 021-632 6458)

BBC*

- (1) Snapper (Acornsoft)
 - (2) Meteors (Acornsoft)
 - (3) Planetoids (Acornsoft)
 - (4) Hopper (Acornsoft)
 - (5) Canyon (BBC Soft)
 - (6) White Knight (BBC Soft)
 - (7) 3D Bomb Alley (Software Invasion)
 - (8) Swarm (Computer Concepts)
 - (9) Pharaohs Tomb (A & F)
 - (10) Demon Decorator (Program Power)
- *BBC Model B only.
(Figures compiled by Micro Management, Ipswich 0473 59181)

