

80p

WIN A
SINCLAIR QL

YOUR

COMPUTER

Canada	C\$ 3.45
Denmark	DKr 30.00
Germany	Dm 7.50
Greece	Dra 210.00
Holland	DFL 7.00
Italy	L 3500
Spain	Pts 300.00
Singapore	M\$ 5.00
Switzerland	SFr 6.40
U.S.A.	\$3.95 D721631

APRIL 1984 BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE Vol. 4 No.4

**Now a monkey with
a monocle can teach
you Spanish—**

**how micros make learning
languages easy**

Review: Aquarius II

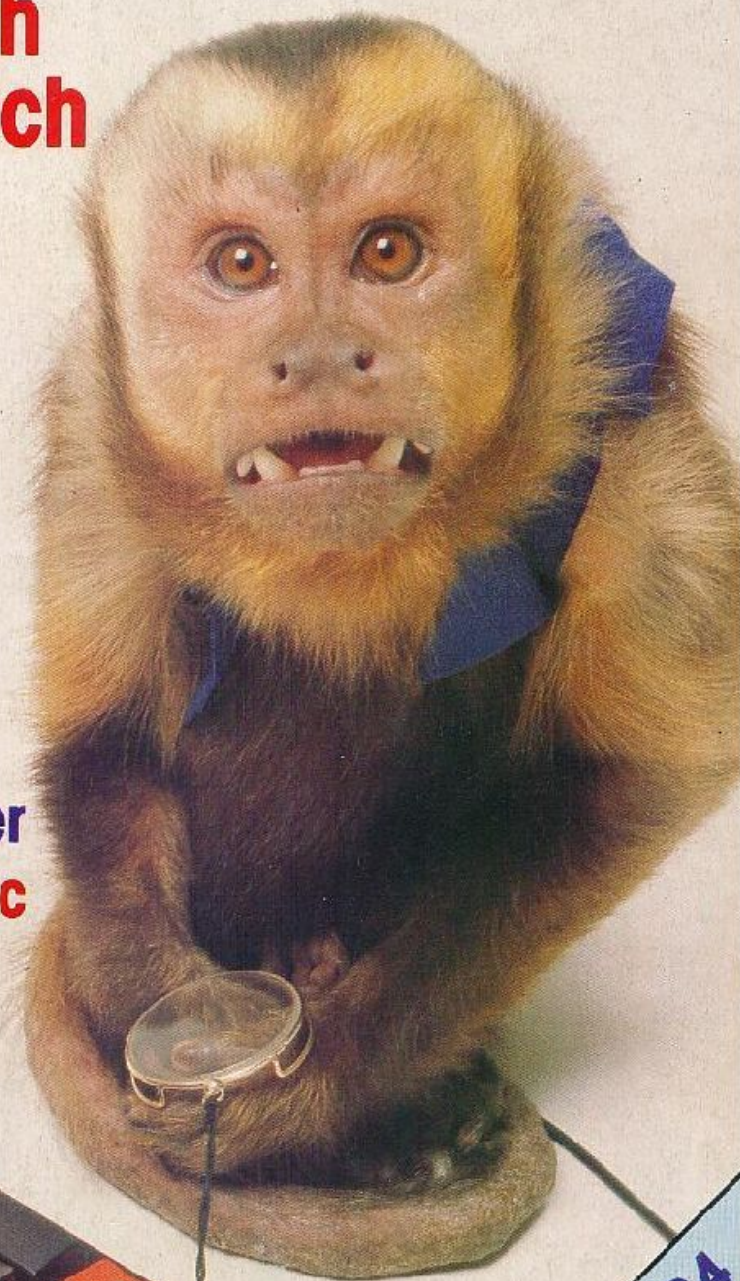
Vlc Labyrinth

**Spectrum Space Quest
and MultiProg**

**CBM-64 and Dragon
games tests**

BBC Squares and Oric Lander

Betta ZX-81 Basic



**COMMODORE 64
SNAPMAN**

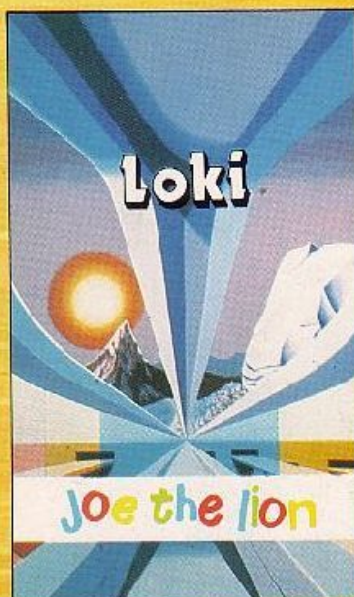
THERE IS ONLY ONE KING
OF THE SOFTWARE JUNGLE!

Joe the lion

Joe the lion
Rules O.K.



Bimbo £5.45
Any Spectrum



Loki £6.45
48 K Oric



Challenger £7.45
BBC B

Distributors please contact Laurence Holt Tel :-061-366-7431. Available from good software outlets.

YOUR COMPUTER

103, 121, 151, 173, 185, 187, 191

Contents

APRIL 1984



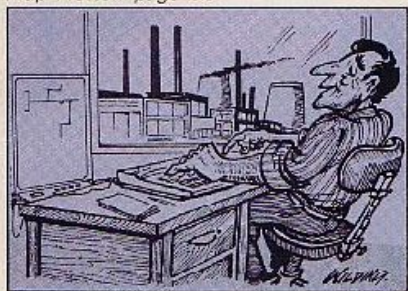
Software Shortlist: page 57.



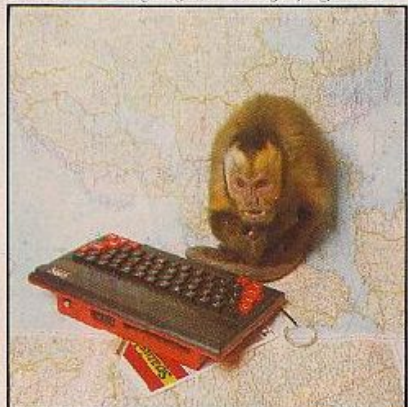
Aquarius II review: page 64.



Map Plotter: page 98.



Above - Multi-programming: page 103.
Below - Language learning: page 80.



Cover photograph by Alan McFaden.

44 EDITORIAL AND YOUR LETTERS: The first of the "why haven't I got my QL yet?" letters; a Sinclair spokesman writes; neglected machines need new software.

46 NEWS: Home computers to control your home; computing under canvas; run your Spectrum programs on a CBM-64 or a QL; cut-throat price cuts loom.

51 FIRST BYTES: User-defined characters; add-ons; Aztec calendar.

55 COMPUTER CLUB: Paul Bone in Guildford.

57 SOFTWARE SHORTLIST: A date with Neptune's daughter, fun with Fred and the Pharaohs; Blue Thunder — blunder through anti-chopper defences.

61 QUEST CORNER: Hugo North is here to help you; meet the Heroes of Kam; get rich quick with the Treasures of Hamil; also hints on pirate hoards.

64 AQUARIUS II: How radical is Radofin's new computer? Kathleen Peel shields her eyes and peers boldly into the second dawn of the age of Aquarius.

68 CBM-64 GAMES: Ace computer jockey Paul Bone looks at 54 releases.

70 DRAGON GAMES: Paul Bone assesses Dragon programs.

72 DESIGN YOUR OWN MICRO: From Angola to Cheam, the computers of your dreams — we preview some competition entries.

77 GAMES WRITING PACKAGES: Simon Beesley looks at Simons Basic; and at an extension to Spectrum Basic; a graphics language; and two games designers.

80 EASY LANGUAGE LEARNING: Meirion Jones, Mike McCann and the *Your Computer* monkey demonstrate how to become polyglots.

86 DRAGON CONVOY: Vince Cockett sails through dire straits.

91 ORIC LANDER: Denis Salisbury goes for a touchdown.

94 ZX-81 LASER DUEL: A two player game for the ZX-81 by David Ives. Collect loads of gold in your V-shaped battle machine.

98 MAP PLOTTER: John Dawson makes land surveying simple with a plane tabling simulation for the BBC Micro and Oric printer.

103 SPECTRUM MULTI-PROGRAMS: Now you can use different utilities simultaneously or show off all your games at any one time with Mark Jones' routine.

107 SINCLAIR QL COMPETITION: Are you one of the lucky winners of Sinclair's 68008-based home computer with the built-in Microdrive?

109 SNAPMAN 64: You are a hungry little Snapman, lost in the food maze. David Rees has produced a remarkably complete version of Pac-Man for the CBM-64.

116 BBC SQUARES: Not a pejorative term, but a games program by Kevin Miles which differs from other Basic games in its use of exclusive-or printing.

121 SPECTRUM SPACE QUEST: Mars too trippy? Venus a trifle artificial? Get away from it all with John Charlesworth. Mind the blue budgies.

125 ZX-81 BETTA BASIC: A set of machine-code routine by J D Jadge which provides the ZX-81 with 14 new Basic commands — some found only on expensive micros.

133 VIC-20 LABYRINTH: A 3D maze game by Paul Hadler.

145 DRAGON SPRITE BASIC: Gary Priest invokes sprites.

151 SPECTRUM TOOLKIT: This program is designed to help the program writer by providing user-friendly routines for actual programming.

156 BBC GRAPHICS: Ian Angel puts things into perspective with the help of three-dimensional co-ordinate geometry in the second part of this series.

164 ZAGORSK: John Ransley searches the Russian monastery.

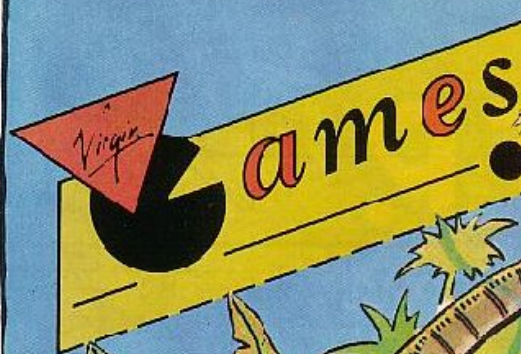
168 MONSTER MINER: Fred Shotton in search of monsters.

171 RESPONSE FRAME: Tim Harrell hands out hints.

173 SOFTWARE FILE: Ten pages of free software for most micros.

193 MTX COMPETITION: Winners of the metal micro.

234 DATABASE: Paul Bond lists micro events.



THE FURTHER ADVENTURES OF THE LAUGHING SHARK

DOWN IN THE JUNGLE
SOMETHING STIRRED.
SOMEONE'S IN A STEW.

YES, IT'S THE LAUGHING SHARK
WHO HAD COME IN SEARCH
OF 6 NEW STEAMING HOT
VIRGIN GAMES

THERE'S RICK O'SHEA
AND THOSE WILD ANIMALS
DOING THE JUNGLE
JIVE

'ELLO CHIEF. NEW
CARPET? SAY NO
MORE. JUNGLE
BLUE WASN'T IT?
NO? OOPS!!
BETTER GET OUT
BEFORE HE CAN
CHECKOUT

I SPY AGENT 003.5 ON
ATLAS ASSIGNMENT.
HIS MISSION TO SEEK AND
FIND STOLEN NUCLEAR PLANS.



LOOKS A LIKELY SPOT
FOR AN AMBUSH
WITH FRANTIC, FAST &
FURIOUS ARCADE FUN.

THIS PLACE IS CRAWLING WITH
BUGS. BIG BUGS, CRAWLY
BUGS, FLYING BUGS. BETTER
BUG OFF..

TO FIND THE
WIZZARD. HE'S
GOT A LOT OF
SORCERY.
HE'LL NEED
EVERY SPELL
IN THE BOOK.

DO IT
YOURSELF
SPELLS

NEW RELEASES



SORCERY

By Martyn Wheeler for the
Spectrum 48K

VGC 1016

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

£5.95 R.R.P.



AMBUSH

By Brian Williams for the
Commodore 64

VGA 6004

Quite simply Ambush is
a, 'just one more go'
type game. Get your
hands on the controls
of your space ship and
nobody will be able to
prise them off. Guide
the space ship through
storms of ever-
increasing attacks from
strange alien forms. Hit
them with your laser
and they split in two,
hit them again and they
drop a proton bomb.
Fast furious action that
is both compelling and
addictive. This is a
winner.

£7.95 R.R.P.
Joystick



ATLAS

ASSIGNMENT

By Martyn Davies for the
Spectrum 48K

VGC 1017

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

£5.95 R.R.P.



CHECKOUT

By Mike Cooke for the
BBC B

VGA 2011

A unique game that
keeps your heart
beating fast. Charlie
the Checkout burglar
dashes round the store
collecting carpet tiles,
a robot guard with
lasers tries to stop him.
This grid walking game
is a must for quick-
thinking, fast-fingered
players.

£7.95 R.R.P.



BUGS

By Dennis Ibbotson for the
Electron

VGA 8001

A rare arcade game for
the new Electron. This
fast-moving arcade
game has the players'
garden being invaded
by a whole host of
nasties, scorpions,
spiders and bugs of all
kinds. Your job is to
shoot them down
before they get you.
Your spray can is very
fast and very
manoeuvrable, but you
can still get caught.

£7.95 R.R.P.



JUNGLE JIVE

By Dennis Ibbotson for the
BBC B and Electron

VGA 2801

By the author of
another new release,
Bugs, Jungle Jive is fast
action shoot 'em up
arcade game. Walk your
hunter between the
lines of snapping,
snarling and slithering
beasts. Shoot them all
but not the baboons,
and especially the
snakes. Faster action as
you progress. But
beware the ricochet -
you could shoot
yourself! Stunning use
of sound and colour.

£7.95 R.R.P.

MAIL ORDER

All our programs are available at normal retail price including postage and packing, direct from our "MY LOCAL DEALER HAS GONE OUT OF BUSINESS BECAUSE HE NEVER STOCKED YOUR GAMES DEPT" at 51-63 Portobello Road, London W11 3DD.

TERMINAL SOFTWARE

from the producers of



STAR COMMAND

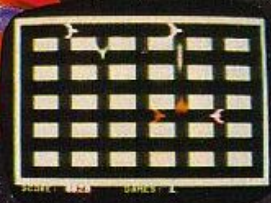
Earn your Star-badge by clearing the Galaxy of hostile forces like Cosmic Kamikazes, Galactic Pirates and hazards like Space Minefields and Meteor Storms.

Fantastic 3-D perspective on the Commodore 64 for £7.95

PLUMB CRAZY!

Stop the tank exploding by plumbing-in a relief pipe using your skill and ingenuity. Avoid the rocks and beware the ghost!

Fun-action game for Commodore 64 £7.95



TERMINAL

TERMINAL SOFTWARE

28 CHURCH LANE, PRESTWICH,
MANCHESTER M25 8AJ

Telephone: 061-797 3635 or 061-773 9313

INTERNATIONAL

WICOSOFT DUSSELDORF, TIAL-ALMHULT,
AASHIMA-ROTTERDAM, CARAT-KOBENHAVN,
ZX AFRICA-SOUTH AFRICA, OZISOFT-AUSTRALIA,
ALPINE-NEW ZEALAND, MICRODIGITAL-U.S.A.

Available from leading computer shops
and distributors, including:-

Dixons
SOFTWARE
EXPRESS

CentreSoft
WEST MIDLANDS

Selected Lewis's
and Co-op
Stores

SoftShop
International

PCS
BLACKBURN,

FD

FERRANTI AND
DAVENPORT LTD.

KRAKATOA

The story so far . . .

"My whole body ached as I scrambled back into the chopper . . . the subs were back! . . . The rockets were coming in over Krakatoa and the constant explosions had brought the volcano to life! . . . I could stay to defend the tanker or get the islanders off the volcano. It wasn't going to be easy! . . . Arming the rockets I lifted off and headed for trouble . . ."

price £5.95

One of the hits of the Microfair at the end of 1983 . . .

"An amazing piece of programming with fantastic full screen graphics and great music! . . . The explosion from the volcano of Krakatoa is both visually and aurally convincing. In short it's a great program with some of the biggest animated graphics we've ever seen. A year ago we would not have believed it was possible to do this."

(Software Supermarket)

PILOT 64

— A flight simulation for the CBM 64 —

Using your memory of the route, safely negotiate the cross-winds, military air-zones and other hazards, over sixteen different types of analog and digital read-out, artificial horizon, air-speed indicator, compass, flaps, instrument landing systems and stall warning. Fly your way back to base and land.

price £7.50

And this is what a professional pilot has to say:-

"PILOT 64 represents a very enjoyable and challenging diversion and will test the skill of pilots of any standard. It affords a close approximation of an actual instrument approach and landing in a light aircraft . . . I unhesitatingly recommend this game to anyone who has ever wanted to be a 'Biggles'."

Yours faithfully

A.M. (ATR/QFI/MULTI/INST, B707, B720, B737, DC8 and TRE on B737)"

AND SOON TO BE RELEASED:

KRAKATOA 64

THE ABOVE SPECTRUM CLASSIC CONVERTED TO THE 64

Abbex magic!

ARCADE ACTION FOR THE ZX SPECTRUM!



JOYSTICK
£9.95
JOYSTICK INTERFACE
£12.95

INCREASE YOUR COMPUTER FUN WITH A PROTEK JOYSTICK SET.

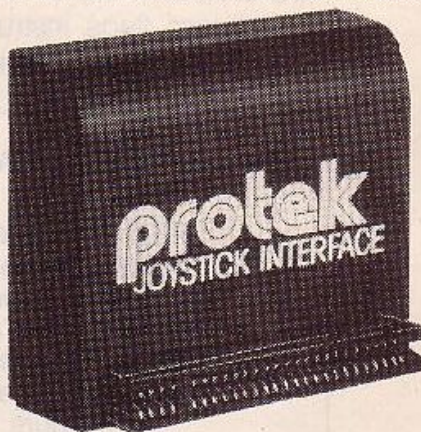
Playing the computer game? Then take control of the situation the Protek way. Our unbeatable combination of joystick and interface has been specially designed to give you arcade quality control on your Sinclair ZX Spectrum.

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

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

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

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



Protek=



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

CBM 64 SOFTWARE

THE HOBBIT	£14.95
HUNGRY HORACE	£5.95
AZTEC TOMB ADVENTURE	£7.95
MOTOR MANIA	£8.95
SIREN CITY	£7.95
BAT ATTACK	£7.95
HOOVER BOYVER	£8.00
FALCON PATROL	£6.95
BITMAN A	£6.95
G.OWNS (Cartridge)	£9.99
RADAR RAT RACE (Cartridge)	£9.99
SEA WOLF	£9.99
SIREN CITY	£7.00
HJSTLER	£5.95
MUNCHMAN	£9.95
SUPER DOG FIGHT	£8.95
FABULOUS WANCA	£7.95
SUPFR GRIDDER	£8.95
PANIC	£7.00
SPRITEMAN	£7.00
FROGGER	£7.00
KONG	£6.50

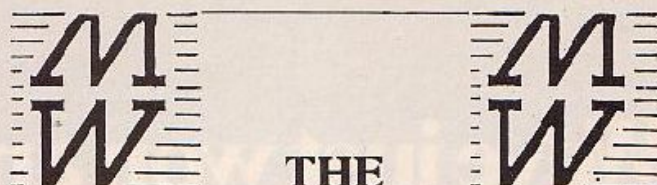
... AND LOTS MORE ...

Cheques/PO's plus 50p PP to:

BYTEWELL

203, Court Road, Barry, S. Glamorgan
CF6 7EW

TEL: (0446) 742491



THE MICRO WORKSHOP MICRO COMPUTER SPECIALISTS

(Spectrum Group Member)

Software and hardware over the counter for
Sinclair Spectrum, ZX-81, BBC, Vic-20, CBM-64,
Memotech, Atari, etc.

- | | |
|----------------|--------------|
| * COMPUTERS | * RAMPACKS |
| * JOYSTICKS | * BOOKS |
| * KEYBOARDS | * DISCS |
| * TAPES | * LIGHT PENS |
| * COMPONENTS * | |

Business/Serious Programs available
Located directly opposite Epsom Main Line
Station. Visit us or ring for friendly service. See
and try before you buy.

Overseas/Export orders welcome

**12 STATION APPROACH
EPSOM, SURREY.
EPSOM 21533**

**48K
SPECTRUM**

Regardez!

**BBC
acorn
electron**

LANGUAGE LEARNING AIDS FOR FRENCH, GERMAN & SPANISH

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

Words, phrases etc are presented first in one language, then the other complete with all necessary accents and special

characters. Masculine, feminine and neuter words appear in different colours to encourage gender learning. All lessons can be run in three different ways, i.e. learning only, self-test or speed and accuracy test.

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

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

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

Available from dealers, large stores or mail order

Also Available "THE SPANISH TUTOR"

Kosmos Software

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

Kosmos Software, 1 Pilgrims Close, Harlington, Dunstable, Beds LU5 6LX.
Please supply the following programs for the computer
(BBC/SPECTRUM/ACORN/ELECTRON) (Prices include postage & packing)

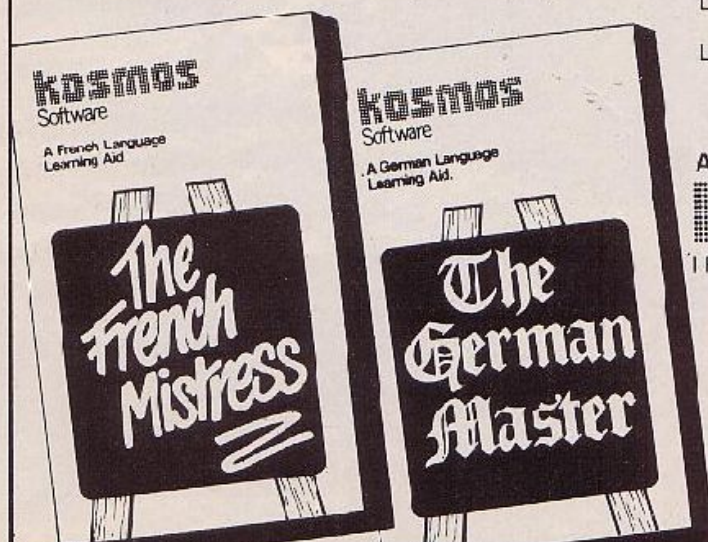
The French Mistress Level A @ £9.95	<input type="checkbox"/> The French Mistress Level B @ £9.95
The German Master Level A @ £9.95	<input type="checkbox"/> The German Master Level B @ £9.95
The Spanish Tutor Level A @ £9.95	<input type="checkbox"/> The Spanish Tutor Level B @ £9.95

Mr/Mrs/Miss

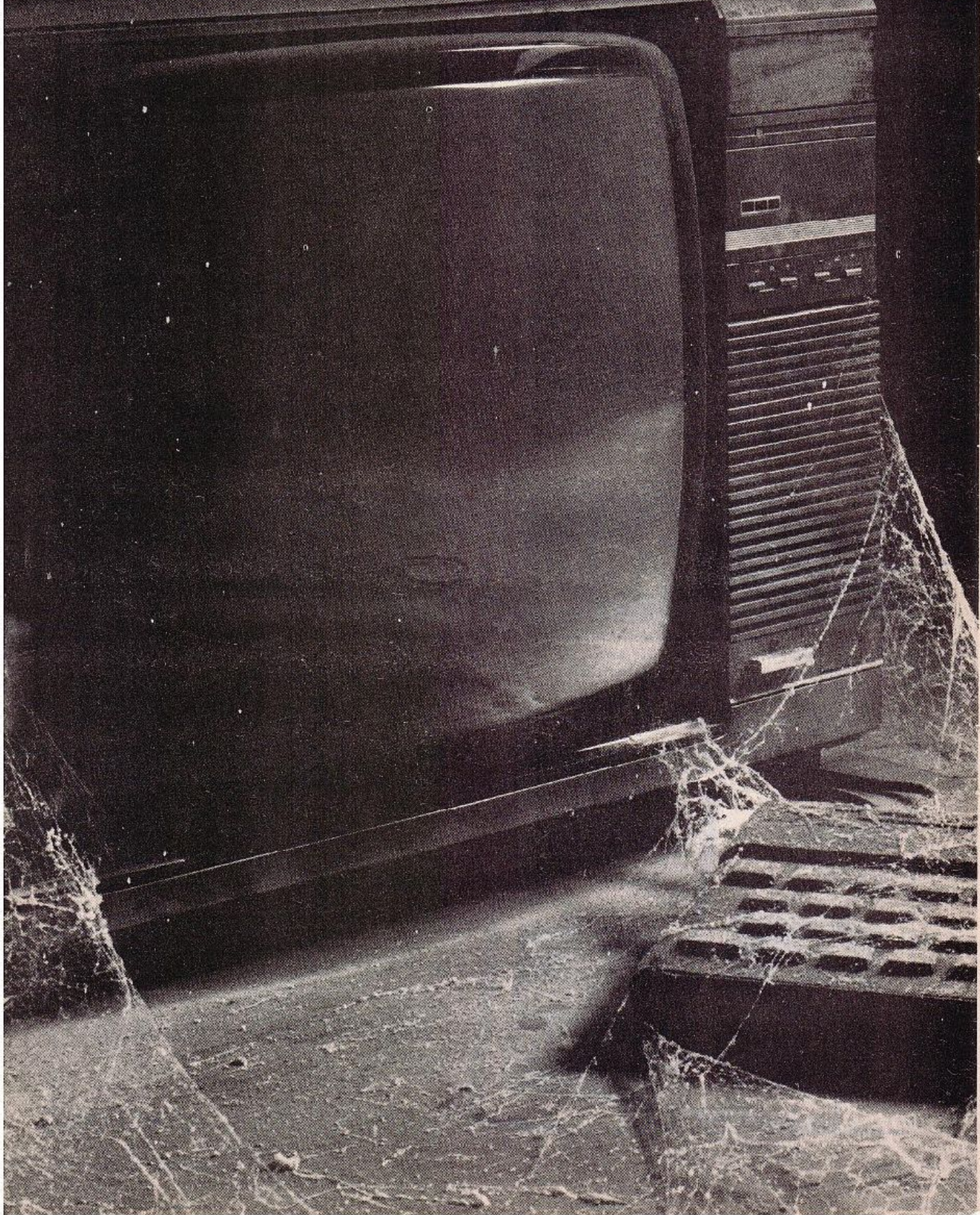
Address

Post code

I enclose a cheque/postal order value £..... payable to Kosmos Software



We've just won an award for blowing



away the cobwebs.

You know the story, the Micro you thought would give endless hours of fun soon becomes a five minute wonder. You get bored and dump it on the shelf to gather dust.

With the introduction of Micronet 800 you now have access to a vast mouth-watering menu of facts, figures and fun.

If we said it was a major breakthrough in microcomputer technology we wouldn't be going over the top.



Just recently at the Which Computer Show we picked up the prestigious RITA award for Systems Innovation of the Year.

RITA is the 'Oscar' of the computer industry. Judged and sponsored by the major forces in related institutes, associations and publications.

Incredibly all it costs is just a pound a week to take up a subscription to the Micronet system. Plus, for most of you, a local telephone call whenever you want to connect up.

Then you've got 30,000 pages at your fingertips, including Computer News Flashes, all that Prestel has to offer, and Micronet's SwapShop. Where you can buy anything from joysticks to second-hand computers.

Interact with our daily news update. You can even take over the world; competing against hundreds of other subscribers on the system, in our 'Starnet' game.

If we haven't won you over with that then try downloading our wide selection of free games and other tele-software.

Naturally, you can run household accounts, manage businesses, talk to other subscribers nationwide using the system.

The list is endless and so is the fun.

The only addition you need to connect with Micronet 800 is a modem unit.

Apart from that all you'll want is a pen to fill in the coupon for more information. Then we'll have you linked up in no time.

Before the dust settles, in fact.

Please send me the full facts about Micronet 800.

Name _____

Make/Model of Micro _____

Address _____

Telephone _____

MICRONET 800, Scriptor Court, 155 Farringdon Road, London EC1R 3AD.
Telephone 01-278 3143.

YC 184

micronet
800

MICRONET 800, Scriptor Court, 155 Farringdon Road, London EC1R 3AD, Telephone 01-278 3143.
*Trade and the Prestel symbol are trademarks of British Telecommunications.

PROGRAM FEATURE

BC BASIC (Commodore 64) £57.50

At last the ultimate has arrived under the name of BC Basic. This is a complete 9K Extension supplied in a Rom pack. Over £7 new or modified commands without affecting the speed or operation. Main areas of enhancement are: Hi-res, Sprites, Text Graphics, UDG, Sound, Machine Code Aids, Structured programming, I/O and more.

Kuma

TERMS: Please add £1.00 post and packing to orders under £20.00 carriage free on all cash, cheque or credit card orders over £20.00 in the U.K. Telephoned credit card orders accepted on our 24 hour ansaphone service. All prices include VAT

SINDAIR SPECTRUM

LOGO	£9.95
The 'Turtle' Graphics language	
ZEN Editor/Assembler	£12.50
A must for the serious programmer	
SUPERCHESS 3.0	£8.95
The strongest Chess program yet	
MAP OF U.K.	£11.95
Educational U.K. Geography	
HORSE RACE FORECAST	£15.00
The Serious Punter's Aid	
HISOFT PASCAL Compiler	£25.00
Compiling Pascal	
VEGETABLE CRASH	£6.95
Exciting Arcade game in M/C	
FROG SHOOTER	£6.95
Exciting Arcade game in M/C	
PINBALL WIZARD	£5.95
Fast-action graphics and sound	
BRIDGE PLAYER	£8.95
Pit your wits against the Spectrum	
BACKGAMMON	£5.95

commodore 64

DATABASE	£24.50
360 pages at 10 lines/page	
BC BASIC	£57.50
Complete 9K Extension in ROM pack	
SIMPLE ACCOUNTS	£24.50
Non-VAT accounting system	
PAINTPIC	£19.50
Drawing/Painting using multi-colour bitmap	
HORSE RACE FORECAST	£19.95
The Serious Punter's Aid	
POOL PERM	£17.25
Improve your pools winning chances	
FOOTBALL FORECAST	£19.95
Written by Professor Frank George	

SHARP MZ MZ MZ 80A 80B 80K

Send for catalogue — an outstanding selection of programs available

SHARP MZ 700

NEW	
● GUNMAN	£6.95
Fast arcade game in M/C	
● COSMIC SCRAMBLE	£5.95
Space Adventure Game	
● CHESSMAN	£6.95
Save the chessmen from destruction!	
● BREAKTHROUGH	£5.95
Fast arcade game	
● SUPER SPACE INVADERS	£6.95
A new version of the arcade classic	
● QUADRAX	£5.95
Line up the counters and foil opponents	
● PINBALL KING	£6.95
Colourful fast-action game in M/C	
● PELMANISM	£5.95
Game of memory	
● MOONLANDER 11	£5.95
Land the lunar module on the moon	
● ATHLETE	£5.95
Fast, colourful maze game	
● STARTREK PLUS	£6.95
The adventures of the starship 'Enterprise'	
● CURSED CHAMBERS	£6.95
Testing adventure game	
● SPEECH SYNTHESIS	£14.50
Over 60 different sound building blocks	
● TYCOON	£6.95
Stock Market game	
● XANAGRAMS	£9.95
Challenging word game in M/C	
● BIORHYTHMS PLUS	£6.95
Program generates biorhythms	
● DISASSEMBLER	£12.50
Zen compatible	
● KUMA COMPILER V2.0	£29.50
Get the best out of your MZ700	
● HU-BASIC	£34.50
220 Commands + D.P.	
● HU-CAL	£34.50
Spreadsheet Calculator in M/C	
● EASIDATA	£19.50
Fast information storage/retrieval	
PACMAN/MILLIPEDE	£9.95
Superb sound and graphics	

EPSON HX-20

DESKMASTER 2	£33.93
Word Processor	
DESKMASTER 2/D	£56.93
Word Processor for disc TF-20	
DESKMASTER 3	£33.93
Spreadsheet Calculator. 16K	
DESKMASTER 3.5	£45.43
Spreadsheet Calculator for expanded HX-20	
DESKMASTER 5	£45.43
The Editing Terminal	
DESKMASTER 6	£22.43
Decision Maker	
DESKMASTER 7	£22.43
Editor Assembler	
DESKMASTER 8	£22.43
Mail Lister	
DESKMASTER 9	£33.93
RAM Database	
DESKMASTER 10	£22.43
Labeller	
DESKMASTER 17	£56.93
Pert and Critical Path Analysis	
DESKMASTER 20	£68.43
Viewdata	
PASCAL Compiler	£45.43
True object code	
FFOSSWRITER	£109.25
Wordprocessor	
CASH EXCHANGE	£22.43
USER DEFIN GRAPHICS	£20.13
A useful asset for the HX-20 user	
HOME BUDGET	£22.43
Home Accounting System	
HORSE RACE FORECAST	£28.17

sirius1 apricot

KUMA FORTH	£207
Full Fg Forth	
BASIC TOOLKIT	£97.75
Ten major subroutines	
ISLES OF ARTUAN	£22.43
Extensive adventure game	
OTHELLO	£22.43
With fine graphics	
MAZE RUNNER	£16.68
Thinking Mans' Maze Game	

PHONE NOW (073 57) 4335

or SEND FOR DETAILS

Please tick box for information required, and send coupon to:

Kuma Computers, Ltd.
12, Horseshoe Park,
Horseshoe Road,
Pangbourne,
Berks RG8 7JW

Hardware
☐ SHARP PC-5000
☐ SIRIUS
☐ SHARP PC 1500
☐ SHARP 700
☐ SHARP A

Software
☐ SHARP 3541
☐ SAGE
☐ APRICOT
☐ EPSON HX-20
☐ EPSON QX-10

Software
☐ NEWBRAIN
☐ COMMODORE 64
☐ ELECTRONIC MAIL
☐ PRINTERS
☐ SPECTRUM

Software
☐

NAME

ADDRESS

POST CODE

I use a

micro-computer.

Choice

Free software, only £225.

If you own a BBC Micro, you can now download, store and run programs (transmitted free of charge via Ceefax) with the new Teletext Adaptor, priced £225 inc. VAT.

These programs make up the BBC Telesoftware Service (which is intended to become a computer software broadcasting channel) and although primarily educational, they will soon develop into general interest and business areas.

And, as they will change every two weeks, you'll soon be able to build up a vast bank of top quality software without ever having to put your hand in your pocket.

But that's not all the adaptor has to offer. It also enables you to gain access to the normal teletext store of data. This is different to simply having a teletext TV because it means

this data can now be transferred to memory and manipulated in any way you wish (making graphs or bar charts for instance).

It's yet another development in our programme to help you fully realise your BBC Micro's potential.

If you're a credit card holder you can order the Teletext Adaptor by ringing 01-200 0200 at any time or 0933-79300 during office hours.

(You can also find out the address of your local BBC Micro dealer by calling the same numbers.)

Alternatively, you can order it by sending off the coupon below.



Technical Specifications

Access to Teletext and Telesoftware Services broadcast on U.H.F channels E21 to E69.

Speed of max. data capture rate approx. 128k baud. (8 lines of Teletext per frame.)

Height 70mm. Width 210mm. Depth 350mm. Weight 2kg. Colour: BBC Computer cream.

Construction: Moulded top and bottom to match BBC computer profile. ABS injection moulded plastic.

Controls: Four tuning potentiometers on rear panel.

Mains on/off switch on rear panel.

Power in 240v, 50Hz, 15w.

Operating Temperature: 10° to 35°C.

Designed and manufactured to comply with BS415 Class 1 standard.

To: BBC Microcomputers, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL.

Please send me _____ BBC Teletext Adaptors at £225 each, inc. VAT and delivery. I enclose PO/cheque payable to Readers A/C, Acorn Computers Ltd, or charge my credit card.

Card Number _____
Amex/Diners/Visa/Access (De.etc)

Name _____

Address _____

Postcode _____

Signature _____

Registered No. 140 3810 VAT No. 215 400220

The BBC Microcomputer System.

Designed, produced and distributed by Acorn Computers Limited.

BUG-BYTE SOFTWARE



**BUG-BYTE
SOFTWARE**

PRESENTS

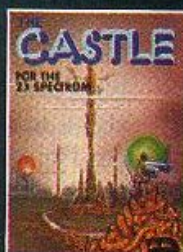
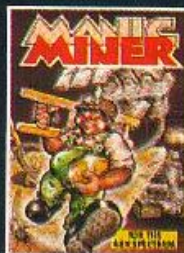
THE BIRDS AND THE BEES
THE BIRDS AND THE BEES (C) 1983



The Birds and The Bees is an original animated cartoon-style game, introducing, for the first time on screen, Boris the Bee. Boris must collect as much nectar as possible, whilst avoiding various nasties like birds, wasps, centipedes and Venus fly traps. Smooth, fast machine-code action throughout, with sound effects, joystick option (most types) and speech option with the Currah Microspeech Unit.

Author: Adrian Sherwin with graphics by Matthew Smith (of Manic Miner fame)

**OTHER BEST SELLERS
FOR YOUR SPECTRUM**



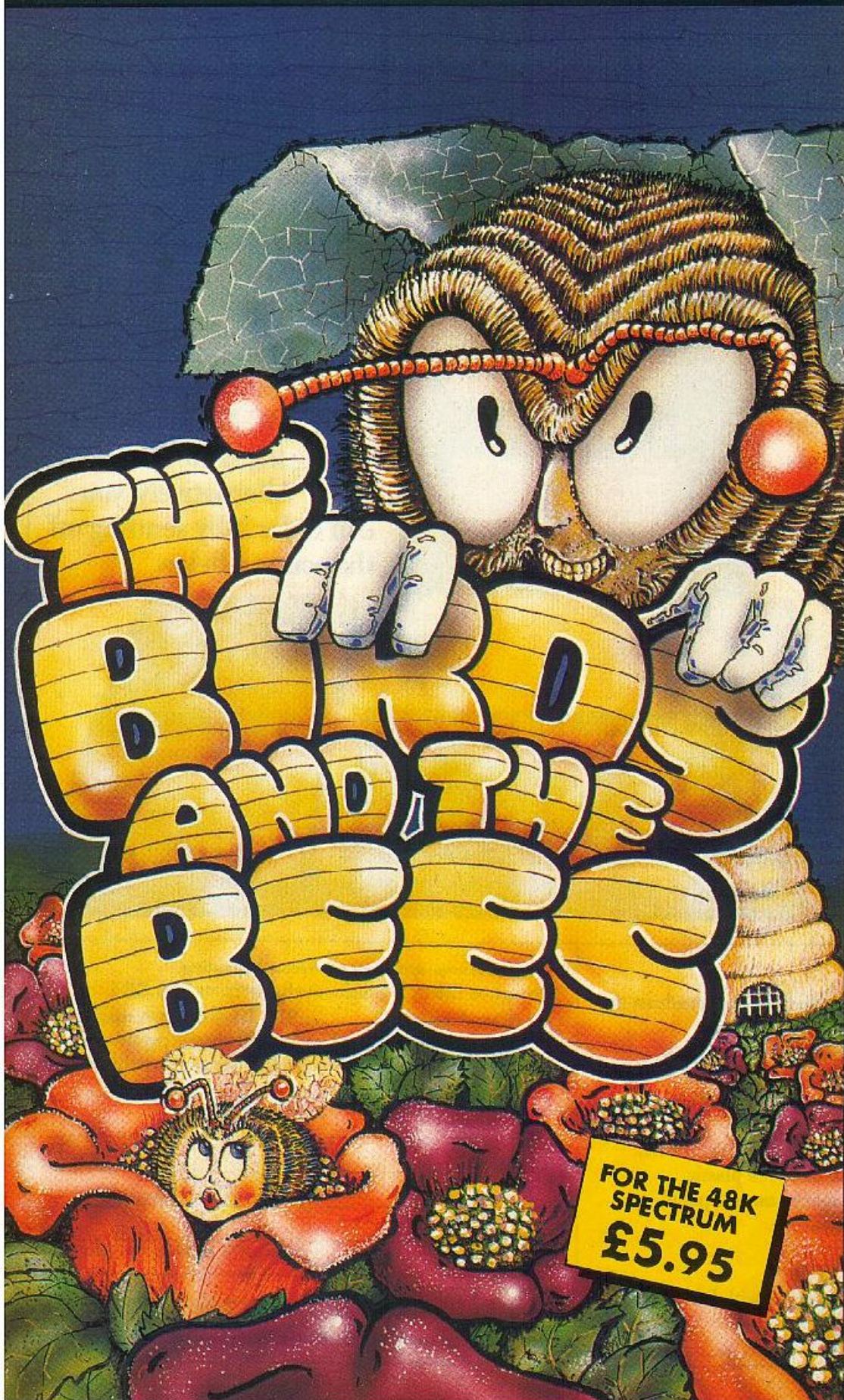
Bug-Byte Limited

Mulberry House,
Canning Place, Liverpool L1 8JB

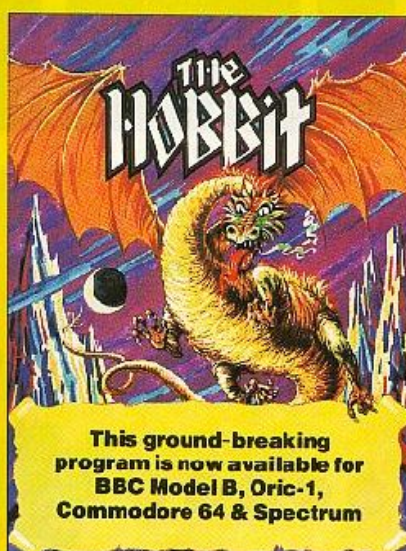
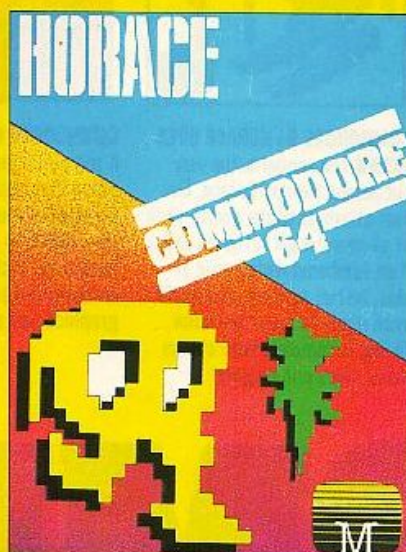
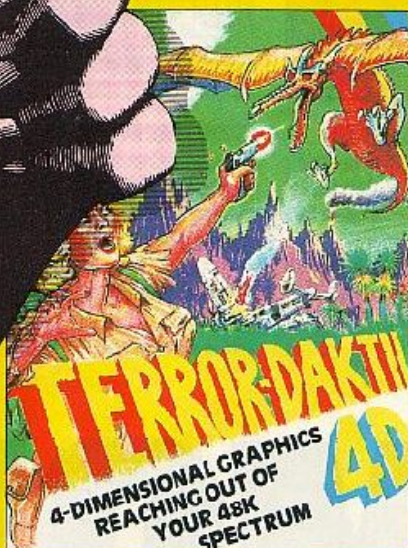
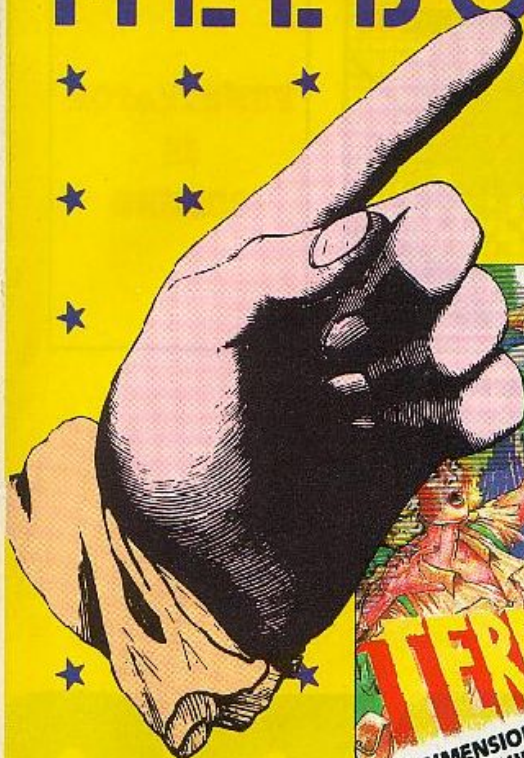
Dealers contact Matthew Thomas
on 051-709 7071

Registered Dealers can order
direct from CBS Distribution
on 01-960 2155

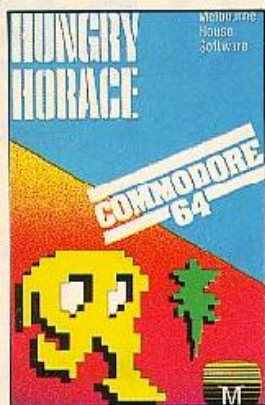
**FOR THE 48K
SPECTRUM
£5.95**



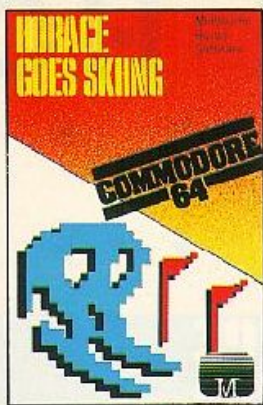
MELBOURNE HOUSE



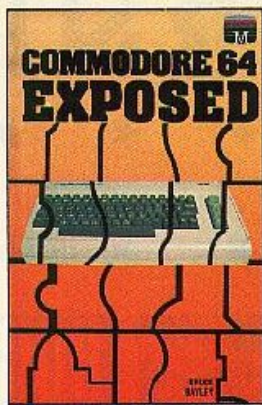
Melbourne House has the No.1 bestsellers
for the Spectrum, Commodore 64,
Dragon 32, BBC, Electron and Oric



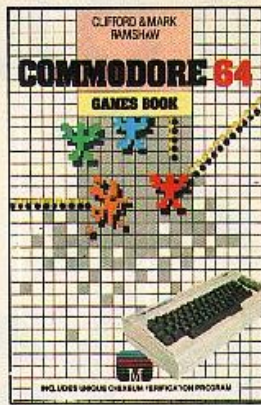
COMMODORE 64 HUNGRY HORACE Just when you thought computer games had nothing more to offer, here comes Horace for your Commodore 64. Hungry Horace creates havoc in the park as he picks the flowers, annoys the guards and steals their lunch.



COMMODORE 64 HORACE GOES SKIING The sequel to the very successful Hungry Horace. Our hero attempts winter sports. First of all he must get to the ski shop, then lumbered with a pair of skis, he has to dodge the traffic once again to reach the snow. Skiing is complete with slalom flags, trees and moguls!



COMMODORE 64 EXPOSED A complete and comprehensive guide that clearly explains every function of your Commodore 64 from BASIC to Machine Language. Includes full details on advanced programming, graphics and sound.

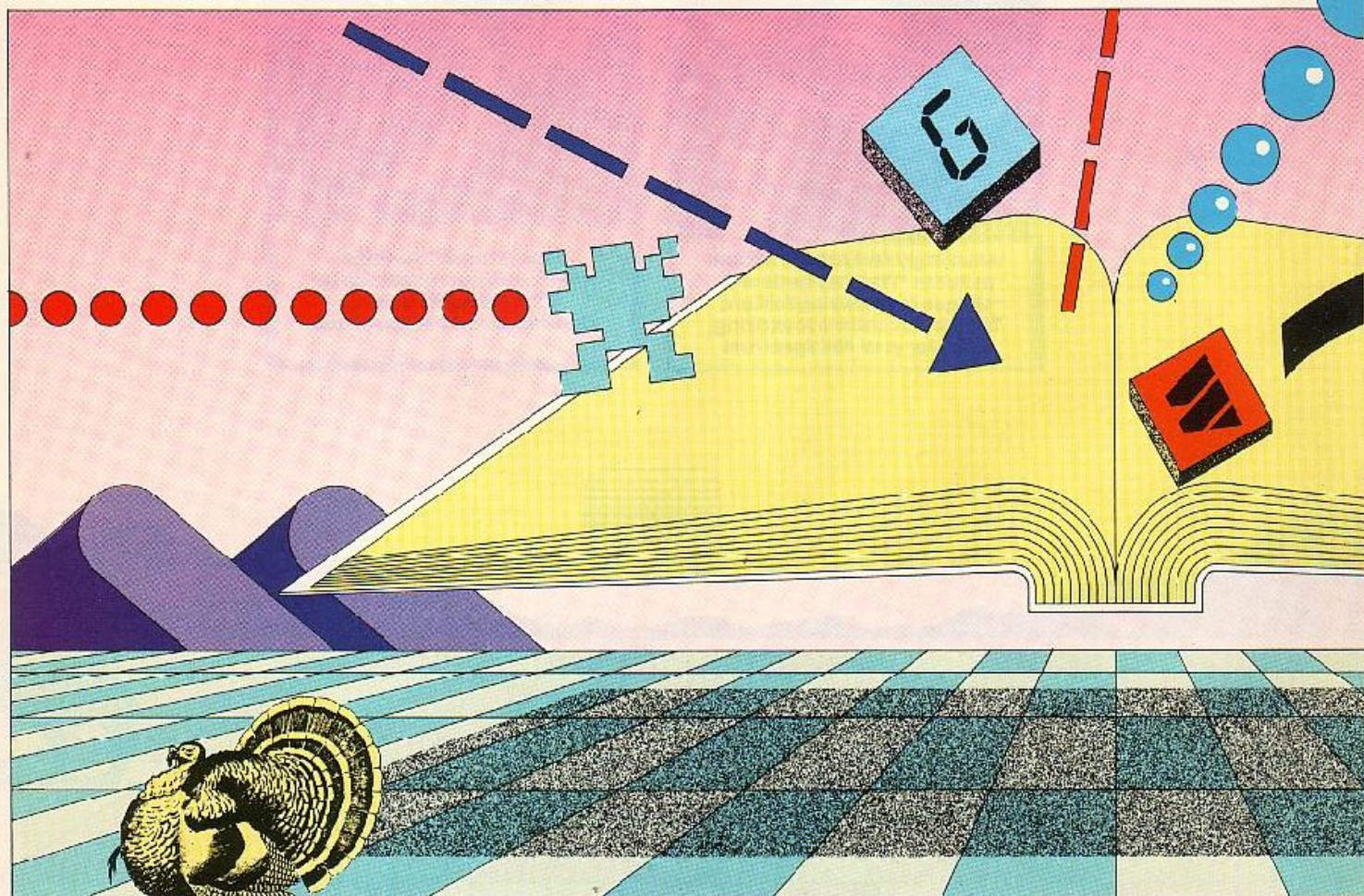


COMMODORE 64 GAMES BOOK Teach your Commodore 64 every trick in the book. 30 programs ranging from nerve-shattering space games to real life adventures. "For a Commodore 64 games enthusiast, this is a must."

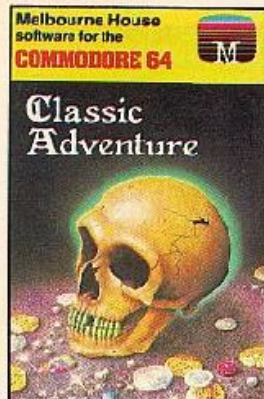
— Personal Computer News



COMMODORE



M E L B O U R N E



CLASSIC ADVENTURE This is the program that started it all! Now you can discover the excitement of Classic Adventure on your Commodore 64, and if you are masterful enough you too could become a Master Adventurer.

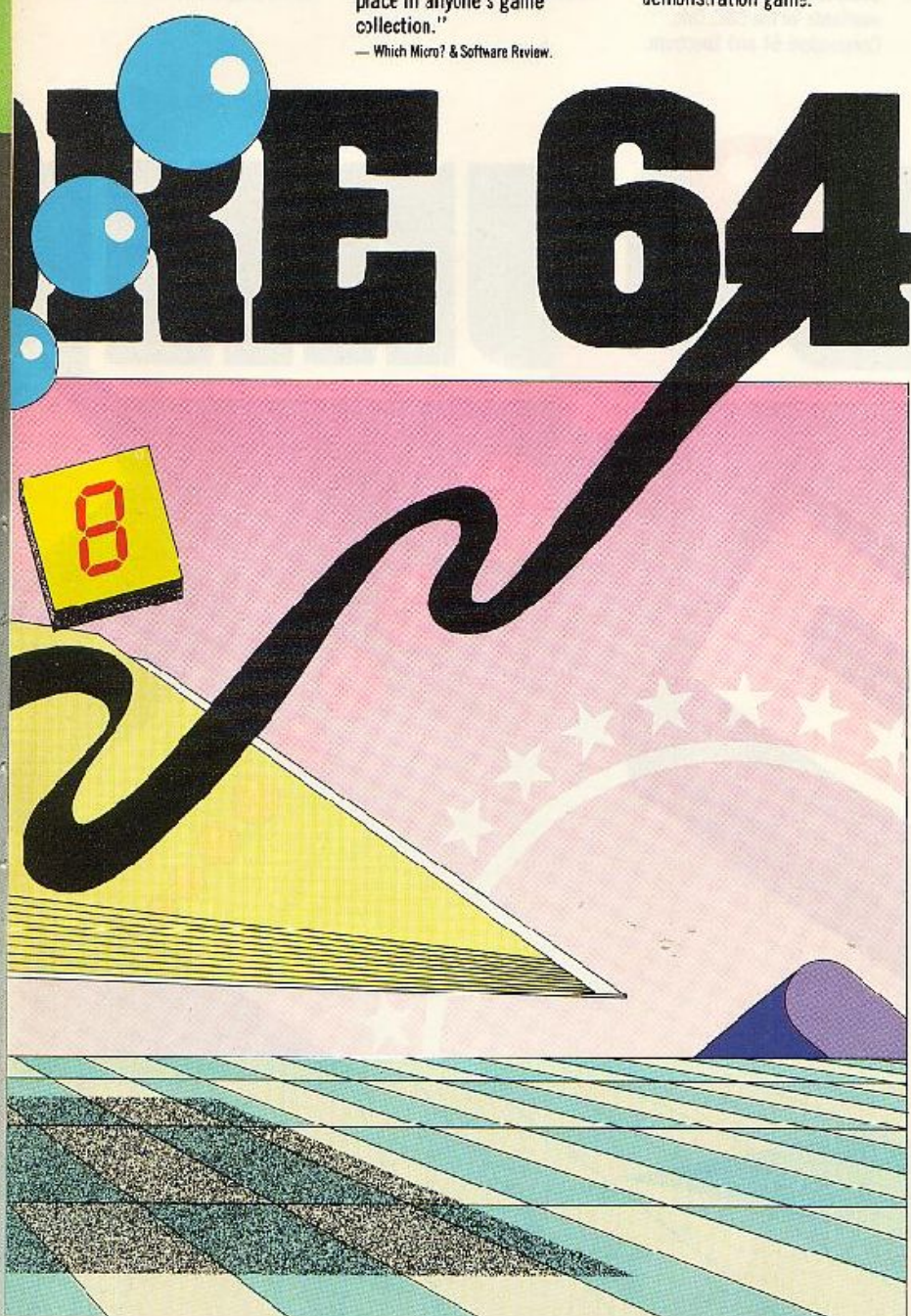


THE HOBBIT Visit J.R.R. Tolkien's Middle Earth with The Hobbit. The most amazing adventure yet devised. "The Hobbit has been transferred to run on the Commodore 64 and what a success it is. The graphical displays are superb. Worth a place in anyone's game collection."

— Which Micro? & Software Review.



A.C.O.S.+ 36 new BASIC commands for your Commodore 64 covering the fields of cassette input and output, graphics, sound and utility commands. The A.C.O.S.+ program also allows the user to add his own BASIC commands. Includes a free demonstration game.



H O U S E

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

Correspondence to:
Church Yard
Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

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

VIC 20

☐ VIC Cosmonauts £5.95

COMMODORE 64 Books

☐ Commodore 64 Games Book £5.95
☐ Commodore 64 Exposed £6.95

Cassettes

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

ORIC-1

☐ Oric-1/48K The Hobbit £14.95

BBC

☐ BBC The Hobbit £14.95

SPECTRUM

☐ Spectrum The Hobbit 48K £14.95
☐ Penetrator 48K £6.95
☐ Tenor-Daktel 4D 48K £6.95
☐ Melbourne Draw 48K £8.95
☐ H.U.R.G. 48K £14.95
☐ Abersoft Fort 48K £14.95
☐ Classic Adventure 48K £6.95

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

£
Please add 80p for post & pack £80

TOTAL £

I enclose my ☐ cheque
☐ money order for £

Please debit my Access card No

Expiry Date

Signature

Name

Address

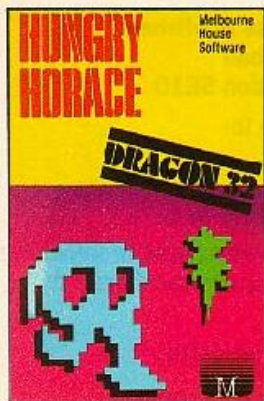
Postcode

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



YC4A





DRAGON HUNGRY HORACE. It has been said that Horace games are in a class of their own. In fact, Horace is almost a legend. Hungry Horace, the original Horace adventure, is now available for the Dragon 32.



COSMONAUT. Written entirely in Machine Language, Cosmonaut is an exciting and challenging game of arcade strategy. Works with joystick or keyboard and features moving elevators, storm troopers, laser guns and more. A full screen game for the unexpanded VIC 20.



THE HOBBIT. Visit J.R.R. Tolkien's Middle Earth in the most amazing adventure yet devised. "A game by which future games will be judged." — Personal Computing Today. "Superior to any other adventure game." — Your Computer. The Hobbit is now available for the BBC, Oric, Commodore 64 and Spectrum.

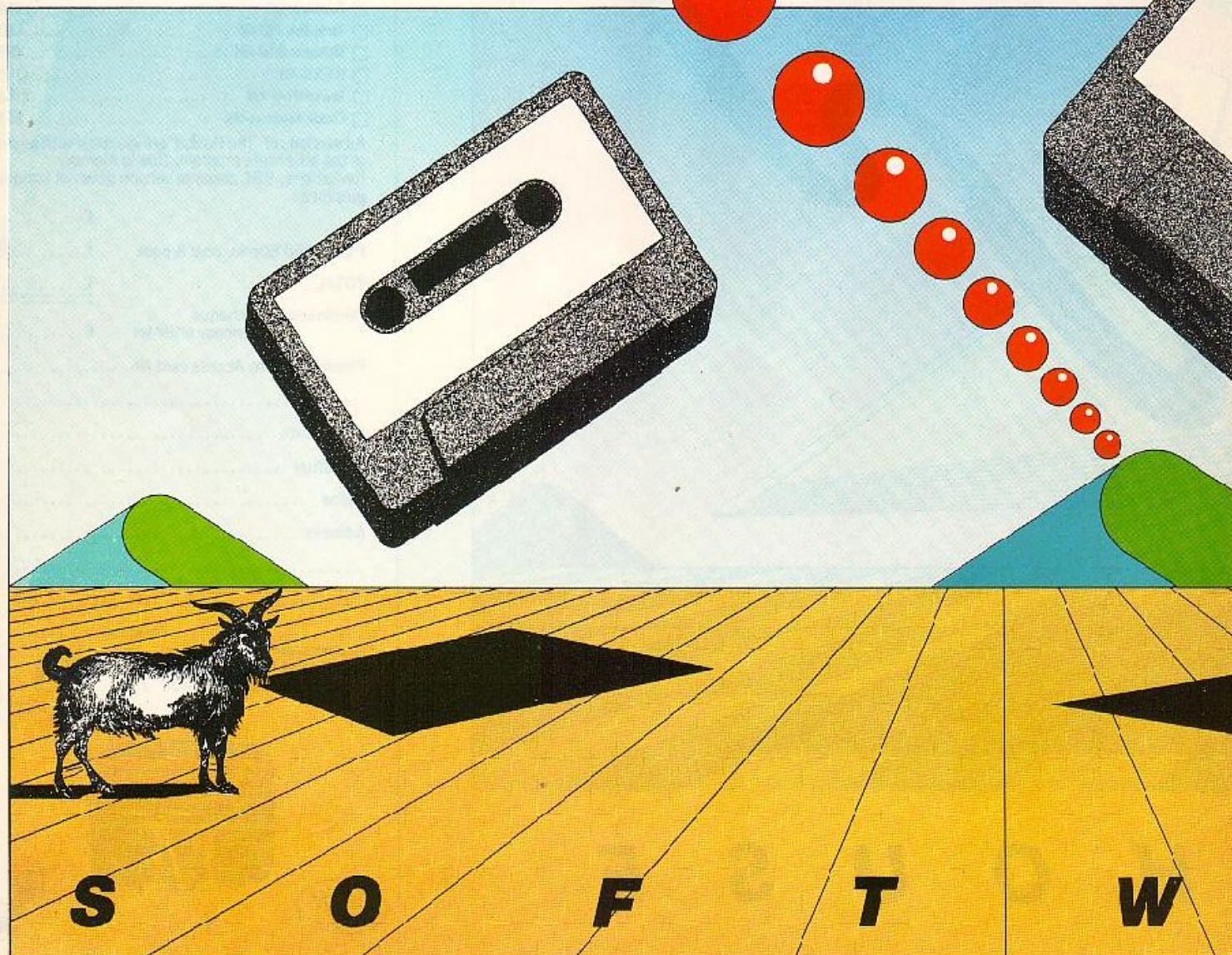


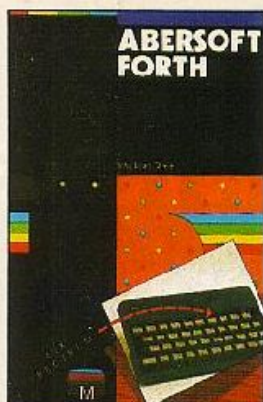
H.U.R.G. A revolutionary piece of software for your 48K Spectrum which allows you to develop high quality Machine Language arcade games with absolutely no programming experience. Enter the H.U.R.G. competition and win £3000.



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

MELBOURNE

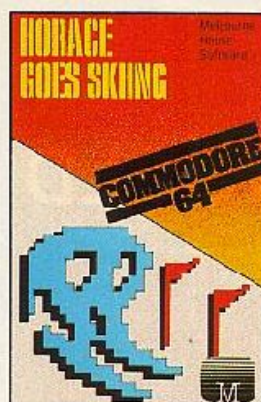




FORTH. Abersoft Forth is an implementation of the Forth Language for your Spectrum 48K. Forth is closer to Machine Code and more than 10 times faster than BASIC. "The only Spectrum package which has been endorsed by the Forth Interest Group" — Sinclair User.

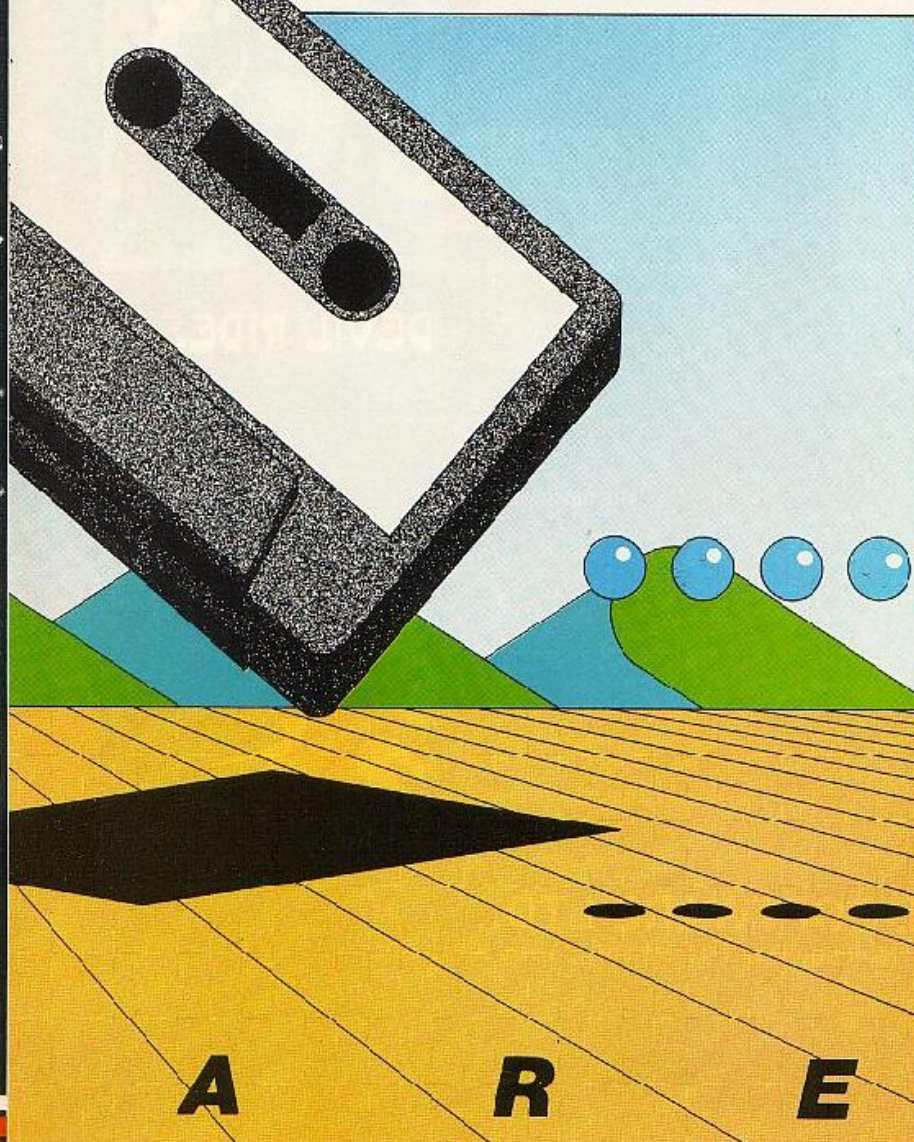


PENETRATOR is one of the most challenging arcade games for the 48K Spectrum. Amazingly fast arcade action includes training mode and unique customising feature. "Penetrator is my pick — the graphics are terribly impressive... a most enjoyable and addictive game." — Computer and Video Games.



COMMODORE 64 HORACE GOES SKIING is the sequel to the very successful Hungry Horace. In this adventure our hero attempts winter sports. Skiing is complete with slalom flags, trees and moguls so watch out Horace!

MELBOURNE HOUSE



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

Correspondence to:
Church Yard
Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

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

VIC 20

- ☐ VIC Cosmonauts £5.95
☐ Wizard & Princess £5.95

COMMODORE 64

Books

- ☐ Commodore 64 Games Book £5.95
☐ Commodore 64 Exposed £6.95

Cassettes

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

DRAGON 32

- ☐ Hungry Horace £5.95

ORIC-1

- ☐ Oric-1/48K The Hobbit £14.95

BBC

- ☐ BBC The Hobbit £14.95

SPECTRUM

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

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

£
Please add 80p for post & pack £80

TOTAL £

I enclose my ☐ cheque
☐ money order for £

Please debit my Access card No

Expiry Date

Signature

Name

Address

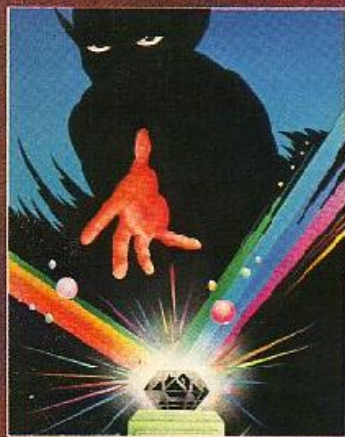
Postcode

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



A NEW WORLD OF ADVENTURE

BLACK CRYSTAL



BLACK CRYSTAL A THIRD CONTINENT SERIES ADVENTURE

The Classic, six program adventure game for the 48K Spectrum and 16K ZX81 computers. No software collection is complete without it. **Black Crystal** an excellent graphics adventure and a well thought out package. *Sinclair User, April '83* "Black Crystal has impressed me by its sheer quantity and generally high quality of presentation. I am afraid I have become an addict." *Home Computing Weekly, April '83* **Spectrum 48K** 180K of program in six parts only **£7.50**
ZX81 16K over 100K of program in seven parts only **£7.50**
WHY PAY MORE FOR LESS OF AN ADVENTURE?

THE CRYPT by Stephen Renton

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

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

THE CRYPT



ADVENTURES OF ST. BERNARD



THE ADVENTURES OF ST. BERNARD

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

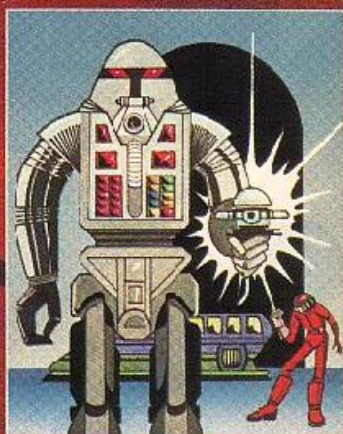
Available for 48K Spectrum **£5.95**

STARFORCE ONE

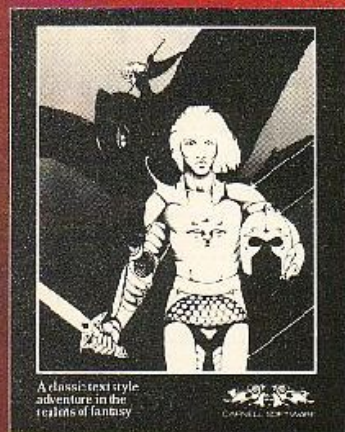
Take on the robot guardians of the central computer in a superbly stylised three dimensional battle game (100% machine code arcade action)

Available for 48K Spectrum **£5.95**

STARFORCE ONE



VOLCANIC DUNGEON



VOLCANIC DUNGEON A THIRD CONTINENT SERIES ADVENTURE

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

"The whole game mechanism makes for a very Addictive Program, and one that remains a firm favourite with many Adventurers."
Popular Computing Weekly, June 1983

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

THE DEVIL RIDES IN

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

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

Available for 48K Spectrum **£5.95**

DEVIL RIDES IN



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

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

DEALERS: Contact us for your nearest wholesaler.

FROM CARNELL SOFTWARE



"THE WRATH OF MAGRA" A THIRD CONTINENT SERIES ADVENTURE

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

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

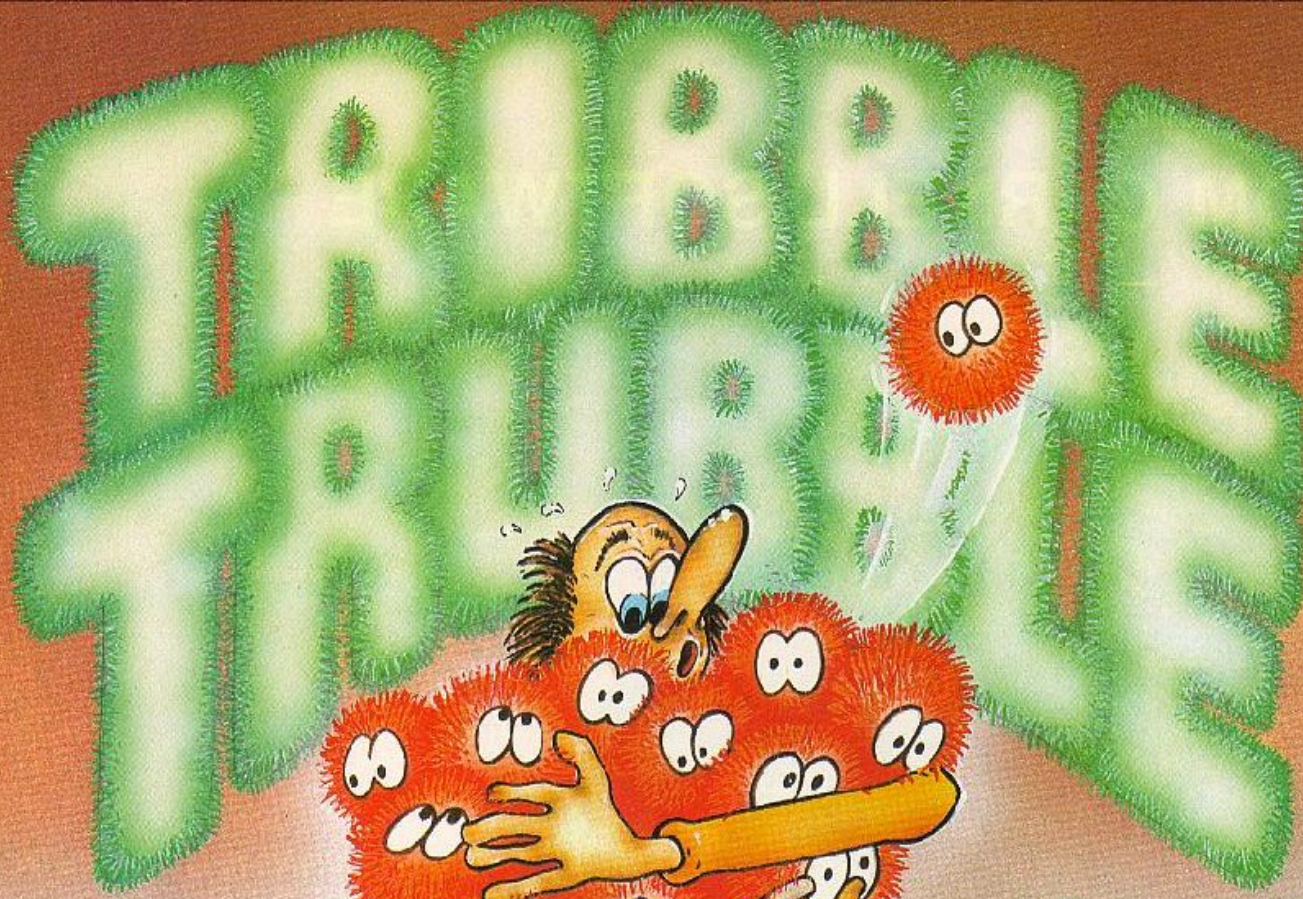
"The Wrath of Magra" comes as three, 48K programmes on cassette, boxed with instruction manual and book detailing the history of the Third Continent and the many spells you will be using throughout the game. For the 48K Spectrum @ £12.50.

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

Available from Feb '84



CARNELL SOFTWARE LTD



By Jim Scarlett

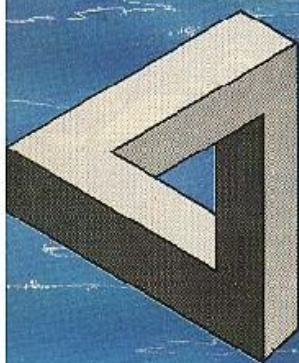
TRIBBLE TROUBLE 48K SPECTRUM

Brian Skywalker is a tribble farmer on the planet Noom. When on a mission to round up wild tribbles to increase his stock, his Noomrever runs out of fuel and poor Brian is forced to herd his captured tribble back to base on foot. Luckily, tribbles are (fairly) obedient and if they are close to Brian, they will go in the direction he is facing. Brian himself is practically indestructible, but various tribble-trapping hazards must be overcome before the pair can return safely to base.

£5.95

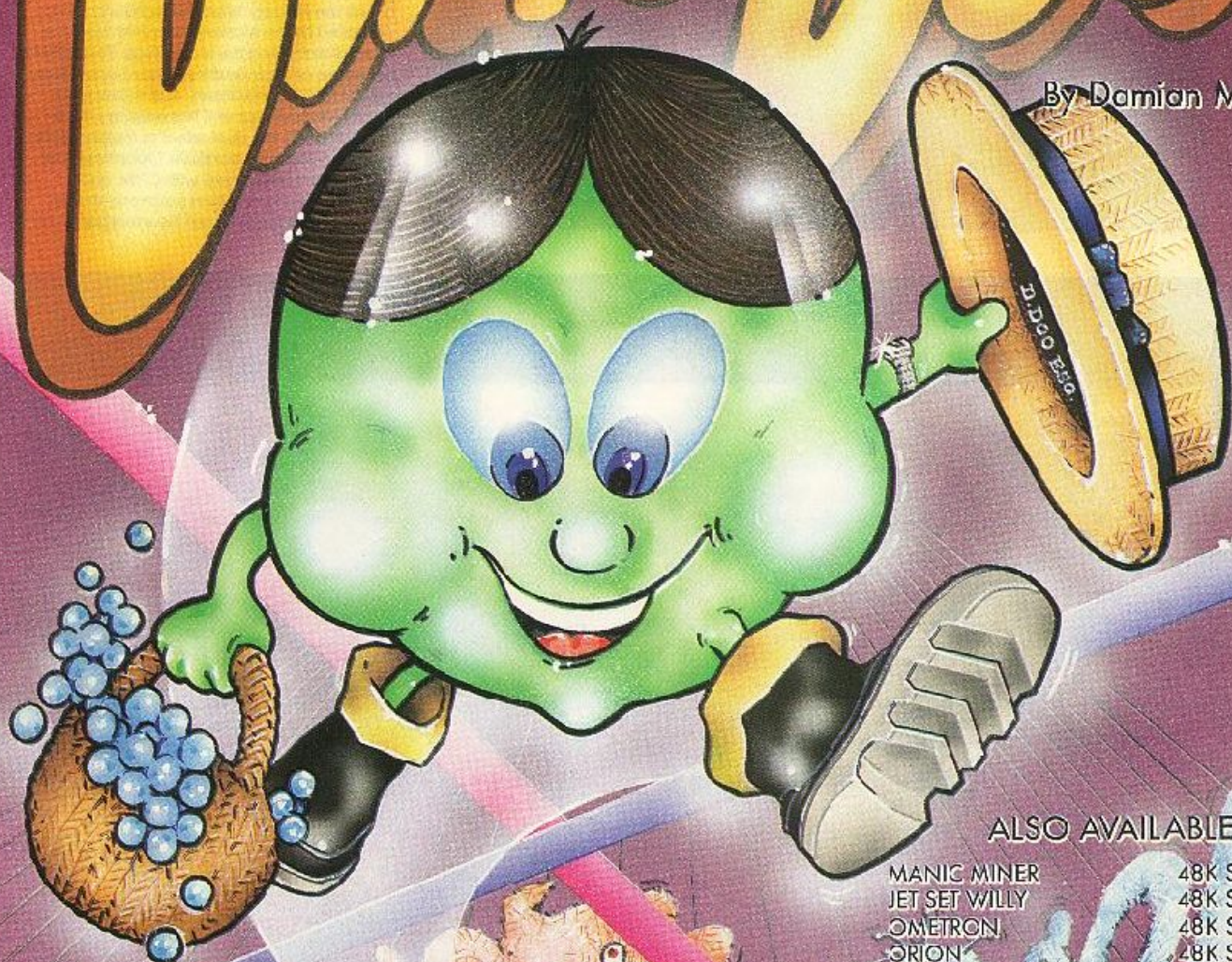
SOFTWARE PROJECTS

Bear Brand Complex,
Allerton Rd., Woolton, Liverpool,
Merseyside L25 7SF



Dinky Doo

By Damian McComb



DINKY DOO COMMODORE 64

You awake as if in a dream. No, not a dream, a nightmare. Everything seems to be against you. Skulls, horrible nasties, electrified walls and snakes. If only you could get around the maze unscathed and drink your hot milk maybe they will all go away.

It seems to work now you can cuddle up to your hot water bottle and dream nice dreams, or can you? Life is hard for cute little Dinky Doo!

£7.95

ALSO AVAILABLE

MANIC MINER	48K SPECTRUM
JET SET WILLY	48K SPECTRUM
OMETRON	48K SPECTRUM
ORION	48K SPECTRUM
PUSH-OFF	16/48K SPECTRUM
THRUSTA	16/48K SPECTRUM
McKENZIE	48K SPECTRUM
SPACE SWARM	UNEXP. VIC 20
SPACE LOUST	UNEXP. VIC 20

ALL £5.95 EACH

CRAZY BALLOON	COMMODORE 64
MANIC MINER	COMMODORE 64
LEGION ADVENTURE	BBC B

ONLY £7.95

IN STOCK NOW AT YOUR LOCAL COMPUTER STORE
AVAILABLE FROM SELECTED BRANCHES OF BOOTS AND JOHN MENZIES
ALL SALES ENQUIRES TO COLIN STOKES ON 051-428 7990

Maximising



The British computer industry is small when judged by international standards. Two large American companies control 90% of world markets. They can do this because their products represent the standard by which others are judged. When these standards are accepted by the marketplace they have the effect of stabilising the technology. Thus CP/M is accepted as the industry standard operating system for 8 bit processors, and subsequent computer development has employed this standard, with the dual effect of making both man and machine portable. Operators can use different computers, with CP/M, and software can be switched from machine to machine. For the end user the emergence of



technology

these standards is critical because they allow him to experiment with the technology without risk of entering blind alleys where systems and products disappear. In order to avoid this situation Memotech has employed these standards within the MTX Series.

In the UK there has been such rapid development in microsystems that in many cases users have been seduced by the technology rather than the standards they should be following. In educational and business applications the need for continuity is obvious. This is accentuated by the development of database technology, where very large information files are accumulated, the primary expense being the input of data.

Companies and schools will not relish the idea of trying to rescue data when the standard 32 bit machines appear in two years time.

There has been a tendency for manufacturers to launch machines which are still on the drawing board, and for which no software standards exist. CP/M 80, the industry standard micro operating system, supports tens of thousands of commercially available software packages. IBM take the view that things should be done properly and then released to the user. This is a well tried and clearly well tested premise which Memotech has implemented in the MTX series.

The MTX Series begins with the MTX500, which costs £275.00 including VAT. The

MTX512, illustrated below, costs £315.00 including VAT, has 64K of User RAM plus 16K of dedicated Video RAM and comes with extended BASIC, a powerful assembler/disassembler, Front Panel machine level editor/monitor, and Noddy, a new text and graphics processing language.

Also included in the series, and available now, are the DMX80 printer at £296.00 and the CMX and MMX monitors.

MEMOTECH

For further information, full technical specification and prices write to:

Memotech Limited
FREEPOST Witney, Oxon. OX8 6BR.

CP/M is a registered trade mark of Digital Research
IBM is a registered trade mark of International Business Machines



MTX 500-VOTED
PRODUCT OF THE YEAR
BY COMPUTER TRADE ASSOCIATION
MEMOTECH
MTX
SERIES



STOP PRESS: NEW SPECTRUM DOMINOES 16K/48K £4.95

ZUCKMAN

ZX81 (16K)

- * ALL MACHINE CODE (10K)
- * FOUR INDEPENDENT GHOSTS
- * HIGH-SCORE 'HALL OF FAME'
- * AUTHENTIC ARCADE ACTION
- * TITLE/DISPLAY MODE

ONLY £4.95 INC. P&P

★ ZX Spectrum New

FROGGY 16K or 48K

SPECTRUM VERSION OF ARCADE GAME
WITH FULL ARCADE FEATURES -

* Fabulous 16-bit Colour Graphics
* Authentic Sound Effects - 3 Tunes
* 10 Logs, Swimming & Diving Turtles
* 11 Levels of Multi-coloured vehicles
* 100-screen Score, Hi-Score, Timer
* Snake, Alligators and Beer Frog
* Top 5 High-Score invulnerable
* Demonstration Game routine

Your brave new frog must save a busy main road, then onto logs and turtles in the river to reach safety of the over-bank frog-rooms.

THIS MACHINE-CODE GAME MUST BE SEEN TO BE BELIEVED!

ONLY £5.55 INC. P&P



FROGGY

ZX81 (16K)

- * MOVING CARS, LOGS, TURTLES
 - * ALLIGATORS, DIVING TURTLES
 - * FOUR 'SCREENS' OF ACTION
 - * ALL ARCADE FEATURES
 - * ENTIRELY MACHINE CODE
- ONLY £4.95 INC. P&P**



DJL SOFTWARE

DEPT YC4, 9 TWEED CLOSE, SWINDON,

WILTS SN2 3PU Tel: (0793) 724317

Trade enquiries welcome Export Orders: Please add £1.00 per tape airmail

Dealer enquiries: Tiger Distribution, Micro Dealer UK, St. Albans 34351.

ORDER FORM

Name

Address

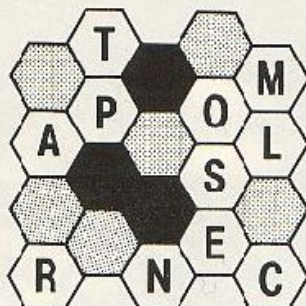
Please send me the following

I enclose cheque/P.O. No for £
SEND TO: DJL Software, Dept YC4, 9 Tweed Close,
Swindon, Wilts SN2 3PU.

NEW! NEW! NEW!

SPECTRUM SOFTWARE

by **COMPUSOUND**



BLOCK BUSTER

©1983
BLOCK BUSTER will test your knowledge to the brink. The game starts off easy, but as you pass the 'commercial breaks', BLOCK BUSTER gets harder and harder.
48k SPECTRUM. ONLY £5.95 + 50p post & packing.

COMPUSOUND



Overseas and Trade Enquiries
Welcome



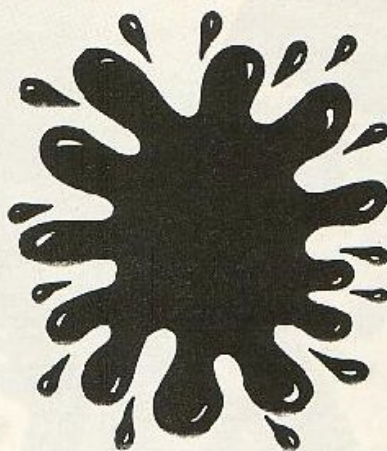
DEPT: YC3, 32-33 LANGLEY CLOSE, REDDITCH, WORCS B98 0ET
TELEPHONE: (0527) 21429 (21439 Answerphone)

NEW
FOR THE CBM64

INCENTIVE

THE SPLAT
CHALLENGE

SPLAT!



NEW FOR THE CBM64

THE SPLAT CHALLENGE FOR THE COMMODORE 64

£6.50



INCENTIVE SOFTWARE, 54 LONDON ST
READING RG1 4SQ (0734) 591578

TT-S :SPECTRUM TOOLKIT

5 programmers' programs for the 16K or 48K Spectrum:

- ★ **GAMMA** : A compact (4K) Microdrive compatible BASIC extension which aids programming and debugging by adding 10 new keywords, with syntax checking.
- RENUMBER** : All or part of the program, intelligently, including all GOTO's, GOSUB's, RESTORE's etc.
- DELETE** : Any block of lines.
- MOVE** : A block of lines, with re-numbering of GOTO's etc.
- FIND** : Any string, variable, keyword etc., starting from any line.
- TRACE ON** : Displays line and statement numbers and the current value of any variable or expression as the program is executed. Variable speed execution or single-step.
- TRACE OFF** : Turns off TRACE function.
- VARIABLES** : Displays an ordered list of all variables used, with their current values.
- FREE** : Shows amount of free memory, values of key system variables, and displays UDGs.
- AUTO** : Gives automatic line numbering when entering programs, from any line number and with any step size.
- HELP** : Provides information on new keywords.
- GAMMA** also protects against accidental over-writing of existing program lines or NEW, and gives a flashing line cursor which is easily visible in listings. It can be loaded into any area of RAM on a 16 or 48K machine.
- ★ **SCFEEN** : A high-resolution drawing program with proper 'fill' and text print facilities. Can be used with a joystick via Cempstor or Sinclair interfaces.
- ★ **UDG** : A powerful aid when creating user defined graphics characters.
- ★ **TAPE** : Reads and displays the contents of tape file headers.
- ★ **RAM** : A fast and comprehensive memory test program.

£7.95 inc. carriage Access/Visa accepted

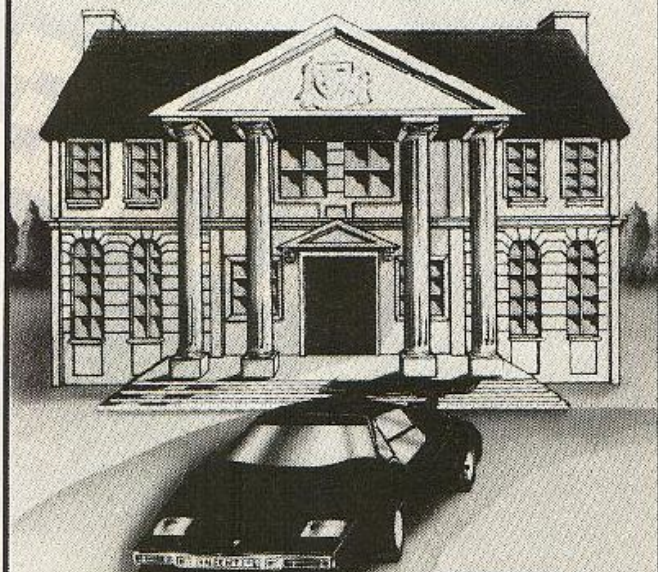
TIMEDATA Ltd. Dept A

16 Hemmells, Laindon, Basildon, Essex SS15 6ED Tel: (0268) 418121

NEW FROM INCENTIVE

MILLIONAIRE

A NEW EXPERIENCE IN GETTING RICH!!



48K SPECTRUM £5.50



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

Mystery of Munroe Manor
You and yourself wandering the misty moon when you come across the gates to Munroe Manor. Old man Boctow has disappeared but reports persist of his wealth hidden somewhere in the manor. The boying of hounds from within the grounds and hidden tales of wandering ghosts and hidden traps. You, our intrepid friend, are about to attempt to solve this mystery... and avel! A full graphic adventure containing 70 different screens displaying each location or action during the game.
CBM 4 - £8.50

Mystery of Munroe Manor
available
late February

Dinky Kong
Attempt to rescue your lovely girlfriend who is held captive by the angry gorilla. As you climb the connecting ladders and move along the gangways, the gorilla will be throwing barrels and fireballs at you! The only way to reach her is to leap over these obstacles and progress to the top. Micro-action with sound effects, full colour action graphics, skill levels, etc.
Author - Adrian Sheppard
Oric-1 48K - £4.95



SEVEN SOFTWARE

Encounter



Encounter A complex and intriguing classic style text adventure. A girl has been kidnapped by thugs - your job is to locate and rescue her! Everything you need can be found in the game but sometimes you may have to manufacture items. Chemistry knowledge will help! Most commands are verb followed by noun although abbreviations can be used. If the alarm sounds you have twenty moves to stop it before you too are caught. It's worthwhile making a map noting what you find and where as the time limit is only 500 moves.
Oric-1 48K - £7.50
Oric Atmos - £7.50
CBM 64 - £7.50
Spectrum 48K - £5.95

Lone Raider As Captain of the spaceship Lone Raider your mission is to save earth from the alien Zugs, who are aiming to destroy all forms of intelligent life in the universe. The Lone Raider possesses formidable weaponry such as phaser cannons and neutron bombs. Armed with these you will need to seek the mother ship, planetary defences and your chance her. She is heavily guarded and even grapples her surviving long enough to stop it are slim. Superb graphics, volume control, hi-score, 4 screen scenarios, missile duel dunks, mines, sharks, octupl, mother ship, etc. Can be played with keyboard or joystick using the P-ne life interface.
Author - Adrian Sheppard
Oric-1 48K - £7.50
Oric Atmos - £7.50

SEVEN SOFTWARE
LONE RAIDER



SEVEN SOFTWARE
GRAIL



Grail You have been chosen to seek and recover the Holy Grail from the Castle Perilous. Throughout the course of your task you will have to use your skill, intelligence and logic (along with a little luck) as you encounter many foes. You will have the opportunity to gather weapons and armour to fight with, but if you are wounded your strength will drain away - many other features such as warts, jewels, etc.
Author - Adrian Sheppard
Oric-1 48K - £6.95
Oric Atmos - £6.95

SEVEN SOFTWARE
Quincy



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

SEVEN SOFTWARE
MORIA



Moria A challenging adventure game set in the mires of Moria. You'll have to try and survive encounters with the monsters of middle-earth while trying to locate Durne Ring. The Wizard and Trader may help or hinder you on your journey to find and open the hidden doors to freedom - a game that will really test your character and slaying power.
Oric Author - Adrian Sheppard
Spectrum Author - Mike Howard
Oric-1 48K - £4.95
Oric Atmos - £4.95
Spectrum 1648K - £4.95

Jogger Guide your joggers across a 4-lane motorway and crocodile haven through the gap in the fence. Each time a jogger is safely home the next one will have to encounter more tortois and cars on the motorway but fewer crocodiles and logs in the river. Full on-screen instructions, Microcode, sound effects and full action colour graphics.
Oric Author - Adrian Sheppard
Spectrum Author - Mike Howard
Oric-1 48K - £6.95
Spectrum 1648K - £4.95

SEVEN SOFTWARE
JOGGER



RISE TO THE

Utilities

Address File Manager This is a new departure for software for the Oric-1 micro. It will allow you to keep ALL your important records of NAMES & ADDRESSES. Up to 255 can be kept in each file and files can be SAVED & LOADED using an ordinary cassette recorder. This means an unlimited amount of information can be permanently stored in a convenient format.

Features: Menu-driven, prompted keyboard entry at end with check, Delete option for old data, Search by surname (handles multiple occurrences), prints or screen or NAME files to cassette, prints or screen or NAME files to cassette, prints or screen or NAME files to cassette, prints or screen or NAME files to cassette.

Author: Mike Howard
Oric-1 48K - £4.95
Oric Atmos - £6.95

Oric Atmos Extended Basic Re Atmos programmer can afford to be without this program! 23 extra commands yet taking up only 3K of RAM.

Commands include: Copy, Scroll, Rotate, Write, On & Off clock, Reset time, Extra sound commands, Facility to enter in upper and lower case and others. Demonstration programs and full instructions included with programs to enter yourself.

Author: Adrian Sheppard
Oric Atmos - £2.95

Oric-1 Extended Basic A must for the programmer! Extended Basic offers the user 13 additional commands to the present Oric-1 48K commands and yet only takes up 2K of RAM.

Features: Commands include: Verify, Write, Recall, Find, Scroll, Draw box, Rotate and others. Takes up only 2K of RAM, so plenty of memory left for users to program. Demonstration programs - all detailed in the cassette inlay. Full instructions.

Author: Adrian Sheppard
Oric-1 48K - £7.50

Onicode A combined assembler/disassembler full 6527/16K memory. Features save and reload M/C address. Assembles and disassembles at any address.

An essential tool for any serious programmer.

Author: Adrian Sheppard
Oric-1 48K - £3.49

The Typing Wizard If you want to learn to type or improve your typing capabilities the program is a must. Continuous on screen displays and sound routines keep your eyes up and away from the keyboard to develop the proper technique. The teaching method is on a row to row basis starting at the home row with other being added. Each lesson has letter, groups of letters, word and finally sentence drill and at the end of each lesson the speed is given in words per minute and a count of the number of errors is given. A beep signals any error during the exercise. You couldn't find a more patient teacher.

Oric-1 48K - £4.50

CHALLENGE with your Oric-1, Oric Atmos, Spectrum or CBM 64.

All Oric-1 and Oric Atmos titles available from Leaky's, Dinky Electronics available from W. H. Smith. All Oric-1 and Oric Atmos titles are recommended by OMC PRODUCTS INTERNATIONAL LTD.

All Spectrum software is available on MICRONET 800.

Other titles available from selected retail outlets or direct from:

Severn Software
15 High Street
Lydney
Gloucestershire
GL15 5DP

TRADE ENQUIRIES WELCOME
Look out for our growing range of software S.D.S. for further.

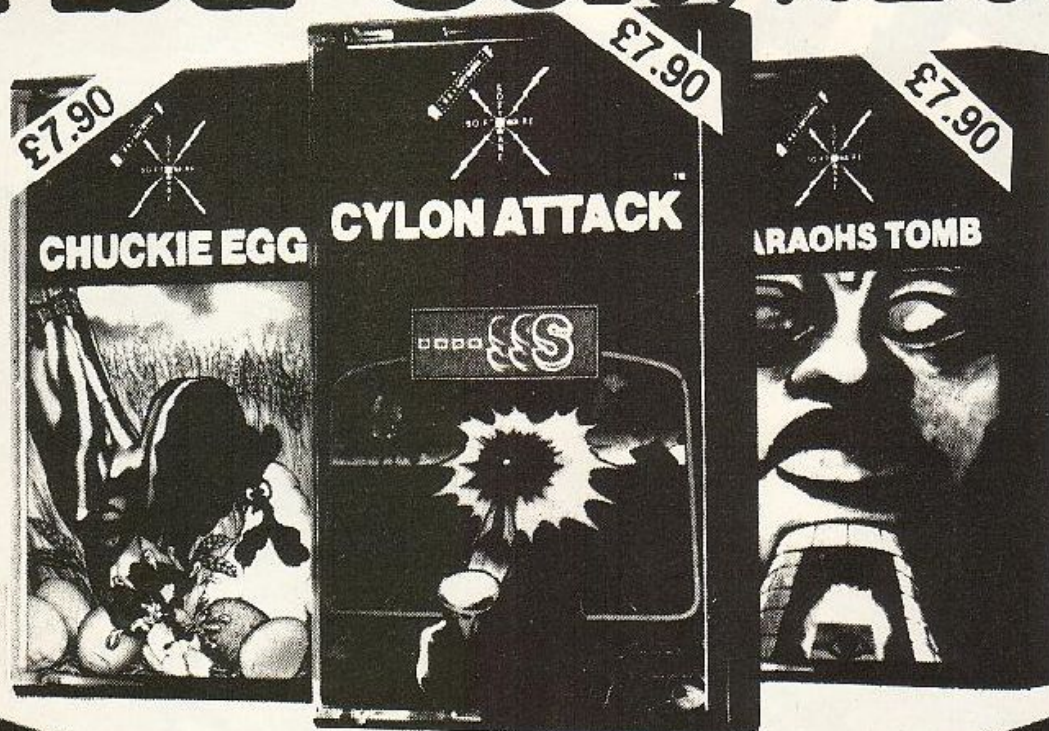
SEVERN SOFTWARE



"ATTENTION EARTHLINGS..."




...Beam us down to A&F Software."



	BBC	ELECTRON	DRAGON	SPECTRUM
CHUCKIE EGG	✓	✓	✓	✓
CYLON ATTACK	✓	✓		
JUNGLE FEVER				✓
PHAROHS TOMB	✓	✓		✓



Available from W.H. Smiths, 
John Menzies and all leading
computer stores.

Unit 8, Canalside Industrial Estate,
Woodbine Street East, Rochdale, Lancs.
OL16 5LB. Tel: 0706 341111

BLOBBO
NOW AVAILABLE
FOR THE ZX SPECTRUM

SOFTWARE FOR THE
MTX
SERIES

CHES

A fully comprehensive chess package. Ten levels of play, from novice to championship standard. Pitch your wits against the computer with this fast, versatile machine code program.

TOADO

The object of the game is to navigate each of **five toads** across a **road** and **two rivers** without being run down or drowning (toads can't swim).

—ALICE IN— WONDERLAND

A fully interactive machine code adventure game set in **Wonderland**. You play the part of **Alice**, and explore the fascinating world of Wonderland, full of excitement and suspense. Delve deep into tunnels, caves and walls in search of hidden treasure.

KILOPEDE

Eliminate **mushrooms** and the descending segmented **Kilopepe** to gain bonus points — avoid killer **crabs**, **fleas**, **spiders** and **jellyfish** which chase you across multiple levels of increasing difficulty.

—SUPER— MINEFIELD

The object of the game is to get from one side of the minefield to the other without being **blown up**. You only get one life so be careful — not all the mines are visible. The only way you can tell how many mines are nearby is by looking at the **mine detector** in the top right hand corner of the screen.

BLOBBO

Run at high speed round the maze collecting **treasure** and **fruit** worth bonus points — but don't get caught by the **Blokbo-caters**! Tactical dodging must be employed to avoid them. If you're caught or step on a skull and crossbones you lose one of your three lives.

KNUCKLES

Move **Knuckles** around his maze, using a joystick to kick **Roks** and **Magic Squares**. The object is to line up the **Magic Squares**, using the fire key, and so advance to the next level gaining a level bonus.

Please send for our free colour catalogue of Business, Education and Games Software.

Illustrator: Nick Mynheer.

Continental Software Limited,
Unit 23, Station Lane,
Witney, Oxon

 **BLOBBO**

N. MYNHEER

Homegrown Soft

**Datasoft's
ZAXXON and
POOYAN £14.95**

CentreSoft breaks the U.S. Price Barrier!
Our unique buying power allows CentreSoft dealers
to sell many U.S. Classic Games at up to half
normal price.
Available at **BOOTS** and your local **CentreSoft**
dealer NOW.

CentreSoft only sell the best! Whilst we're searching the World for excitement—we don't forget our own back-garden. Shown below is a colourful crop of British Software. Home Grown for Great British Fun!

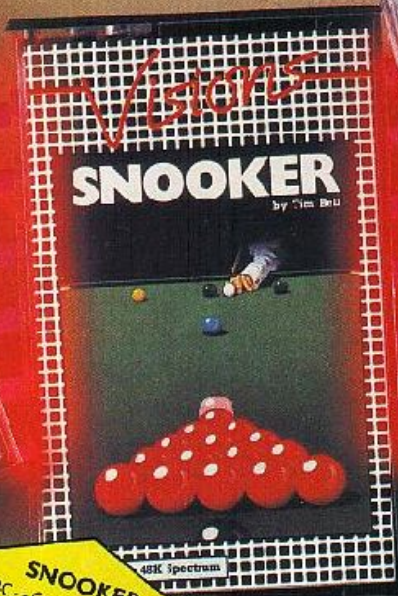
You can buy with total confidence from any of the CentreSoft retailers below, because we guarantee replacement—free of charge—on any faulty media.

If you haven't bought your own Home Computer System yet, all of the retailers shown carry a big choice of Hardware. Why not call in, for a quote, and a 'hands on' test run?



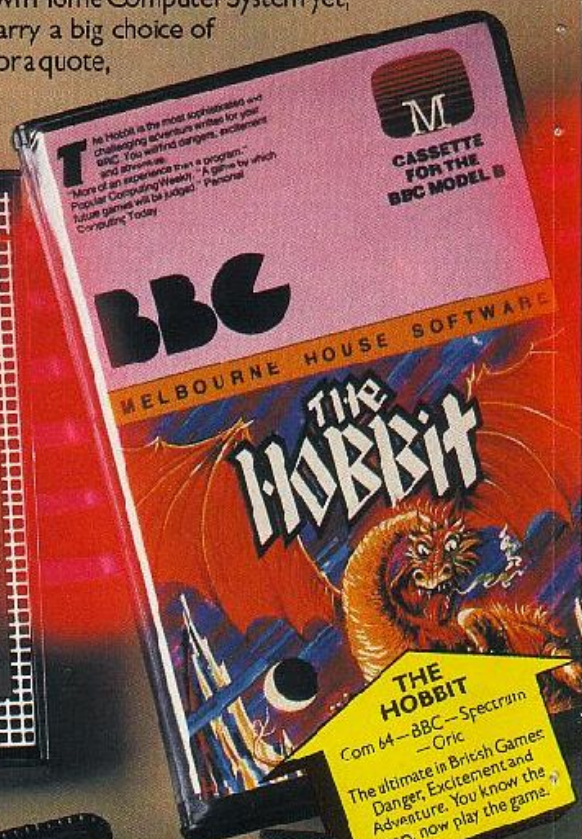
**PLAGUE/
ALIEN DEMON**
Vic 20

A great K-Tel Double Sider.
Wipe out the plague—
a creeping terror!
Then...Find the Alien
Demon before it gets you.



SNOOKER

BBC - Com 64 - Spectrum
— Vic 20
Physical co-ordination,
advanced geometry and
applied mathematics —
Yes, that's Snooker.



**THE
HOBBIT**

Com 64 - BBC - Spectrum
— Oric

The ultimate in British Games.
Danger, Excitement and
Adventure. You know the
story, now play the game.



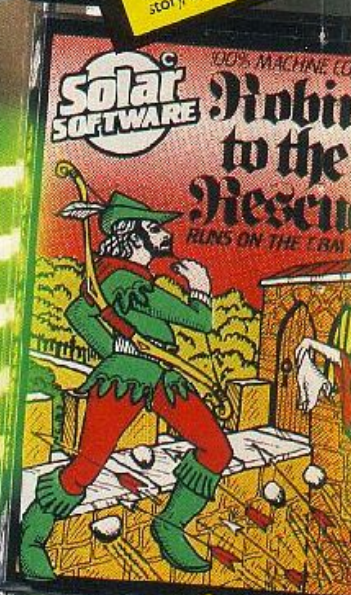
**BLUE
MOON**

Com 64
You are the pilot of an inter-
galactic spacecraft.
You face unknown hazards as
you cross the vastness of
space.



SENTINEL

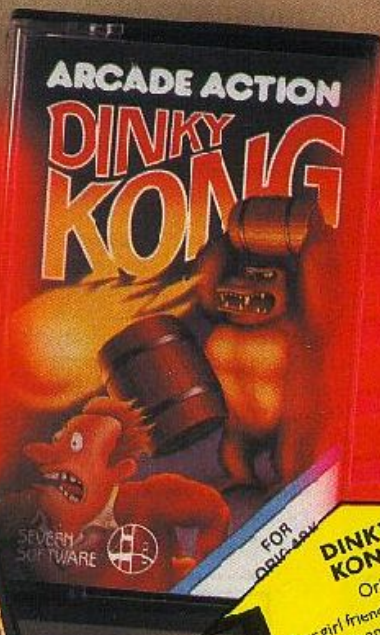
BBC
You patrol the gate-way to
the anti-matter world of
Migor.
Watch out for laser beams!



**ROBIN
TO THE RESCUE**

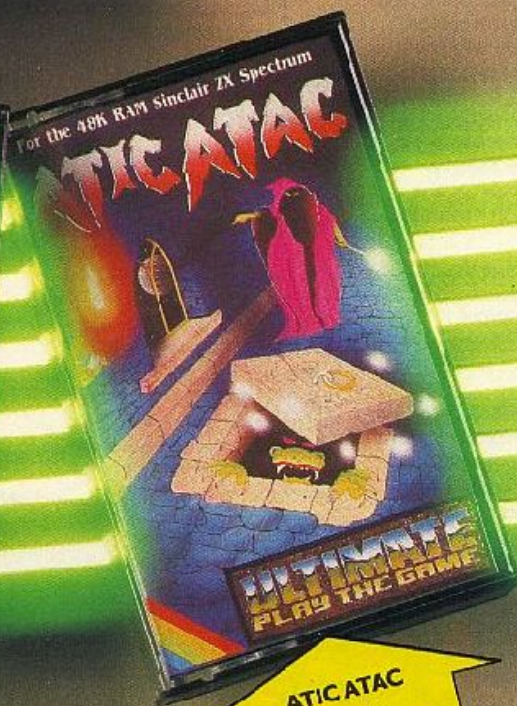
Com 64
Rescue Marion in a British
Classic!

ware!



DINKY KONG

Orc
Your girl friend is held captive
by an angry gorilla.
You must rescue her.
This is not easy.



ATAC ATAC

Spectrum
Do you believe in Ghosts
or Monsters?
You will now!

Where to find your CentreSoft stockist:

GAMESWORKSHOP LTD.

95 The Moor, Sheffield.
(0742) 750114.
41a Broad Walk, Broadmarsh
Centre, Nottingham.
(0502) 585744.
162 Marsden Way,
Ardale Centre, Manchester.
(061) 832 5863.
Unit 37, West Court,
Birmingham Shopping Centre,
Birmingham. (021) 632 4804.

ENGLAND

AVON

Radford Hi-Fi Ltd.
52 Gloucester Road, Bristol.
(0272) 428247.

EAST ANGLIA

Brainwave
24 Crown Street, Ipswich, Suffolk.
(0473) 50965.

Brainwave
51-Head Street, Colchester, Essex.
(0473) 50965.

GREATER LONDON

Godfreys Computer Centre
28-32 East Walk, Basildon, Essex.
(0258) 289779.

Alpha Scan Ltd.
Chester House, Windsor End,
Beaconsfield, Bucks. (0494) 671259.

3D Computers
30 Station Road, Belmont,
Surrey SM2 6BS. (01) 642 2534.

3D Computers
11A Gunnersbury Avenue, Ealing,
London W5 4BH. (01) 592 5855.

Trionic
144 Station Road, Harrow.
(01) 861 0036.

Vision Store
3 Eden-Walk, Kingston-upon-
Thames, Surrey. (01) 546 8974.

Lion House (Software) Ltd.
Lion House, 227 Tottenham Court
Road, London W1. (01) 637 3024.

Galaxy Video
60 High Street, Maidstone, Kent.
(0622) 679205.

3D Computers
Unit 1, Heathfield, Stacey Bushes,
Milton Keynes MK12 6HP
(0908) 31782.

3D Computers
26 Stanley Road, Newbury,
Berk RG14 7PB. (0635) 30047.

3D Computers
Greystone Works, The Green,
Croxley Green, Rickmansworth,
Herts WD3 3A. (0923) 779250.

Silica Shop Ltd.
1-4 The Mews, Hatherley Road
Sidcup, Kent DA14 4DX.
(01) 301 1111 or (01) 309 1111.

Acc Software
94 Western Road, Southall,
Middx UB2 5DZ. (01) 574 4098.

Rams Computer Centre
117 Queensway, Bletchley, Bucks.
(0908) 647744.

Gatwick Computer Services
62 The Boulevard, Crawley,
W. Sussex. (0293) 26240.

Landau Electronics
(Sutton) Ltd.
215 High Street, Sutton, Surrey.
(0164) 33494.

Vision Store
96-98 Northend, Croydon,
Surrey CR0 1UD. (01) 631-7539.

Computasolve
8 St Marks Hill, Surbiton, Surrey.
(01) 390 5135.

3D Computers
230 Tolworth Rise South, Tolworth,
Surbiton, Surrey KT5 9NB.
(01) 337 4317.

Video City
45-47 Fshe's Green Road,
Stevenage, Herts. (0438) 53808.

Datastore
Victoria Road, Hailsham, Sussex.
(0328) 846777.

Modata Computers Ltd

30 St Johns Road, Tonbridge Wells,
Kent. (0892) 41555.

The Advanced

Technology Centre
207 Elham High Street, Elham,
London. (01) 859 7696.

Adams World of Software

190c Station Road, Edgware,
Middlesex. 01-952 0451.

NORTH EASTERN

Photosave
18 Cheapside, Bradford BD1 4JA.
(0274) 308598.

Bass + Bligh
4 Lower Briggate, Leeds.
(0532) 454451.

The Computer Show
Unit 25 Handyside Arcade,
Percy Street, Newcastle-Upon-
Tyne. (0632) 616260.

York Computer Centre
7 Stonegate Arcade, York.
(0904) 641862.

Small Fry + Hobby
51-53 Kirkgate, Wakefield WF1 1HX.
(0924) 360551.

Just Micro
21 Carver Street, Sheffield.
(0472) 752732.

Com-Tech
6 Eastgate, Barnsley. (0226) 46972.

The Soft Centre
8 Queensgate, Waterdale Centre,
Doncaster. (0502) 20038.

The Compushop
10 Newgate Centre, Newcastle-
Upon-Tyne. (0632) 618673.

NORTH WESTERN

The Atari Center
Home Entertainment Ltd.,
13 Miller Arcade, Preston, Lancs.
(0772) 562707.

Home Computers
234 Church Street, Blackpool.
(0253) 22340.

Clearstone Hi-Fi
156-158 Blackburn Road, Bolton,
Lancs. (0204) 31423.

Chester Software Centre
49-51 Book Street, Chester.
(0244) 310115.

Microspot
15 Moorfield, Liverpool.
(051) 236 6628.

Camera + Computer Centre
113 Mill Street, Macclesfield,
Cheshire. (0625) 27468.

Gemini Electronics
50 Newton Street, Piccadilly,
Manchester. (061) 236 3083.

Channel 8 Software
51 Fishergate, Preston. (0772) 53057.

Wildings Computer Centre
111 Bridge Street, Warrington
Cheshire. (0925) 38290.

Wildings Computer Centre
11 Mesnes Street, Wigan.
(0942) 44382.

Micro Workshop
273 Moston Lane, Moston,
Manchester. (061) 205 4974.

Computer Link
21 St. Werburgh Street, Chester.
(0244) 316516.

MIDLANDS

The Atari Center
Home Entertainment Ltd.,
2-2-213 Broad Street,
Birmingham. (021) 643 9100.

Computer Plus

1 Church Lane, Banbury, Oxon.
(0295) 55890.

Calisto Computers

119 John Bright Street, Birmingham.
(021) 632 6458.

CT Electronics

2 The Spot, Derby. (0332) 360456.

Gordon Harwood

69-71 High Street, Alfreton,
Derbyshire. (0773) 832078.

Mays Hi-Fi

57 Churchgate, Leicester.
(0533) 22212.

Movies Computer Centre

5 Church Street, Melton, Mowbray,
Leicester. (0664) 61169.

Vista Video

50 Friar Lane, Nottingham
NG1 6DQ. (0602) 418400.

Foxs Computer Centre

38-40 Upper Parliament Street,
Nottingham. (0602) 410926.

Carvels

3-7 Bank Street, Rugby CV21 2QE.
(0788) 65275.

Greens

23 Market Way, Coventry,
West Midlands. (0203) 26342.

Arnolds (Corby)

45 Corporation Street, Corby,
Northants. (05366) 3645.

The Gamekeeper

Grand Fare, 224 High Street,
Erdington, Birmingham.
(021) 384 6108.

The Playpen

6 Market Street, Hay-on-Wye,
Hereford. (0497) 820129.

Vision on Video

255a High Street, Erdington,
Birmingham. (021) 373 9383.

SOUTHERN

Computerstore Ltd.

2-11 Richmond Hill, Bournemouth.
BH2 6HE. (0202) 296963.

Gamer

24 Gloucester Road, Brighton.
(0273) 698424.

Canterbury Software

9 The Friars, Canterbury CT1 2AS.
(0227) 53531.

Efficient Chips

40 The Market Place, Chippenham,
Wiltshire. (0249) 654321.

G-B Microland

7 Queens Parade, London Road,
Waterloo, Portsmouth.
(07014) 59911.

Microchips

27 Bedford Place, Southampton.
(0703) 38399.

Microchips

46-48 St Georges Street,
Winchester. (0962) 68085.

SCOTLAND

The Silicon Centre

6-7 Antigua Street, Edinburgh,
(031) 557 4546.

Livingston Computer Centre

17 The Mall, Craighill Shopping
Centre, Livingston. (0506) 36978.

WALES

Hi-Fi Western Ltd.

48 Cambrian Road, Newport,
Gwent. (0633) 62790.

Clywd Personal Computers

Unit 19, Daniel Owen Precinct,
Mold. (0352) 56842.

GP Video

St Georges Crescent, Wrexham.
(0978) 264451.

CHANNEL ISLANDS

Audio + Computer Centre
7 Peter Street, St Helier, Jersey.
(0534) 74000.

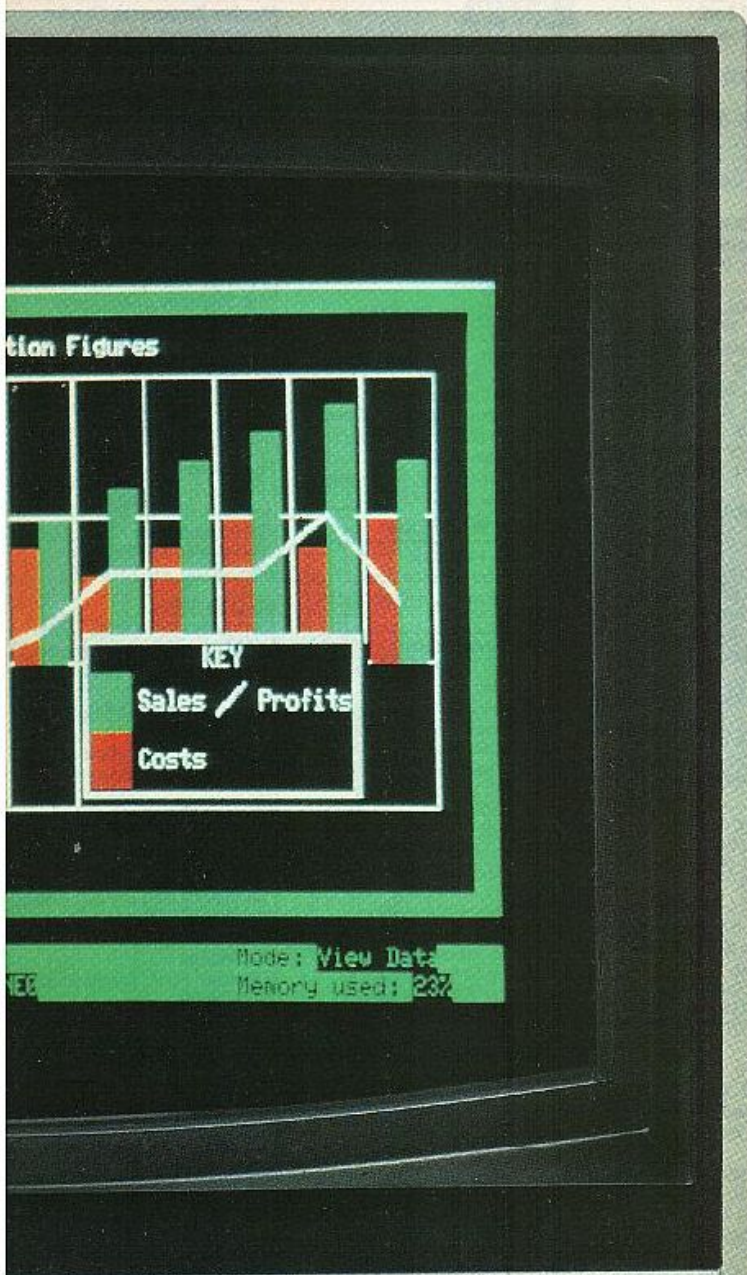


CentreSoft

DEALERS! - for information on how to become a CentreSoft stockist: Write to:
CentreSoft Ltd., CentreSoft House, Unit 24, Tipton Trading Estate,
Bloomfield Road, Tipton, West Midlands DY4 9AH TEL: 021-520 7591

New-Sinclair QL

There's no comparison chart, b



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

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

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

The Sinclair QL has 128K RAM. Big deal?

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

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

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

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

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

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

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

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

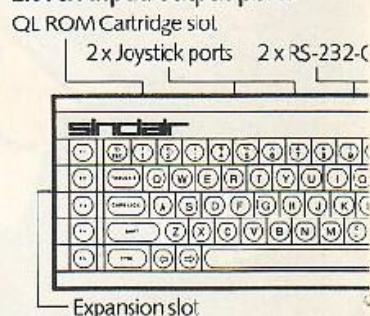
Exclusive: new QDOS operating system

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

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

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

Eleven input/output ports



New professional keyboard

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

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

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



£399

because there's no comparison!

Advanced new friendly language – Sinclair SuperBASIC

The new Sinclair SuperBASIC combines the familiarity of BASIC with a number of major developments which allow the QL's full power to be exploited.

Unlike conventional BASIC, its procedure facility allows code to be written in clearly-defined blocks; extendability allows new procedures to be added which will work in exactly the same way as the command procedures built into the ROM; and its constant execution speed means that SuperBASIC does not get slower as programs get larger.

Included – superb professional software

The suite of four programs is written by Psion specially for the QL and incorporates many major developments. All programs use full colour, and data is transportable from one to another. (For example, figures can be transferred from spreadsheet to graphics for an instant visual presentation.)

Word-processing



Certain to set a new standard of excellence, QL Quill uses the power of the QL to show on the screen exactly what you key in, and to print out exactly what you see on the screen.

A beginner can be using QL Quill for word-processing within minutes.

QL Quill brings you all the facilities of a very advanced word-processing package.

Business graphics



QL Easel is a high-resolution colour program so easy to use you probably won't refer to the manual. It handles anything from lines, shaded curves or histograms to overlapping or stacked bars or pie charts. QL Easel does not require you to format your display before entering data; it handles design and scaling automatically or under your control. Text can be added and altered as simply as data.

Spreadsheet



QL Abacus makes simultaneous calculations and 'what if' model-construction easier than they've ever been. Sample applications are provided, including budget-planning and cash-flow analysis. QL Abacus allows you to refer to rows, columns and cells by names, not just letters and numbers. Function keys can be assigned to change a variable and carry out a complete 'what if' calculation with a single key-stroke.

Database management



QL Archive is a very powerful filing system which sets new standards, using a language even simpler than BASIC. It combines ease of use for simple applications – such as card indices – with huge power as a multi-file data processor.

An easy-to-use labelling facility means that you don't have to ask for your file by its full name – a few letters are enough.

New – the Sinclair QLUB

The QLUB is the QL Users Bureau. Membership is open to all QL owners. For an annual subscription of £35, QLUB members receive one free update to each of the four programs supplied with the QL, and six bi-monthly newsletters. Sinclair has also made exclusive arrangements for QLUB members to obtain software assistance on QL Quill, Abacus, Archive or Easel by writing to Psion.

The Sinclair QL challenge

If you're seriously considering any other computer, post the coupon for a blow-by-blow comparison. We'll take a published comparison chart for the machine you're considering (not one we've created ourselves), and give you the Sinclair QL figures, detail by detail.

Take action today!

To order by mail

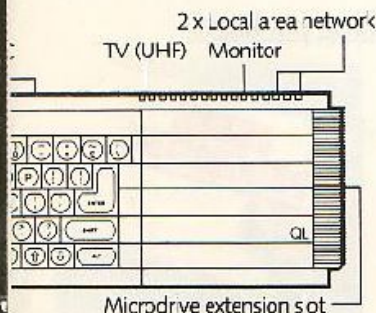
– complete the coupon and send it to the FREEPOST address below. For credit card holders it may be possible to extend your credit limit. Full details will be sent when we acknowledge your order.

To order by telephone

– phone Camberley (0276) 685311; – have your credit card (Access, Barclaycard, Trustcard) number ready. It may be possible to extend your existing credit limit. Please ask our telephone staff for more details. **Please do not use this number for other enquiries.**

For more information

Phone Camberley (0276) 686100, or use the coupon to get a QL brochure. Due to demand, delivery may take more than 28 days. Your order will be acknowledged immediately with an expected shipment date. Remember that Sinclair offers a 14-day money-back undertaking.



Two 100K microdrives built in

The Microdrives for the Sinclair QL are identical in principle to the popular and proven ZX Microdrives, but give increased capacity (at least 100K bytes each) and a faster data-transfer rate. Typical access speed is 3.5 seconds, and loading is at up to 15K bytes per second. The Sinclair QL has two built-in Microdrives. If required, a further six units can be connected.

Four blank cartridges are supplied with the machine.



Send to: Sinclair Research Ltd, Computer Division, FREEPOST, Camberley, Surrey, GU15 3BR.

Qty	Item	Code	Item Price £	Total £
	Sinclair QL Computer	600C	399.00	
	QLUB membership (one year)	£10C	35.00	
	Postage & packing (any order over £390)	£99S	7.95	

Please tick the appropriate box –

☐ I enclose a cheque made payable to Sinclair Research Ltd for £ _____ f _____

☐ Please charge my Access/Barclaycard/Trustcard Account No. _____

Signature _____

Mr/Mrs/Miss _____

Address _____

_____ YOG 4041

☐ Please send me a chart comparing the Sinclair QL computer with a _____

☐ Please send me a Sinclair QL brochure

Small business can now stop going by the book.

For under £1,000 a small business can now equip itself with a BBC Microcomputer, a disc drive, a word processor and printer.

(All tax deductible by the way.)

Once you've parted with that money, you'll find that business has never been brisker.

Because now, there's a new series of floppy disc software specially for the smaller business.

It has been developed by Acornsoft, the software division of Acorn Computers who are the manufacturers of the BBC Micro.

For only £24.95, each disc can store volumes of vital bookwork which can be updated and amended in a fraction of the conventional time.

And there is a disc to cover most aspects of paperwork and book-keeping.

The Invoicing package.

This program stores details of products, VAT numbers and, of course, the names and addresses of your customers. As orders come in, you simply record them. Then, when it's time to invoice, you just press a few keys and each invoice or credit note is printed automatically in seconds.



Allowing for variable terms of trading, the system calculates and prints discounts. And it should help to improve your cash flow dramatically.

The Order Processing package.

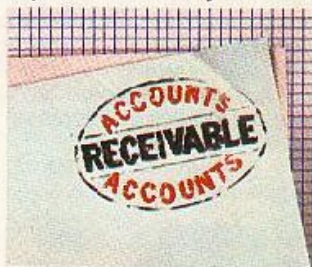
With this program, you can confirm your customers' orders, prepare and print despatch notes and make fast analyses of individual orders or of all the orders stored on disc.



The Accounts Receivable package.

Now, it couldn't be easier to keep your customer accounts under control.

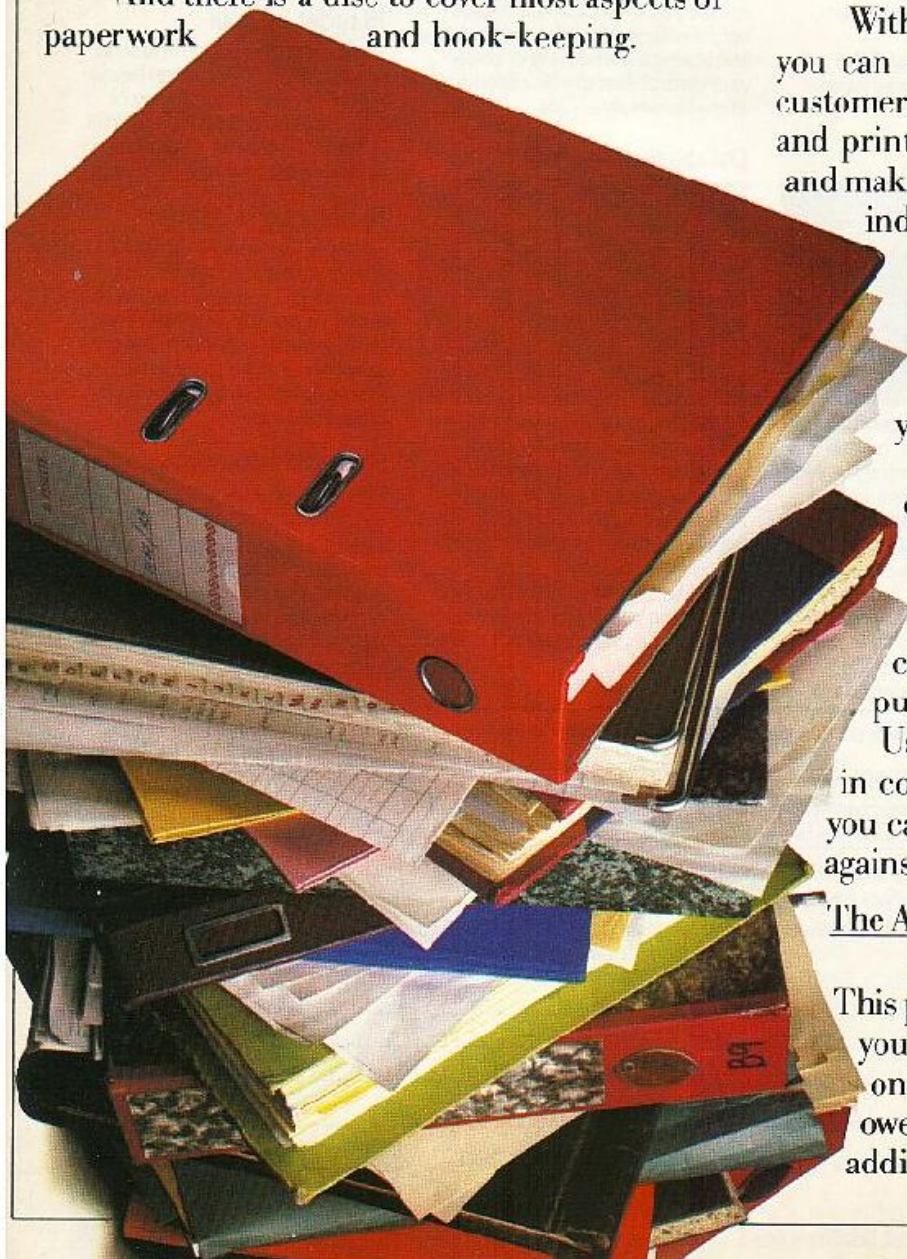
In an instant, you can analyse debtors, produce statements, keep a check on any credit limit and calculate VAT output automatically.



Using this package in conjunction with the invoicing package, you can also keep tabs on payments received against payments outstanding.

The Accounts Payable package.

This package will keep you fully up-to-date on how much you owe and who to. In addition, it calculates



input VAT and, used with the Accounts Receivable package, produces instant VAT returns.

It also highlights settlement discounts, produces remittance advices and provides an immediate analysis of all creditors.

The Stock Control package.

Touch a few keys and you have instant access to stock status and automatic analysis by quantity and value.

Consequently, it's easy for you to maintain correct stocking levels, having an early warning of out-of-stock situations or the likelihood of over-stocking.



The Purchasing package.

All your suppliers' names and addresses go onto the disc. Then they can be retrieved instantly for preparing and printing orders.

All order data can be recalled in seconds, allowing you to check on orders, and suppliers' invoices and to record all deliveries.



The Mailing package.

Instead of the shotgun method of sending mailshots, this package enables you to refine each mailing down to the customers who are most likely to respond.

It gives you a rapidly accessible mailing file of your customers, according to any criterion you choose. Size of company, for instance, or type of business.



Average value of the business they do with you, or whether they are good or bad payers.

Then, when you are doing a mailing, you simply choose the group or groups of customers you want.

At £24.95 each, these packages could be priceless.

Each package comes with clear instructions on how to get the program running so that you can devote much more of your time to more profitable activities.

If you're a credit card holder, you can order any or all of the packages by ringing: 01-200 0200 anytime. Or 0933 79300 during office hours.

(By ringing the same number, you can get the address of your nearest stockist, or full details of the BBC Microcomputer system if you don't already have one.)

Alternatively, you can order the packages by sending the order form below to: Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL. Please allow 28 days for delivery.

☎ Credit card holders, phone 01-200 0200, anytime. Or 0933 79300, during office hours.

To: Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL.
Please send me the following business software packages at £24.95 each.

PROGRAM	QUANTITY	TOTAL	(Code Acornsoft use only.)
Invoicing			SNB 08
Order Processing			SNB 12
Accounts Receivable			SNB 10
Accounts Payable			SNB 13
Stock Control			SNB 11
Purchasing			SNB 14
Mailing			SNB 09
TOTAL			

I enclose PO/cheque payable to Acornsoft Ltd. Or charge my credit card.

Card Number _____

Amex/Diners/Visa/Access (Delete)

Please send me details of the BBC Microcomputer System ☐

Name _____

Address _____

Postcode _____

Signature _____

Registered No. 1524763

VAT No. 215 8123 85

YC 4

ACORNSOFT

EVERY PICTURE TELLS A STORY.

GP 50A LOW COST DOT-MATRIX PRINTER

5" width roll printer. 40 cps printing speed. Graphics capability. All modes can be intermixed on a single line. Alternative colour ribbons optional with replacement ink reservoirs.

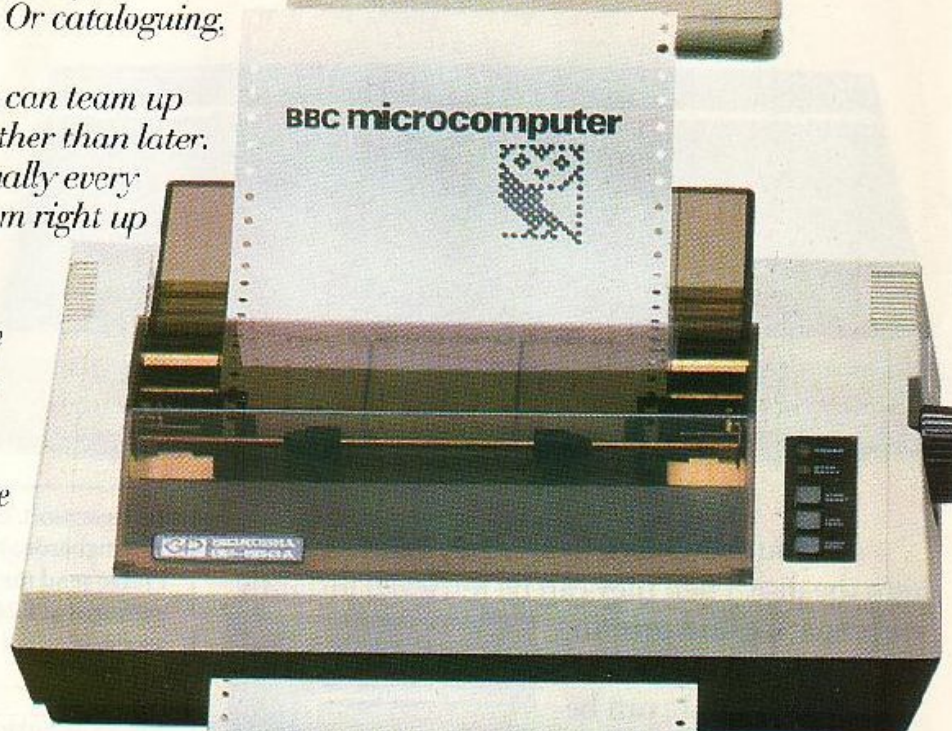
Available shortly is a dedicated Sinclair Spectrum version. £138.00

If you want to make the most of your micro, sooner or later you'll need to add on a printer. To help with preparing and debugging programs for example. Or preparation of reports. Or cataloguing, word processing and file listing.

Low Seikosha prices mean you can team up with the printer you want sooner rather than later. The wide range interfaces with virtually every computer from a Dragon or Spectrum right up to Apple and IBM.

Designs are sophisticated, performance is versatile and reliable and quality is all you'd expect from the name Seikosha.

Get hold of the full picture - ask for a demonstration at one of the dealers over the page.



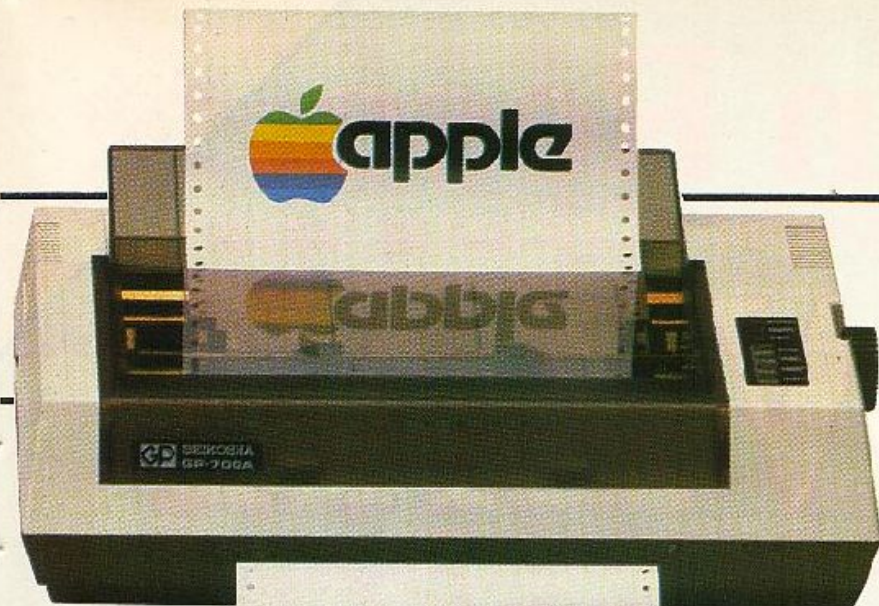
GP 550A CORRESPONDENCE PRINTER

Standard dot-matrix and near letter quality printing. Print speed 50 cps (DP) or 25 cps (NLQ) modes. 8 fonts. £299.00

GP 100VC COMMODORE EXCLUSIVE DOT-MATRIX PRINTER

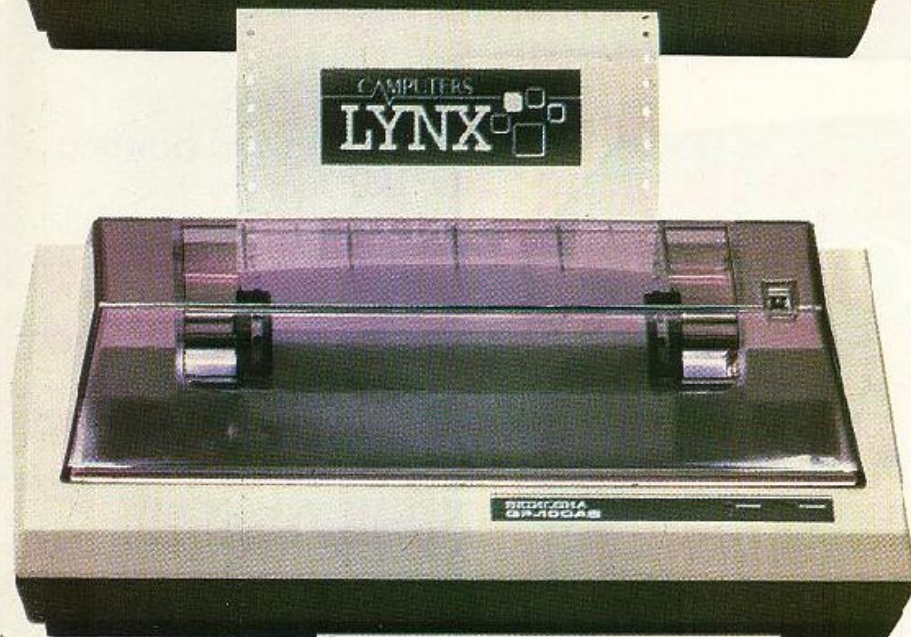
Built exclusively for VIC 20 and 64. Full graphic printing including all VIC characters. 30 cps printing speed. Supplied complete with dedicated cable interface. £229.00





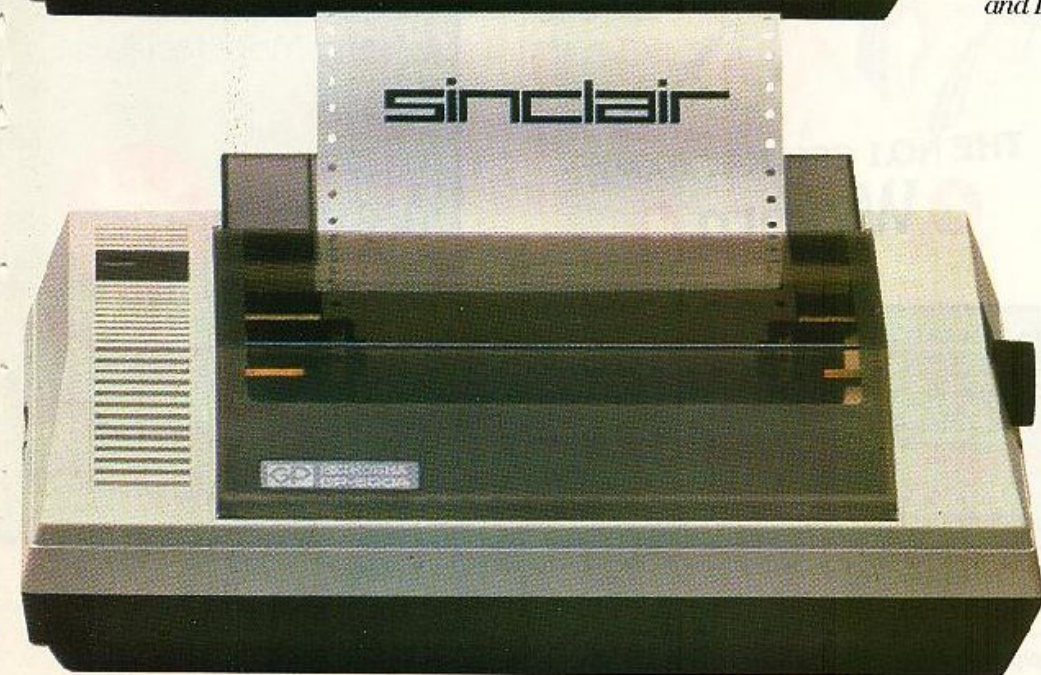
GP 700A COLOUR PRINTER

4-hammer impact dot-matrix. 7 basic colours with 30 colour shades. Unique ribbon arrangement permits multiple colours in one pass. Graphics dump interfaces for Apple and BBC Micro available as options. Low noise level. £489.00



GP 100AS SERIAL DOT-MATRIX PRINTER

Serial version of the GP 100A. Ideal for Spectrum with microdrive, New Brain and Lynx. £229.00



GP 500A PERSONAL DOT-MATRIX PRINTER

A development of the extremely popular Seikoshita 100A. 50 cps printing speed. Full graphics capability. Paper width adjustable up to 10". £249.00

SEIKOSHITA DRG

*DRG Business Systems, Peripherals Division, 13/14 Lynx Crescent, Winterstoke Road, Weston-super-Mare, Avon BS21 9DN.
Telephone: 0934 419914. Telex: 444761.*

Brian Rose

Somerset and England Cricketer Says

48K
SPECTRUM

HOWZAT

"A Truly Addictive Cricket Game"

★ Detailed match analysis

★ Excellent Graphics

★ All County and Test Squads

★ Batting and Bowling skill factors

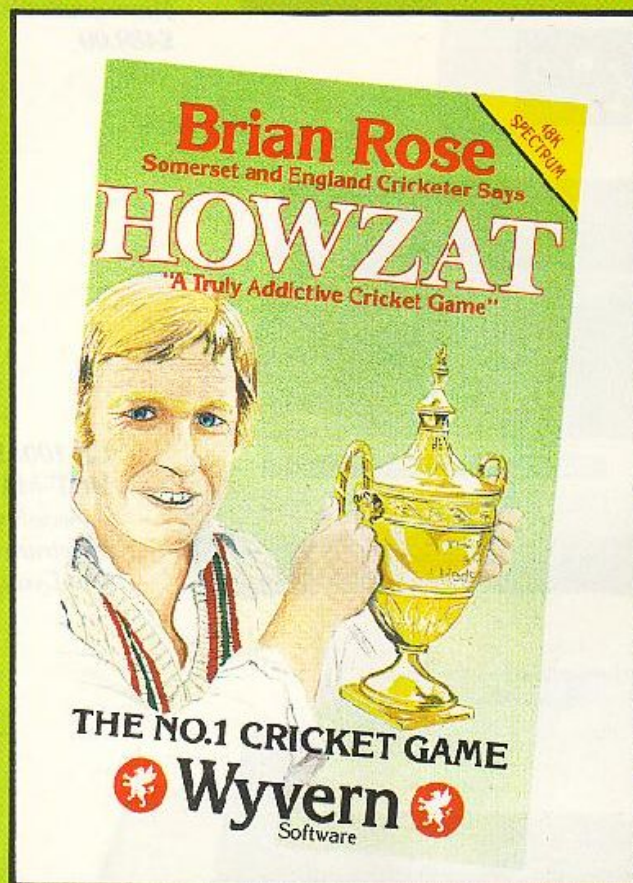
★ One day, County and Test competitions

★ 'Save' match facility

★ Many More facilities

**FREE
DRAW**

Closing Date
30th April 1984



Wyvern
Software



Everyone buying a copy of HOWZAT before 30th April 1984 will go into a free draw. The prize is a framed print (32" x 24") from the 1983 Prudential World Cup signed by every participating player, i.e., Ian Botham, Kapil Dev, Richard Hadlee, etc. The draw will be made on 25th May 1984 at the County Ground, Taunton, by Brian Rose.

THE NO.1 CRICKET GAME

Please complete the order form or write direct - No stamp required.

**Only
£5.50
including
VAT and
P/P.**

Order Form: No Stamp Required

Please send me _____ copy(s) of 'HOWZAT' at
£5.50 (inc. VAT & p/p)

I enclose a cheque/P.O. valued at £ _____

NAME _____

ADDRESS _____

Send to:

**Wyvern Software
FREEPOST
Bath
BA1 1FN**

Dealer Enquiries
Tel: 0225 65747

POSTCODE _____

Please tick to receive
details of other
programs ☐

YCI

CLOSING DATE FOR FREE DRAW 30th APRIL 1984

Ready for the BIG time?

If you're ready to take on the challenge of professional programming for the hobbyist micro market, then we want to help you.

We are Severn Software — creators and producers of high quality software for the Oric-1, CBM 64 and of course the Spectrum. Our software includes adventure and arcade games, educational programs and utilities. It is distributed through the leading high street outlets, like W H Smith and Laskys. So if you have the right product we have the market.

Whether you've written a certain winner, need some help with a partly finished program or simply have a good idea, we would like to talk to you. We can turn your program into cash. This leaves you free to write more, and count the cash, while we handle the worries.

SEVERN SOFTWARE Write to:
ROGER BUFFREY,
SEVERN SOFTWARE,
15 HIGH STREET,
LYDNEY,
GLOS. GL15 5DP



Are your finances driving you mad?

Do you find that working out your finances makes your head buzz? Do you see red?

Don't worry, now you can have Hilton's **Personal Banking System** on your side, giving you a clear headstart and (hopefully) putting you back into the black!

Maintain permanent records and fully detailed statements of your finances + Search facility. **Bank Reconciliation** module is included to automatically match your Bank Statement to your PBS account.
* ZX81 £9.95 (16K)
* ZX SPECTRUM £12.00 (16K)
* DRAGON £12.00 (32K)
* BBC £9.95 (32K) PBS only guaranteed after sales maintenance provided.

NEW RELEASES

SPECTRUM (48K)	
GARDENBIRDS	£6.50
A captivating introduction to Ornithology and entertaining	
PLAY TYPE & TRANSPOSE	£8.00
Compose, transpose key, Play & Save it. Print it!	
DRAGON (32K)	
UTILITIES 1	£5.00
Including Compress, Catalogue and Copy	
DISASSEMBLER	£5.00
Prints either to screen or printer in HEX and MNEMONICS	
MEMORY MAP	£5.00
Over 9A4 pages of Dragon Memory locations. INVALUABLE!	
ORDER by POST (specifying machine) OR at the POST OFFICE using TRANSFASH ACCOUNT 302 9857	

Hilton Computer Services Ltd
(Dept YC) 14 Avalon Road,
Orpington, Kent ER6 9AX

Ask for the PBS at your local computerstore.

PUT YOURSELF IN THE PICTURE HERE.

ENGLAND

AVON

Bristol: Dewco Computer Services. (0272) 76994.
Weston-super-Mare: C.K. Supplies. (0934) 418838.

BEDFORDSHIRE

Bedford: Bedford Micro-computers. (0234) 215015.

BUCKINGHAMSHIRE

High Wycombe: Kingsley Computers. (0494) 449749.

CAMBRIDGESHIRE

Cambridge: Cambridge Computer Store. (0223) 358264.

CHESHIRE

Frodsham: Northern Computers. (0928) 35110.

CORNWALL

Camborne: Microaid. (0209) 831274.

COUNTY DURIAM

Darlington: Darlington Computer Shop. (0325) 487478.

CUMBRIA

Carlisle: The Computer Shop. (Carlisle) Ltd. 27710.

DEVON

Exeter: Devon Computers Ltd. (0392) 218461.

DORSET

Poole: Densham Computers Ltd. (0202) 737493.

ESSEX

Harlow: Akhter Instruments. (0279) 412639.

GLOUCESTERSHIRE

Cheltenham: The Screen Scene. (0242) 528979.

HAMPSHIRE

Portsmouth: Advanced Digital Services. (0705) 823825.

HERTFORDSHIRE

Watford: Computer Plus. (0923) 33927.

HUMBERSIDE

Hull: The Computer Centre. (Humberside) Ltd. 26297.

KENT

Bromley: Kent Computers and Communications. 01-464 6533 x 72.

LANCASHIRE

Blackpool: Blackpool Computer Store. (0253) 27091/20239
Burnley: IMC Computer Centre. (0282) 57411/54299.
Lancaster: Castle Computers. (0524) 61133.

LEICESTERSHIRE

Lewesier: Arcade Computers. Lewesier 532991.

LONDON

Eltham: The Advanced Technology Centre. 91-859 7696.

LINCOLNSHIRE

Grantham: Oakleaf Computers. (0476) 76994.

MANCHESTER

Sunlock Electronics: 061-834 4233.

MERSEYSIDE

Liverpool: Specialist Computer Centre Ltd. 051-236 3499.

NORFOLK

Norwich: Sunlock Bonmain. (0603) 617083.

NOTTINGHAMSHIRE

Nottingham: Computer Market. (0602) 55454.

OXFORDSHIRE

Chipping Norton: Octswold Computers. (0608) 41232.

SALOP

Telford: The Computer Village. (0952) 50466.

SOUTH YORKSHIRE

Barnsley: Comtec. (0226) 46972.

STAFFORDSHIRE

Stoke-on-Trent: Computer Cabin. (0782) 636911.

SURREY

Croydon: Visionstore Ltd. 01-681 7539.

Kingston-upon-Thames: Visionstore Ltd. 01-546 8974.

SUSSEX

Worthing: Worthing Computer Centre (0903) 210861.

TYNE AND WEAR

Gateshead: H.C.C.S. (0632) 821924.

WEST MIDLANDS

Birmingham: Specialist Computer Centre Ltd. 021-643 4743.

Cosebury: Coventry Micros. (0203) 58942.

WEST YORKSHIRE

Bradford: Eltec Computers. (0274) 722512.

Leeds: Microcell. (0532) 449722.

WILTSHIRE

Westbury: Everyman Computers. (0373) 864644.

SCOTLAND

EDINBURGH

Microworld: 031-225 1111.

GLASGOW

Microworld: 041-332 1116.

WALES

CARDIFF

Cardiff Micros: (0222) 373072.

GWYNEDD

Abergele: Abergele Computer Centre. (0745) 826234.



**HILTON
COMPUTER
SERVICES**

SEIKOSHA DRG

AGF PROGRAMMABLE JOYSTICK INTERFACE

for
Spectrum
or **ZX81**

MICRODRIVE
COMPATIBLE



AGF PROGRAMMABLE INTERFACE

Recognised as the only true Hardware Programmed joystick interface this product offers all the features associated with such a design.

You can use any Atari-compatible joystick controller with any software for your Sinclair Spectrum or ZX81, not just those with a joystick option.

Movement of the joystick is recognised by the computer exactly the same as pressing the appropriate control keys, and can therefore give the most immediate response to that movement. The hardware programmed design works with all possible key-reading methods, both BASIC and Machine Code.

Eight directional movement, with or without the fire button being pressed, can be achieved by only programming the left, right, up, down and fire keys required by the game.

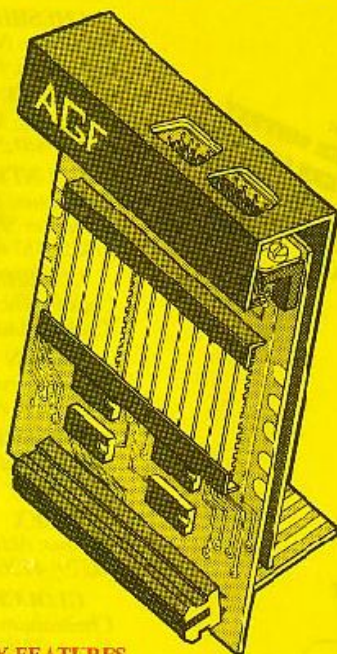
Programming is achieved by a two-digit code, which is looked up on the Programming Chart supplied, for each direction and firing button. These two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

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

The keyboard remains fully functional and can be used simultaneously with the joystick.

An integral rear expansion connector means there is no need to remove the interface to connect other peripherals.

NB. A recent design improvement now means that the AGF Programmable Interface works with the new Quickshot II rapid "Auto Fire" feature.

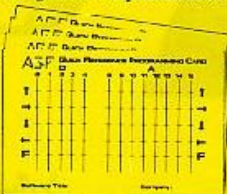


KEY FEATURES

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

PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements.
- 12 months guarantee and full written instructions.

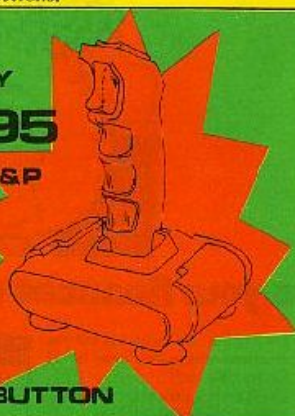


Quickshot II JOYSTICK

NEW IMPROVED GRIP : BUILT-IN STABILIZING SUCTION CUPS

TRIGGER FIRE BUTTON : RAPID AUTO FIRE SWITCH : TOP FIRE BUTTON

ONLY
16.95
+ £1 P&P



FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.YC.

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR.

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	27.95	
	JOYSTICK(S)	17.95	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/> Please tick		FINAL TOTAL	
DEALER ENQUIRIES WELCOME		EXPORT PRICES ON APPLICATION	

NOMINATED
SOFTWARE
PROGRAM
OF THE YEAR
C.T.A

Unlock Your Imagination

SCOPE

Computer Graphics Language

- ★ A VERY POWERFUL, TRUE MULTITASK LANGUAGE
- ★ AS FAST AS MACHINE CODE
- ★ SIMPLER THAN BASIC

Write Machine Code in a fraction of the time currently required

SCOPE is available from most good quality dealers and selected branches of WHISMITH

For details of how to get your games published commercially contact ISP Marketing

TECHNICAL DETAILS

SCOPE is a fully structured multitask language specifically for writing *graphics, animation and sound*. Being fully compatible with BASIC it is ideal for writing both arcade and adventure style games. Additionally, with SCOPE present in high memory it can be used as an assembler with SCOPE words as plain language mnemonics. Therefore no knowledge of machine code is required. The language is extremely easy to comprehend and is very powerful indeed providing many features not available from BASIC.

**SCOPE HAS TO BE USED
TO BE BELIEVED**

48K SPECTRUM



CLIP THE COUPON NOW AND UNLOCK YOUR IMAGINATION
Post to: ISP Marketing Ltd, Crown House, 38b High Street, Godalming, Surrey
Tel: Godalming 04868 24151 Please rush me ... copies of the SCOPE computer graphics language tape and instruction manual at £11.95 (p&p free).
(Cheques payable to ISP Marketing Ltd)

Name

Address

Block capitals please
Dealer Enquiries
Welcome

PRICE

£11.95

SINCLAIR'S NEW Q-LENGTH



Sinclair seem to be going down a familiar path, one would have thought they'd have learned by their experience with the Spectrum — but no.

On February 13 I rang the enquiry number 0276 686100 given in the QL brochure to enquire what the current delivery situation was. I was told it would be 28 days from receipt of order, as this was rather important to me I asked if the lady was absolutely sure about this, she replied "Well it could be as much as five weeks, would you like to order one now?" I did order one but I am now wondering if I did the right thing as what I was told would now seem to have been a blatant lie.

According to recent articles in computer magazines Sinclair were in fact in the process of sending out letters to people who had already ordered to say that there would be a delay in delivery. These letters were already in the process of being sent before I ordered, it seems that the people who ordered in the first week will not receive their QL's until the end of April, that does not give me much chance before the end of May.

I think it is about time Sir Clive started to treat his customers with just a little more respect instead of abusing their faith in his products. It is now two weeks since I ordered and I have not even received the confirmation of order which I was told would be sent in a few days.

If I knew from the start that I would have to wait 12 weeks that would be fair enough, I feel sure all customers would prefer to be told the truth right from the start and plan accordingly — there is no excuse when they know full well that they are not in a position to deliver in the stated time.

Bryan K. Lee,
Nuneaton,
Warwickshire

MANIC MINER

I was probing through Manic Miner the other day and I encountered a fantastic "Bug". It proves that it is perfectly possible to choose any of the 20 stages to look at and/or begin a game on.

It involves typing in a sequence of numbers at the start of a game these are as follows:

6031760

A boot identical to the one that squashes you at the end of any normal game then appears at the bottom left of the screen next to the dancing figure of Miner Willy.

Then you press a combination of numbers to select the stage desired. For example:

To begin on the 20th stage, the four numbers 1-2-5-6 have to be held down all at once and released at the same time.

You will then begin on the 20th stage!

To select other stages such

combinations as 2-4-5 have to be pressed. By trial and error all can be selected at any one time. But all of them contain a 6 and none of the numbers are more than 6.

Ben Hardymont,
Clapham,
London SW4

MONSTERS' LAIR

With regard to my Atari program Monsters' Lair which appeared in the February issue of your magazine it would appear that two lines have become corrupted in your printed listing from the supplied tape. In addition the inverse characters have not appeared in their correct form in the magazine. I should therefore be grateful if you could publish the following corrective article within your pages at the earliest opportunity.

Two lines have corrupted during the printing process. The correct versions are shown below:

```
Line 710 IF PEEK (6321)<>15 THEN
BONUS = BONUS + 1: SOUND 2,20*
(PRIZE>0):0,15: SOUND 2,0,0,0: IF
BONUS = 75 THEN GOSUB
25: BONUS = 0
Line 3500 ?"AAAAABBBAAAAAA
CCCCAAAAAACCACAAAAABBB
AAAAA":
But replace 'A' with a normal %
replace 'B' with an inverse control R
replace 'C' with a normal space
```

In addition the following characters should be printed in inverse form as they appear in the listed lines:

```
Line 20 #
Line 625 0
(within the quotes)
Line 1530 #
Line 3840 SHLD = 90
Line 3840 bon
Line 3850 #
Line 7110 diff level
```

```
Line 7110 initialise
Line 7200 initialising
Line 7200 min
Line 8050 lair
Line 8060 energy used
Line 8070 time taken
Line 8100 OPTION
Line 8100 SELECT
```

The notes regarding inverse characters are quite important on the Atari machine since they control colour and are required to balance the screen display.

Dave Hitchens,
Blackpool,
Lancashire

PROGAID BUG

My ZX-81 program Progaid published in March contains a bug which will cause the program to crash if Merge is implemented in Slow mode. It will however work properly in Fast.

To correct the bug three extra bytes have to be inserted in the listing at 16623. The three missing bytes are CDE702 and their insertion means that everything between 16623 to the end, 16937,

has to be shifted three bytes down.

The program will now be 402 bytes long ending at 16940. In addition the addresses of the facilities RT-Down, PGM-SVR and Merge will be reduced by three bytes. Merge, for example, now starts at 32450 instead of 32453.

Albert Oliver,
Gibraltar

ORIC ADDRESSES

Having read S. Tighe's letter in the November 1983 issue of Your Computer which listed some Oric memory addresses, I thought that those readers who own Orics, especially those like myself who enjoy dabbling with machine code, may be interested in a few more addresses from ROM routines:

```
#F412 'PING'
#F415 'SHOOT'
#F418 'EXPLODE'
#F41B 'ZAP'
#F41E 'SOUND'
#F421 'PLAY'
#F424 'MUSIC'
```

The parameters for the last three commands should be placed as a series of two-byte integers, starting at location #231 (737), in the same order as for Basic, before linking to the routine with a JSR.

Also, four of the locations listed in the aforementioned letter, have another use which the author did not give. Locations #26D and #26E (621/2) contain the start address of the screen (normally 48000), and #26F (623) contains the number of lines in the scrolled area of memory. Decreasing the latter and adding to the former — in increments of 40 — creates a "window" on the display starting at the address held in location 621/2 consisting of a number of lines determined by the contents of location 623.

This protects the rest of the display from overprinting and

HELP TO COMPILE GAMES TOP 20

To all micro owners. Have you bought a pre-recorded cassette lately? What standard was it? Whatever your answer, this survey is for you.

I want you to send me a list of your top 20 games you've played on your micro — Vic-20, Oric, CBM 64, ZX-81, Texas, Spectrum, Atari, EBC B, and Dragon. I don't mind if it's your cassette or not. All I want to know is your favourite 20 games in order. Please state the memory required and the company who makes the game. Do your list for one micro only. Please state which on your list and on your envelope.

We will then analyse the results which will then be published later on. We will be able to find the top 20 games for each of the top selling micros.

This will be one of the biggest software surveys conducted in any of the computer books on sale in any newsagent.

Please include your name and address as I hope that some software houses will donate some cassettes as prizes. The prizes will be given to the person who's entry is closest to the one published, if no one is correct then the games will be withheld and added to the prize next time.

We have already completed a small survey using magazines, schools, youth and computer clubs. Please send entries to the following addresses:

Nigel Sutton, 18 Claypole Drive, Northborough, Peterborough, PE6 9DW or Chris Mahon, 4 Clare Road, Northborough, Peterborough, PE6 9DN.

EDITORIAL

scrolling, but to change the colour of only the window it is necessary to Poke 619 with the required background attribute — or any other character — and to Poke 620 with the foreground attribute, then to CLS. This technique can be used to protect headings or to put text under a picture without writing over it.

Two more locations which may be useful are 537 and 538 which contain the hi-res X and Y co-ordinates and can therefore be used in testing for out of range parameters with the Draw or Curvov commands.

Andrew J. Edgington,
Norwich,
Norfolk.

MILLIPODS

In the March issue of *Your Computer*, three errors crept into listing 2 of Millipods:

210 IF ASC(B\$)>60 THEN etc

230 C = 5*16

250 IF ASC(B\$)>60 THEN D = etc

Peter Tomson,
Tamworth,
Staffordshire.

TUNNEL RUN

People who have entered my program Tunnel Run which was printed in Software File in the March issue will have got an error when running it. This is because the text says the @ character should be typed instead of the £ character. This would have been correct if my listing had been used but because you printed your own it is not. The correct character to be typed is the hash symbol. The lines which will need altering are 410, 1480 and 1750.

If you wish to make stage 2 of the game harder, enter the line 785 M2=6. This will give a roof to the tunnel.

M. Severs,
Walton-on-Thames,
Surrey.

STOPPING COPIES

Many people that make their own programs and lend them to friends or eventually sell them become surprised with the quick proliferation of unauthorized copies of their own work.

For owners of Spectrum machines I will suggest a small trick that will make any user have to sweat infinite hours of pain and frustration to copy a private label program.

The non-mergeable/non-stop loader. If your programs are in machine-code load them through a Basic header-code loader of the following type:

1 Poke Val "23785", Not Pl: Poke Val "23659", Not Pl

2 Go To Val "9999"

9990 Rem to save the loader

9995 Poke Val "23785", Val

"255": Save "Loader" Line Val

"1": Stop

9999 Rem Insert here LOAD "", if Basic or Load "" Code: Randomize
USR Address f M/C.

Jose Alberto P. Pascoa,
Lisbon,
Portugal.

WHILE QL DELAYS MAY be bad news for the early orderers, they could be a blessing in disguise for the rest of us. Every time a new wonder machine appears on the market the supply of software for one of the old favourites seems to dry up.

The million-plus ZX-81 and Vic-20 owners already know what it feels like to be left out in the cold. The flow of commercial programs for these two old-timers slowed to a trickle soon after the Spectrum and the CBM-64 had arrived in a big way, and as the software houses turned their attentions to these new rising markets.

What interests the program-makers are computer users and not computer owners. The hundreds of thousands of Vics and ZX-81s did not just vanish overnight. They either became second-string machines as their owners moved up *en masse* to larger and more sophisticated micros, or were judged by the software manufacturers to have passed their first year of use when most money is spent on buying programs.

Those who stuck with these machines from the outset and those who bought one after their sales had reached a peak are rewarded with a dwindling choice of programs: software houses prefer the areas of increasing demand.

The programming effort that goes into a new computer is enormous. It often pushes the micro's capabilities well beyond the original expectations of both manufacturer and public. Compare, for example, the quality of early Spectrum software with what can be achieved today.

Machines that are in decline do not receive that kind of attention. So not only is no progress made, but they actually go backwards relative to the latest micros. As this software gap widens between old and new machines, yesterday's computers become even less attractive to buyers.

How to write for Your Computer

We called this magazine *Your Computer* precisely because we welcome your views, tips and hints and even your criticism of machines and software in general. If you would like to see your name in print, whether on a Software File program or a full-blooded article, here is how to go about it. Ideally, all articles should be typed double-spaced on one side only of uniform sheets of paper. If list ncs can be dumped directly from a printer — you can always use a friend's or user group's — this minimises the risk of error. In a perfect world a cassette would accompany the article. That considerably speeds up the checking process. Not only do you get to air your own discoveries and opinions, but we will even pay you for the privilege. We pay £35 per published page — that's as it appears in the magazine and includes illustrations.

Why not give it a try? You have nothing to lose but your postage.

Editor

TOBY WOLFE

Assistant Editor

MEIRION JONES

Staff Writer

SIMON BEESLEY

Production Editor

IAN VALLELY

Sub-editor

PAUL BOND

Editorial Secretary

LYNN DAWSON

Editorial: 01-661 3144

Subscriptions: U.K. £10.50 for 12 issues.

Printed in Great Britain for the proprietors
Business Press International Ltd, Quadrant House, The
Quadrant, Sutton, Surrey SM2 5AS. Tel: 01-361 3500

Telex/grams: 892084 3IPRESG ISSN 0263-0385.
Printed by Riverside Press Ltd, Whitstable, Kent, and
typeset by Instan Ltd, London EC1

ABC

Advertisement Manager

SHOBHAN GAJJAR 01-661 3127

Assistant Advertisement Manager

NICHOLAS RATNIEKS 01-661 8548

Advertisement Executives

NIGEL BORRELL 01-661 3660

JULIAN BIDLAKE 01-661 8453

KAY FILBIN 01-661 8484

Northern Office

RON SOUTHALL 061-872 8861

Advertisement Secretary

JEANETTE MACKRELL

Classified

CLAIRE NOTLEY 01-661 3036

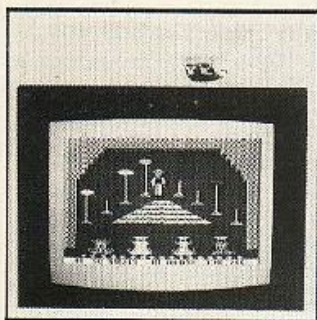
Publishing Director

CHRIS HIPWELL

Your Computer, Quadrant House, The

Quadrant, Sutton, Surrey SM2 5AS.

© Business Press International Ltd 1984



Hungary for a take-away

CHINESE JUGGLER is the first computer game from Hungary. It runs on the Commodore 64 and is sold in Britain by Ocean Software for £6.90. Juggler won an ideas competition on Hungarian TV and was written by a mathematician, an artist and a musician.

Shaking all over about the pirates

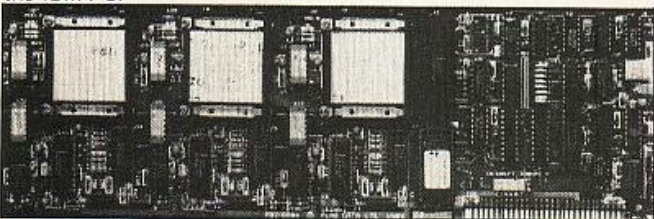
NICK ALEXANDER of Virgin Games is accusing the Government of "endorsing and giving actual support to computer pirates". This follows the Ministry of Defence ban on JLC Data using a new anti-piracy system on the grounds that it might be a threat to national security.

More 6502 for Acorn

ACORN IS FINALLY releasing its 6502 second processor for the BBC Micro which also gives at least 50K of user-memory in any graphics mode.



Shapes of things to come: The 16-bit Grid portable, above, which was used on the space shuttle with its 256K RAM, 384K bubble memory and built-in Modem and flat screen is probably what a typical £300 computer will look like in a couple of years. Below, cheapest bubble memory so far, £600 for a 128K unit to plug into the IBM PC.



Don't call me Elan, Flan, DPC or Samurai — just call me very late



SPRING will be a little late for the Enterprise this year. Chip delays and yet another change of company name

mean that the £200 computer will not be released till September instead of April as originally promised.

Last September when details of the micro then called the Elan Enterprise were released its ultra-high resolution, massive range of colours, 64K RAM, built-in word processor and joystick seemed the ideal home computer but it had already had an unfortunate problem with its names. In the early days of the project which was managed by Intelligent Software it had been code named DPC — damp proof course — but it was first advertised as the Samurai Home Computer. Legal action by another micro firm called Samurai forced a change of name and after a brief flirtation with the name Oscar the company settled on Elan.

Unfortunately, Elan Digital Systems of Crawley were less happy with the name the makers of the Enterprise Marketing Manager Mike Shirley told a gullible computer press that he was considering changing the name to Flan but the company is actually negotiating with an American firm to buy a new name with a futuristic Space travel ring about it. Names like Apollo, Gemini and Mercury have been suggested. The change of name will delay the whole project because here will have to be some retotyping and changes will have to be made to manuals and

advertising materials.

At the same time there have been problems debugging the ambitious Nick and Dave video and sound chips in the Enterprise. The computer will be built by Welwyn Electronics at a plant on Tyneside which will create 90 jobs.

What William Morris — the nineteenth century artist, writer and craftsman would have made of digital watches or interior designer programs for the Spectrum is perhaps fortunately unknowable. He found it difficult enough to adjust to the mass production of the Victorian age but the Institute of Contemporary Arts is celebrating the 150th anniversary of his birth with an exhibition including a computer generated image of his Red House which can display 16 million different colours — presumably including red.

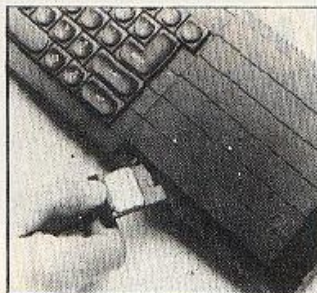
At the same time Richard Williams has set up his own cottage industry producing Spectrum Interior Designers programs which allow you to try out different layouts of furniture on screen. Phone 061 440 0333 for Richard Williams. The ICA exhibition is on at the Mall in London till 29 April.

Easy one for pocket desk

EASY-ONE is an attempt by Elkan Electronics to turn the Sharp PC-1500 pocket computer into an instant work desk. It contains Calculator and Statistics, programs, a 400 word Notepad, an Alarm which can display short messages when it sounds such as "RING DAVID NOW", Text a mini-word processor and a handy currency and measures conversion program. Easy-one costs £25 on tape and it requires an 8K or 16K RAM module and the CE-150 cassette interface.



Microdrives but no QL



EVEN IF SINCLAIR holds to his promise and supplies the first QLs to customers this week most of the thousands of people who have already ordered will have to wait three or four months instead of 28 days for delivery. Sinclair is already quoting delivery dates well into June for those who sent their order forms in at the end of January.

A few QLs which have found their way out by backdoor means and with incomplete ROMs have been changing hands for high prices behind the scenes as software houses race to be the first to produce QL games and applications.

That's no tape recorder — its a mass storage system

TWO NEW high-speed tape drives, the £80 Ultra-Drive and the £120 Floopy, claim to offer disc-style mass storage for a fraction of the price.

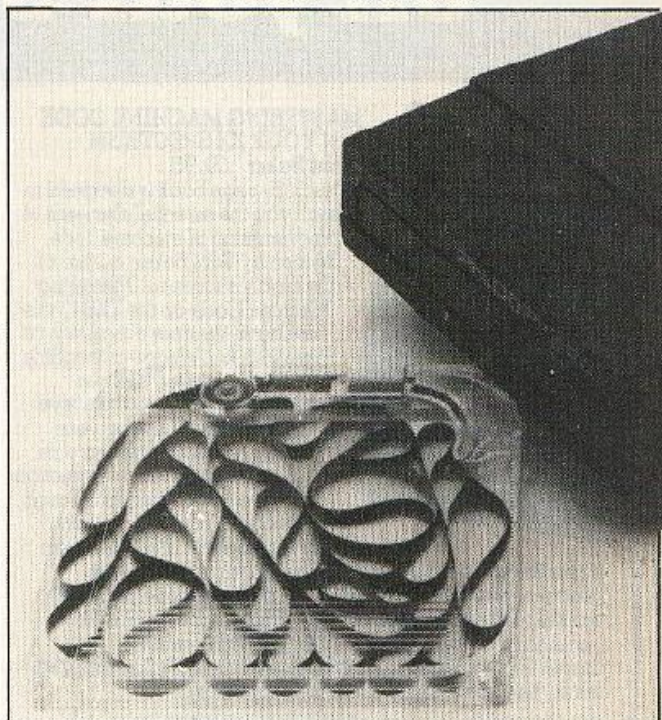
If the claims sound familiar from Sinclair Microdrive advertising that is because the technology is similar. Phloopy, from Phi Mag Systems in Falmouth uses a continuous loop of tape in a cassette which passes a nine-track recording head. Unlike the Sinclair the tape is not twisted over on itself.

Eight of the tracks carry data giving each a cassette a capacity of 100K, and the ninth tracks for error correction. Phi Mag claims an average access time of just three seconds and with a data transfer rate of 10K bytes a second it takes just another three seconds to load a 32K program.

Ikon's Ultra Drive which uses a conventional Philips mini-digital cassette is slower but costs only £80 as opposed to £115 for the Floopy. Access times can be as slow as 90 seconds but capacity is 200K per

cassette. Initially Ikon, on 099-421-515, will produce Dragon and BBC versions of the Ultra-Drive with Oric, Electron and Commodore

variants to follow in the Summer. The Floopy is BBC only but Phi Mag hope to make other versions available later.



International links of Spectrum mob

AFTER DESIGNING everything from guided missiles to robot submarines you might think that inventor Brian West would find making Modems for home computers rather unexciting — but not a bit of it.

His new Spectrum Modem will allow you to transmit programs or play interactive games with other Sinclair owners abroad or in other parts of the country. He has spent the last month testing the new half-duplex unit with connections between his Bristol base and identical machines in London, Paris, Lisbon and Copenhagen.

Micron Eye for the Commodore 64 adds vision to your computer. Details from ESI (0256) 57166.



Brian West is not the only one producing new Modems. This is Minor Miracles WS2000.



Brian West started by producing simple £50 acoustic couplers for the ZX-81 and Spectrum under the name of MicroMyte. His new unit uses a half-duplex Modem which senses how good a telephone line is and adjusts its speed to send the data as quickly as possible.

At first it tries to send data in blocks of 500 bytes each with a checksum to make sure that interference on the line has not caused errors. If after three tries it cannot send a block through it will change down a gear and send data in blocks of half that size. Eventually if the line is bad enough it will go all the way down to 32 byte blocks.

In practice Brian West finds that except in the busiest periods when the telephone lines are noisy he can send data at top speed in 500 byte blocks though on some international lines the Modem changes down to quarter speed.

Jupiter Ace, Forth micro at a third of the price

AT LESS than a third of its original price the £26 Jupiter Ace being sold by Boldfield Computing becomes the cheapest home computer ever sold in Britain. Boldfield is selling off the remaining stocks of Jupiter Cantab which went into liquidation last year.

RAMpacks and software for the Forth based computer are also available which may cheer up any owners who are sickened at the thought that they paid £89 for their Aces less than a year ago, and now find themselves without support. Boldfield is on 0487 840740.

Vadas is what Voice input of St Ives is calling its new speech activated room designed for the disabled. It consists of a voice entry connected to a micro with a disc drive which allows a disabled person to use a cassette player or dial a phone number, open or close curtains and turn on and off a fire, all without touching anything.



At last!

MASTER MACHINE CODE on your Spectrum



MASTERING MACHINE CODE ON YOUR ZX SPECTRUM

Toni Baker £9.95

This 315-page book is designed to teach you the essential elements of programming in machine code. Written by Toni Baker, author of the highly successful 'Mastering Machine Code on the ZX81', this new book assumes absolutely no previous knowledge of machine code whatsoever, and yet promises to take you to a level of proficiency beyond your wildest dreams. Starting with simple addition and subtraction you'll be slowly guided through the entire subject of machine

code. The book explores and utilises the incredible speed of machine code, giving you real time graphics games like BREAKOUT and leads you up to a full working DRAUGHTS program. Among other useful skills you'll acquire the ability to create music in real time (impossible in BASIC) and to plot in high-resolution graphics faster than you would have believed possible.

SPECTRUM MACHINE CODE MADE EASY

Volume One — James Walsh

Volume Two — Paul Holmes

These two books provide a graduated course in machine code programming on the ZX Spectrum. Book one starts off with the basic concepts of machine code, followed by an explanation of binary maths, hexadecimal and base conversion, leading as quickly and painlessly as possible onto the rules and types of addressing the Spectrum's



powerful Z80 microprocessor. Book two is designed for those who already understand the rudiments of machine code programming, and now wish to increase their skills.

Each book is just £5.95



THE SPECTRUM MACHINE CODE REFERENCE GUIDE

Microdrive, Interface 1, and ROM Disassembly

Richard Ross-Langley £4.95

This 170-page reference work for Spectrum machine code programmers contains a full disassembly of the Spectrum ROM, with details of the Microdrive and Interface 1.

Features of the disassembler include: Zilog mnemonics are

used, eg LD A, (HL) instead of MOV A, M, relative jumps show the signed decimal offset and the result; hex values are default and are printed without suffix; decimal values are preceded by a plus or minus sign; and some restart instructions are followed by data bytes. The absolute addresses of all system variables and several important routines have been named, using where possible the standard names shown in the manual. The chapter headings in the Microdrive/Interface 1 section of the book include the RS232 Interface; Microdrive Channel data; Local Area Network; Network Algorithms; System Variables; and a summary of functions. This book is a must reference work for serious Spectrum machine code programmers.

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

Please send me the following books. I enclose £

- ☐ Mastering Machine Code on your ZX Spectrum — Toni Baker — £9.95
- ☐ Spectrum Machine Code Made Easy, Volume One for beginners — James Walsh — £5.95
- ☐ Spectrum Machine Code Made Easy, Volume Two for advanced programmers — Paul Holmes — £5.95
- ☐ The Spectrum Machine Code Reference Guide — Richard Ross-Langley — £4.95
- ☐ Creating Adventures on your ZX Spectrum — Peter Shaw and James Mortimer — £4.95
- ☐ Putting Your Spectrum to Work (includes 15 major programs, including a word-processor and spread-sheet calculations) — Chris Cillender — £4.95
- ☐ Creating Arcade Games on the ZX Spectrum — Daniel Haywood — £3.95
- ☐ Programming Your ZX Spectrum — Hartnell/Jones — £6.95
- ☐ 60 Games and Applications for the ZX Spectrum — David Harwood — £4.95
- ☐ Beyond Simple BASIC — Delving Deeper into your ZX Spectrum — Dilwyn Jones — £7.95

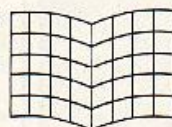
- ☐ Instant Spectrum: Programming (tape and book) — Tim Hartnell — £4.95
- ☐ 20 Simple Electronic Projects for the Spectrum — Stephen Adams — £6.45
- ☐ Giant Book of Computer Games — Tim Hartnell — £7.95

Name:

Address:

**INTERFACE
PUBLICATIONS**

We're the experts!



All books available from computer and book stores including WHSmiths, Menzies, and Dixons.
Trade supplied by: The Computer Bookshop, 30 Lincoln Road, Olton, Birmingham B27 6PA (021 707 7544, telex 334361).



Philips new £70 12in. monochrome computer monitor keeps the family TV clear for Coronation Street, but at that price it is competing with larger second hand colour sets for a place in the computer room.

YOUR COMPUTER TOP 20

Game	Company	Machine
■ Atic Atac	Ultimate	Spectrum
■ Bongo Bob	Quicksilver	CBM 64
■ Cavens	Centrosol	Atari
■ Khafka		
■ Chequered Pawn		Spectrum
■ Fag		
■ Chinese Juggler	Ocean	CBM 64
■ Chuckie Egg	A&F Software	BBC
■ Computer Wars	Thorn EM	Vic-20
■ Cyrus is Chess	Psion	Spectrum
■ Dragoon	Cablesoft	Dragon
■ Flight Simulation	Psion	Spectrum
■ Hobbit	Melbourne House	Atari
■ International Football	Commodore	CBM 64
■ Lunar Vic-20	Ultimate	Vic-20
■ Manic Miner	Software Projects	Spectrum
■ Maze Death Race	PSS	ZX-81
■ Mushroom	Arcade	One
■ Mania		
■ Space Shuttle	Microdeal	Dragon
■ Stinkets	Imagine	Spectrum
■ Twin Kingcom Valley	Bug Byte	BBC
■ Zaxxon	Centrosol	Atari

Renault's new slippery customer — the low drag Renault 25 boasts a 0.28 drag co-efficient — the lowest so far of any production car but inside it relies on a microprocessor from the 6800 family and a ROM full of synthesised speech to justify its claim that the 25 makes "the most extensive use of electronics yet seen in a large-scale production car."



OK Mugsy we've put Sherlock Homes on your tail so watchout

MELBOURNE HOUSE'S staff went crazy when Manic Miner came out last year — "we lost a week of programmer time when that came out" confesses company boss Fred Milgrom. What with that and Ultimate Play the Game's arcade style graphics Milgrom had to admit that "these games were technically far superior to what we were coming up with".

To be fair Melbourne House had produced a similar effect on the other software houses with its cult adventures like the Hobbit but Fred Milgrom is determined to get back on top in arcade games too. The first stage is to mix adventure themes with arcade graphics as in Mugsy — the gangster game Melbourne House is about to release — but meanwhile back in the company's secret base, somewhere in the Antipodes, a team of programmers are working on arcade and adventure blockbusters for release later in the year.

The company is keeping the details of its forthcoming action games close to its chest but loyal Australian Philip Mitchell "I wouldn't leave the place for anything" who wrote the Hobbit gives some clues to the adventure plans. He is just putting the finishing touches to Sherlock



Holmes.

Although it uses the same language analyser as the Hobbit, Philip has made improvements so it can take sentences like "I think the vicar killed Sir Henry in the conservatory

with a blowpipe," — very useful if you happen to be a Victorian detective. Philip also wants to produce a "sausage machine" to take the hard work out of adventure writing.

Shakespeare on silicon will test your English revision to the limit

IF YOU BELIEVE what Penguin says the company's new computer-based Study Software is "the first truly revolutionary breakthrough in the study of literature since the invention of printing." Only time will judge whether the Study Software revision aids which are aimed at students preparing for "O" levels and CSEs prove to be more significant in human history than the invention of the blackboard or teach the mass of the population to read and write, but Penguin hopes eventually to produce Study Software for all subjects.

The first set of Penguin programs deal with six of the examiners favourite Shakespeare plays, Macbeth, Romeo and Juliet, Julius Caesar, Merchant of Venice, Twelfth Night and the first part of Henry IV. You cannot throw away your books just yet though. The program gives comments on particular themes and characters in the play, but you will have to leaf your way through to the line reference.

Where the Study Software beats traditional pocket guides to the plays is in its cross referencing. In Macbeth for instance you can call up any of seven main characters plus the witches, and match them with over 20 themes. You can call up Macbeth and match him with themes like Ambition, Loyalty and Treachery.

You can even cross reference different themes — like blood and water. Not surprisingly the authors are two secondary school teachers, John Mahoney and Stewart Martin. They have tried out the programs in their own classes but they stress that the Study Software is mainly aimed at home revision.

That is why the titles will be released first on the Spectrum at

£5.95 each this month with the BBC and Electron versions to follow in May.

Geography revision is the target for TSSL's map reading program for the 48K Spectrum. The £8 program explains and then tests co-ordinates, grid references, longitude and latitude, map scaling and map key reading. Once you've mastered map reading you could always turn to John Dawson's use of computers for map writing on page 98 of this issue.



ComputerPro

LIMITED

Dept YC, 65 The Falstones, Basildon,
Essex, SS15 5DF. Tel: 0268 412545
Cash & Carry, by appointment

THE COMPUTERPRO PROMISE

ComputerPro is owned and run by electronic engineers. We test and evaluate the equipment to ensure quality — then we negotiate the best possible price. IF YOU CAN BUY CHEAPER — WE'LL REFUND THE DIFFERENCE.

Our prices include VAT and fast delivery by Courier or 1st class post. As engineers we will interface any computer to any printer or modem.

Ring for a quote on any printer.

DOT MATRIX PRINTERS

Shirwa-CT1 CP80/Riteman (P)	£228.95
Star Gemini 10X 0.8K (P)	£248.40
Star Gemini 15X 0.8 IP	£269.15
Star Delta 10 8K (P+S)	£279.50
Epson RX80FT (P)	£289.80
Epson FX80 (P)	£289.95
Epson MX100FT (P)	£437.00
Epson FX100FT (P)	£437.00
Seikosha G2100A/YC/AS	£209.30
Seikosha GP250X (P+S)	£249.55
Seikosha GP700A COLOUR (P)	£385.25
Star STX-80 Thermal (P)	£139.15
MCP-40 Colour (P)	£129.95
'BBC' Spark Jet Printer (P)	£228.35
Mannesmann MT80 (P)	£241.50

DAISYWHEEL PRINTERS

Smith-Corona TP-1 (P/S)	£235.75
Daisy Step 2000 (P)	£318.55
Silver Reed EXP 500 (P)	£299.00
Silver Reed EXP 500 (S)	£333.50
Juki 6100 2K (P)	£385.25
Brother HR15 3K (P/S)	£389.95
Keyboard FOR HR15	£159.85
Sheet Feder FOR HR15	£227.70
Tractor Unit FOR HR15	£108.10

PRINTER/TYPEWRITERS

Silver Reed EX44 0.25K (P)	£389.85
Silver Reed EX44 0.25K (S)	£424.35
Brother EP22 2K (2-KRO)	£149.50
Brother EP44 4K (S-KSR)	£219.65
Brother HR5 (P/S)	£180.55



BASF/WABASH 5.25" DISCS

SS/SD (10)	£13.8C
LIB. CASE ADD.	£2.0C
DISC CLEANING KIT	£8.0E

Buffers for Epson & Shinwa 2K (S)	£67.85
1EK (PorS) £98.90; 32K (PorS)	£142.8C

Gallid Universal Printer Stand	£98.9C
--------------------------------	--------

PRINTER INTERFACES

Printer Cables (State micro)	£20.7C
COM64/V C20 I.F. & Cable (Cass)	£29.9C
COM64/V C20 I.F. & Cable (Disc)	£32.2C
COM 64/Vic 20 Cassette I.F.	£11.5C
Kempston Sinclair I.F. & Cable	£44.8E
Tasword Two word pro for above	£12.6E
Kempston Sinclair Joystick I.F.	£17.2E
Sharp MX-700 Series I.F. & Cable	£32.2E
Sharp MZ-80A Series I.F. & Cable	£80.5C
Atari Printer I.F. & Cable	£49.4E
Texas TI-99/4A Printer system	£169.0E

CASSETTE RECORDERS

Banish loading problems forever, with the Sanyo DR101	
Date recorder	£44.85

COMPUTERS

BBC Model B	£397.90
BBC Mode B - Disc Interface	£468.05
Disc Interface kit	£81.65
1/2h 5.25" disc drives in matching colour case. Inc format disc and leads	
1" 100K S/S 40 track drive	£173.65
2" 100K S/S 40 track drive	£219.65
Torch 280 Disc Pack Inc S/W	£799.25
Cassette leads for DR101	£4.60
Monochrome Monitor leads	£3.91
Sanyo RGB Colour Monitor leads	£11.50
Centronics Printer Cable	£11.50

MONITORS

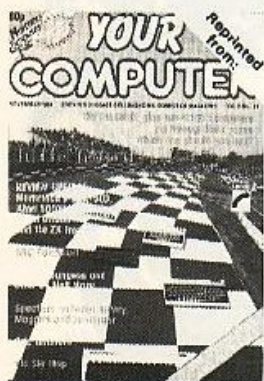
Sanyo SM12N 12" <18Mhz green	£77.05
Sanyo SM12H 12" >18Mhz green	£98.90
Phoenix 12" 24Mhz amber	£98.90
Fidelity 14" RGB, RGBY, Composite Video and Sound	
Superb value	£210.45
Sanyo 14" RGB (400 Pixas)	£198.95

BBC 1/2h disc drives in matching colour cases that fit snugly under the Micro, Inc. format disc, manual and all cables.
5.25" Single (400K) 40/80T.....£267.95
5.25" Dual (800K) 40/80K.....£458.85
Single to dual upgrade kit.....£253.00
Optional power supply unit.....£40.25

* If we receive documentary proof of a lower price within 7 days of order.

REPRINTS

a ready made sales aid



If you are interested in a particular article or advertisement in this publication why not take advantage of our reprint service. We offer an excellent, reasonably priced service. For further details and a quotation

Ring Michael Rogers on 01-661 3457

I could do that...

(continued from page 51)

Week one	Week two
1 ALL-GATOR	6 DEATH
2 WIND	7 DEER
3 HOUSE	8 RABBIT
4 LIZARD	9 WATER
5 SERPENT	10 DOG
Week three	Week four
11 MONKEY	16 BUZZARD
12 GRASS	17 EARTHQUAKE
13 REED	18 FLINT KNIFE
14 JAGUAR	19 RAIN
15 EAGLE	20 FLOWER

By combining the number series and the day series, you get "One-alligator" as the name of the first day, of the second, "Two-wind", of the third, "Three-house" — until you reach the day "Thirteen-reed". The following day is called "One-jaguar"; the next, "Two-eagle", and so on.

There were 18 Aztec "months" — $16 \times 20 = 360$ days — plus one anonymous week — $360 + 5 = 365$ days — in a year.

If one was called Four-monkey — 4-11 — his Name-day fell in different months than his friend's who was called Three-monkey. You need a computer program to find out the Name-days. Good luck!

Nobody found February's Pascal's Triangle problem very taxing. From a large number of entries the first to be picked from the bag came from R. Nicol, 22 Hawks Park, Saltash, Cornwall.

```

10 CLS: PAPER 7: INK 0: INPUT
  "Enter number of lines required"
11 GET B1
12 DIM A(1)
13 LET B1(1)=1: PRINT "1"
14 FOR A=2 TO C
15   PRINT 1: FOR B=2 TO A: LET A
    (B-1)*A+(B-1): PRINT A(1)
16 NEXT B: PRINT "1"
17 FOR A=1 TO A: LET B1(A)=A(1)
18 NEXT A
19 STOP

```



Expanded diagram of PI symbol.

(continued from page 51)

(144 + n): NEXT n

Before carrying on, try using this one-liner. See how it works by looking up code of the characters in the ZX Guide, page 186.

Now for the next step. Look at the P symbol set out on page 93 of the guide. Included herewith is an expanded diagram of the symbol, with the value of each column, the Binary value of each row and also the decimal equivalent of the Binary number.

The P symbol may be entered into the "Graphics P" location in the Spectrum's memory using program 1. When the input "r" is called for in line 80, the numbers may be entered either in decimal — e.g. 84 in the 5th row — or binary — in this case as "BIN 01010100". You may even mix binary rows and decimal rows in the same figure being defined.

The Binary number relates quite obviously to the shape of the graphics character. To convert the Binary to decimal, add up the column values of each binary "1". So Binary 01010100 is decimal $(64 + 16 + 4) = \text{Decimal } 84$. Check the figure for P, row 5, until you are quite certain that you have grasped this.

There are two things to note in connection with program 1. Firstly, you can replace line 90 by this line: `90 POKE USR "P" + n,r`. Secondly, you can use Read and Data to Input the rows.

Program 2 shows how the graphics for P can be entered into the Graphics P location by using the Read/Data feature.

```

Program 1
10 REM "defUDG"
30 CLS: PRINT: PRINT "Row"
40 FOR c=1 TO 8
50 PRINT AT 3+c,12;c
60 NEXT c
70 FOR n=0 TO 7
80 INPUT "Next Row "r
90 POKE USR CHR$(80+n),r
100 PRINT AT 4+n,16;"
110 NEXT n
120 PRINT: PRINT TAB 12:CHR$(80,CHR$(159)
150 STOP
9990 SAVE "defUDG" LINE 10

```

```

Program 1a (to add to program 1)
10 REM "defUDG"
20 FOR n=0 TO 20
30 POKE USR CHR$(65+n),n,r
120 PRINT: PRINT TAB 12:CHR$(65+n),CHR$(144+n)
130 INPUT "Press ENTER to continue "Z$
140 NEXT n

```

BEGINNERS

first bytes

```

Program 2
10 REM "defUDG"
20 FOR n=0 TO 7
30 READ a
40 POKE USR CHR$(80+n),a
50 NEXT n
60 PRINT "Graphics "; CHR$(80);
  gives U.D.G. "CHR$(59)
70 DATA 0,0,2,60,84,20,20,0
80 STOP

```

So far, entering a single character has been considered. A complete set may be entered by adding the lines of program 1a to program 1, or by using program 3, in which the Data lines — starting at line 70 — will yield the graphics set I wrote for a few Chemistry programs.

```

Program 3
10 REM "defUDG"
20 FOR n=0 TO 20
30 FOR m=0 TO 7
40 READ a
50 POKE USR CHR$(65+m)+n,a
60 NEXT n
70 NEXT m
80 DATA 24,36,35,36,24,0,0,2,4,
  36,8,16,60,0,0,56,4,24,4,56,0,
  0,0,0,0,24,36,36,36,24,0,0,0,
  24,36,8,16,60,0,0,56,4,24,4,56,
  0,0,0,32,32,40,50,8
90 DATA 0,0,3,60,32,24,36,24,0,0,
  0,16,32,56,36,24,0,0,60,4,8,8,
  5,0,0,0,24,36,24,36,24,8,8,62,8,
  5,0,0,0,0,60,0,0,0,0,0,28,16,"6,
  16,16,"6,16,28,56,3,8,3,8,8,56
100 DATA 0,4,2,255,0,255,64,32,0,0,
  0,0,108,146,108,0,0,0,28,32,120,
  32,28,0,0,6,10,18,34,66,231,0,0,
  231,68,120,68,66,231,0,0,8,20,
  20,34,62,0,0
110 CLS: PRINT TAB 3:"CHR$(TA
  B 11: "Graphics"; TAB 23:
  "U.D.G."; PRINT
120 FOR b=0 TO 20
130 PRINT TAB 3: 144+b; TAB 15:
  CHR$(65+b) TAB 25: CHR$(
  144+b)
140 NEXT b
150 STOP

```

By this stage, you may have wondered about reading a graphics set, such as those you may have generated using the Horizons character generator. Program 4 does this, dismantling my chemistry graphics set.

```

Program 4
10 REM "UDGlist"
20 FOR n=0 TO 20
30 PRINT CHR$(65+n); TAB 2,
  CHR$(144+n);
40 FOR r=0 TO 7
50 PRINT TAB 5+3*n;PEEK
  (USR CHR$(65+n)+r),
60 NEXT n
70 PRINT
80 NEXT m
90 STOP
9990 SAVE "UDGlist" LINE 10.

```

```

Program 4. Printout.
A 24 36 36 36 24 0 0 C
B 24 36 8 16 60 0 0 C
C 56 4 24 4 56 0 0 C

```

D	0	0	0	24	36	36	36	24
E	0	0	0	24	36	8	16	60
F	0	0	0	56	4	24	4	56
G	0	0	0	32	32	40	60	8
H	0	0	0	60	32	24	36	24
I	0	0	0	16	32	56	36	24
J	0	0	0	60	4	8	8	8
K	0	0	0	24	30	24	36	24
L	8	8	62	8	8	8	8	8
M	0	0	0	60	8	8	8	8
N	28	16	16	16	16	16	16	28
O	56	8	8	8	8	8	8	56
P	0	4	2	255	64	32	64	32
Q	0	0	0	0	108	146	108	0
R	0	0	0	28	32	120	32	0
S	0	5	10	18	34	66	231	0
T	0	231	68	120	68	66	231	0
U	0	8	20	20	34	62	0	0

The final problem is how to save and use your UDG set. This depends on whether you have a 16K or a 48K Spectrum. I think it is rather wasteful to use a Read/Data structure to re-define a graphics set each time, and use this approach.

Suppose you have a UDG set in your memory. You may, for example, have entered and run program 3, Newedit, and entered program 4 to dismantle it. Now to clear the program, without switching off.

Next, enter program 5 without typing in line 9000. Run the program, which displays the graphics set, and then add line 9000. Be sure to use the correct codes in lines 9000 and 9995. The program and the graphics set are saved in two sections by Goto 9990 — and Enter. Watch for the second "start tape then press any key" message. The program will auto-start — again in two sections — by simply Load".

The lines between 10 and 8999 are available for any program you like to write, using the UDG set.

```

Program 5
10 REM "UDG48"
20 PRINT "User Defined
  Graphics"
30 PRINT: PRINT " CHR$(
  Graphics U.D.G.": PRINT
40 FOR n=0 TO 20
50 PRINT TAB 3: 144+n;
  TAB 15: CHR$(65+n);
  TAB 25: CHR$(144+n)
60 NEXT n
70 STOP
8010 GO TO 10
9990 SAVE "UDG48" LINE 9000
9995 SAVE "UDG48" CODE
  65368,168

```

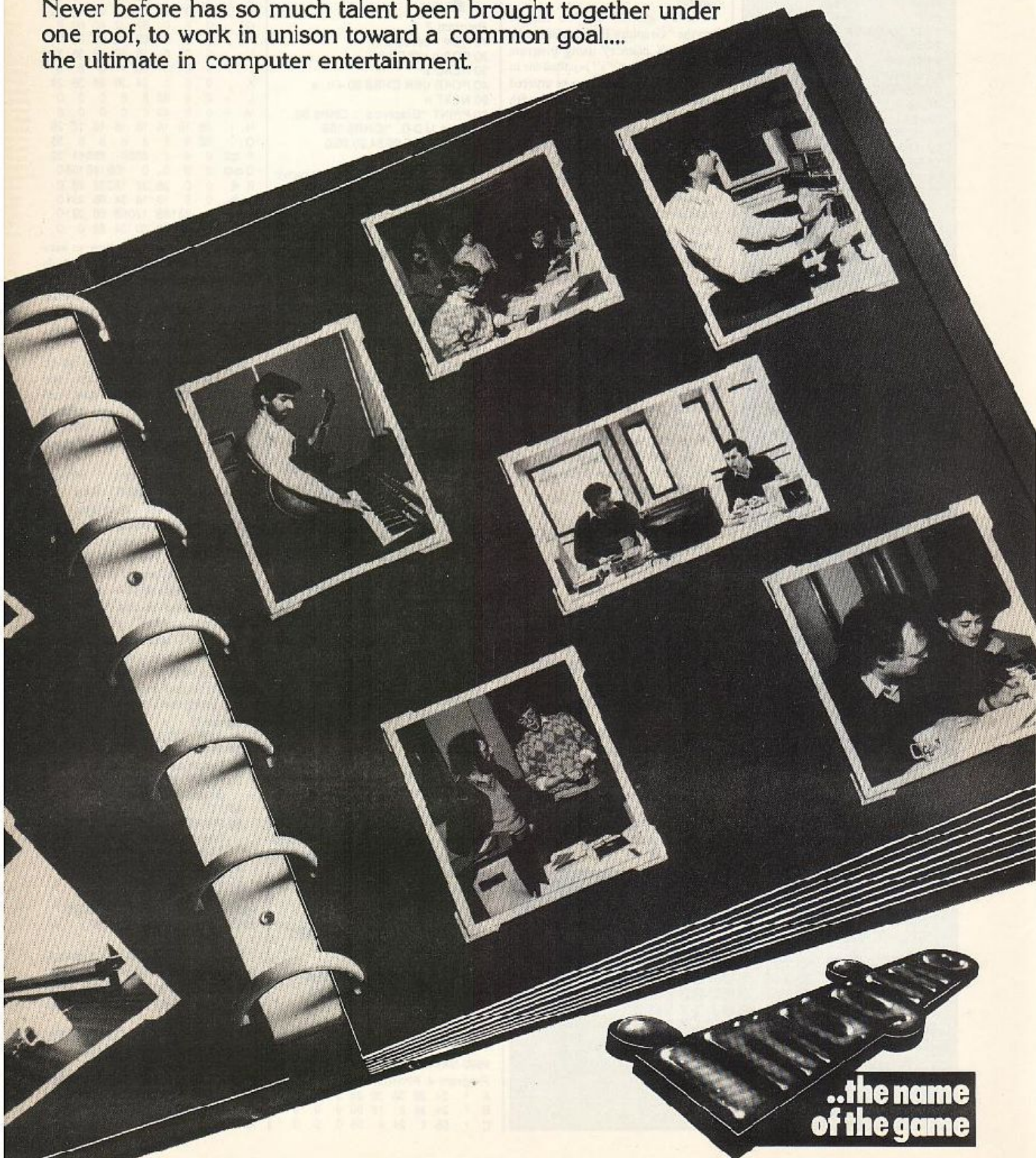
With graphics set in this memory, Run program 5 without line 9000. Now add line 9000, and the demo program is ready to Save by Goto 9990. 9000 LOAD "UDG48" CODE 65368 For 16K Spectrum, substitute 10 REM "UDG16" 9000 LOAD "UDG16" CODE 32600 9990 SAVE "UDG16" LINE 9000 9995 SAVE "UDG16" CODE 32600,168

When there are better computer games we will be writing them...

Imagine, the largest most successful software house in the world are dedicated in the pursuit of excellence.

From our massive programming, graphic arts and music department in the heart of Liverpool, the most creative and innovative games in the industry are conceived, created and brought to fruition.

Never before has so much talent been brought together under one roof, to work in unison toward a common goal....
the ultimate in computer entertainment.



Imagine Software Limited, 5 Sir Thomas Street, Liverpool, Merseyside L1 6BW.
Dealer Enquiries Contact: Sharon O'Brien or 051-236 8100 (20 lines)

If you have anything of interest to tell us about your computer club why not contact us on 01-661 3144.

Local news

Stoke on Trent

The Mixed Bytes Computer Club meets at Dilhorne Recreation Centre, New Road, Dilhorne near Stoke-on-Trent every other Thursday between 7.30 and 9 p.m. All users are welcome. Call Mr A Cope on 0782-396003.

Long Eaton

The ZX Spectrum Club in Long Eaton, Nottingham, is a non-profit making organisation dedicated to the care and rehabilitation of Spectrum owners. For more details contact P Riley, 63 Kingsley Crescent, Sawley, Long Eaton, Nottingham NG10 3DA.

Arun

Arun Microcomputer Club gets together at Wick Amenity Centre, Littlehampton, West Sussex on the first Monday of every month at 8 p.m. and the third Sunday of every month at 6 p.m. Contact P Cherriman, 7 Telbot Road, Littlehampton, West Sussex DN17 7BL. Telephone 08064-7807.

Shrewsbury

Shrewsbury Micro Club meets at Shrewsbury Shirehall once every two weeks. Contact Mr V Ives, 6 Bramley Close, Severn Meadows, Shrewsbury. Telephone: 0743-55024.

Mid-Kent

The Mid-Kent Micro Club has freed itself from association with the TRS-80 and all computerniks are now welcome at the Maidstone Teachers' Centre, Sittingbourne Road, Maidstone between 7 and 10.30 one Friday a month. Contact M K Gotes at 65 Buckland Road, Maidstone, Kent.

COMPUTER

Paul Bond visits Guildford to find out what computers offer in the way of aids to the handicapped.

A NEW VENUE — THE Stoke Hotel, Stoke Road, Guildford — may have thrown a few members but nevertheless there was a good turnout when *Your Computer* visited the West Surrey Computer club recently. The evening was dedicated to micros in the service of the disabled as club chairman Fred Tickle explained.

Tony Isles from the Foundation for Communication for the Disabled started the evening off by demonstrating applications for the Microwriter. This is a hand-held keyboard with liquid crystal display and 8K onboard CMOS RAM which was originally designed some years ago as a kind of high-tech notebook not specifically aimed at the disabled.

The Microwriter uses a five-key system to generate text; you have to learn different combinations to generate different characters. This is of obvious use to someone whose handwriting is getting spidery and shaky — as in the case of a multiple sclerosis sufferer. But versions have been developed which do not even require hands. Mr Isles demonstrated a Microwriter controlled by breathpower. Lights in place of buttons on the keyboard indicate what notional buttons are being pressed; when you release the mouth-piece, the letter comes up on the LCD.

This means children with disability can be integrated in normal schools because they have a means of writing that they can carry around with them and which is independent of the mains supply, unlike the bulky electric typewriters that they are often forced to use.

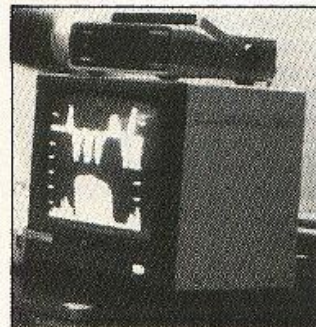
An interesting application of computerised voice synthesis which benefits blind people was also demonstrated.

They can play their Microwriters into a voice synthesiser which can either spell, or read out what they have keyed in. Future developments include bigger program dictionaries so that the machine will be able to pronounce words like "Wednesday" as we do, rather than separating each syllable.

Peter Bell put the emphasis on education. He teaches at the Lord Mayor Trelor College, a school for handicapped in Alton, Hampshire. While many of this 250 pupils make use of Microwriters, they don't solve everything. Some youngsters are not highly-motivated enough to learn the codes. Another system used is the MacApple computer — an Apple with special software which allows you to use the whole keyboard, part of it, or just one button as a scanning



Above: demonstrating a Microwriter adapted for breath control. Left: the BBC Visi-speech set-up for deaf speech education.



device.

One child with speech disability was experiencing considerable difficulty in writing — a line of typewriting might be his entire output for the day, leaving him exhausted. Communication with the outside world was a real problem. Using the MacApple, together with a joystick, instead of his expanded keyboard connected to a typewriter by failure-prone solenoids and wires, he generated so much text on his first day of use that he had to be held down; he was so excited.

Some time ago, the school was involved in a study rather like *Your Computer's* "Design a Micro" competition — ideal for their purposes, they decided, would be a portable battery-powered, CMOS-based computer with LCD display and built-in printer. Coincidentally, Epson brought out the Epson HX-20 just as they finished, and it was pretty much what they wanted. This enables pupils to communicate and to take notes in classes.

John Piper, from Tools for Living, a Welsh-based organisation contactable on 0437-83472, pointed out that we're all one-fingered typists at heart. He showed an ergonomically-designed keyboard designed to

reduce the number of repetitive moves, built by PCD Maltron Ltd.

Typing with one finger is all very well, but however fast you do it, being able to generate one word with one movement is still much faster. Clive Sinclair's Spectrum came in for some praise with its keyboard system — but you still need two fingers to operate it. A similar device for people with communication problems has been developed by Guy Hamilton, a doctor from Woking.

This is a big 2ft by 3ft pressure pad board with 800-1000 keywords written on it. The Slink, as it is known, can be hooked to a VDU via an infrared link like a remote control TV unit. This obviates cables lying around in an environment where there are probably enough people with mobility problems anyway.

Mr Piper also demonstrated a system employing the BBC Micro to teach deaf people how to modulate the sound that comes out of their throats. Because deaf who have been deaf from birth cannot hear what they are saying, their speech may sound strange to non-handicapped people.

The BBC can be used as a source of feedback. Using a £900 Visi-speech interface, an oscilloscope pattern is generated on the screen by vocal inputs. The deaf person can then try to achieve the same pattern underneath that created by the teacher.

The West Surrey Computer Club, whose secretary, Chris Karney, can be contacted on Guildford 68121 Ext 587, has many such informative evenings lined up.

THE CHALLENGE IS WITHIN YOUR GRASP



Compatible
with
Atari
Commodore
Spectrum

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

NEW

PRO 1000

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

PRO 3000

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

NEW

PRO 5000

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

KEMPSTON JOYSTICK INTERFACE FOR THE ZX SPECTRUM

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

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



SPECTRUM JOYSTICK INTERFACE £11.50

PRO 5000 £13.50

PRO 3000 £12.75

PRO 1000 £10.99

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

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

CONVERSION TAPE III
- Converts: Ah Diddums, Jumping Jack, Major Maul, Androids, Horace And the Spiders, Space Raiders, Winged Avenger, Muncher

ALL £4.95 each



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

KEMPSTON
MICRO ELECTRONICS LTD

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

Star★ chart

Dambusters

BBC B:
Bomb it down:
£7.95:
Aliigata:

★★★★ Plus 5 raspberries for lack of information on availability of disc version or possibility of swapping. Great fun and rather unpredictable vers on of W.W.I Dambusters exploits, Rathol similar graphics to defender (planetoid) but good and simple. Also good sound with external speakers.

Vortex

BEC B:
Shoot'em-up:
£7.95:
Software Invasion:

★★★ This 3D in 2D game (no red and green glasses) has an inevitability about it that makes you try harder even though you know that failure looms! Unusually I found that both the joystick and keyboard gave good control of the fighter craft equipped with laser torpedoes.

Pengwyn

BEC B and Electron (see note):
Novelty:
£6.95:
Postern:

★★ Plus 5 raspberries for lack of information on availability of disc version or possibility of swapping. Moving blocks of ice, crushing nasties and trying to align special blocks leaves me chilly.

Hicksted

Spectrum 48K:
Games for Girls:
£5.95:
CCS:

★★ Hicksted, is a game of computer sed horsemanship based on the differently spelt show jumping ground Hickstead. It is one of three games under the somewhat dubious category of 'Games for Girls' I thought it best if I got a little horse mad, computer crazed friend of mine to review it. She was to put it mildly disappointed. Conclusion: a great idea executed poorly.

SOFTWARE

Shortlist

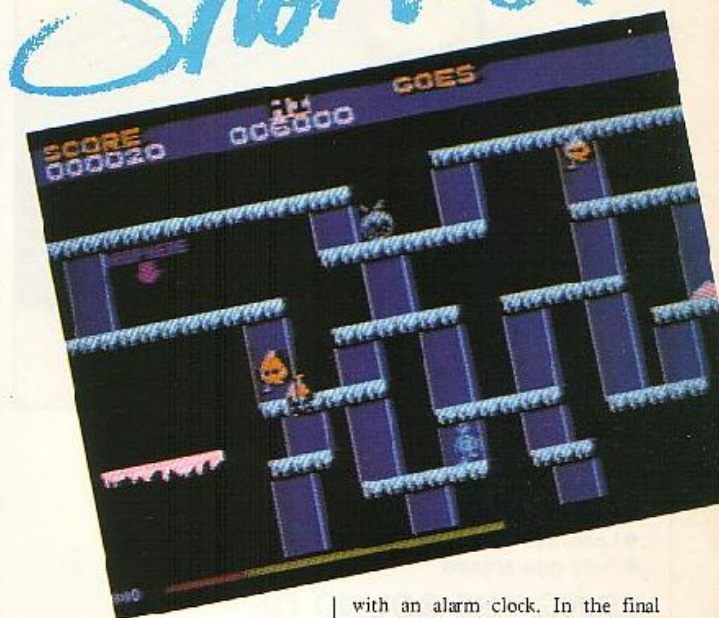
Snowman

■ Spectrum 48K
■ £6.95
■ Quicksilver

★★★★

THERE'S NO PEOPLE like snow people, and the Snowman, based on the book by Fungus the Bogeyman creator Raymond Briggs, is already nosed abroad as unique among computer games for its non-violence. At last a game that parents can buy for Junior secure in the knowledge that they will not awake next morning to find their lovable offspring transformed into a bloodcrazed twitching freak.

Instead of dying in the Snowman, you go to sleep. The screen display is a frosty blue, ladders and levels display. You have to collect six pieces of snow in order to build the snowman. Watch out for roving gas flames — these melt the snow you are carrying, and it reappears elsewhere on the screen. This game will appeal to perverse people who insist on celebrating Christmas in the middle of the summer, since you gain extra points for collecting various Christmas crackers, presents, stockings and trees. If you collect an ice lolly you can ward off the gas flames. Your energy is replenished



by eating a turkey or Christmas pudding.

In staves two and three you have to kit out the snowman with scarf, hat, nose etc while avoiding the Sleep Monsters. These can be neutralised

with an alarm clock. In the final stage you try to collect icecubes to stop your snowman from melting. The gas flames make their comeback here. Attractive graphics, well thought-out idea, perhaps a little too much dexterity required to position your man at the bottom of ladders



Blue Thunder

■ Spectrum 48K
■ £6.95
■ Richard Wilcox Software

★★★★

NOTHING TO DO with the film starring Roy Scheider, or the TV series starring James Farentino; in this program we are a world away from the difficulties of community policing by helicopter. You are

probably better off playing this game with a joystick, than the keyboard, but even then the fire button is given the three functions of 90, 180 degree turns and firing. This can complicate

(continued on page 59)

ZEAL SOUND BOOSTER FOR SPECTRUM



- Plug in and use — No internal connections
- No batteries needed
- Good clear sound
- Output control
- Load/Save facility built-in
- Fully guaranteed

BRING THE SOUND OF
YOUR GAMES TO EXCITING
LIFE FOR JUST

£14.99

(Including VAT + P&P)

NEWSFLASH!

14" MICROVITEC
COLOUR MONITOR

SPECTRUM COMPATIBLE

£285 (INCL VAT & CARRIAGE)

16K RAMPACK FOR ZX81

£17.50 (INCL. VAT & P/P)

Please send me (enter quantity in box)

☐ Sound Boosters @ £14.99

☐ Colour Monitors (Spectrum

Compatible) £285.00

☐ Rampacks for ZX81 @ £17.50

Above prices include VAT/P/P/Carriage

NAME.....

ADDRESS.....

I enclose cheque/P.O. for £.....

ZEAL MARKETING LTD

VANGUARD TRADING ESTATE, STORFORTH LANE

CHESTERFIELD, DERBYSHIRE S40 2TZ

Telephone: (0246) 208555

BBC COMPUTERS

West Wales

BBC model B.....	£399.00
ELECTRON.....	£199.00
Microvitec Colour Monitors.....	£247.00
Disc Drives.....	from around £189.00
Teletext Adaptor.....	£225.00
Wordwise (Wordprocessor).....	£46
Graphics ROM.....	33
Disc-Doctor.....	£33

Plus a range of Accessories & Peripherals etc exceeding that of any other Micro, including Printers, Paper, Ribbons, VDU's, Z80 Second Processors, ROM Boards, Joysticks, Light Pens, Dust covers etc etc etc.

24 hr despatch on all stocked items

School/College Orders Accepted... Immediate Supply
Discounts on Educational Software

ALL OUR PRICES INCLUDE VAT at 15%, Securicor Carriage extra.

We are official dealers, and stock probably the largest range of COMPUTER SOFTWARE & BOOKS for the BBC Micro in West Wales, plus a good selection for several other popular computers. (Over 300 software, and 55 book titles FOR THE BBC MICRO ALONE.)

FOR FURTHER DETAILS, CALL IN FOR A
DEMONSTRATION, OR SEND A SELF ADDRESSED,
STAMPED, LARGE ENVELOPE FOR PRICE LIST etc.
(We cannot reply without one)

(We urge you to phone FIRST if coming any distance.
Note our shop hours!)

CARDIGAN ELECTRONICS

Chancery Lane, CARDIGAN, (Near Woolworth's)

TEL: 0239 614483... Hours MON-SAT 10am-5pm

CLOSED ALL DAY EVERY WEDNESDAY (and Public Holidays)

BETA BASIC

ENHANCED BASIC FOR THE

ZX SPECTRUM 16/48K

26 NEW KEYWORDS — 10 NEW

FUNCTIONS — MANY EXTRA FEATURES

KEYWORDS INCLUDE:

ALTER	allows extensive manipulation of the attributes file.
AUTO	for automatic entry of line numbers.
CLOCK	controls a digital clock with alarm and alarm-initiated GOSUB facility.
DELETE	any block of lines.
DO	DO...LOOP structure with WHILE, UNTIL and EXIT IF.
DPOKE	double POKE.
EDIT	a specified line number.
ELSE	used with IF...THEN.
GET	waits for keyboard entry; doesn't use ENTER.
KEYWORDS	switches between new keywords and normal graphics mode.
ON	GOSUB or GO TO a line number from a list of line numbers.
ON ERROR	allows trapping of error reports; has available ERROR, LINE and STAT variables.
POP	removes data from BASIC's stack.
PROC	named procedures, with DEF PROC and END PROC.
RENUM	renumber part or whole program with specified start line and increment. Handles GO TO, GOSUB, CN, etc.
ROLL	pixel movement of part or whole screen in any direction, with wrap-around.
SCROLL	as ROLL, but without wrap-around.
SOFT	sorts part or all of string or numeric arrays according to specified substring or column. SORT INVERSE sorts in reverse order. One hundred strings can be sorted in about one fifth of a second.
TRACE	allows display of line and statement numbers as a program is running. Display of selected variables, single stepping, and reduced speed are also possible.
USING	used with PRINT. Formats numbers.

Functions provide:

Conversion between decimal and hexadecimal — conversion between integers and two-character strings (allows "integer arrays") — formatting of numbers — INSTRING and STRING\$ equivalents — amount of free memory — double PEEK — current time.

Features include:

Single-entry keywords (in graphics mode) with syntax check on entry — seven new error messages — compatibility with Spectrum BASIC — program occupies just 5.6K — cursor can move in all directions in a line being edited — flashing current line pointer — BREAK gets you out of even machine code lock-ups — PLOT lets you plot string anywhere on the screen — PLOT and DRAW scale and offset values can be set using XRG, YRG, XUS and YUS — 16K and 48K versions on same tape — comprehensive manual.

Only £11.00 inclusive!

Please send me copies of Beta BASIC.

I enclose cheque/p.o. for £.....

Name:.....

Address:.....

BETASOFT

92 Oxford Road, Mosely, BIRMINGHAM B13 9SQ

Star★ chart

Starship Escape

Vic-20 with 16K expansion:

Maze shoot-'em-up:

Sumlock:

£7.95:

★★

A tractor beam drags you aboard the alien ship. Your craft is dismembered and you must prowling about the eerie craft reassembling your own vessel. Androids, robots, space spiders and the ever-watching Force Cloud make life difficult. Playable with joystick or keyboard. You zoom around the space-hulk at great speed, infuriatingly being re-imprisoned where you started from with your trusty K9 friend. Graphics not marvellous, of course.

Destroyer

Unexpanded Vic-20:

Shoot-'em-up:

Sumlock:

£7.95:

★★★

An unembellished shoot-'em-up, requiring plenty of co-ordination, nevertheless. Using the keys you have to steer your destroyer back and forth on the oggin, shooting to left and right at attacking aircraft, depthcharging submarines, and dodging torpedoes and bombs. The whole game runs for a time period shown by a changing strip at the bottom of the screen. If you survive the time period, a bonus based on planes downed is added to your score. Not bad in 3K.

Bull Run

16/48K Spectrum:

Run away:

Phipps Associates:

£6.95:

★

Silicon Pamplona. On holiday in a Spanish village you are pursued by a wild bull. There is a 30,000 pesetas reward from which 50 is deducted every second. You use yourself as bait and put up fences. These do not stay up very long. The Bull will gore you if you are carrying a fence, but you are fairly safe behind one. Three levels of play, not great graphics, cheaper than a holiday in Spain.

SOFTWARE

Shortlist

(continued from page 57)

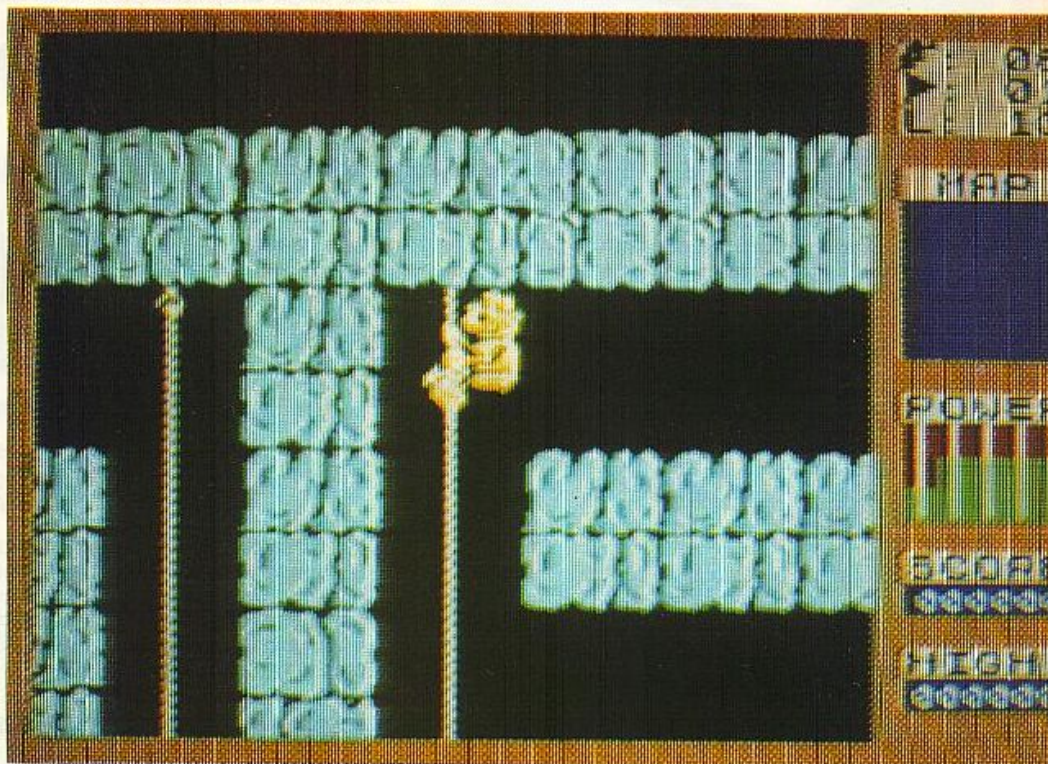
matters. I am also dubious about the claim of incredible perspective graphics.

This is a pretty Chopflier with a nuclear reactor throw in. First, pilot your whirlwind. Off the V-STOL carrier over the islands, getting shot at. There are five different levels of difficulty. In the higher levels you contend with waves of jet fighters and indestructible red

balloons. Only one of the latter at a time — the number never gets as high as 99. You penetrate enemy lines, destroy the nuclear reactor and rescue up to 16 comrades in one

trip.

The on-screen score line displays from left to right, reserve etcoppers, current score and mission number. A vertical bar on the right of the screen indicates your chopper's fuel level. A challenging game.



Neptune's Daughters

■ Commodore CBM-64

■ £7.95

■ English Software

★★

AS THE OLD pre-decimalisation jokes goes "My girlfriend's a mermaid — lovely vital statistics: 36,24 and four and six a pound." Your history teacher might be able to explain it to you. The aim of this game is to rescue Neptune's beautiful daughter from the sea serpent who is holding her captive. Unfortunately we have to admit this game had us pretty well stumped. It is either a very demanding and challenging game, or impossible to play and consequently stupid, depending on who you talk to.

Either way, Neptune's daughter never showed up for any of us, and it is a lot of bother fighting octopuses, sucker plants and deadly amoebae just for a blind date. You take the

part of an acuanman who absorbs oxygen through his gills. You have to fight off the attentions of poisonous octopodes and clear the way of deadly sucker plants to get through to successive caverns in this Sutmanner Scramble scenario. You eventually encounter amoeba swarms, you have to manoeuvre yourself into a position where you can kill them with your harpoon and absorb the bubbles of oxygen which they emit as they die.

This is as far as most of us could get. Apparently after this a monster crab is encountered. You kill this and take it with you to feed the sea serpent. All being well, the gorged ophiuchan ogre will knock off for 40 winks while you depart with the girl in the wet-look outfit. You then lead her back to the safety of the palace, where (presumably) you can settle down to discuss the experience over half a shandy and a packet of shrimp-flavoured crisps.

This is all hearsay, however: one thing we can say — this game has a very high frustration quotient.

Fred

■ 48K Spectrum

■ £6.95

■ Quicksilver

★★★★

FROM THE people who brought you Bugaboo or Booga-boo, depending on which computer you play it on, comes another feast of Disneyesque graphics.

The screen display presents you with a vertical maze of glowing blue stone walls, around which the intrepid Fred wends his weary way in search of the treasures of the Pharaohs. Yes, I know we have done the Pharaohs at the bottom of your garden joke.

Fred shins up and down ropes, avoiding contact with rats, acid crops, ghost which can go through walls, chameleons, mummies and vampires. He has a gun and six bullets.

There are six screens, increasing in difficulty, followed by the option to return to the first screen, or redefine the maze and number of monsters.

Tandy® TRS-80: Setting The Standard

With Dot Matrix Printers...



9 1/2" Dot-Matrix

£399

- With Colour Computer and Parallel Interfaces

DMP-120. This versatile 9 1/2" dot-matrix printer has high speed data processing and graphics modes that makes light work of many many tasks. It prints ten and 16.7 characters per inch, or elongated five and 8.3 characters per inch at up to 125 characters per second. A very compact printer it uses fanfold, single sheet or roll paper and has built in parallel and colour computer compatible serial interfaces. **26-1255**

Colour Graphics

£149

- Uses Easily Replaceable Ink Cartridges

CGP-115. Ultra-compact colour graphics printer helps you create beautiful graphics in red, green, blue and black, and it prints alphanumerics. Built-in commands make it easy! Text mode prints 40 or 80 characters per line at 12 characters per second. Uses easily replaceable ink cartridges. A selection of colour pens is available. Set measures 2 15/16 x 8 1/4 x 8 1/2". **26-1192**



Low Cost Dot-Matrix

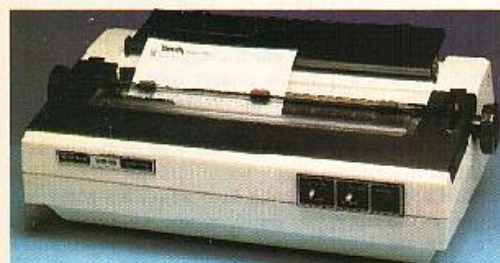
£79⁹⁵

- Print Graphics and Alphanumerics
- Whisper Quiet!

TP-10 Thermal Printer. Perfect for use with the MC-10 Colour Microcomputer, and our other colour computers. You can print both screen graphics and alphanumerics. Textmode prints 32 characters per line at 30 characters per second on 4 1/8" wide thermal paper. Special repeat function to make graphics programming easier. Colour computer-compatible serial interface only (600 baud). **26-1261**



..Or Choose The Daisy Wheel Printer That Best Suits Your Needs.



"Letter Perfect"

£1199

With Free Bi-Directional Tractor Feed (26-1459)

"Letter Quality"

£599

• With Automatic Wheel Positioning



DWP-410. Ideal for SCRIPSIT™ word processing! Select ten or 12 characters per inch, or proportional pitch. Forward and reverse paper feed and 1/2" line feed, underline and programmable backspace. Includes 1/120" space and 1/48" line feed. Automatic paper set makes paper insertion easy. Uses interchangeable print wheels for type selection. EPM mode for special wheels. **26-1250**

DWP-210. A low-cost printer for that "professional look"! Select ten or 12 characters per inch, or proportional pitch. Prints over 200 words per minute (18 characters per second) at ten characters per inch. Easily handles an origina plus two copies, features 1/200" space and 1/48" line feed, ribbon end, cover open and paper empty sensing. With carbon ribbon and Courier 10 print wheel. **26-1257**

Tandy

Tandy® The Largest Electronics Retailer
In The World With Over 350 Stores
Nationwide We're Near You.

NEWS

o a e o
r s s u
t t t t
h h

The crystal ball

Giving the crystal orb a good shake reveals two new adventures from Software Projects of Liverpool. The first, Legion, is for the BBC B and takes place at the time of the Roman Empire. McKensie is the second and has you playing the role of a famous space explorer who has been captured and imprisoned on a pirated space station. You will need a 48K Spectrum to play it.

Lothlorien, perhaps better known for its war gaming programs, has launched a series called adventure Master. The first in the series is an Arabian Nights type fantasy entitled The Stolen Lamp. It is a text and graphics adventure for BBC B owners.

Another text and full pictorial adventure for the BBC B and Commodore 64 micros is Twin Kingdom Alley, a large and complex adventure from Bug-Byte.

A helping hand

Calling all fans of Level 9 Computing's Colossal Adventure. Are you baffled by a certain bridge-blocking Troll? See below for a clue that will enable you to pass free of charge.

Attention all Scott Adams Pirate Adventurers. Could be you are stuck at the second treasure. Help is at hand below. As usual, the clues are written backwards to avoid the eyes of the unwary. Let us hear from you about other problems you are having — I will do my best to help in these pages.

Troll trouble:
RETAL MEHT EVEITER
OT DROW CIGAM YAS:
LLORT OT SGGE NEDLOG
EVIG

Pirate treasure:
GID NEHT O3
ECAP,DLEIF EHT NI
Happy hunting!

QUEST

Our man with the brass lamp and the key to a thousand mysteries sheds light on new adventure programs. Lost? Never fear, Hugo North is here.

Kingdom of Hamil

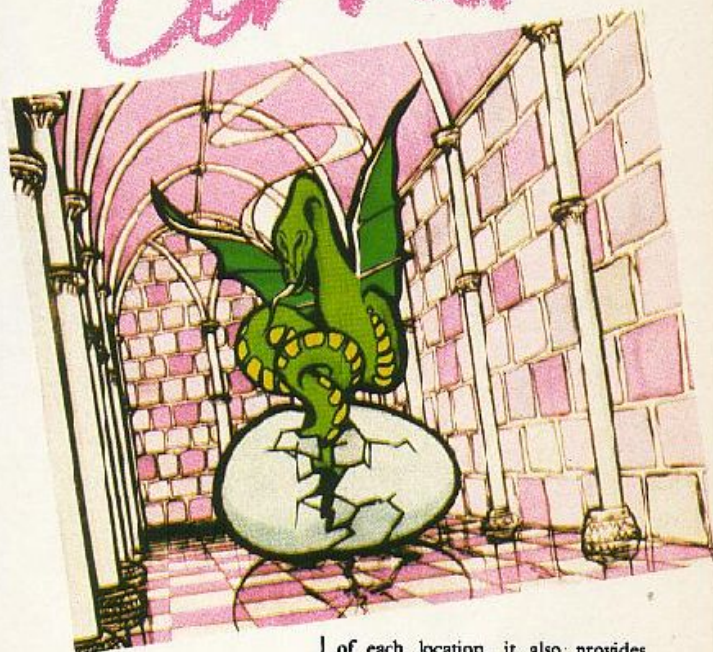
■ BBC B
■ £9.95
■ Acornsoft

KINGDOM OF HAMIL is the latest puzzler to join the illustrious band of Acornsoft adventures for the BBC B Micro. This group now includes such brain busters as Philosopher's Quest, Sphinx Adventure, Castle of Riddles and Countdown to Doom — enough mind-bending puzzles to keep you occupied for the rest of this year.

Like the other Acornsoft adventures, Kingdom of Hamil is text only, commands being input in the normal verb and noun format. Each location is described in detail on your visit but thereafter in brief — unless you specifically request the full description with the command Look.

Some of the commands recognised by the program are detailed on the cassette box; it is up to you to find out the rest while playing.

You always wondered why you had blue blood in your veins when all your friends had common or garden red. Now you have learned why — you were stolen from your royal parents, the rulers of Hamil, as a child. It is up to you to prove your identity and claim your birthright,



but watch out — you seem to have made an awful lot of enemies when you were a baby.

The adventure starts with you trapped inside a chapel. Venture outside and a 16 ton weight drops on your head, ending your assault on the throne before it has begun.

Some adventures have plenty of locations but precious little in the way of objects, dangers and puzzles. Kingdom of Hamil has them all, in spades.

Heroes of Karn

■ CBM-64
■ £7.00
■ Interceptor Micros

HEROES OF KARN is a Commodore 64 adventure of the classic mode but in modern dress. Not only does this text-based fantasy give you an attractively drawn coloured picture

of each location, it also provides some very impressive music into the bargain. As you might expect in a classic adventure, there's quite a bit of treasure needing to be collected but that is not the main purpose of your mission.

Long, long ago, a horde of fell creatures swept down upon the Land of Karn, and great was the slaughter. Few escaped the carnage but among the handful that did were four Heroes of Karn: Beren, lord of the birds of the air and swordsman supreme; Ista: the Wise, master of magic and lore; Haldir, greatest of all minstrels; and Khadim the Dwarf, small in stature, mighty in renown.

Yet, eventually and one by one, they were taken captive, bound with stone, iron and magic. Where and what they now are is unknown but legend has it that one day the stranger will come, will venture forth into the dark Lands, will fight with the powers of night, will find and release the long-imprisoned heroes.

That day has dawned — you are that stranger. Can you fulfil your destiny?

If you can, I guarantee you will not do it quickly. There are over 65 locations to seek out and explore, and over 30 puzzles to solve. Much of the adventure is linear — that is, some problems can only be solved by overcoming earlier ones. This makes it a shade tougher than some others and should give your mental powers a real workout.

Heroes of Karn is a first-rate adventure providing a great deal of pleasure. The musical passages are a delight — turn up your volume for the best effects.



You're to the east of a ruined cottage.
Open country lies to the east and south.
There is an archway to the west.



**The Commodore 64 is compact and nippy
like many other home computers.**

The Commodore 64 has an enormous memory: it's a positively elephantine 64K.

If you're unsure as to why you should want a home computer with such a big memory, we'll tell you.

It means you can use more exciting and advanced software.

This means you'll get greater enjoyment

out of your home computer because you can do so much more with it.

You can create high resolution graphics, or reproduce the sounds of many different musical instruments.

You can broaden your horizons with the library of educational programs. You can teach yourself programming, or you can entertain



**But its memory ...
well, that's a little different.**

yourself with countless games.

As well as hundreds of software programs, for use both at home and in the office, there's also every peripheral you're ever likely to need.

Turning your 64 into a super sophisticated computer system with a printer, plotter, disk drive and monitor is simple.

Little wonder the Commodore 64 is seen

to be the premier home computer, especially with a price tag of only £229, or less.

Makes the name worth remembering, don't you think?

 **commodore**

FOR MORE INFORMATION CONTACT THE COMMODORE INFORMATION CENTRE 675 AJAX AVENUE, SLOUGH, BERKSHIRE SL1 4BG

JOHN LEWIS, WOOD WORTH, REDIFFUSION CO-OP, BRITISH HOME STORES, ASDA, ZAPPA, SAVACENTRE, HOUSE OF CL'ESDALE, LEWIS'S AND OTHER GOOD RETAILERS. ALSO AT BRANCHES OF A NATIONAL NETWORK OF COMMODORE COMPUTER DEALERS

REVIEW

After the first false dawn, Kathleen Peel finds out if real keys can help Radofin succeed where Mattel failed.

CONTINUING THE recent fashion of repackaging an existing low-price computer by fitting it with a proper keyboard, the Aquarius II succeeds the ill-fated Aquarius. At £80 it becomes the cheapest real-keyboard computer currently in production.

The misgivings regarding the original Aquarius, apart from the keyboard, were in the limited resolution of the colour display, poor Basic, virtually non-existent editing facilities, high price of peripherals and very limited software. Combined, these led to a general panning of the computer.

The revamped Aquarius competes with the Spectrum, Tandy MC-10 and Laser — the Laser may not now be on sale due to the demise of Computers for All — and fills the gap left by the discontinuation of production of the Oric 1 and the real keyboard computers, the Vic-20 and the TI-994A.

The review model is a preproduction version of the Aquarius II and there may be some minor detail changes to the finished product. As the standard of the review model is very high with a clean PCB without

changes, I presume any changes will be in ROM and cosmetic.

The new keyboard makes a tremendous difference to the Aquarius. Although not elegantly styled, it is very good. As I like computers to have both keyword and fully typed entries, the Aquarius gets a definite plus here. My only criticism of the keyboard is that some users like an audio feedback and the computer does not provide this facility.

The Aquarius comes in a Basic 4K which leaves 1,652 bytes free for your programs — not much but a 16K RAM pack at £30 and 32K RAM pack are available.

More memory or a games cartridge can be plugged into the expansion slot. Further expansion is via a mini expander which adds two joysticks, a cartridge and a memory port and costs £40.

The Aquarius II can use the peripherals designed for the first Aquarius, and the manufacturer of these micros states that the Aquarius III, due for release in the autumn, and the Aquarius IV under development, will also be fully compatible with all peripherals and software.

The printer interface is RS-232C, but does not allow for two-way computer traffic; a pity really as it would have been useful to be able to network the Aquarius. Because the interface is RS-232, it should be possible to use any other printer providing it is capable of running at 1,200 baud.

The display was quite reasonable with little dot crawl, but surprisingly for a computer from the Far East, there is no video output.

A reset key is provided next to the on/off switch. This allows a warm start when followed by Control and C.

The Aquarius II is identical in operation to the original Aquarius with the Extended Microsoft Basic cartridge. This provides several improvements, the most significant of which is the implementation of an editor.

The editor has some very nice search facilities, but also some rather annoying anomalies although in use I soon became accustomed to the fact that once you have gone past a position in a line you cannot go back to edit further, you must restart the line.

The ability to search a line for the nth occurrence of a character was impressive and would have been even more so if the multi-statement lines were not limited to 72 characters.

The editor commands are:

- I insert
- X go to end of line
- L list rest of line and restart
- nD delete n characters, default 1
- H delete to end of line
- nC change n characters
- E save changes
- Q ignore changes (quit)
- A abort current changes
- nS char — search for nth occurrence
- nK char — delete n chars in line

The tape interface worked without many

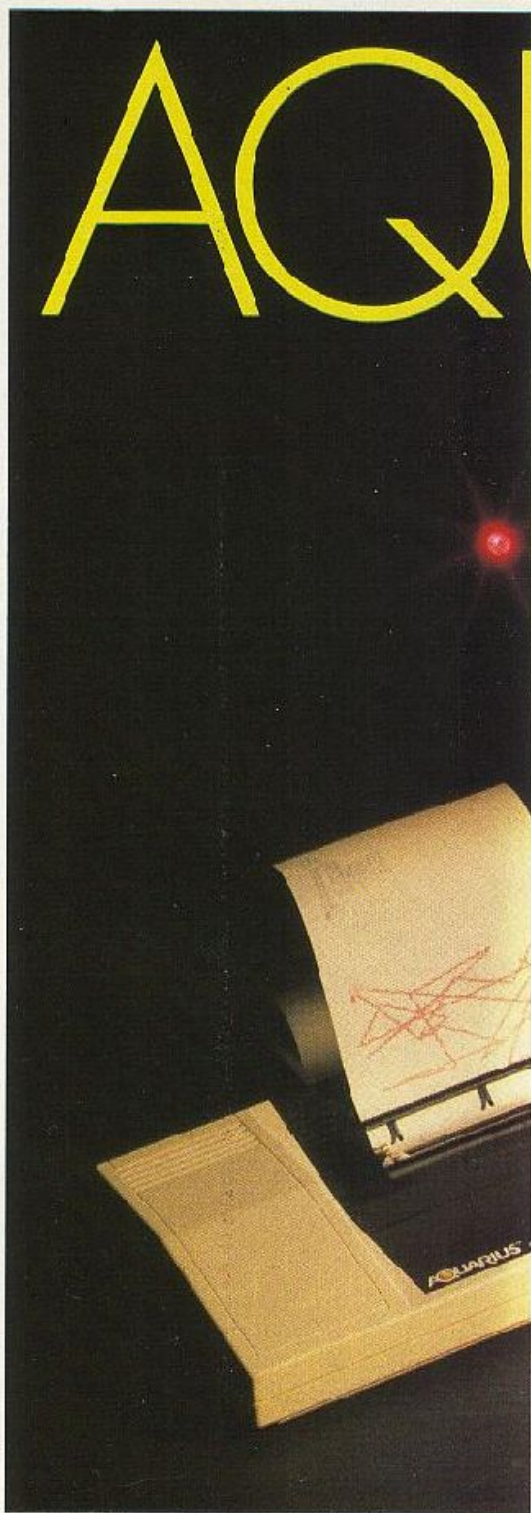


Figure 2. Draw macro commands.

```
OK
LIST
10 CLS
20 DRAW "S"
30 DRAW "50,50:100,100:250,250"
40 DRAW "100,100:150,150:200,200"
50 DRAW "150,150:200,200:250,250"
60 DRAW "200,200:250,250:300,300"
70 DRAW "250,250:300,300:350,350"
80 DRAW "300,300:350,350:400,400"
90 DRAW "350,350:400,400:450,450"
100 DRAW "400,400:450,450:500,500"
110 DRAW "450,450:500,500:550,550"
120 DRAW "500,500:550,550:600,600"
130 DRAW "550,550:600,600:650,650"
140 DRAW "600,600:650,650:700,700"
150 DRAW "650,650:700,700:750,750"
160 DRAW "700,700:750,750:800,800"
170 DRAW "750,750:800,800:850,850"
180 DRAW "800,800:850,850:900,900"
190 DRAW "850,850:900,900:950,950"
200 DRAW "900,900:950,950:1000,1000"
210 DRAW "1000,1000:1050,1050:1100,1100"
220 DRAW "1050,1050:1100,1100:1150,1150"
230 DRAW "1100,1100:1150,1150:1200,1200"
240 DRAW "1150,1150:1200,1200:1250,1250"
250 DRAW "1200,1200:1250,1250:1300,1300"
260 DRAW "1250,1250:1300,1300:1350,1350"
270 DRAW "1300,1300:1350,1350:1400,1400"
280 DRAW "1350,1350:1400,1400:1450,1450"
290 DRAW "1400,1400:1450,1450:1500,1500"
300 DRAW "1450,1450:1500,1500:1550,1550"
310 DRAW "1500,1500:1550,1550:1600,1600"
320 DRAW "1550,1550:1600,1600:1650,1650"
330 DRAW "1600,1600:1650,1650:1700,1700"
340 DRAW "1650,1650:1700,1700:1750,1750"
350 DRAW "1700,1700:1750,1750:1800,1800"
360 DRAW "1750,1750:1800,1800:1850,1850"
370 DRAW "1800,1800:1850,1850:1900,1900"
380 DRAW "1850,1850:1900,1900:1950,1950"
390 DRAW "1900,1900:1950,1950:2000,2000"
400 DRAW "1950,1950:2000,2000:2050,2050"
410 DRAW "2000,2000:2050,2050:2100,2100"
420 DRAW "2050,2050:2100,2100:2150,2150"
430 DRAW "2100,2100:2150,2150:2200,2200"
440 DRAW "2150,2150:2200,2200:2250,2250"
450 DRAW "2200,2200:2250,2250:2300,2300"
460 DRAW "2250,2250:2300,2300:2350,2350"
470 DRAW "2300,2300:2350,2350:2400,2400"
480 DRAW "2350,2350:2400,2400:2450,2450"
490 DRAW "2400,2400:2450,2450:2500,2500"
500 DRAW "2450,2450:2500,2500:2550,2550"
510 DRAW "2500,2500:2550,2550:2600,2600"
520 DRAW "2550,2550:2600,2600:2650,2650"
530 DRAW "2600,2600:2650,2650:2700,2700"
540 DRAW "2650,2650:2700,2700:2750,2750"
550 DRAW "2700,2700:2750,2750:2800,2800"
560 DRAW "2750,2750:2800,2800:2850,2850"
570 DRAW "2800,2800:2850,2850:2900,2900"
580 DRAW "2850,2850:2900,2900:2950,2950"
590 DRAW "2900,2900:2950,2950:3000,3000"
600 DRAW "2950,2950:3000,3000:3050,3050"
610 DRAW "3000,3000:3050,3050:3100,3100"
620 DRAW "3050,3050:3100,3100:3150,3150"
630 DRAW "3100,3100:3150,3150:3200,3200"
640 DRAW "3150,3150:3200,3200:3250,3250"
650 DRAW "3200,3200:3250,3250:3300,3300"
660 DRAW "3250,3250:3300,3300:3350,3350"
670 DRAW "3300,3300:3350,3350:3400,3400"
680 DRAW "3350,3350:3400,3400:3450,3450"
690 DRAW "3400,3400:3450,3450:3500,3500"
700 DRAW "3450,3450:3500,3500:3550,3550"
710 DRAW "3500,3500:3550,3550:3600,3600"
720 DRAW "3550,3550:3600,3600:3650,3650"
730 DRAW "3600,3600:3650,3650:3700,3700"
740 DRAW "3650,3650:3700,3700:3750,3750"
750 DRAW "3700,3700:3750,3750:3800,3800"
760 DRAW "3750,3750:3800,3800:3850,3850"
770 DRAW "3800,3800:3850,3850:3900,3900"
780 DRAW "3850,3850:3900,3900:3950,3950"
790 DRAW "3900,3900:3950,3950:4000,4000"
800 DRAW "3950,3950:4000,4000:4050,4050"
810 DRAW "4000,4000:4050,4050:4100,4100"
820 DRAW "4050,4050:4100,4100:4150,4150"
830 DRAW "4100,4100:4150,4150:4200,4200"
840 DRAW "4150,4150:4200,4200:4250,4250"
850 DRAW "4200,4200:4250,4250:4300,4300"
860 DRAW "4250,4250:4300,4300:4350,4350"
870 DRAW "4300,4300:4350,4350:4400,4400"
880 DRAW "4350,4350:4400,4400:4450,4450"
890 DRAW "4400,4400:4450,4450:4500,4500"
900 DRAW "4450,4450:4500,4500:4550,4550"
910 DRAW "4500,4500:4550,4550:4600,4600"
920 DRAW "4550,4550:4600,4600:4650,4650"
930 DRAW "4600,4600:4650,4650:4700,4700"
940 DRAW "4650,4650:4700,4700:4750,4750"
950 DRAW "4700,4700:4750,4750:4800,4800"
960 DRAW "4750,4750:4800,4800:4850,4850"
970 DRAW "4800,4800:4850,4850:4900,4900"
980 DRAW "4850,4850:4900,4900:4950,4950"
990 DRAW "4900,4900:4950,4950:5000,5000"
1000 DRAW "4950,4950:5000,5000:5050,5050"
1010 DRAW "5000,5000:5050,5050:5100,5100"
1020 DRAW "5050,5050:5100,5100:5150,5150"
1030 DRAW "5100,5100:5150,5150:5200,5200"
1040 DRAW "5150,5150:5200,5200:5250,5250"
1050 DRAW "5200,5200:5250,5250:5300,5300"
1060 DRAW "5250,5250:5300,5300:5350,5350"
1070 DRAW "5300,5300:5350,5350:5400,5400"
1080 DRAW "5350,5350:5400,5400:5450,5450"
1090 DRAW "5400,5400:5450,5450:5500,5500"
1100 DRAW "5450,5450:5500,5500:5550,5550"
1110 DRAW "5500,5500:5550,5550:5600,5600"
1120 DRAW "5550,5550:5600,5600:5650,5650"
1130 DRAW "5600,5600:5650,5650:5700,5700"
1140 DRAW "5650,5650:5700,5700:5750,5750"
1150 DRAW "5700,5700:5750,5750:5800,5800"
1160 DRAW "5750,5750:5800,5800:5850,5850"
1170 DRAW "5800,5800:5850,5850:5900,5900"
1180 DRAW "5850,5850:5900,5900:5950,5950"
1190 DRAW "5900,5900:5950,5950:6000,6000"
1200 DRAW "5950,5950:6000,6000:6050,6050"
1210 DRAW "6000,6000:6050,6050:6100,6100"
1220 DRAW "6050,6050:6100,6100:6150,6150"
1230 DRAW "6100,6100:6150,6150:6200,6200"
1240 DRAW "6150,6150:6200,6200:6250,6250"
1250 DRAW "6200,6200:6250,6250:6300,6300"
1260 DRAW "6250,6250:6300,6300:6350,6350"
1270 DRAW "6300,6300:6350,6350:6400,6400"
1280 DRAW "6350,6350:6400,6400:6450,6450"
1290 DRAW "6400,6400:6450,6450:6500,6500"
1300 DRAW "6450,6450:6500,6500:6550,6550"
1310 DRAW "6500,6500:6550,6550:6600,6600"
1320 DRAW "6550,6550:6600,6600:6650,6650"
1330 DRAW "6600,6600:6650,6650:6700,6700"
1340 DRAW "6650,6650:6700,6700:6750,6750"
1350 DRAW "6700,6700:6750,6750:6800,6800"
1360 DRAW "6750,6750:6800,6800:6850,6850"
1370 DRAW "6800,6800:6850,6850:6900,6900"
1380 DRAW "6850,6850:6900,6900:6950,6950"
1390 DRAW "6900,6900:6950,6950:7000,7000"
1400 DRAW "6950,6950:7000,7000:7050,7050"
1410 DRAW "7000,7000:7050,7050:7100,7100"
1420 DRAW "7050,7050:7100,7100:7150,7150"
1430 DRAW "7100,7100:7150,7150:7200,7200"
1440 DRAW "7150,7150:7200,7200:7250,7250"
1450 DRAW "7200,7200:7250,7250:7300,7300"
1460 DRAW "7250,7250:7300,7300:7350,7350"
1470 DRAW "7300,7300:7350,7350:7400,7400"
1480 DRAW "7350,7350:7400,7400:7450,7450"
1490 DRAW "7400,7400:7450,7450:7500,7500"
1500 DRAW "7450,7450:7500,7500:7550,7550"
1510 DRAW "7500,7500:7550,7550:7600,7600"
1520 DRAW "7550,7550:7600,7600:7650,7650"
1530 DRAW "7600,7600:7650,7650:7700,7700"
1540 DRAW "7650,7650:7700,7700:7750,7750"
1550 DRAW "7700,7700:7750,7750:7800,7800"
1560 DRAW "7750,7750:7800,7800:7850,7850"
1570 DRAW "7800,7800:7850,7850:7900,7900"
1580 DRAW "7850,7850:7900,7900:7950,7950"
1590 DRAW "7900,7900:7950,7950:8000,8000"
1600 DRAW "7950,7950:8000,8000:8050,8050"
1610 DRAW "8000,8000:8050,8050:8100,8100"
1620 DRAW "8050,8050:8100,8100:8150,8150"
1630 DRAW "8100,8100:8150,8150:8200,8200"
1640 DRAW "8150,8150:8200,8200:8250,8250"
1650 DRAW "8200,8200:8250,8250:8300,8300"
1660 DRAW "8250,8250:8300,8300:8350,8350"
1670 DRAW "8300,8300:8350,8350:8400,8400"
1680 DRAW "8350,8350:8400,8400:8450,8450"
1690 DRAW "8400,8400:8450,8450:8500,8500"
1700 DRAW "8450,8450:8500,8500:8550,8550"
1710 DRAW "8500,8500:8550,8550:8600,8600"
1720 DRAW "8550,8550:8600,8600:8650,8650"
1730 DRAW "8600,8600:8650,8650:8700,8700"
1740 DRAW "8650,8650:8700,8700:8750,8750"
1750 DRAW "8700,8700:8750,8750:8800,8800"
1760 DRAW "8750,8750:8800,8800:8850,8850"
1770 DRAW "8800,8800:8850,8850:8900,8900"
1780 DRAW "8850,8850:8900,8900:8950,8950"
1790 DRAW "8900,8900:8950,8950:9000,9000"
1800 DRAW "8950,8950:9000,9000:9050,9050"
1810 DRAW "9000,9000:9050,9050:9100,9100"
1820 DRAW "9050,9050:9100,9100:9150,9150"
1830 DRAW "9100,9100:9150,9150:9200,9200"
1840 DRAW "9150,9150:9200,9200:9250,9250"
1850 DRAW "9200,9200:9250,9250:9300,9300"
1860 DRAW "9250,9250:9300,9300:9350,9350"
1870 DRAW "9300,9300:9350,9350:9400,9400"
1880 DRAW "9350,9350:9400,9400:9450,9450"
1890 DRAW "9400,9400:9450,9450:9500,9500"
1900 DRAW "9450,9450:9500,9500:9550,9550"
1910 DRAW "9500,9500:9550,9550:9600,9600"
1920 DRAW "9550,9550:9600,9600:9650,9650"
1930 DRAW "9600,9600:9650,9650:9700,9700"
1940 DRAW "9650,9650:9700,9700:9750,9750"
1950 DRAW "9700,9700:9750,9750:9800,9800"
1960 DRAW "9750,9750:9800,9800:9850,9850"
1970 DRAW "9800,9800:9850,9850:9900,9900"
1980 DRAW "9850,9850:9900,9900:9950,9950"
1990 DRAW "9900,9900:9950,9950:10000,10000"
2000 DRAW "9950,9950:10000,10000:10050,10050"
2010 DRAW "10000,10000:10050,10050:10100,10100"
2020 DRAW "10050,10050:10100,10100:10150,10150"
2030 DRAW "10100,10100:10150,10150:10200,10200"
2040 DRAW "10150,10150:10200,10200:10250,10250"
2050 DRAW "10200,10200:10250,10250:10300,10300"
2060 DRAW "10250,10250:10300,10300:10350,10350"
2070 DRAW "10300,10300:10350,10350:10400,10400"
2080 DRAW "10350,10350:10400,10400:10450,10450"
2090 DRAW "10400,10400:10450,10450:10500,10500"
2100 DRAW "10450,10450:10500,10500:10550,10550"
2110 DRAW "10500,10500:10550,10550:10600,10600"
2120 DRAW "10550,10550:10600,10600:10650,10650"
2130 DRAW "10600,10600:10650,10650:10700,10700"
2140 DRAW "10650,10650:10700,10700:10750,10750"
2150 DRAW "10700,10700:10750,10750:10800,10800"
2160 DRAW "10750,10750:10800,10800:10850,10850"
2170 DRAW "10800,10800:10850,10850:10900,10900"
2180 DRAW "10850,10850:10900,10900:10950,10950"
2190 DRAW "10900,10900:10950,10950:11000,11000"
2200 DRAW "10950,10950:11000,11000:11050,11050"
2210 DRAW "11000,11000:11050,11050:11100,11100"
2220 DRAW "11050,11050:11100,11100:11150,11150"
2230 DRAW "11100,11100:11150,11150:11200,11200"
2240 DRAW "11150,11150:11200,11200:11250,11250"
2250 DRAW "11200,11200:11250,11250:11300,11300"
2260 DRAW "11250,11250:11300,11300:11350,11350"
2270 DRAW "11300,11300:11350,11350:11400,11400"
2280 DRAW "11350,11350:11400,11400:11450,11450"
2290 DRAW "11400,11400:11450,11450:11500,11500"
2300 DRAW "11450,11450:11500,11500:11550,11550"
2310 DRAW "11500,11500:11550,11550:11600,11600"
2320 DRAW "11550,11550:11600,11600:11650,11650"
2330 DRAW "11600,11600:11650,11650:11700,11700"
2340 DRAW "11650,11650:11700,11700:11750,11750"
2350 DRAW "11700,11700:11750,11750:11800,11800"
2360 DRAW "11750,11750:11800,11800:11850,11850"
2370 DRAW "11800,11800:11850,11850:11900,11900"
2380 DRAW "11850,11850:11900,11900:11950,11950"
2390 DRAW "11900,11900:11950,11950:12000,12000"
2400 DRAW "11950,11950:12000,12000:12050,12050"
2410 DRAW "12000,12000:12050,12050:12100,12100"
2420 DRAW "12050,12050:12100,12100:12150,12150"
2430 DRAW "12100,12100:12150,12150:12200,12200"
2440 DRAW "12150,12150:12200,12200:12250,12250"
2450 DRAW "12200,12200:12250,12250:12300,12300"
2460 DRAW "12250,12250:12300,12300:12350,12350"
2470 DRAW "12300,12300:12350,12350:12400,12400"
2480 DRAW "12350,12350:12400,12400:12450,12450"
2490 DRAW "12400,12400:12450,12450:12500,12500"
2500 DRAW "12450,12450:12500,12500:12550,12550"
2510 DRAW "12500,12500:12550,12550:12600,12600"
2520 DRAW "12550,12550:12600,12600:12650,12650"
2530 DRAW "12600,12600:12650,12650:12700,12700"
2540 DRAW "12650,12650:12700,12700:12750,12750"
2550 DRAW "12700,12700:12750,12750:12800,12800"
2560 DRAW "12750,12750:12800,12800:12850,12850"
2570 DRAW "12800,12800:12850,12850:12900,12900"
2580 DRAW "12850,12850:12900,12900:12950,12950"
2590 DRAW "12900,12900:12950,12950:13000,13000"
2600 DRAW "12950,12950:13000,13000:13050,13050"
2610 DRAW "13000,13000:13050,13050:13100,13100"
2620 DRAW "13050,13050:13100,13100:13150,13150"
2630 DRAW "13100,13100:13150,13150:13200,13200"
2640 DRAW "13150,13150:13200,13200:13250,13250"
2650 DRAW "13200,13200:13250,13250:13300,13300"
2660 DRAW "13250,13250:13300,13300:13350,13350"
2670 DRAW "13300,13300:13350,13350:13400,13400"
2680 DRAW "13350,13350:13400,13400:13450,13450"
2690 DRAW "13400,13400:13450,13450:13500,13500"
2700 DRAW "13450,13450:13500,13500:13550,13550"
2710 DRAW "13500,13500:13550,13550:13600,13600"
2720 DRAW "13550,13550:13600,13600:13650,13650"
2730 DRAW "13600,13600:13650,13650:13700,13700"
2740 DRAW "13650,13650:13700,13700:13750,13750"
2750 DRAW "13700,13700:13750,13750:13800,13800"
2760 DRAW "13750,13750:13800,13800:13850,13850"
2770 DRAW "13800,13800:13850,13850:13900,13900"
2780 DRAW "13850,13850:13900,13900:13950,13950"
2790 DRAW "13900,13900:13950,13950:14000,14000"
2800 DRAW "13950,13950:14000,14000:14050,14050"
2810 DRAW "14000,14000:14050,14050:14100,14100"
2820 DRAW "14050,14050:14100,14100:14150,141
```


AQUARIUS II



```

0000
10 DIM B(100)
20 FOR A=1 TO 100
30   B(A)=100
40   B(A)=B(A)-A
50   B(A)=B(A)+1
60   B(A)=B(A)-1
70   B(A)=B(A)+1
80   B(A)=B(A)-1
90   B(A)=B(A)+1
100  B(A)=B(A)-1
110  B(A)=B(A)+1
120  B(A)=B(A)-1
130  B(A)=B(A)+1
140  B(A)=B(A)-1
150  B(A)=B(A)+1
160  B(A)=B(A)-1
170  B(A)=B(A)+1
180  B(A)=B(A)-1
190  B(A)=B(A)+1
200  B(A)=B(A)-1
210  B(A)=B(A)+1
220  B(A)=B(A)-1
230  B(A)=B(A)+1
240  B(A)=B(A)-1
250  B(A)=B(A)+1
260  B(A)=B(A)-1
270  B(A)=B(A)+1
280  B(A)=B(A)-1
290  B(A)=B(A)+1
300  B(A)=B(A)-1
310  B(A)=B(A)+1
320  B(A)=B(A)-1
330  B(A)=B(A)+1
340  B(A)=B(A)-1
350  B(A)=B(A)+1
360  B(A)=B(A)-1
370  B(A)=B(A)+1
380  B(A)=B(A)-1
390  B(A)=B(A)+1
400  B(A)=B(A)-1
410  B(A)=B(A)+1
420  B(A)=B(A)-1
430  B(A)=B(A)+1
440  B(A)=B(A)-1
450  B(A)=B(A)+1
460  B(A)=B(A)-1
470  B(A)=B(A)+1
480  B(A)=B(A)-1
490  B(A)=B(A)+1
500  B(A)=B(A)-1
510  B(A)=B(A)+1
520  B(A)=B(A)-1
530  B(A)=B(A)+1
540  B(A)=B(A)-1
550  B(A)=B(A)+1
560  B(A)=B(A)-1
570  B(A)=B(A)+1
580  B(A)=B(A)-1
590  B(A)=B(A)+1
600  B(A)=B(A)-1
610  B(A)=B(A)+1
620  B(A)=B(A)-1
630  B(A)=B(A)+1
640  B(A)=B(A)-1
650  B(A)=B(A)+1
660  B(A)=B(A)-1
670  B(A)=B(A)+1
680  B(A)=B(A)-1
690  B(A)=B(A)+1
700  B(A)=B(A)-1
710  B(A)=B(A)+1
720  B(A)=B(A)-1
730  B(A)=B(A)+1
740  B(A)=B(A)-1
750  B(A)=B(A)+1
760  B(A)=B(A)-1
770  B(A)=B(A)+1
780  B(A)=B(A)-1
790  B(A)=B(A)+1
800  B(A)=B(A)-1
810  B(A)=B(A)+1
820  B(A)=B(A)-1
830  B(A)=B(A)+1
840  B(A)=B(A)-1
850  B(A)=B(A)+1
860  B(A)=B(A)-1
870  B(A)=B(A)+1
880  B(A)=B(A)-1
890  B(A)=B(A)+1
900  B(A)=B(A)-1
910  B(A)=B(A)+1
920  B(A)=B(A)-1
930  B(A)=B(A)+1
940  B(A)=B(A)-1
950  B(A)=B(A)+1
960  B(A)=B(A)-1
970  B(A)=B(A)+1
980  B(A)=B(A)-1
990  B(A)=B(A)+1
1000 B(A)=B(A)-1

```

Figure 1. Aquarius timing

As is usual in computers of this price, the Basic lacks good structure and only supports On Goto and On Gosub.

The Basic is not space-sensitive and tidies up messy input nicely and treats upper- and lower-case the same. Unfortunately, error messages are of the two-letter variety and are not always that helpful to the uninitiated.

Program lines are compressed in memory. The speed test program used 227 bytes in program storage, and Spectrum used 339 for the same program, thus the small memory is worth about 2.2K in Spectrum terms. Note that as a consequence of the packaging, numerical accuracy is not so good.

The Aquarius Extended Microsoft Basic can use the Def FN command to define user-

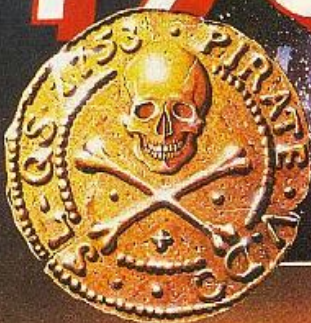
specified functions. These act as small programs within the Basic program and when given an argument will produce a numeric answer. SQR is a built-in Def and given the argument 49 would produce the answer 7.

Line and Circle commands are available which can be extended to cover colour, fill and boxing using additional parameters. Interestingly there is a subset of the MSX Draw Macro commands. Figure 2 gives a screen dump of an example from the manual showing the macro commands in use, drawing a little house.

The Aquarius II has a screen resolution of 80 by 72 using the teletext-type three-by-two graphics blocks — figure 4. The Aquarius

(continued on page 67)

1984



QUICKSILVA

...THE YEAR OF THE GAME LORDS.

NEW RELEASES!

COMMODORE 64 STING 64 £7.95

Author: **Anton Hinxman**
Hive-cave action!
Bortie Bee needs help
defending the hive. Fight off
the invading swarms, battle
the bees and defend your
Queen!

COMMODORE 64 BUGABOO (THE FLEA) £7.95

Author: **Indescomp**
Itchy action!
Jump your way out of the
caves with Bugaboo the flea
but beware of the fearsome
Dragon as you jump around
the exotic vegetation.

48K SPECTRUM RAYMOND BRIGGS' THE SNOWMAN £6.95

Author: **David Shea**
An enchanting game based
around episodes of Raymond
Briggs' amazingly successful
book.

48K SPECTRUM ANT ATTACK £6.95

Author: **Sandy White**
Battle the Ants in the soft
solid 3D city of Anteschier.

48K SPECTRUM DRAGONS BANE £6.95

Authors: **M. Preston,
P. Hunt, R. Rose, D. Moore.**
A mythical graphic
adventure in the dark and
deadly halls of Earthstone
Castle. Battle Dragons,
Vampires, Sphinx, Zombies,
Skeletons, Gryphons and
other legendary beasts to
rescue the beautiful Princess
Paula.

48K SPECTRUM FRED £6.95

Author: **Indescomp**
Action beneath the
Pyramids!
Fearless Fred the Intrepid
Archaeologist searches the
creepy catacombs below the
torrid tomb of 'Tootiecamoon'
for the terrible treasures
amidst monstrous mummies,
ghastly ghosts, bats and rats!

48K SPECTRUM • TIME GATE Author: John Hollis £6.95
COMMODORE 64 • PURPLE TURTLES Authors: Mark & Richard Moore £7.95
VIC 20 + 3K or 8K RAM • SKYHAWK Authors: Steve Lee/Chatec £7.95
DRAGON • MINED OUT Authors: I & C Andrew/Incentive £5.95
BBC MODEL • THE GENERATORS Author: Dave Mendes £5.95

All titles available from Quicksilva Mail Order
P.O. Box 6, Wimborne Dorset BA21 7PY.

Quicksilva programs are available from: Boots, W.H. Smiths, J. Menzies, Microdealer,
HMV, Hamleys, John Lewis, Computers for All and all reputable
specialist computer stockists.

SEND S.A.E. FOR
FULL COLOUR
CATALOGUE

(continued from page 65)

claim of a 320 by 192 graphics resolution simply means that 320 is the number of pixels across the screen and that there are 192 down. They are not individually addressable.

The colour resolution is equivalent to 40 by 48 or 80 by 24 depending upon which way you wish to use the teletext graphics.

Two other useful commands are Ger and Put. These sprite-like commands copy to and write from a specified array, producing high-speed animation — it is quicker than Peek and Poke.

Menu is a command I have not seen before. It permits a selection of items to be placed on the screen and the cursor used to make a choice from the menu — figure 5. This looked to be more than just a novelty.

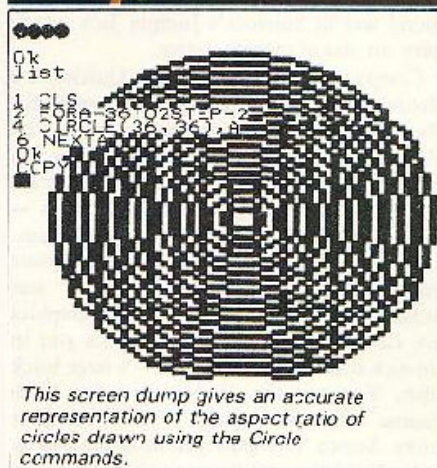
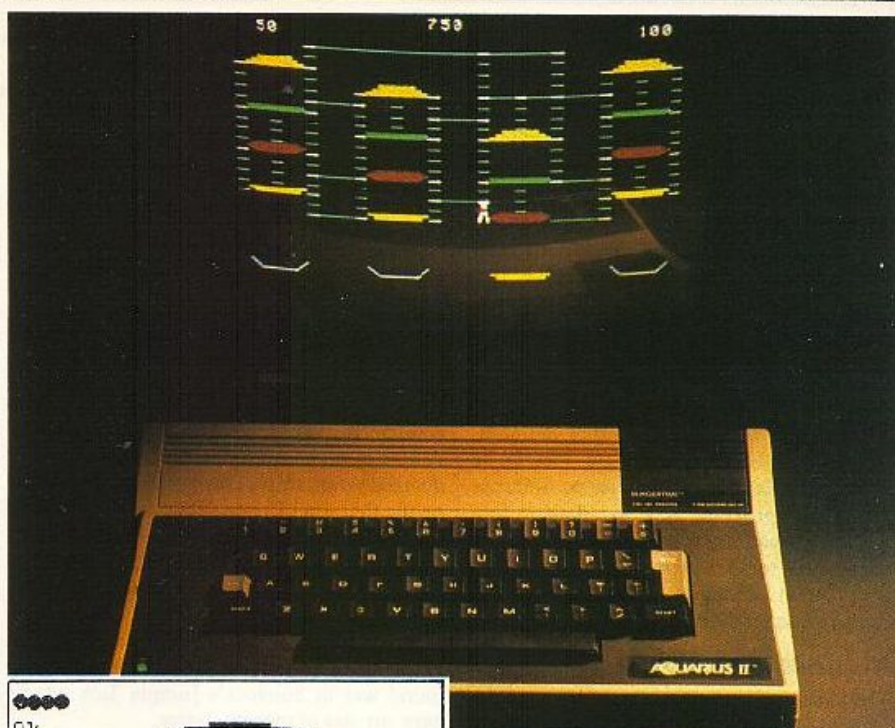
There was very little documentation regarding the sound capabilities of the Aquarius II. It appeared to be a single channel operating through the television speaker. The games cartridges supplied with the review model showed the sound to be superior to the Spectrum.

It can be seen from the screen copies that the circle command does not produce round circles. This can be corrected by using the aspect parameter of the circle command.

A new variation of the popular four-colour printer plotter is to be launched with this computer. The printer has all the normal printing and plotting facilities of the originally released Tandy model and costs £120.

- The differences are:
- There is no Centronics interface.
- The whole of the Aquarius character set is built into the printer.
- The printer can produce single colour screen dumps using the Copy command.
- The transmission rate at 1,200 baud is twice the speed of the Tandy.

I managed to hook the printer up to a Spectrum through the Interface 1 without difficulty. The graphic characters are obviously different but using the full-colour screen dump programs I have produced in the Microdrive articles, this should not be a problem.



This screen dump gives an accurate representation of the aspect ratio of circles drawn using the Circle commands.

There appears to be a bug in the Aquarius Copy command which sometimes gives an offset of half a character out of position on mixed graphics and text use.

The accuracy of the reproduction is very much better than that of the Aquarius Thermal Printer at £95.

General control of the colour printer is by:

- Text; LPrint; LList the only way to use the plotting facilities.
- Mixec; LPrint; LList graphic characters available but fewer control codes.
- Graphics; Copy for screen dumps.

The technical specification for the printer is:

RS-232C with Data and CTS
Eight bit character
One start bit
One stop bit
No parity
1,200 baud

The provisional documentation appears to be very detailed with a number of useful examples to get the user started.

Because the review model was a pre-production version of the Aquarius it did not have any documentation specific to it. Neither the computer or the printer are completely new products and therefore documentation should be good.

CONCLUSIONS

■ The concept of compatibility through the Aquarius range is good and probably worth a premium. The software, comparatively speaking, is limited in both volume, quality and is also expensive, but is available. I think the peripherals could be more aggressively priced and every effort must be made to ensure users are not restricted in accessing information on the technical aspects of the Aquarius.

■ At £80, a games machine well worth considering and a vast improvement over the Aquarius 1.

■ It is expected that disc drives will be available in April or May but at present there is no indication of price.



CBM-64 SOFTWARE

WE WELCOME our new president. Our country of Ananaba should prosper under your supreme excellency's care. With such celutions of grandeur we commerce this survey of some of the recent games software which has become available for the Commodore CBM-64, the computer you automatically associate with elephants.

Banana Drama proves conclusively that it ain't what you do, it's the way that you do it. Part of a batch of what might loosely be termed "simulations" from Visions Software Factory, the program puts you shaking into the shoes of Juan Rodriguez LVII. This tinpot dictator has to remain in power by skillful manipulation of public opinion and careful financial management.

Graphics are limited

Graphics are limited to colour presentations of status reports, financial analyses, and news-flashes. Your supreme excellency is sometimes, for example, asked by the industrialists to make trade union activities illegal. If you co, you will enhance your popularity with the created State Security Organisation. Ananaba obviously sorted out any problems with its equivalent of GCHQ Cheltenham years ago.

Once you have decided whether or not to infringe people's democratic rights, the program presents you with a number of options. You can please foreign powers, pacify a sector, assist a sector, raise state funds, do nothing or look after number one. You can buy a private submarine, for example. You can also improve your status, but this is almost as expensive as hiring an advertising agency as some governments have been known to do.

Gusher is also from Visions. Your chance to wear a 10-gallon hat and sit in front of the computer grinning and saying "Have a nice day, y'all; getcha later". This Dallas scenario has you drilling for oil, transporting it by road, or building pipelines. You can export it

Paul Bond flees with fleas and races in space.

by tanker or supertanker, but there is no Straits of Hormuz hazard.

A good map display shows your read tanker crawling to its destination, or your ship coming in. There are random well-based disasters, pipelines valve failures, and wage demands from ship's personnel. The aim is to be the first out of two to four players to earn one million dollars from the exporting of oil. Until then all your revenue is pounds. Maybe there's something to those New Forest oil deposits after all.

Insects are attracted to the Commodore 64 for some reason, although the only real bug I found was in Sumlock's Jumpin Jack which gave an out-of-memory error.

Creeepy-crawlies abound in Quicksilver's Boogaboo — a close relative of Bugaboo for the Spectrum. That program was written by Paco and Paco and a whole host of Spanish types. Pedro Ruiz takes a bit of the credit for the 64 version, along with Felix Arrahas — music — and J L Dominguez — production.

Sting 64, another exercise in computerised entomology from Quicksilver, was less attractive. The idea is good, but the graphics are rather clumsy. Screen One puts you in joystick control of a bee-swam — a large black blob. You use this to bounce other blob-swams which are trying to take over your hives. Screen Two puts you in defence of an individual hive; and fly a squadron of stripey stingers into the encroaching hordes. When your bees are all dead you can swoop back to the hive and pick up another lot until the hive is taken over. The final scene leaves you defending a rather repulsive looking organism, from attacking drones.

From bees to ants. Hideous Bill and the Gigants, a gripping three-part tale of heroism

and romance, is one of Virgin Games' more promising efforts. Bill — we are assured that the nickname Hideous was bestowed upon him by his father out of simple but accurate malice — must save Greta, the light of his life, from becoming ant food.

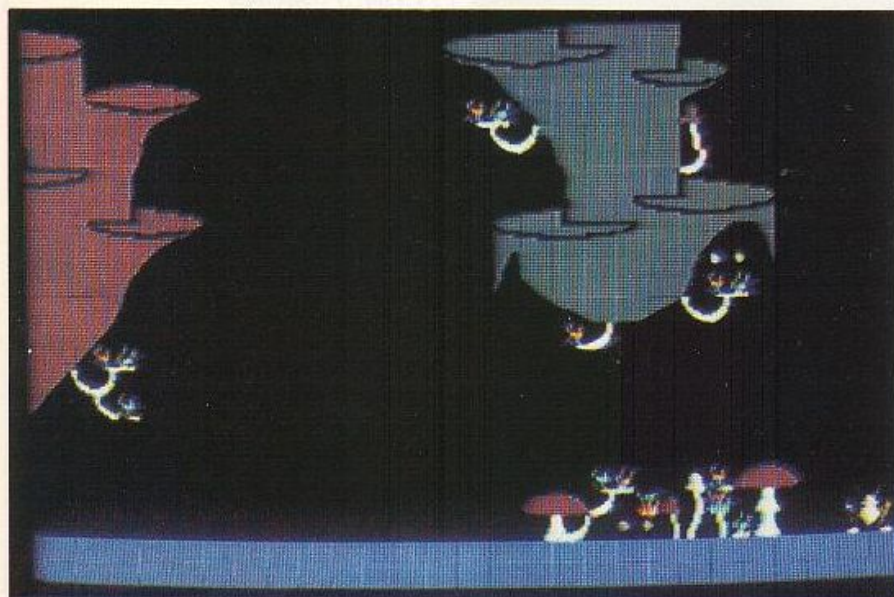
You propel Bill around a Pac-Manesque maze crushing ant-eggs, pursued by the aggrieved parents. Grab a spear and you can kill the soldier ants, but only for a set period of time. The pink ant seems particularly nasty, but *Your Computer* would not wish to be accused of singling out pink monsters for critical attention. Any reference to the peculiar aggressiveness of these creatures is based solely on detached observation. You have been warned.

You get no weapons

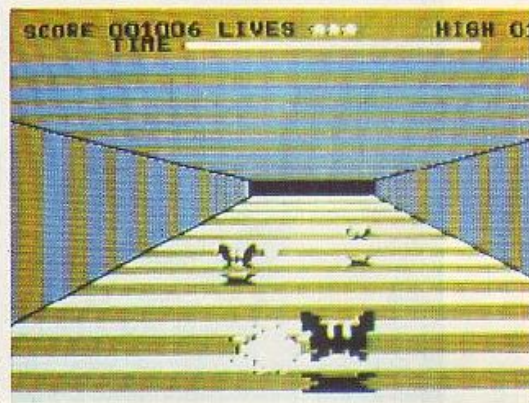
On the second screen you get no weapons; you run around the maze, squashing baby insects, presumably infants. To trap the Gigants you pick up a lever, insert it in a mechanism and use it to open and close the doors in the maze-centre. Pretty convoluted, huh? There is a tin of baked beans in the centre: you need this to get through the third level, where you tunnel down through underground workings, while the eggs are hatching, to free Greta. Then you get a surprise. This game is definitely value for money.

Spiders also get a look in, in Ribble Rus's Wicow's Revenge. Arachnophobes beware. This is one of those scenarios where interecine violence in the back garden has escalated to a previously unacceptable level. Using a laser base, mobile within the bottom third of the screen, you must neutralise various ants and spiders. There is an impressive bird which whoops when you hit it and shoots up the screen. It is Centipede without the centipede. Fast and furious and quite addictive.

The depths of space are beckoning as they do about this time, but first I thought I'd have a quick game of table football before zooming off into the lonely cosmos. Of course Bubble Bus's Kick-off doesn't compare with the Chromasonics 3D football game, neither is there an option for grabbing one side of the



Left: Bugaboo from Quicksilver.
Below: Megahawk from Big C.



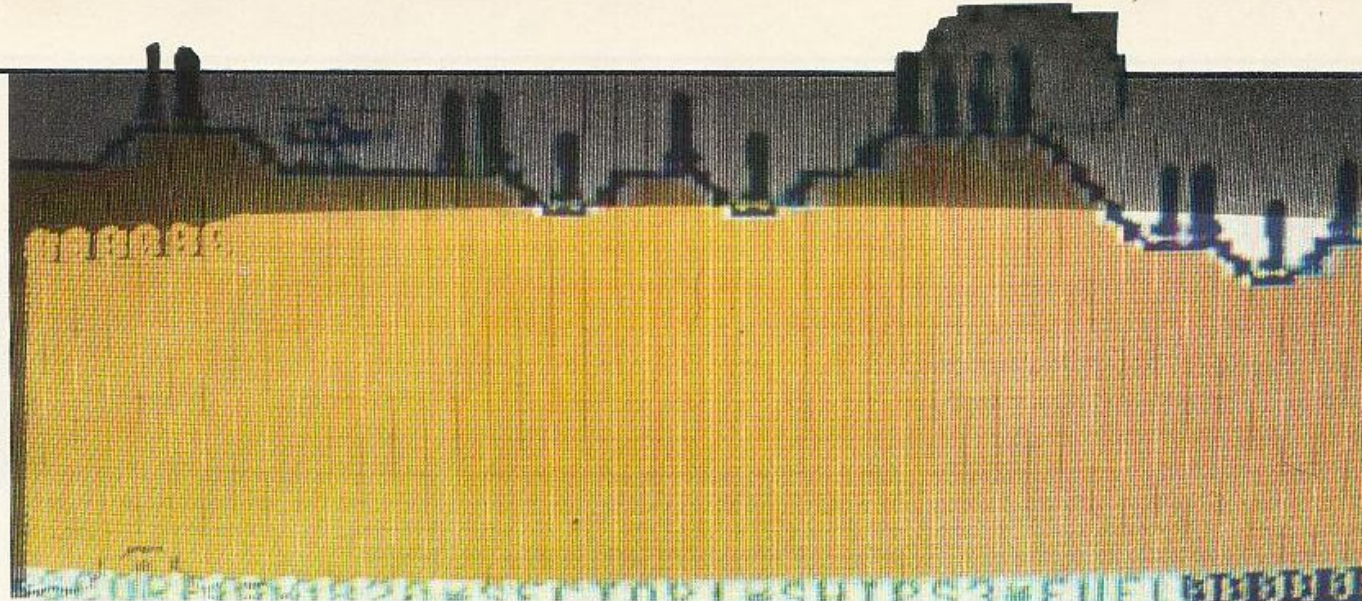


table and making sure the ball rolls down the opposite end.

Right, here we go. Zooming down the fearsome space tunnel, the first of Hagon's many sophisticated defence systems, every fibre of my being is filled with dread. The Hagon fleet has been alerted and wave after wave of astro-fighters comes hurtling at me. The fate of entire galaxy et cetera rests on the success of my mission. You know how it is. Quasar from Voyager is actually rather good; you fly down a valley with mountains on either side. Above you stars twinkle in the airless reaches of the void. The approaching craft cast shadows, giving a realistic 3D effect. Your craft can bank and swerve to avoid them. When you have knocked out these — the more skilfully you knock them out the faster you progress to the next level — you are confronted by bouncing robots. These don't cast shadows. Having dispensed with the springy cyborgs you are flying through space with asteroids, space mines and Etror rockets as they flash towards you. Next you face scere one again, but with indestructible defence poles added — you have to fly around these.

Megahawk from Big C is startlingly similar, except that the corridor sequence has a roof on it, and that both you and the approaching aliens have flapping wings. Refinements include a gauge showing how much longer you have to survive in each sector. My vote goes to the kangaroo dinosaurs that suddenly appear hopping across the planetary plain in this program.

Hopping is one way of travelling in Anirog's Moon Buggy. Piloting your balloon-wheeled personnel carrier across the stark lunar landscape, rocket motors help you spring across chasms and a ray-gun disintegrates the groke-like orange blobs sitting around with a singular disregard for the highway code. Apart from the gelatinous jay-walkers, your joy-ride is impeded by the activities of what looks suspiciously like a helicopter dropping bombs on you. Of course, everyone knows that it's impossible to have helicopters on our moon; and likewise this game is practically impossible to play. Any lunar motorist who lives longer than 25 seconds is a veteran.

Anirog Skramble pitches you into the familiar red landscape, dotted with anti-aircraft missiles and fuel dumps which you

Above: *Super Skramble* from Terminal Software. Right: *Skramble* from Anirog.

have to bomb to keep yourself flying. This is followed by a blue landscape leading into the traditional tunnel with its irritating whizzers. You can shoot these but in the next zone you are confronted by indestructible fireballs over a brown landscape; it is a competent implementation and quite good fun to play.

Terminal's *Super Skramble* is a little more daunting. There is a distinct fuel consumption problem. You really do have to wreak havoc in every single fuel depot or you just won't stay off the ground long enough to enter the cavern.

In PSS's *Neoclyps* you are the good guy, freedom fighter and renowned star pilot. The bad guys, an alien race from a distant solar system have invaded *Neoclyps*, one of your colonial planets.

Destroy the radar towers

The aim of the game is to destroy the alien radar towers and shoot down the defence craft. You start off with 12 ships and lose one each time you crash into an aliers, a radar tower or the planet itself. Every time you down one of the bad guys, you get an energy shield which means you can move through solid objects — you can dive down through the city structures and into the planet's surface itself.

Stellar Dodger from Terminal Software plunges us into another other-worldly scenario unlikely to encourage tourism. As an inter-stellar shuttle pilot you provide the vital link between your starcruiser mothership and the planetary supply dumps. In the way is a treacherous asteroid belt. The screen display shows the carrier, from which you detach your spherical lander. It even has little flashing lights around its equator — by pressing the fire button on the joystick. Dodge the rocks and land on one of the three blastpads at the bottom of the screen.

The game can be played with the keyboard as well as with joystick, but I don't feel myself quite in accord with the effusive blurb on the packaging. Superb hi-res flicker-free sprite graphics? Superb, they ain't. Just plain ordinary. Full colour? Maybe, but the things on the screen are so small they look mostly white. Great sound effects? I should jolly well hope so.



Company	Game	Price
Visions Software	Gusher	£9.95
Factory	Banana Drama	£9.95
1 Felgate Mews		
Studland St		
London W6 8JT		
Quicksilver	Sting 64	£7.95
Palmerston Park	Booga-boo	£7.95
House		
15 Palmerston		
Rd		
Southampton		
SO1 1LL		
Virgin Games	Hideous Bill and the Gi-gants	£7.95
61-63 Porriobello		
Rd		
London W11 3DD		
Bubb'e Bus	Kick-off	£5.99
87 High St	Widow's	£5.99
Tonbridge	Revenge	
Kent TN9 1RX		
Anirog Software	Moon Buggy	£7.95
8 High St	Skramble	
Horley		
Surrey		
Terminal Software	Super Skramble	£7.75
28 Church Lane,	Stellar Dodger	£7.75
Prestwich,		
Manchester.		
PSS	Neoclyps	£7.95
452 Stoney	Cosmic Split	£7.95
Stanton Road		
Coventry		
Big C	Megahawk	£5.95
Bircross Hall		
Haverton		
Nantwich		
Cheshire		
Voyager	Quasar	£5.99
The Business		
Centre		
Cloughton Road,		
Birkenhead		
L41 6ES		

DRAGON SURVEY SOFTWARE

From a quiet day fishing on the riverbank to zooming through hostile space zones, Paul Bond discovers the Dragon has it all.

IF THERE IS one thing the Dragon has been blessed with in abundance by the software companies, it is adventure games. Another popular theme, for some reason, appears to be Kong-style games. So if you are into swords and sorcery, dungeons and dragons, and a certain amount of running up and down ladders evading the wrath of apes/droids/icky things, then the Dragon has it all.

Monsters from Softek Software is a prime example of the latter genre. Your spacecraft lands on the surface of Zol II, which as luck would have it is a veritable Swiss cheese of ladders and platforms patrolled by bellicose monster-robots. You have to find a power module in each mine and return it to your ship before your air supply runs out and you succumb to anoxia.

On-screen this gripping scenario is reduced to the usual grid of vertical ladders and horizontal platforms depicted from a side-view in the traditional autumnal Dragon colours of green, brown and yellow. The ladders are always yellow. It is tempting to conclude that the Dragon's home environment of bosky hillsides, verdant valleys and fertile sylvan glades has exercised some strange atavistic influence on the Welsh micro's colour-set. The result may be restful, but when looking at a batch of Dragon software one is left with a craving for a splash of colour, perhaps the torrid crimson of the heraldic dragon of Cymru itself.

If you succeed in your task by dexterous use of the cursor keys to move the Shift keys to dig, you can penetrate further into the alien

delvings and encounter monster-robots who have actually found out how to climb ladders and give you quite a hard time. The computer games fall into certain generic types is undeniable. This is a competent implementation of the digging-holes-for-monsters-to-fall-through type.

Bonka is another variation on the same theme. This scenario from J Morrison Micros thrusts a man wearing a bowler hat and carrying a space-hammer in among a bunch of homicidal, highly-charged Blue Meanies. This is closer to the arcade ancestor, except that the Meanies do not wave their antennae about, but the idea is to lure them into holes dug with the trusty space hammer and bonk them on the head.

The worst example

There are four different ladder layouts, four selectable speeds and option of one to nine Meanies to start with. More points are added for the more levels the Meanie falls — the idea is try and dig holes from the top level down to the bottom. Of course your oxygen supply is running out. This would get my vote, if only for the fact that the Meanies are blue. The ladders remain stolidly yellow.

Fireball, from Abacus Software, is the worst example of the Kong tendency. You cannot even get the man up the ladders. The company, who should not be confused with Abacus Programs, are hard to contact, so I could not deduce if this bug was solely due to incomplete documentation. Why it is called Fireball is a complete mystery. You are on the bottom level being assailed by half-sentient

purple jellies. Apparently if you hit the fire-button this will help you in and out of lifts. Sadly there are no lifts in this particular program.

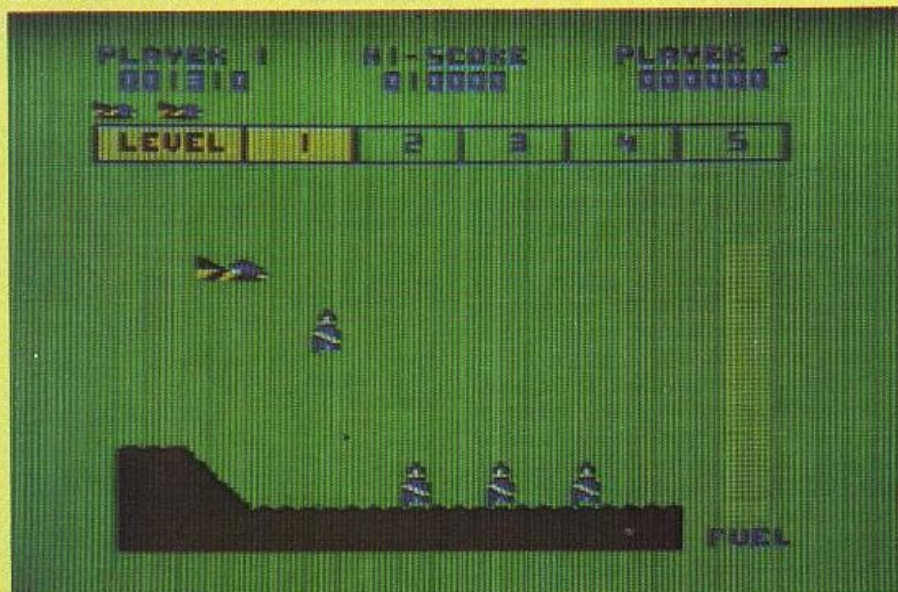
There are, of course, shoot-'em-ups for the Dragon, but most of the ones tested for this review remained relatively restful. Microdeal's Skramble sticks close to the standard Scramble format, although you probably would never have guessed this from the ingeniously original name. You zoom over mountains, bombing fuel dumps, braving anti-aircraft fire and shooting down missiles.

Drazenhawk from Microdeal presents us with an unedifying scenario of larvae and flies littering the screen. You have to shoot all the flies but avoid hitting the larvae because they turn into birds. The Nuffield biology course really has a lot of things to answer for.

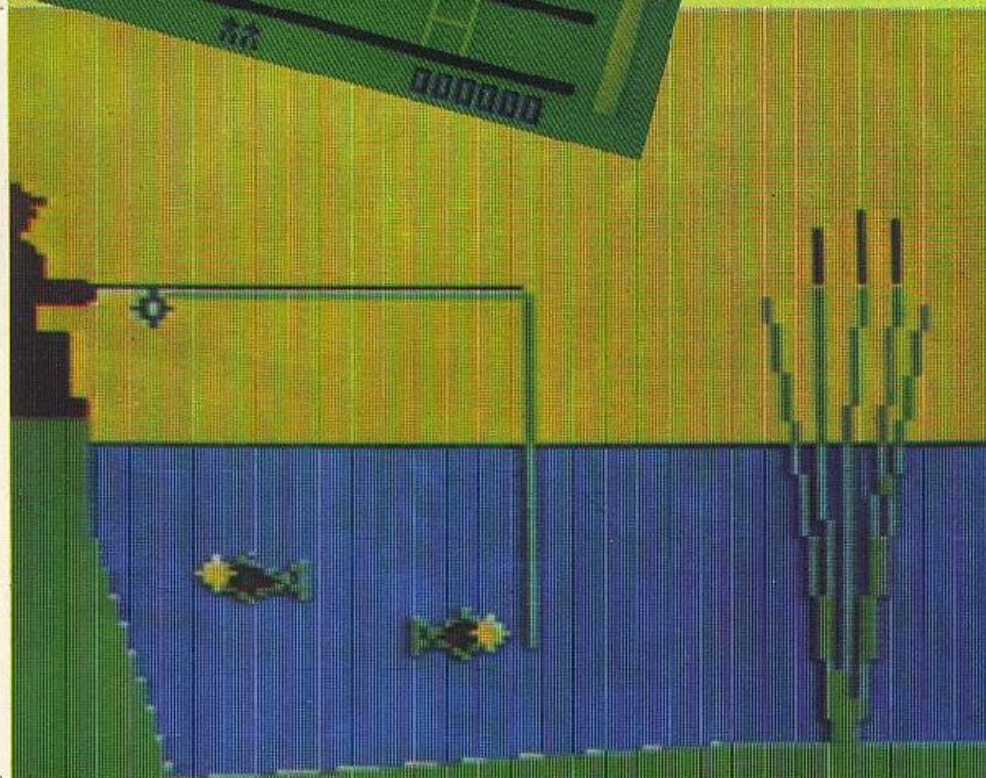
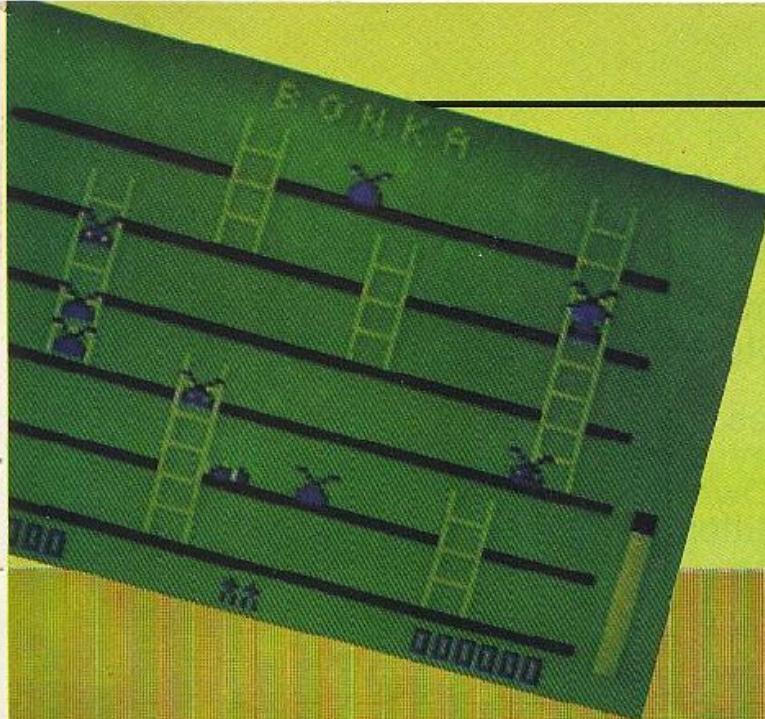
The problem with the birds is that they hamper your movement somewhat by blowing up every time you bump into them, and they tend to spend a lot of time lying around on the ground. You are supposed to be saving the unfortunate Fred from being collared by a Dragonhawk which flaps ponderously across the top of the screen, hiding behind a brown shield. You can shoot the bird, provided you do not trip over one of the fissile avians dust-bathing to the base of the screen, but you really only get two opportunities to do it. If you shoot it after Fred has been seized in its claws then you have to catch him in a tray, of course. The whole thing has the perverse logic of dream except of course that dreams usually have a higher resolution and are much more colourful.

Being the adventurer you are and having survived all the previous adventures you have attempted, you still went out and bought Microdeal's Ultimate Adventure 4. This is, we are assured, an adventure game with a difference. You are obviously over qualified for any more expeditions of the dungeons, haunted houses, space trek type. So here we have a game which is totally new, that is, it has all the elements just mentioned thrown in together.

You begin with £250 in the market place. You have to buy gear ranging from spacesuits to shovels to assist you in your quest. Your goal is to accumulate £1,000. Common problems are encountered: each move diminishes your initial 250 strength units. Most is lost in encounters. Your survival depends on using the right item for the right fight, but you can only carry up to eight objects, including treasure. There are seven treasures to be collect.



Below: Skramble from Microdeal.



Above left: *Bonka* from J. Morrison Micros.
Above: *Avenger* from Voyager Software.
Left: *Hooked* from Shards.

The difference here is the porrholes which link the various parts of the adventure together. You can be wandering down a dune and suddenly get zapped into a jungle, or somewhere even more outlandish.

A fishing rod might have been of some use to me in my travels — however I had plenty of opportunity to build up that resource which the "complete" angler requires more than any other. Patience. The screen display for Shards' *Hooked* depicts a brother of the angler sitting hunched on the riverbank clutching a telescopic rod guaranteed to make Izaak Walton green with envy. As no man is born an artist, so no man is born an angler, as the great fisherman used to say; this simulation did nothing to convert me, but I would hazard that it replicates faithfully the boredom of the actual pastime with none of the disadvantages of contracting arthritis or killing swans by poisoning them with lead weights.

This is the sort of game that might come in useful for people recuperating from the effects of prolonged space combat such as we experience in *Avenger*, by Voyager Software. This has a rather peculiar loading protocol, not well explained in the documentation — I

had to mess about a bit to get the machine code in. Screen 1 presents you with a number of green objects — munitions stores — which you have to land on without bumping into the orange cross-shaped mines.

Each landing gains you 10 shots in the second stage of the game where you are catapulted headlong into an advancing swarm of actually rather inoffensive aliens. They do not shoot at you. You, however can butcher them mercilessly — if it moves blast it as they say on the more bloodcrazed blurbs.

Each hit scores five points. If you get as far as the third screen, you have to try and attain the top of it in the time allowed.

You have a fly through a couple of asteroid belts however and if you hang around too long waiting for a gap a missile will be launched these missiles never miss. Each level has its own high score table.

Illusions of speed

Devil Assault, another Microdeal game, this time by well-known software cowboy Tom Mix, shows the kind of illusion of speed that can be generated on the D32. As in the previous game you can select the colour of the background you wish to play on. There are six skill levels. These determine the starting level and the type of missile fired.

At the beginning of each screen the alien antagonists materialise by having their component parts appear to rush together from each side of the screen, accompanied by an impressive whooshing sound.

Vampire bats fly back and forth across the first screen, while the lowest one tracks you and tries to bomb you *a la* Galaxians. Should you manage to hit one of these creatures they split in two — if it is one of the lowermost pair the rest of the flock come swooping down at your laser base. At higher levels, the devil himself appears running across the top of the screen and dropping a flaming cauldron which severely hampers your movement. And this is not all — presently you have to put up with crazed robots on the second screen, and last but definitely not least, the belligerent spruings — purple blobs which bounce about trying to stomp on your base.

Company	Program	Price			
Softek 12/13 Henrietta Street, London WC2 8LH	Monsters	£6.95	J Morrison Micros 2 Glensdale St Leeds LS9 9JJ.	Bonka	£7.95
Voyager Software Business Centre Claughton Road Birkenhead, Merseyside L41 6ES	Avenger	£5.99	Microdeal 41 Truro Rd St Austell Cornwall PL25 5LE	Skramble Ultimate Adventure 4 Dragonhawk	£8.00

DESIGN YOUR OWN MICRO

WAKE UP Clive Sinclair, and Commodore and Acorn too. So far Aphrodite, Da Vinci, Invincible, Mardarin and the rest have just been project code names in the *Your Computer* vaults. Now we can reveal the plans our readers have for putting better micros at their fingertips — and there are more would-be computer designers out there than you ever imagined.

Ideas ranged from a go-anywhere portable with a built-in radio telephone to a latter-day Nascom hobby computer. Entries came in from all over the world including an IBM lookalike from Angola and a Barg & Olufsen hi-fi style design from Denmark.

Some readers put in more work than others. While half a dozen people sent in sketches on the backs of envelopes other covered pages of graph paper with circuit diagrams and Peter Au-Yeung sent in an 8,000 word typed submission outlining his ideas.

The overwhelming majority of the entrants took the competition very seriously — except, that is for Matthew May of Dublin. His Perfect Micro would have a robot arm for typing in programs, not to mention robotic legs, an acoustic Modem to give you access to "everything from Ceefax to Nato" and a list of languages including Basic, Pascal, Fortran, Rude, Assembler, French, Logo, Pogo, Pretty Basic, Very Basic, Forth, Second, Noddy, and Big Ears.

A surprising number of the entries in all categories were improvements on the Spectrum. The most popular idea was to give it a proper typewriter keyboard, with function keys, better sound, cartridge and joystick interfaces and a built-in cassette recorder to tidy up loading. You could tell that the dreaded ZX-81 RAMpack wobble problem had burnt its way indelibly into some of the

Everyone wants to be a computer designer now, as the flood of entries for our January Design Your Own Micro competition shows. Meirion Jones reports on the ideas that appealed to our independent team of experts. Next month — what the computer companies think.

designers' minds. They had drawn agricultural-looking bolt on peripherals which would not have come adrift in a nuclear war let alone if someone jogged the table when you were programming.

Sinclair's QL was announced before the competition closed — in time to affect some of the later entries. One design was just a rough sketch of a QL in the attache case, sawn off at the end of the keyboard so that the twin Microdrives could be fitted in by being turned through 90° and fitted above the keyboard next to a flat screen TV.

Like Apple's Macintosh, also announced in January, the QL has one of the 68000 family of processors at its core so it was no surprise that the last few mailbags of designs were full of 58000-based machines. Overall most readers went for the 8-bit central processors they know and love — 6502s if they were Commodore, Oric or Acorn users, Z-80s if they had a Sinclair and 6809s if they had a Dragon or Tandy.

The supposed benefits of compatibility with the IBM PC drove some to adopt 80385s and 8086s and there was a sprinkling of Z-8000s

Top, everything you wanted on a micro except a spacebar. TV, phone, video recorder and computer in one portable unit. Aphrodite, above, and Da Vinci, right, use more conventional technology.

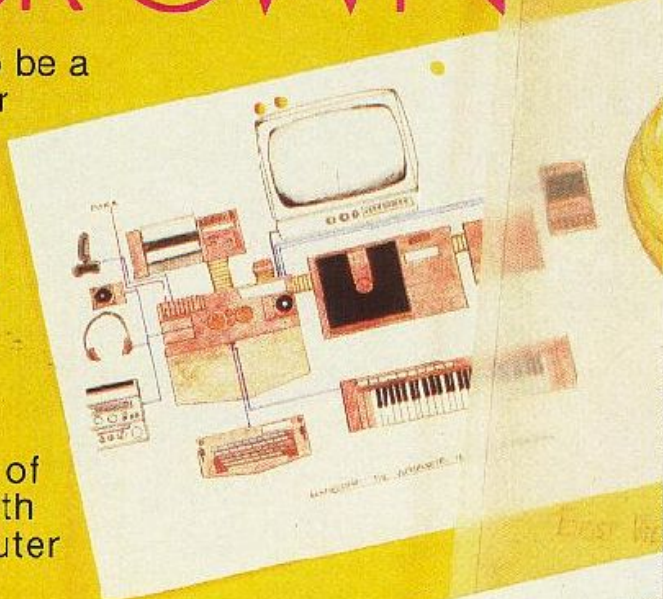
and an 80186s.

Built-in light pens and joysticks seem popular although most designs included a provision for the joystick to be detached from the keyboard when necessary. Alexander Martin, whose sketch carried the deftful note "Product design graduate — job needed" included a detachable trackball in his plan.

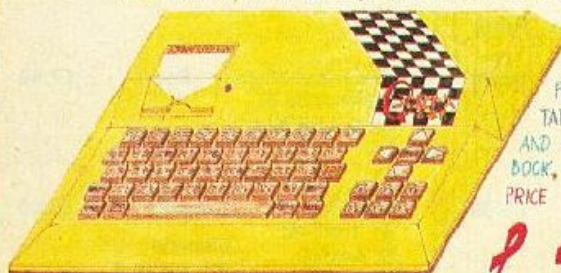
While most of the light pens were intended for drawing on screen or selecting from a menu Matthew May's consisted of a light bulb on the end of a wire "for programming in the dark". Richard Heimans gave the credit to his mum for suggesting a remote control joystick and several designs used infra red or ultrasonic beams to communicate between peripherals.

Most of the battery-powered micros suggested included some sort of flat screen display on the keyboard even if it was only a single-line liquid crystal display. One cheap and easily practicable idea which occurred to both John Niven and Patrick Lawton was a little watch-style LCD showing how much free memory is left in the computer at any time.

By incorporating a battery — as Andrew



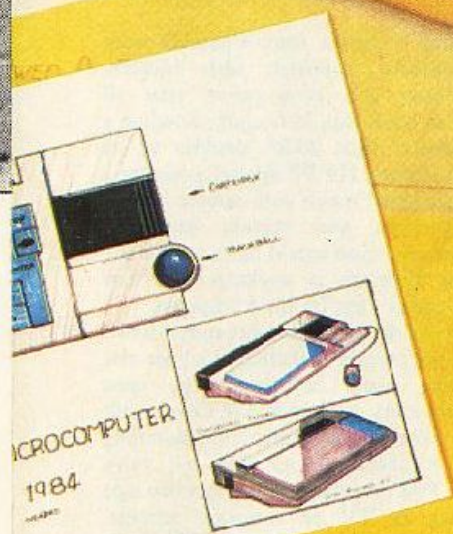
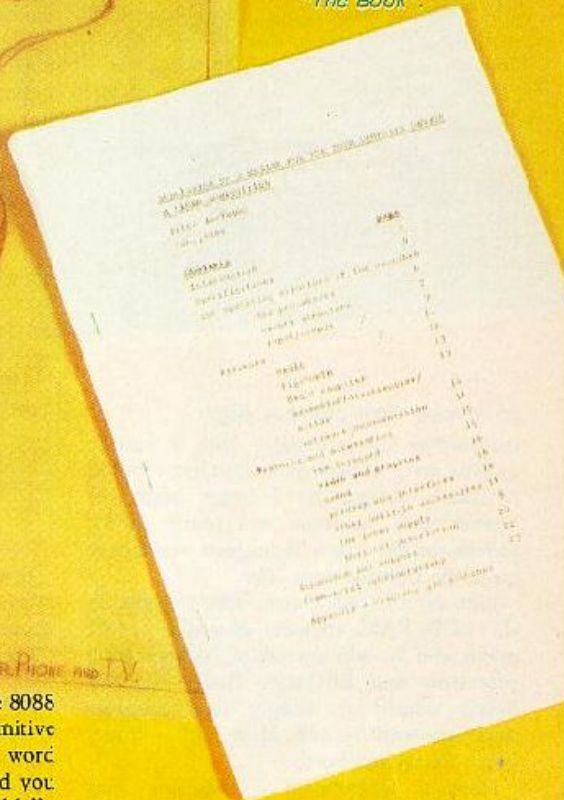
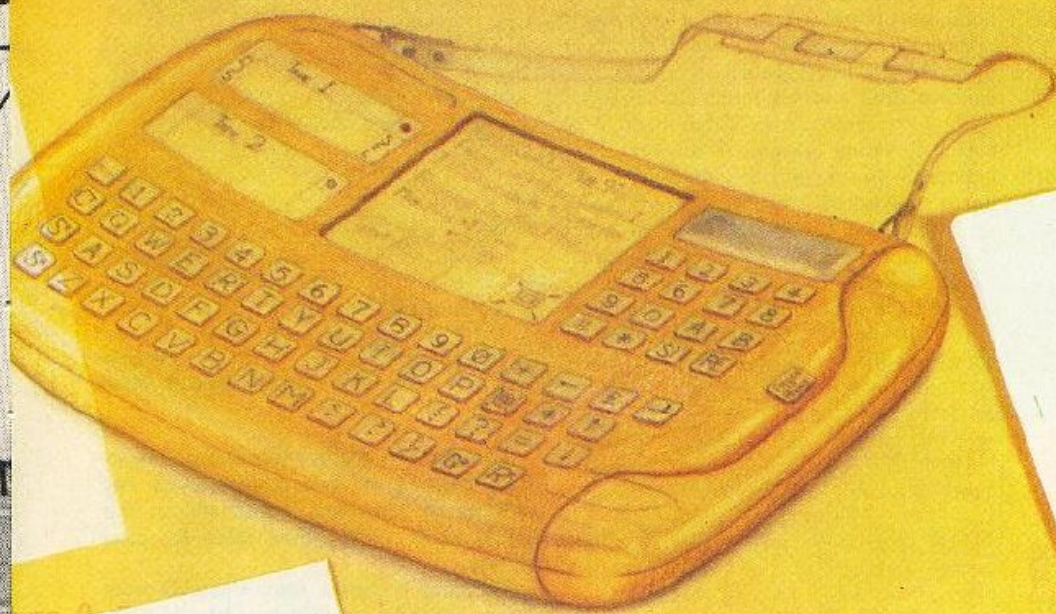
128K RAM, 32K ROM, MOVING KEYBOARD, CARTRIDGE PORT,
16 COLOURS-256 BRIGHTNESSES, BASIC AND FORTH LANGUAGE STANDARD,
1280 x 760 RESOLUTION, 4 CHANNEL SOUND, BUILT-IN ASSEMBLER,
RESET AND ON/OFF SWITCHES, 40x30 CHARACTER DISPLAY, TV, MONITOR, RS232,



NETWORK AND RGB INTERFACES, JOYSTICK PORTS, Z80A CPU, FREE DEMONSTRATION TAPE, EXTENSIVE BASIC AND FORTH INSTRUCTION BOOK, 3 YEAR GUARANTEE, PRICE

£180!

Peter Au-Yeung's
8,000 word
submission,
below, soon
became known as
"The Book".



number cruncher unit in addition to the 8088 to speed up calculations — this is a primitive form of multi-tasking — leave out the word primitive as David Moore suggests and you have "an ideal selling point to the gullible".

In top mode the 42 has 924x240 resolution taking up a massive 57K of screen memory. The £450 price tag suggested for the Adept sounds a little optimistic for a 128K machine with a built-in 5.25in. disc drive.

The Phoenix attempts to squeeze extended Microsoft Basic, Logo and an operating system into 16K of ROM. It also has a sound range of 12 octaves — well beyond what humans can hear — presumably in case there are any dogs or mating prawns in the audience. Automatic Load and Save buttons make the Phoenix user's life easier.

6502s were also popular with the group. *Hot 64, below, from Richard Heimans was one of the best of the junior entries.*

entries. Silicon City Micro was a £150 Commodore 64 look-a-like with a built-in detachable joystick. The cheaper 16K Prism concentrated on making interfacing easy with a MIA chip — miniature interface adaptor.

At junior level the under 14s were not afraid to send in circuit diagrams. Barry Adams did with his anonymous 64K Z-80 micro. For £170 it looked good value and well thought out but 28 graphics modes would frighten all but the most daring new users. 10 year old Michael Davis's Zodiac, on the other hand was a simple but effective idea for a BBC (continued on next page)

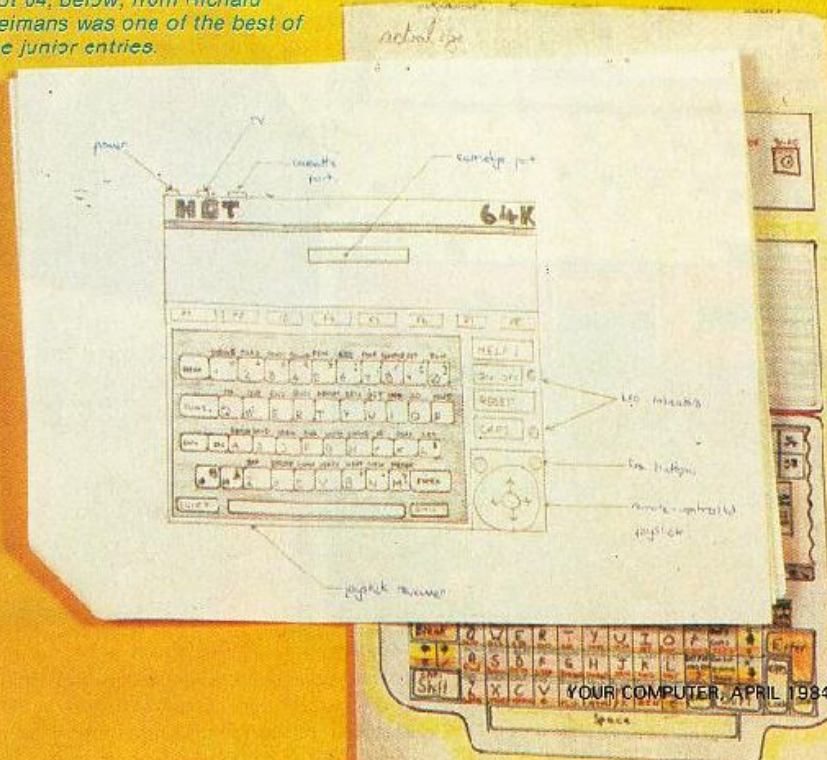
Rice suggested you could make it a real time clock too. This could be used to timestamp files as you created them. A warning panel flashing up messages such as OH — overheating — was yet another proposed use for an LCD.

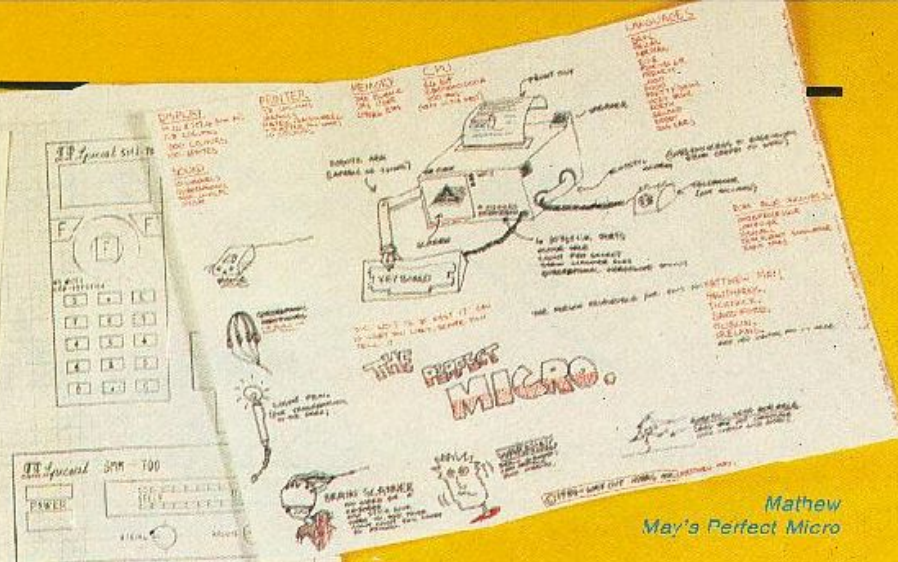
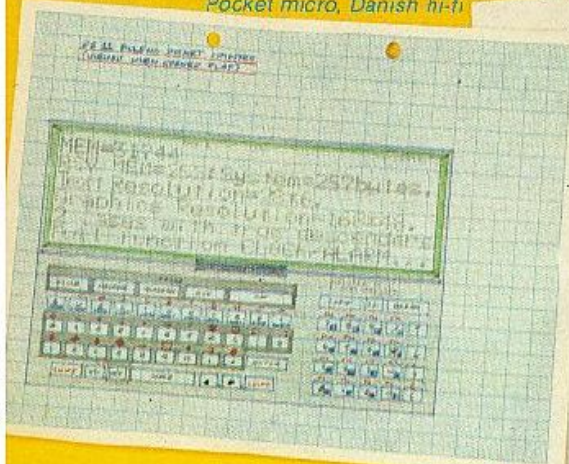
Most of the competitors wanted between 16 and 128K of RAM in their micros with easy interfacing to floppy or even hard disc units for extra storage. Silicon discs were one of the more original ideas for additional storage. These would look just like games cartridges but would contain a small battery and up to 256K of RAM on CMOS chips which need little powers to keep the memory refreshed.

When you plug one of these into your micro it will behave like a disc drive except with instant access. You can unplug it safely without losing the information on it.

The competition was split into three categories and although there was an overwhelming response in the Junior and Open sections we had relatively few group entries. Many of the group entries were meant to be IBM compatible.

The best of these were the Phoenix — a £230 128K micro designed by Hove Park School Computer Club and the Adept 42 BC, sent in by David Moore from Dorset, which has a built-in disc drive. The 42 BC has a





Mathew
May's Perfect Micro

(continued from previous page)

compatible 32K computer with a built-in cassette drive. If only Acorn had had a look at Michael's design the Electron might be blessed with cartridge and printer ports, though the flat screen he suggests would have made the Electron even later.

John Niven from Cman, who thought up the LCD RAM counter, proposed a 48K micro with the odd mixture of Z-80 and 6809 processors and BBC-style Basic. Nicholas Speed wanted to supply four language cartridges with his 64K Ideal M84 — Basic, Logo, Pasca and Forth.

Heimans Operational Technology, alias Richard Heimans from Camberley, had a real keyboard, improved sound 64K RAM and 6502 chip for about £120. A built-in compiler was one of Richard's priorities.

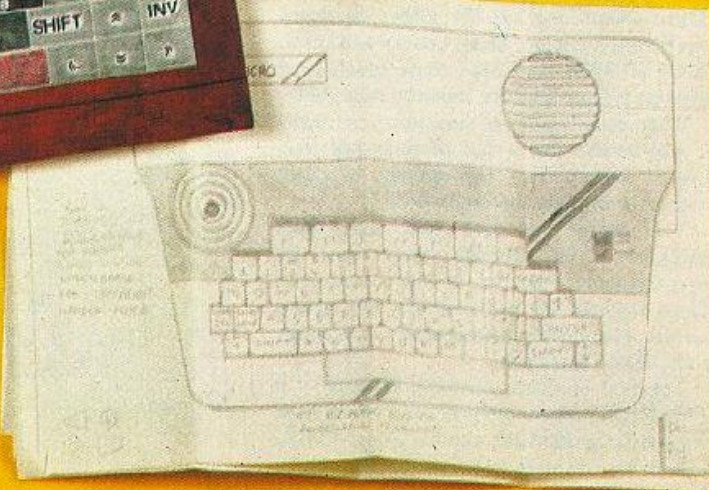
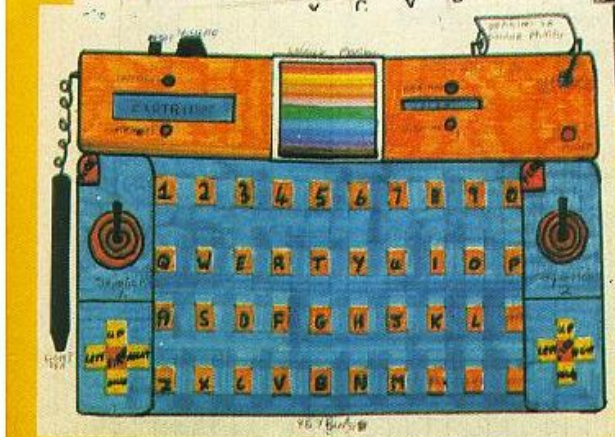
In the Open the competition was toughest of all. Peter Au-Yeung's submission — which because of its weight soon became known as "The Book" was very carefully thought out, with a Z-80 and an 8085 but with only 80K RAM and no built-in storage for around £500-£600 it would have a limited market. David Kinrade's pocket micro — half the size of a paper back book — was immediately appealing. When you open it up there is a six-line LCD in the lid. The proposed 6502-compatible CMOS CPU is coupled with 64K RAM.

The small size does not stop David Kinrade from building in two joystick ports and facilities for expansion. A little add on unit would make 128K silicon discs for mass storage.

Flemming Pedersen from Denmark went for a modular approach with Modem, printer/plotter and even power unit all designed to stack with hi-fi units including a stereo cassette deck which doubles up as computer storage. His FP Special would be a 64K 68000-based micro with remote control of peripherals and remote joysticks. Maximum resolution would be 640x512 and Flemming Pedersen is working on a new language called Plim for his FP Special.

Duncan Kinnaird's Aphrodite concentrated again on peripherals — including a laser disc player and piano keyboard. The most imaginative entry came from TM Colver with his go-anywhere portable micro incorporating a radio telephone, colour TV and video recorder. Two cassette units taking video tape would act as TV or computer storage. Colver's micro would have twin CPUs — Z-80 and 65C2 — presumably CMOS versions unless you planned to take a yak loaded with car batteries on your travels. The radio telephone might have to wait for cellular radio before you could make the most of it and it might take a couple of years before flat screen colour TVs become cheap and reliable.

So much for *Your Computer's* view of your entries. Now we are taking the leading designs in each category to the computer companies for their opinions. Watch this space.



PROGRAM FEATURE

BC BASIC (Commodore 64) £57.50

At last the ultimate has arrived under the name of BC Basic. This is a complete 9K Extension supplied in a Rom pack. Over 97 new or modified commands without affecting the speed of operation. Main areas of enhancement are: Hi-res, Sprites, Text Graphics, UDG, Sound, Machine Code Aids, Structured programming, I/O and more.

Kuma

TERMS: Please add £1.00 post and packing to orders under £20.00 carriage free on all cash, cheque or credit card orders over £20.00 in the U.K. Telephoned credit card orders accepted on our 24 hour ansaphone service. All prices include VAT

Sinclair SPECTRUM

LOGO	£9.95
The 'Turtle' Graphics language	
ZEN Editor/Assembler	£12.50
A must for the serious programmer	
SUPERCHESS 3.0	£8.95
The strongest Chess program yet	
MAP OF U.K.	£11.95
Educational U.K. Geography	
HORSE RACE FORECAST	£15.00
The Serious Punter's Aid	
HISOFT PASCAL Compiler	£25.00
Compiling Pascal	
VEGETABLE CRASH	£6.95
Exciting Arcade game in M/C	
FROG SHOOTER	£6.95
Exciting Arcade game in M/C	
PINBALL WIZARD	£5.95
Fast-action graphics and sound	
BRIDGE PLAYER	£8.95
Pit your wits against the Spectrum	
BACKGAMMON	£5.95

commodore 64

DATABASE	£24.50
360 pages at 10 lines/page	
BC BASIC	£57.50
Complete 9K Extension in ROM pack	
SIMPLE ACCOUNTS	£24.50
Non-VAT accounting system	
PAINTPIC	£19.50
Drawing/Painting using multi colour bitmap	
HORSE RACE FORECAST	£19.95
The Serious Punter's Aid	
POOL PERM	£17.25
Improve your pools winning chances	
FOOTBALL FORECAST	£19.95
Written by Professor Frank George	

SHARP MZ MZ MZ 80A 80B 80K

Send for catalogue — an outstanding selection of programs available

SHARP MZ 700

NEW	
● GUNMAN	£6.95
Fast arcade game in M/C	
● COSMIC SCRAMBLE	£5.95
Space Adventure Game	
● CHESSMAN	£6.95
Save the chessmen from destruction!	
● BREAKTHROUGH	£5.95
Fast arcade game	
● SUPER SPACE INVADERS	£6.95
A new version of the arcade classic	
● QUADRAX	£5.95
Line up the counters and foil opponents	
● PINBALL KING	£6.95
Colourful fast-action game in M/C	
● PELMANISM	£5.95
Game of memory	
● MOONLANDER 11	£5.95
Land the lunar module on the moon	
● ATHLETE	£5.95
Fast, colourful maze game	
● STARTREK PLUS	£6.95
The adventures of the starship Enterprise	
● CURSED CHAMBERS	£6.95
Testing adventure game	
● SPEECH SYNTHESIS	£14.50
Over 60 different sound building blocks	
● TYCOON	£6.95
Stock Market game	
● XANAGRAMS	£9.95
Challenging word game in M/C	
● BIORHYTHMS PLUS	£6.95
Program generates biorhythms	
● DISASSEMBLER	£12.50
Zen compatible	
● KUMA COMPILER V2.0	£29.50
Get the best out of your MZ700	
● HU-BASIC	£34.50
22C Commands + D.P.	
● HU-CAL	£34.50
Spreadsheet Calculator in M/C	
● EASIDATA	£19.50
Fast information storage / retrieval	
PACMAN/MILLIPEDE	£9.95
Superb sound and graphics	

EPSON HX-20

DESKMASTER 2	£33.93
Word Processor	
DESKMASTER 2/D	£56.93
Word Processor for disc TF-20	
DESKMASTER 3	£33.93
Spreadsheet Calculator 16K	
DESKMASTER 3.5	£45.43
Spreadsheet Calculator for expanded HX-20	
DESKMASTER 5	£45.43
The Editing Terminal	
DESKMASTER 6	£22.43
Decision Maker	
DESKMASTER 7	£22.43
Editor Assembler	
DESKMASTER 8	£22.43
Mail Lister	
DESKMASTER 9	£33.93
RAM Database	
DESKMASTER 10	£22.43
Labeller	
DESKMASTER 17	£56.93
Pert and Critical Path Analysis	
DESKMASTER 20	£68.43
Viewdata	
PASCAL Compiler	£45.43
True object code	
FFOFSWRITER	£109.25
Wordprocessor	
CASH EXCHANGE	£22.43
USER DEFIN GRAPHICS	£20.13
A useful asset for the HX-20 user	
HOME BUDGET	£22.43
Home Accounting System	
HORSE RACE FORECAST	£28.17

sinus 1 apricot

KUMA FORTH	£207
Full Fig Forth	
BASIC TOOLKIT	£97.75
Ten major subroutines	
ISLES OF ARTUAN	£22.43
Extensive adventure game	
OTHELLO	£22.43
With fine graphics	
MAZE RUNNER	£16.68
Thinking Man's Maze Game	

PHONE NOW (073 57) 4335

or SEND FOR DETAILS

Please tick box for information required, and send coupon to:
Kuma Computers, Ltd.
12, Horseshoe Park,
Horseshoe Road,
Pangbourne,
Berks RG8 7JW

Hardware
☐ SHARP PC-5000
☐ SIRIUS
☐ SHARP PC 1500
☐ SHARP 700
☐ SHARPA

Software
☐ SHARP 3541
☐ SAGE
☐ APRICOT
☐ EPSON HX-20
☐ EPSON QX-10

Hardware
☐ NEWBRAN
☐ COMMODORE 64
☐ ELECTRONIC MAIL
☐ PRINTERS
☐ SPECTRUM

NAME

ADDRESS

POST CODE

I use a

micro-computer

Choice

Learning is fun with Ollie Octopus

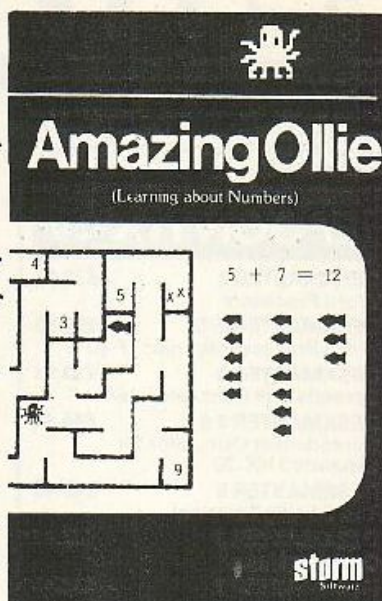
Top quality
educational
software

Widely used in
schools

Ideal for 4-8 year
olds

BBC Model B
and 16K/48K ZX
Spectrum

FREE badge with
every program



Ollie Octopus' Sketchpad. Drawing tablet to stimulate children's creative abilities, 8 colours, 8 directions of movement. Build triangles, squares and circles to enlarge, reduce and shade in. With simple On-Screen instructions.

Amazing Ollie. Entertaining program to improve numerical skills and hand-eye co-ordination. Move Ollie Octopus through maze to catch fish, with options for basic recognition and counting of numbers, addition and "Beat-the-Clock!"



storm

Available from selected branches of Boots, and all leading computer shops. Trade availability from Websters Software Directory. In case of difficulties, order direct, at £6.95-40p P&P (inc. VAT), from:

Storm Software,
Winchester House,
Sherborne, Dorset.
0935 813528

PLANNING POWER....

orion format 4+ plus microdraw*

The first fully compact A4 ringbinder graphics planning system specially designed for SPECTRUM owners who like to keep a tidy work base. These comprehensive kits contain everything you really need to get the most out of your programming. And if you have a 14" or 16" TV you can link hard copy plan to screen de-bugging using TELEPLAN. This unique TV screen overlay is matched to format 4+ print plans and gives a guide to PRINT co-ordinates literally 'onscreen'.

format 4+ & TELEPLAN are available direct from us, or send a stamped addressed envelope for full details and current list of stockists. * by MICROMANIA

FORMAT 4 KIT SP/1 @ £15.95 plus £2.50 P&P

Please tick ☐ orion TELEPLAN 14" 16" @ £1.25 plus 50p P&P

☐ I am enclosing my (delete as necessary) cheque/Postal Order/International Money Order made payable to OFION SOFTWARE

NAME

ADDRESS

POSTCODE

On their way... Kits for ELECTRON & BBC!

orion Pippbrook Mill, London Road, Dorking, Surrey



Producing fast-action games without the need to learn machine-code programming — Simon Beesley reviews a crop of games designers including the newly-released Hurg.

GAMES WRITING PACKS

THERE ARE FEW more dismal experiences than playing a version of Space Invaders written in Basic. The invading aliens dawdle across the screen while your missiles take an age to reach them. The fact is that Basic is usually too slow for writing adequate arcade games. For best effects you need the speed and flexibility of machine code. But for most of us learning machine code is a daunting task.

As an alternative there are now a number of programs which offer a more painless way of writing arcade quality games. These are either extensions to Basic or full-blown games designers.

Melbourne House's Hurg is such a program. Hurg, incidentally, stands for High-Level, User-Friendly, Real Time, Games Designer. The terms High-Level and User-Friendly refer to the fact that by using Hurg you can design a game without writing a line of code — the entire system is menu driven. It offers, in fact, an extensive hierarchy of menus and sub-menus which between them cater for almost every aspect of designing a game.

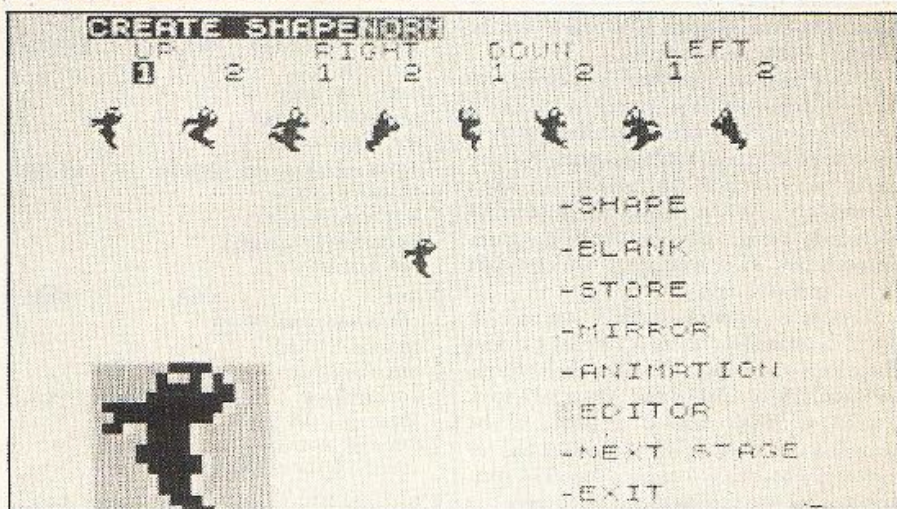
Define eight objects

Not only, for example, can you define up to eight different objects but you can also animate each in a different way and determine how it is to move. Movement can be described in considerable detail. You could instruct an object to mimic the movement of another object or give a weighting to movement in certain directions. Alternatively you could define eight paths and link four of them together.

The animation facility is extremely impressive. Each object can be given up to eight animation sequences. It can either be allotted two different shapes for each direction or be made to pass through an entire eight shape cycle in every direction. Once you have defined its shapes you can set the speed at which animation occurs as well as the speed with which the object moves across the screen. The Shape Generator is one of the most enjoyable features of Hurg. In effect it lets you construct the frames for a cartoon. As soon as you have defined at least two different shapes you can see your cartoon character in motion.

There are a host of other options such as a regeneration menu, a collision table, and a games variation menu. To take just one of these, the games variation menu allows you to alter the pattern of a game after a specified event. Thus you could instruct the ghosts in a Pacman-type game to move away from the player when a power pill has been eaten.

Although there is no facility for designing a background you can load in a predefined



Hurg from Melbourne House.

screen. This means that an assortment of different games can be designed. Two of the demonstration games included with Hurg show its range. Manic Koala is a creditable Manic Miner type game — with only one screen — while Ms Hortense is a Pac-Man variation.

Designing a complete game with Hurg is quite a complicated business. The program's facilities are so extensive that they need much fuller explanations than are given in the manual. More examples are needed. The manual gives an example of how to write a simple game but this is rather sketchy. When I came to design an Invaders type game I was unable to make my missile leave its silo. Doubtless I had made an elementary mistake but detailed step by step instructions would have been handy.

Quicksilver's Games Designer is easier to use but more limited in its scope. Essentially it is an instant shoot-em-up kit. Several game formats are open to you — Invaders, Asteroids, Scramble and so on — but these are really a matter of fixing the directions the aliens come from and how your character moves. The program does not allow you to design a game at the same level of detail as Hurg. So you are confined to producing variations on the same shoot-em-up theme: aliens approach and you blast them out of the skies.

Again, it is menu driven. There are eight options on the main menu: Play Game, Select New Game, Alter Sprites, Configuration, Movement, Attack Waves, Load from Tape, and Save to Tape. Selecting any one takes you to another section. The sprite option, for example, takes you to a character definer where you can define either your own player and missiles or the enemy characters and their missiles.

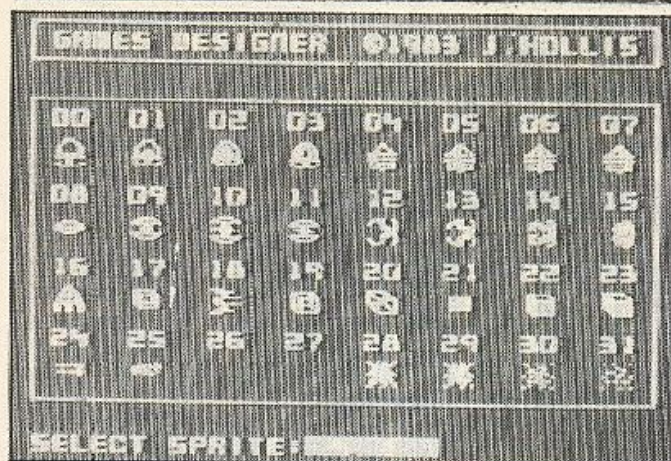
Included in the configuration sub-menu is quite a sophisticated sound editor — a feature lacking in Hurg. By moving a slide up and down on five scales you can create the sound of your choice for explosions or missiles. Given the range of different sounds that can be produced this is particularly simple to use as well as being fun to play with.

Although you can give the aliens a limited degree of animation and set their flight path you cannot animate your own character. This feature does not begin to compare with Hurg's extensive facilities for defining animation and movement. Only one set of aliens can appear on the screen at any one time and all move in the same way.

Nor is it possible to define the background. The background option reduces to a choice of colours and the decision to include stars or not.

But for all its limitations Games Designer is

(continued on next page)



(continued from previous page)

a highly effective package. The eight pre-defined games which are included with it show that you can certainly design games of commercial quality. I shoot-em-ups are your taste then this program will allow you to indulge yourself to the full.

Games designer programs, however, have their frustrations. They restrict you to a set course menu. With Hurg, for example, it is possible to design a Pac-Man game but you could not instruct the ghosts to move intelligently. As the blurb for Interactive Software's Scope puts it, such programs cannot satisfy those who enjoy 'the challenge of true programming'.

Scope is a computer graphics language. It has 31 command words which are tagged onto Basic Rem statements. They cannot, however, be intermingled with Basic. Once you have written a Scope routine it needs to be compiled into object code in another area of memory. The idea is that once compiled your graphics routine can be called from Basic.

Entire game in Scope

You could also write an entire game in Scope; although with only 31 commands on hand this would be a daunting task. Scope does not allow floating point variables so the sine and cosine functions cannot be used. Nor are there commands for multiplication and division. User-defined characters need to be set up in Basic.

At first glance Scope's syntax seems rather complex. To set up the equivalent of the empty loop

```
FOR A = 0 TO 100 NEXT A
requires the following commands:
10 REM Var:a:0
20 REM Label:A:
30 REM Inc:a:1:
40 REM Test:194,a,100,A:
```

But the language's graphic commands like Plot, Draw and A:tr are familiar enough; while Fscr is a useful addition which scrolls the screen one pixel in any direction.

By using Scope to build up graphics routines you could undoubtedly speed up your Basic programs considerably. It is also an interesting introduction to lower-level languages — a compromise between Basic and assembly language. As an alternative to Scope one could use a fully fledged Basic compiler or Forth.

Richard Taylor's Fifth is a more accessible aid to writing fast games and, arguably, just as effective. One of Your Computer's regular

Company	Game	Price
Melbourne House, 131 Trafalgar Road, London SE10 48K Spectrum	Hurg	£14.94
Quicksilver 55 Haviland Road, Farnham Industrial Estate, Wimborne, Dorset. 48K Spectrum	Games Designer	£14.94
ISP Marketing Ltd Crown House, 38B High Street, Godalming, Surrey 48K Spectrum	Scope	£11.95
CRL 140 Whitecapel Road, London E1 1EJ. 48K Spectrum	Fifth	£9.95
Commodore Business UK Ltd 675 Ajax Avenue, Trading Estate, Slough Commodore 64	Simons' Basic	£50

contributors Richard Taylor needs, as they say, no introduction. In an interview he once said that he likes to make machines do things they are not designed to do. Having given the ZX-81 high resolution and speeded up its loading rate, he is now doing amazing things for the Spectrum. Fifth is a 4K extension to Basic which lets you harness effects normally only available through machine code. It supplies 25 new commands and a further 13 functions. To use them you simply enter the commands and their parameters after Rem statements.

The largest group of commands provide the spectrum with a sprite facility. The beauty of this is that since the sprites are interrupt driven they move independently of your program. You can specify the direction of one or up to 255 sprites and then set the speed and number of pixels they unsp at a time. Once set in motion the sprites carry on moving while the program attends to something else. If a sprite collides with another object or veers off the screen control returns to Basic whereupon you can redirect it.

Along with the sprite facility Fifth offers a number of other new commands. Among them are Sound, a far more powerful instruction than Beep, and Replace which changes colours on screen in a similar way to the BBC's VDU 19 command. With Get and Put you can store away any rectangular section of the screen and then reprint it at a

Above and above left: Games Designer from Quicksilver.

new position.

Put together these facilities make up a highly useful too for writing quality games without dipping into machine code. The sprites are particularly impressive. As they can be set to move pixel by pixel at a rate of 50 jumps per second they are both fast and smooth.

The Commodore 64 already has sprites but using them in Basic is a slow and tedious business. Almost unchanged since the days of the PET Commodore's Basic now looks a little long in the tooth. It has no specific commands to handle sprites, high resolution graphics or the 64's sophisticated sound chip. To access these facilities you must instead rummage through the manual in search of the requisite Pokes.

Simons' Basic remedies this state of affairs. It is an extension to Basic which makes good the resident Basic's shortcomings with a further 114 commands.

Number of novelties

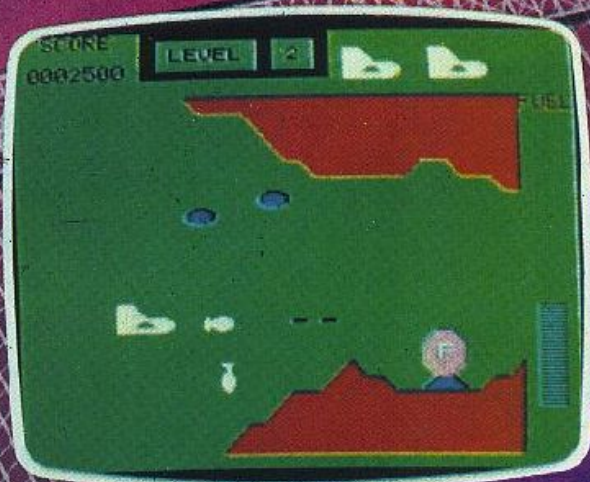
With the Simons' Basic cartridge in place Commodore's Basic can hold its own and indeed feel superior to any other version of the language on the market. Before writing it David Simons drew up a shopping list of all the commands and features he would like to see in his idea Basic. And here they all are: structured programming features such as Repeat Until and local variables; programming aids such as Auto, Trace and Renumber; error trapping commands, extra string handling commands, scroll commands for any direction; and, of course, an extensive range of instructions to deal with sound, high-resolution graphics and sprites. There are also a number of novelties like Delay which varies the rate at which a listing is printed, and Disapa which hides a program line as a security aid.

The graphics commands, in particular, do all you could hope for. To mention just a few, Paint fills in an enclosed area, Rec crawls a rectangle, while Rot will rotate and expand a predefined shape.

In return for 8K of your RAM Simons' Basic gives you a remarkable number of new software features. Some were sorely needed, others can be considered bonus extras. The pity is that Commodore did not think to rewrite its Basic at the outset incorporating some of these features in the ROM.

ORIC (16&48K) TANDY COLOUR (16K)
DRAGON 32

SKRAMBLE



Actual picture of screen on
ORIC 48K

Your mission is to penetrate the enemy scramble system and destroy their headquarters. You will start with three of our latest spacefighters equipped with repeating cannon and twin bomb launcher. If you succeed in evading the elaborate ground defences, you will arrive at the Cave where flying becomes more difficult. In the cave are UFOs, after which you must avoid a hall of meteorites. Very few pilots succeed this far, but if you do, then you must enter the Fortress, followed by the Maze. If you manage to destroy Enemy Headquarters, then your reward will be a more difficult mission! One or two player game. Machine Language, High Speed, Arcade Action. Full colour graphics with sound. Keyboard or Joystick control.

Available on tape for
ORIC £5.50 DRAGON 32 £8
TANDY COLOUR £8

(Tandy colour version only available at Tandy Shops)

Orders by post to
41 Truro Road, St. Austell,
Cornwall PL25 5JE.
Credit Card Hotline 0726 3456



Selected Microdeal titles are
available from larger



Stores and
Computer
Shops
Nationwide

MICRODEAL 1984

AS THE SCREEN CLEARS a surreal message flashes up in front of you — "Imagine" it says "the Edinburgh Tattoo being held on your roof". The idea is that you will use Tatroo as a link word to remind you that the Spanish for roof is tetto.

It sounds crazy but it seems to work and now companies like Acornsoft, Tansoft and Silversoft are racing to produce Linkword programs teaching as many languages as possible before the Summer holidays. Tansoft is in the lead at the moment with French, German, Italian and Spanish learning packages already on sale for the Oric 1 and Atmos. Silversoft is releasing Linkword languages on the Spectrum and Acornsoft has already produced BBC versions with the Electron soon to follow.

Over the next few months Dragon Data and Computers will produce Linkwords on the Dragon and Lynx, English Software on the Atari and Audiogenic is perfecting versions for the Vic-20 and Commodore 64. All this despite the fact that on paper Linkword does not look very impressive. All it claims to do is teach you a 200 word vocabulary and a crude grammar for whichever language you pick.

Beside the seaside

Why then has it received such an unprecedentedly favourable response from the software houses who reject hundreds of programs for every one they publish? Foreign language teaching programs for computers are nothing new. The Atari among others has had one since 1980. But most of these early programs were expensive and over ambitious. The intimidating eight cassette Atari package ran to £40. Meanwhile two factors have changed.

First the home computer has become an ordinary household good rather than just an exotic toy — potentially a learning machine in every home. The software houses have realised that the millions of families who now have micros are a ready market for a cheap, fun way of learning the ropes of a foreign language before going away on holiday — so long as the price is right — say £5 to £15.

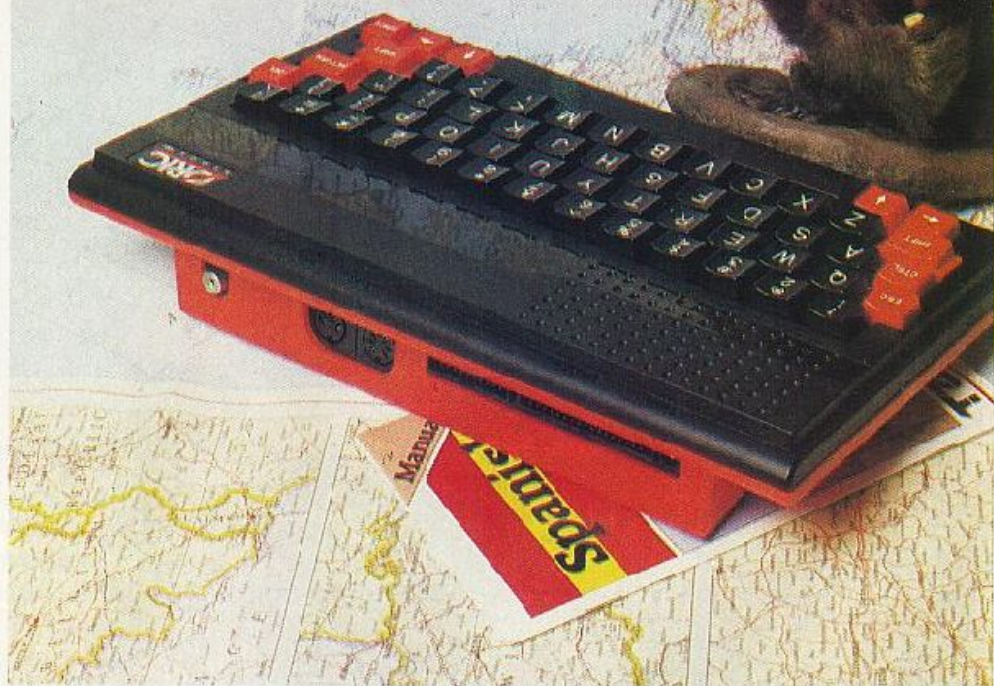
Secondly authors have produced a crop of lively programs which make no pretence to teach a whole language but aim at quickly and painlessly giving a potential tourist enough to get by on.

The Linkword method is only one of these new ideas. French is Fun and German is Fun by CDS are even more approachable — and make good use of graphics. The CDS tapes which cost £6 each for the 48K Spectrum and will soon be available for the Commodore 64 give you a choice of six scenes — house, countryside, beach café, street and school.

When you select one a simple picture appears on screen and then objects materialise out of thin air with their names in English and the foreign language. The beach scene in German is Fun, for instance opens with just the sand and the sky visible.

The sun appears, with the caption "SUN — DIE SONNE" and gradually the whole seaside scene builds up — with even a bouncing beachball and a radio which blares out "I do like to be beside the seaside." Then it tests you by showing the objects and asking you to type in the German name.

CHEER UP! LANGUAGE LEARNING IS EASY



One slight problem is that it will only accept the correct letter each time so you find the answer by trial and error. The program is certainly fun and would quickly interest a young child but at the moment there is no guide to pronunciation.

CDS is working on an audio tape for about £4 to go with the program.

The Kosmos language programs — French Mistress, German Master and Spanish Tutor — are more aimed at the needs of schools but are available on the BBC Electron and Spectrum and cost £10.

You really need a teacher to advise you on pronunciation but at least all the accents are displayed over the right letters, unlike the Linkword program. Once you have grown out of the Level A cassette you can shell out another £10 for the Level B which takes you further.

Perhaps because Kosmos aims higher its programs seem less fun and immediately rewarding than the others, but it does give you the capability to create your own lessons

and is a massive improvement on learning a language from a book.

The Linkword programs will probably be the lazy tourist's best bet for learning a few words and phrases painlessly. All the versions on the different machines — even the programs for the IBM PC and Junior, Sirius, Apricot, Apple II and Macintosh which ACT is developing are essentially similar.

Imagine going green

Mike Gruneberg, the University of Wales academic who developed the system, supplied each software house with the vocabulary and link word examples for the four languages developed so far. He is now working on Cantonese, Dutch, Greek, Hebrew, Japanese, Portuguese, Russian and Swedish. You will get very confused if you try learning too many of them.

As it says at one point in Silversoft's German Linkword for the 48K Spectrum "Imagine going GREEN after looking at the GRUNEberg Linkword system for too long".

NEXT STOP ROME

You'll never believe the new wonder ingredient that's supposed to teach you foreign languages in a fraction of the time a phrase book takes.

It's a monkey with a monocle and a micro.

Meirion Jones looks at the new techniques home computers are using to make languages fun, while Mike McCann tries to learn Italian in 10 hours.

Mike Gruneberg does not claim that Linkword will be right for everybody, "it's not the only way" he says "but it is a different way".

His imagination seems to be a strange place infested by salmon leaping over bullfighters, bakers being chased by bees, witty lobsters and of course monkeys, at least to judge by his Linkwords.

The Japanese word for knickers is pronounced "hands upon", or so I am told. I dread to think what Mike Gruneberg will use as a Linkword for that.

There is considerable variation in the prices the companies are charging. For the programs which most of them are supplying with an audio cassette and a leaflet. In each case all the software house had to do was write a relatively simple program for a particular machine.

Considering they look almost identical on screen it is hard to understand why Acornsoft charges £15 to Electron and BBC owners while Spectrum users need only pay £10 to Silversoft.

THIS YEAR five million Britons will leave these shores to experience the delights of another country, another culture and, more often than not, another language. Doubtless they will return with tales of sun, sea, sand, Italian waiters, German beer-festivals, Spanish hotels and French lorry drivers. But the language, what about the language?

We British do not particularly like learning other languages. We tend to stick to the colonial belief that our mother-tongue should be spoken — or at least understood — by anyone who should have the good fortune to be addressed by the legendary "Englishman abroad". Last century we conquered an Empire to prove the point. Churchill's "History of the English Speaking Peoples" did not help matters, and now the Common Market has only confirmed our linguistic prejudices.

The result is that many of the five million intrepid explorers will have only a few phrases of the language in question, and these will probably have been acquired from an out of date phrase book during the quieter moments of the channel crossing.

But it is possible to learn the bare essentials of a language — 400 useful words and enough grammar to put them into simple sentences — and learn them quickly. That, at least, is the claim made by Tansoft of Cambridge. In fact, Tansoft claims that the computer-based course can teach the basics in ten hours, as opposed to 40 hours using more familiar methods.

For £13 you get two tapes and a small manual-cum-glossary. One tape contains 10 computer programs, each containing one section of the course, while the other is an audio tape to teach you the pronunciation.

An ugly brute

The Gruneberg Linkword Language Course (well, the name makes a welcome change from "Ultima Zone" or "House of Death") was designed by a professional psychologist, Dr. Michael Gruneberg, of University College Swansea, and uses an unusual but effective method to jog the memory and make learning fun. Dr. Gruneberg is in fact something of an authority on memory, having published numerous papers on the subject since 1967. Now he has teamed up with a fellow academic from the relevant language department in Swansea and computerised the lot.

The course works by giving you some strange instructions, such as:

"The Italian for Ugly is Brutto. Imagine looking at an ugly brute"

You then do precisely this for ten seconds and

Concentrate on the message below for 10 seconds then turn over the page.

THE SPANISH FOR MONKEY IS MONO

< MONO >

IMAGINE A MONKEY WEARING A MONOCLE

SPACE RETURN OR SPACE

then go on to the next word. After ten words the computer gives you a quick test: translate from Italian into English and English into Italian. You then sit back in your chair with pleasure and surprise as you realise that the system does work.

The course is divided into 10 sections, each one teaching you about forty words using this routine, interspersed with some easy-to-pick-up rules of grammar, and before you know it you are constructing your own sentences. Each section takes about an hour to master, including listening to and repeating the pronunciation on the audio tape, hence Tansoft's ten-hour claim. It is advisable, though, not to cram them together — one a day for two weeks is probably what the Doctor had in mind.

The Earth is black

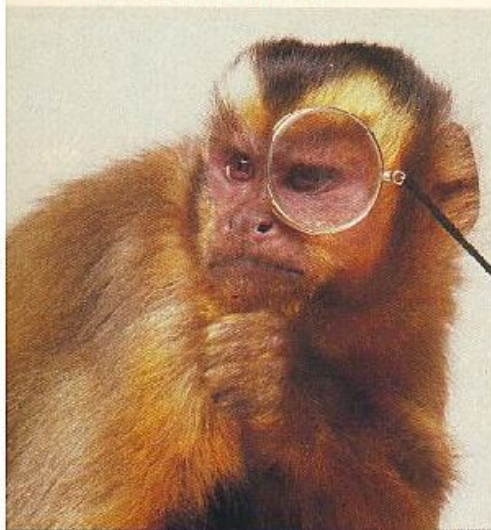
Some of the sentences you are asked to translate are mildly eccentric; "the Earth is always black", for example, while others are worse than the "postillion-struck by lightning" variety. How many times have you had the urge to say "The bonnet and the wheel are very hard, but why is the steering wheel not clear?" There are two reasons for this apparent shortcoming: to illustrate the rules of grammar and to avoid the parrot-fashion recital of stock words and phrases. Some of the more outlandish examples actually seem to stick in the mind because they are so ludicrous. At any rate you quickly progress to such useful bits of information as "In July, August and September the water is very dirty".

The Gruneberg system uses a neat catch-all visual image for words which sound the same in English as they do in another language. The Italian for piano is "pianoforte", so you are invited to imagine a pianoforte covered in spaghetti. The French equivalent is a piano at the top of the Eiffel Tower (le piano). German and Spanish rely on the National flag — imagine a mouse on the German flag (die maus).

Some of the links do confuse matters, though. It would surely have been easier to link

(continued on next page)

So now you know the Spanish for monkey using the Linkword principle.



(continued from previous page)

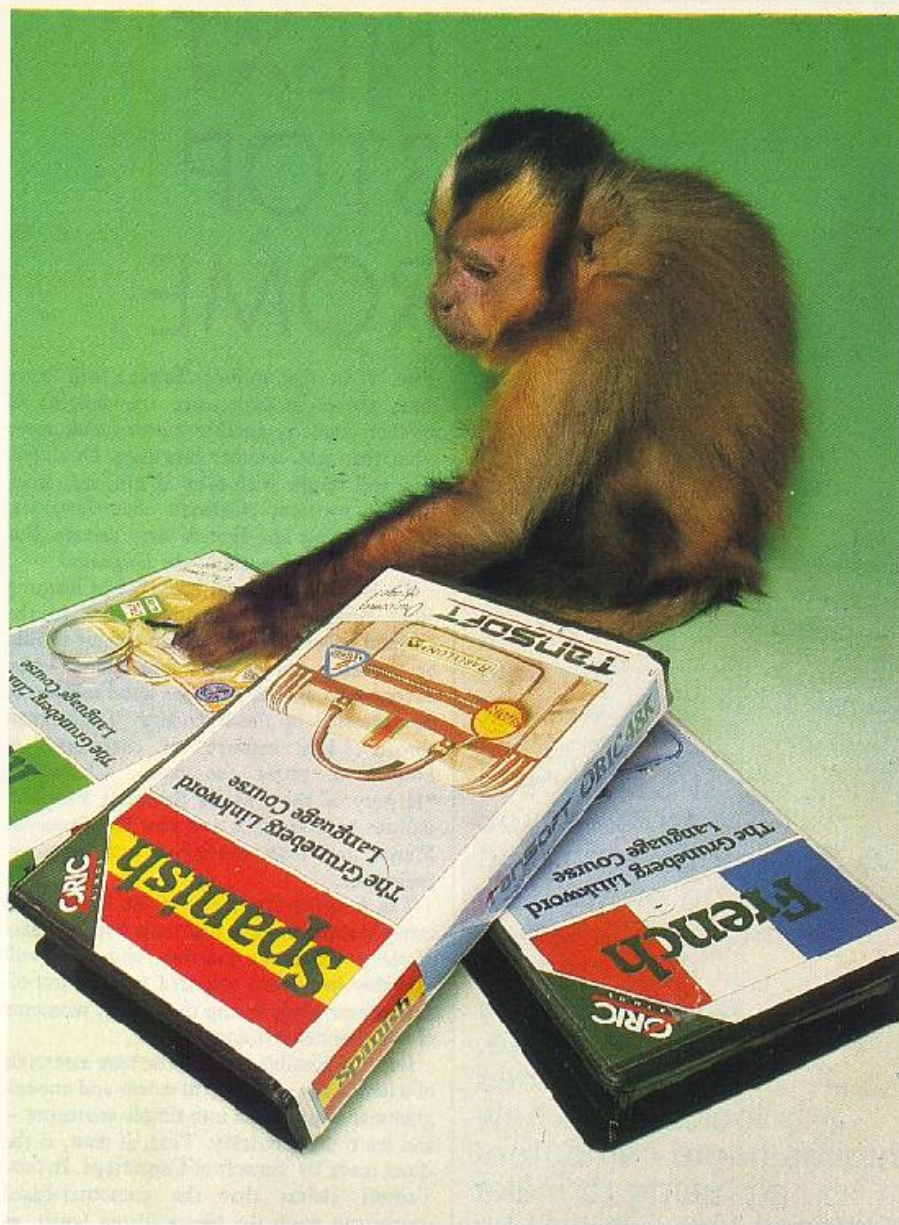
red and white with a well-known Italian drink, rosso and bianco, than to a "bank all painted white". And I remembered goud, bad and ugly by thinking of the film rather than the linkword.

One slightly disappointing aspect of Transoft's package is that it hardly uses the computer's graphic or sound capability. A brief flash of the Italian flag at the start of lesson 1 and then back to a simple 2-colour text display. Sound is similarly limited; just a single bleep or musical note as each question is answered. Gruneberg believes that graphics and sound could prove to be a distraction from the learning process, and points to academic research to support him.

Another surprise is that the computer performs each test in exactly the reverse order to the learning order. My immediate reaction was that the programmer was being lazy and didn't want to write a random-order test routine. After a while, however, I found myself remembering a difficult word because it came before or after a more familiar one. And for numbers or days of the week a set order is an obvious advantage. The keep-it-simple philosophy triumphs again.

Operating the program is easy — just a matter of pressing Return when you are ready to go on to the next page or the space bar if you want to have the recommended 10 seconds to concentrate on the suggested image. This makes the courses ideal for those who are not familiar with a keyboard. You can, however, type in your answers if you want to, though the machine will treat these in the same way as before. It does not give you a chance to correct a wrong answer, for example.

The computer takes most of the tedium out of learning a language. In fact, it acts in more or less the same way as a school classmate does — testing and re-testing a list of words you have committed to memory. I wonder if Transoft is going to incorporate this feature into another program aimed at schoolteachers, which would enable them to write in a list of words — or even chemical formulae — and let the pupils test and assess themselves. I certainly found this package a quick way of learning — quicker than the printed page.



One obvious disadvantage of a computer-based learning system is especially apparent with language. Not many people will take their computers on holiday. Once separated from their Orics, anyone who has used this system has to rely on the glossary in the handbook, which only gives English-to-Italian translation of the 400 word vocabulary. It certainly cannot be used as a tourist phrasebook or dictionary, nor even as a guide to the structure of the course. This seems to be penny-pinching: anyone who uses the system will have to buy a phrasebook if they really want to be self-sufficient abroad, and I would have expected University academics to realise this.

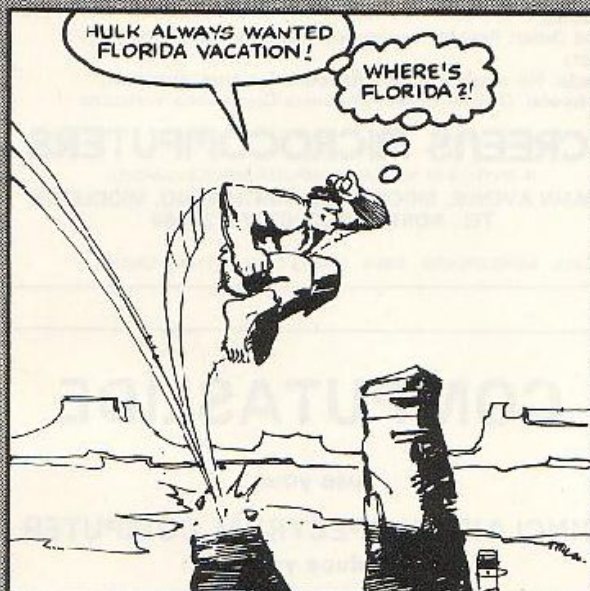
Main use is for tourists

For the most part the courses have been designed to teach you words you will actually need to use abroad, whether you are sunning yourself on the beach, ordering a meal in a restaurant or fuming in a broken-down car. The one exception to this is the section dedicated to the business man. The business vocabulary — words like shop assistant, price, secretary and holidays — is probably more use for small talk and the expense

account rather than the boardroom.

The audio tape is probably the most important part of the package. There is a world of difference between the spoken and the written word. The Gruneberg system tells you not to listen to the pronunciation until you are satisfied with your grasp of the computer-written word. This strikes me as being unadventurous. Most cassette players have remote control; it would have been a nice idea to use the computer to trigger the audio tape (with the playback socket disconnected, of course), and so learn on a real audio-visual system. A refinement for the future, perhaps.

The Gruneberg Linkword System is surprisingly efficient at cramming in short facts in rapid succession. But it should not be taken too seriously: it is certainly not up to 'O' level standard, though it might conceivably replace the first few chapters of a school textbook. Its main use will be for tourists who want to learn the bare essentials of a language — just enough to get by for a week or two on the Costa del Sol. It's certainly enough to make me want to convert my assets into French Francs and parler with these lorry drivers!



NEWS FLASH! MARVEL SUPER HEROES ORDERS TO U.K. IN SEARCH OF COMPUTER ADVENTURERS. E.T.A. MAY 1st ADVENTURE INTERNATIONAL

CAMEL PRODUCTS

Firm up your S/ware with an EPROM PROGRAMMER

AT LAST! for the Spectrum user. Put your programs, utilities, Assemblers into EPROMs for instant load from the unique ROM-SP.

ROM-SP for Spectrum
Ingenious unit for Spectrum, with 2x28 pin sockets and a Reset button allows up to 16K of Basic or M/C program to RUN or LOAD instantly from EPROMs. Cabled connector and full extender card.
NOTE: Does not disable Sinclair ROM. £29.95

PROMER-SP NEW for Spectrum
A brand new Spectrum programmer for 2764/128. Zero insertion force socket & software on tape. £29.95

PROMER-81S NEW for Spectrum
The very popular PROMER-81 for the ZX81 has been adapted to the Spectrum, and the price kept low. £22.95

ROM-81 for ZX81
Provides two 24 pin sockets for up to 8K of EPROM memory in the 8-16K area. Can use 2516/32 or 2716/32 £14.95

PROMER-81 for ZX81
At last! A low cost reliable programmer for 2516/32, 2716/32 EPROMs. This is the solution to using EPROMs instead of tape. Requires 4xPP3 batteries for a regulated 25 volts. Remarkably priced at £15.95

BLOPROM-81

A uniquely sophisticated EPROM PROGRAMMER

In use at various labs incl. Sinclair Research

Eprom programmer for the 2516, 27XX single supply families, yes, even the 27128 from Intel. Check, Read, Program - Verify all or part of Eprom.

So immensely user friendly you'll hardly need the manual. Designed for the beginner but includes a single key entry route for the professional. Supplied as firmware, the m/c driver routine alone is worth more than the price of BLOPROM-81. No personality

Cards, or other additions, just a ZX81. Several inbuilt safety features. On-board Vpp generator. 28pin ZIF socket. Cabled connector and extender plug. ABS case.

Note: Can provide up to 36 inputs or 40 outputs as an I/O £79.95

Dream-81
Full 64K Rampack with link options to disable 6-8-16K. Plus a 28 pin EPROM socket for 2716, 2732/2764 and even the latest 27-28 from Intel. Fast/slow Eprom option, professionally built and tested. In an ABS case with an LED indicator £59.95

DHOB1
Compact. Mains powered. Save. Fully cased. Up to 3 EPROMS £18.95

DHOB2
With automatic timer £22.95

MEMIC-81
A 4K CMOS RAM and lithium battery unit. Easy SAVING, 10yr storage and instant retrieval of programs. Resides in 8-12K or 12-16K of ZX81. £29.95

CRAMIC-81
Ingenious hardware/software allows this 16K CMOS RAM with lithium battery to co-exist in same memory area as ordinary RAM. ZX81 can multitask on two completely independent programs. £79.95

PRINTER/MONITOR ACCESSORIES

MSD Monitor Stand for BBC micro. Fits over the Beeb 17" x 12" x 3.75" P&P £3.50 £19.95
PSS Standard printer stands for OKI, Epson etc. 15" x 12" x 4.5". P+P £3.50 £16.95
PSL Large model 17" x 14.5" x 3.75" P&P £5.50 £19.95



PSC-3 for Epson MX-100 etc. etc. 21" x 14" x 3.75" P&P £3.50 £22.95

CUSTOM PRINTER STANDS for larger printers P.O.A.

POT Printer Output Tray for 11" fanfold paper P&P £3.50 £16.95



UK. VAT extra. No VAT on exports P+P UK. Free Europe +5% — Overseas +10% T.L.X. 81574

Cambridge Microelectronics Ltd. One Milton Rd. Cambridge CB4 1UY Tel: (0223) 314114

'THE' MIDDLESEX COMPUTER CENTRE AT SCREENS MICROCOMPUTERS

COMPUTERS APPLE, ACORN, BBC, COMMODORE, DRAGON, GENIE, MEMOTECH, ORIC, SPECTRUM AND OTHERS

PRINTERS BY SEIKOSHA, EPSON, JUKI, STAR, ORIC, BROTHUR, SINCLAIR, COMMODORE, BIT, RICOH, QJME, DIABLO, NEC, UCHIDA etc

DISK DRIVES BY COMMODORE, BBC, TORCH, CUMANA, TEAC, DRAGON, MITSUBISHI, HITACHI, APPLE etc

MONITORS BY NOVEX, FIDELITY, COMMODORE, NORMANDE, MICROVITEC AND OTHERS

DATA CASSETTES BY SHARP, BBC, OMEGA, FERGUSON, BUSH, PHILIPS AND OTHERS

PLUS HAM Packs, Diskettes, Cassettes, Discs, Covers, Light Pens, Joysticks, Books, Furniture, Cleaning Kits, Monitor Base Leads, Paper and everything for the computer owner.

NOW AVAILABLE!

New Commodore SX64 Portable Computer
New Memotech MTX/500
MTX/512 Computers
New Dragon 64K Computer

Personal Shoppers: Open 6 days per week. Easy parking outside.

Mail Order: Reliable worldwide fast service. Check P&F costs.

Trade: No minimum order. Account facilities available.

Schools: Official Orders/Enquiries/Quotations welcome

SCREENS MICROCOMPUTERS

(A DIVISION OF MAYFAIR COMPUTER SERVICES LIMITED)

6 MAIN AVENUE, MCOR PARK, NORTHWOOD, MIDDLESEX
TEL: NORTHWOOD (09274) 20664

ACCESS: BARCLAYCARD, AMEX, DINERS CLUB, INSTANT CREDIT

COMPUTASLIDE

use your

SINCLAIR ZX SPECTRUM COMPUTER

to produce your own

PROFESSIONAL QUALITY TECHNICAL, BUSINESS or PERSONAL COLOUR SLIDES

COMPUTASLIDE is a suite of computer programmes which allow TITLES, LISTS, TEXT VERTICAL & HORIZONTAL BARCHARTS and GRAPHS to be drawn quickly and easily onto the TV screen for photographing to make technical colour slides. They are user-friendly programmes which have automatic scaling and formatting to simplify their use. Full advantage is taken of the amazing graphics and colour capabilities of the SPECTRUM computer. Quick colour changing enables you to produce dramatic and effective slides.

On 3 cassettes, 2 programmes per cassette, complete with BOOKLET containing operating and photographing instructions.

Cassette 1 TITLES & LISTINGS

2 Horizontal & Vertical BARCHARTS

3 GRAPHS from points or equations

£12 per cassette. £30 for the full set.

Send cheque with order to:

Orange Enterprizes (Dept. YC)

20 Badby Road, Daventry, Northants.

ADVERTISERS ANNOUNCEMENT

A YEAR IN THE LIFE A SOFTWARE COMPANY

WIDGIT SOFTWARE, one of the first software houses to write for very young children, looks back on its progress in the first year and assesses its future.

From a small start a year ago, WIDGIT Software is now to be found in almost every High Street and has achieved a high reputation for quality and interesting software for children. During the year they have produced seven titles and another four will be ready in the spring. One of Widge's titles, QUICK THINKING, was chosen by the Mirror Group Newspaper's software company MIRRORSOFT, for its launch in November 1983, and the Commodore 64 version reached number 7 in the Websters charts — an unusual feat for an educational tape.

LEARNING THROUGH PLAY

One of Widge's main concerns is to write good quality entertaining material which gives good value for money without sacrificing standards. All the programs are essentially games, but each has clear educational aims and a sound basis. The idea is that children learn much better through play. The 'on screen' images and the quality of the graphics must be appealing, full of colour and, where appropriate, animated. High quality use of graphics must be appealing, full of colour and, where appropriate, animated. High quality use of graphics has become a feature of Widge products and they firmly believe that educational material just the same quality of display as other programs. As far as programming is concerned, Tina says:

"We use a mixture of machine code and basic machine code for the graphics and basic to get a good degree of flexibility. We want to allow for a variety of levels of play and can maintain the interest of a child as his or her skills develop."

HOW IT ALL STARTED

Kate and Simon Detheridge's enthusiasm for computers was the initial driving force behind Widge Software. At the ages of 2 and 3 they were ready and keen to use computers, but there was no commercial software available. Their parents Mike and Tina had done quite a good deal of programming on business machines, but when the SPECTRUM arrived with its low price and super graphics capabilities, they saw a market potential and immediately set about writing material. With a generation gap growing around computers Mike and Tina were anxious to write material which young children and their parents would use together. They hoped to persuade parents to use computers, and that once they had had 'tastes on' experience the computer would take its rightful place as a standard domestic utility item.

Using their experience as teachers, parents and programmers they designed their first set of four tapes for pre-school and infant children. When these were produced in May 1983, Mike and Tina had little idea how the business would develop. They were confident that the market was there and that their programs had the quality to be a commercial success. This confidence was fortuitously shared by W.H. Smiths who promptly put Widge Software on its shelves where it has been selling very successfully ever since.



"Simon and Kate testing out some of the programs."

By the middle of August a new tape PATHFINDER was ready for release, and with several ideas in the pipeline, Mike and Tina decided it was time for expansion. Lucas Fowler joined them as a programmer, Vivienne Halling as an educational adviser, and at the same time they were approached by Mirrorsoft. The tape that the team were working on at the time was QUICK THINKING and was published by Mirrorsoft in November.

By Christmas the whole Widge range was available in Boots, and with an export market starting to take off, Widge was on a firm footing to enter 1984.

NOW AND ONWARDS

One of Widge's best liaisons has been with Gordon Askew. Gordon is Head of a primary school in Cheshire and has a great deal of very relevant educational experience. He has made important contributions to Widge including their most recent release HUMPTY-DUMPTY. Work is now in hand for four more releases, two of which are due for publication very soon. Some programs will be released through MIRRORSOFT and others under the WIDGIT label.

"We enjoy working with Mirrorsoft," says Mike, "apart from the commercial benefit a great deal is gained from the interchange of ideas which we get during the development."

Widge now feel that they have a broad base of experience and talents to stay in the forefront of educational software.

THE PROGRAMS

COUNTING, ADDING & SUBTRACTING and QUICK THINKING are tapes which develop the concept of number from a very early beginning. Care was taken to ensure that the very first program on COUNTING could operate from the very simplest level and the 3 next programs on the tape develop from this. ADDING & SUBTRACTING makes sure the process of counting can effectively lead into simple sums. There are 3 programs on this tape, which with its smooth scrolling and good, clear graphics has been uniformly well received by the press and schools.

"Outstanding programs for Infant school!" (Ed. Computing)

"My favourite education tape" (ZX Computing)

QUICK THINKING takes arithmetic a stage further; it is now necessary to do the sums mentally. The levels are carefully graded from adding single digit numbers to fast time trials which stretch adults! The other program on the tape introduces multiplication tables and number sequencing in a magnificent robot machine.

SHAPE SORTER is a tape to develop visual perception and its simple 2 key operation makes it suitable as a first tape for children from about 2. The first program is simple shape recognition and the second, HOUSES, which can be used as the child gets slightly older is a 'spot the difference' game. On the second level this can be quite hard but there is a lovely reward. The third program is on size sorting. "they are superb early learning programs" (ED. Computing)

ALPHABET is a program for children as soon as they can learn to recognise letters on the keyboard. Clear, full-screen pictures illustrate each letter and there is an option to relate lower to upper case letters. It is a nice program for parent and child to start using computers together.


PATHFINDER (for ages 4 to 9) is a series of 4 graded maze games featuring animals. All the mazes are randomly generated and no two are ever the same. They deal with important basic concepts — up, down, left and right, and begin to develop the ability to plan in advance. KANGAROO, the second program leads the player in the direction of simple programming. The graphics are bold and brightly coloured and there is a nice, but not excessive use of sound. Again the reviews of this tape have been very good:

"These games should prove very entertaining to play as well as providing a very real challenge" (Crash Magazine)

"Well done Widge. A very real application for a home computer, cleverly executed and which does not cost the earth" (Home Computing Weekly)

The HUMPTY-DUMPTY MYSTERY and WHO KILLED COCK ROBIN are two programs on the latest tape from Widge only recently released, and is suitable from early readers to about 10 year olds. This tape contains 3 programs designed to develop logical thinking and memory. There are 2 games to discover which of the King's 12 men pushed Humpty off the wall, in the first by asking questions and/or guessing and in the second, the player gets a glimpse of the culprit but then has to remember and describe him. Cock Robin asks the daunting question "Can Sparrow's confession be believed?" and through a process of logic and using the clues provided the player must discover WHO killed Cock Robin, WHERE and WHEN. These are very appealing games and are certainly not exhausted after one or two playings. They lead to a lot of discussion when played by a group of children and appeal to quite a wide age range.

COUNTING	16K Spectrum	5.25
ADDING & SUBTRACTING	16K Spectrum	5.25
QUICK THINKING	40K Spectrum Commodore 64 BBC B and Electron	6.95
SHAPE SORTER	16K Spectrum	5.25
ALPHABET	48K Spectrum	5.25
PATHFINDER	16K Spectrum	5.95
HUMPTY-DUMPTY	48K Spectrum	6.25

WIDGIT SOFTWARE is available through  and W.H. Smith and many other retail stores.

In case of difficulty contact
WIDGIT SOFTWARE Ltd.
48 Durham Road, London N2 9DT

Widge software is a member of the Guild of Software Houses.

LOOK SHARP for 'LOOK SHARP'
Widge's next title from Mirrorsoft

ELEV 90
AZIMUTH 90

CONVOY

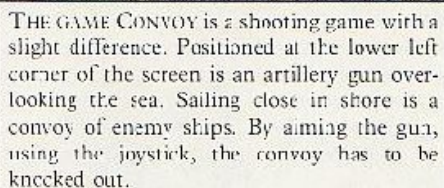
Loose lips sinks ships. So can Vince Cockett's Dragon.

```

10 CLEAR1000
20 POKE65495,0
30 PCLEARB
40 GOSUB1020
50 GOSUB420
60 PI=57.2957805:JA=10:JB=10:HA=1
70 IFG=1 THEN150
80 JA=JA+(JOYSTK(1)=0)-(JOYSTK(1)=63)
90 IFJA<0 THENJA=0
100 IFJA>90 THENJA=90
110 MA=SIN((JA)/PI):MD=COS((JA)/PI)
120 JB=JB+((JOYSTK(0)=0)*2)-((JOYSTK(0)=63)*2)
130 IFJB<0 THENJB=0
140 IFJB>90 THENJB=90
150 LINE(2,16)-(JA+2,20),PSET,BF
160 LINE(93,16)-(JA+3,20),PRESET,BF
170 LINE(2,28)-(JB+2,32),PSET,BF
180 LINE(93,28)-(JB+3,32),PRESET,BF
190 MX=SIN((JB)/PI):MY=COS((JB)/PI)
200 R=INT(100*(MA*MD))
210 SX=10+(5*(R*MX)):SY=200-(4*(R*MY))
220 IF G=0 THEN IF PEEK(65280)=254 OR PEEK(65260)=126
    THENPLAY"01T255V20AV25AV30T20AV<T<AV<T<AV<A":ST=INT(R/
    8):G=1
230 IFG=1 THENCH=CH+1:IFCH=ST THENGOSUB330:G=0:CH=0
240 IFSC=6 THEN NS=NS+1:SC=0:FORT=1 TO 4:PCOPYT+4 TO T
    :NEXT:GOSUB950:HA=0:GOTO60
250 IFHA=0 THEN70

```

(listing continued opposite)



target is, the longer the shell will take to reach it thereby allowing the ship to sail away from the original target area.

are drawn across the picture, using the alternate colour to the one already chosen to clear the screen, every second line position: down the screen an extra pale blue/grey background can be provided.

Note also that because two modes have been used to build the picture, two different resolutions of drawing can be achieved. This has been used to create the textured clouds in the game.

```

260  FORT=1 TO 6:TA(T,1)=TA(T,1)+2:TA(T,2)=TA(T,2)+RND(
3)-2
270  IFTA(T,1)>235 ANDTA(T,3)=0THEN1260
280  IFTA(T,2)<48 THENTA(T,2)=48
290  IFTA(T,2)>150 THENTA(T,2)=150
300  GDSUB100C
310  NEXTT
320  AONT070
330  IF$V<49 THEN400 ELSEPLAY"T20V3004V30CV20CV10CV5C":
    FORT=1 TO 4:GET(SX,SY)-(SX+7,SY+7),EL,B:PJT(SX,SY)-(S
X+7,SY+7),SP,PSET:FORDE=1 TO 50:NEXTDE:PUT(SX,SY)-(SX+
7,SY+7),BL,PSET:NEXTJ
340  FORT=1 TO 6
350  IFTA(T,3)=1 THEN370
360  Q=SX-TA(T,1)+4:IFQ<16 ANDQ=>0 THEN380
370  NEXTT:RETURN
380  Q=SY-TA(T,2):IFQ<4 ANDQ=>0 THEN390 ELSE370
390  IFT=7 THENRETURN ELSE TA(T,3)-1:SC=SC+1:PUT(SX,SY)
-(SX+7,SY+7),BL,PSET:PUT(TA(T,1),TA(T,2))-(TA(T,1)+17,
TA(T,2)+11),SL,PSET:RETURN
400  FORT=1 TO 4:DRAW"BM110,44C1NR4U4R4D4BR4NU4R4NU4BR4
U4L2R4BD4BR4NR4U4R4D4BR4U4NR4D2NR4D2BR12;R4L2L4U2R4BD
4BR4NU4BR4U4NR4D4R4U2NL2D2BR4U4D2R4U2D4BR6J4L2R4":PLAY
T255D4ABCDEF605ABCDEF6":PUT(110,38)-(2:0,44),A,PSET:N
EXT:RETURN
410  RETURN
420  FMODE3:PCL57
430  DATA129,131,135,138,131,130,143,132,143,133,143,14
3,138,143,129,131,133,138,143,138
440  DATA133,143,143,138,143,138,143,129,141,133,138,14
3,138,143,133,143,133,139,141,137
450  DATA133,143,143,138,143,138,143,133,134,133,138,14
3,138,143,133,143,133,143,138,143
460  DATA132,140,143,130,140,136,143,133,143,133,143,13
4,135,143,132,140,133,143,138,143
470  DATA174,170,174,234,184,126,176,59,224,7,0,0,128,3
,192,6
480  DATA36,36,36,36,60,153,129,231
490  DATA63,255,252,63,251,248,63,249,241,63,250,227,63
,253,69,63,253,142,63,254,29,63,230,43
500  DATA63,226,55,63,192,115,63,208,235,63,129,221,63,
131,173,63,135,70,63,174,146,63,221,56
510  DATA63,187,121,63,119,57,63,239,51,62,223,47,61,19
1,135,54,127,207,29,255,255
520  FORT=2 TO 9:READA,B:POKE1537+(T*32),A:POKE1538+(T
32),B:NEXT

```

```

530 DIMB(20),SL(20),BL(2),TA(6,3),A(36),SP(2)
540 GET(4,0)-(21,11),EO,6
550 GE1(4,20)-(21,31),SL,6
560 FORT=0 TO 7:READA:POKE1536+(T*32),A: NEXT
570 GET(0,0)-(7,7),SP,6
580 PCLS6
590 CCLR7
600 FORT=0 TO 48 STEP2
A10 LINE(0,T)-(255,T),PSET
620 NEXT
630 FORT=0 TO 31:POKE1536+(48*32+T,RND(128)+127:NEXT
640 A$="U2RU2RURUR2DR2D2RD2
650 B$="D2R2D2DRDR2JR2U2R2U2
660 DRAW"BM90,20;C5":EOSUB630
670 DRAW"BM160,30":GCSUB6B0:GOTO690
680 DRAWA$+A$+A$+A$+"EM-4,+6;"A$+"BM-36,-3;"B$-B$+B$
+B$:RETURN
690 PAINT(96,20),B,5:FAINT(102,20),B,5:PAINT(124,20),B
,5
700 PAINT(166,30),B,5:PAINT(172,30),B,5:PAINT(194,30),
B,5
710 Y=150
720 DRAW"BM0,150;C5"
730 LINE-(X,Y),PSET
740 X=X+2:Y=Y-RND(6)+4
750 IFY<194 THEN730
760 PAINT(5,190),B,5
770 PMODE4
780 FORT=2 TO 8 STEP2
790 CIRCLE(230,15),T
800 NEXTT
810 GU=1536+(168*32)
820 FORT=0 TO (22*32) STEP32:READA,B,C:POKEBU+T,A:POKE
GU+T+1,B:POKEGU+T+2,C:NEXT
830 LINE(0,0)-(96,48),PSET,BF
840 LINE(0,0)-(96,48),PSET,B
850 LINE(2,2)-(94,46),PSET,B
860 LINE(0,0)-(255,192),PSET,B
870 DRAW"BM4,B;NR4U4R4D4BR21;U4NR4D2NR4D2R4BR4NU4R4BR4
U4NR4D2NR4D2R4BR6H2U2BR4D2G2BR23;R4U4L4D2R4D2BR4NR4U4R
4D4
880 DRAW"BM4,44;NR4U4R4D4BR11;U2NR4E2F2D2BR4NR4E4NL4BD
4BR4NU4BR4U4F2NDE2D4BR4NU4R4NU4BR6U4NL2R2BD4BR4U4D2R4U
2D4BR11;R4U4L4D2R4D2BR4NR4U4R4D4
890 GET(110,38)-(210,44),A,6
900 LINE(8,184)-(33,159),PSET
910 LINE(7,184)-(32,159),PSET
920 LINE(6,184)-(32,158),PSET
930 SCREEN1,1
940 FORT=1 TO 4:PCOPYT TO T+4:NEXTT
950 FORT=1 TO 6
960 EOSUB970:NEXT:RETURN

```

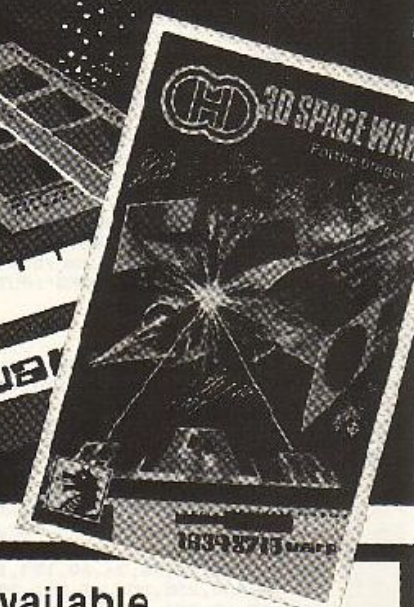
(listing continued on page 89)

**NOW
AVAILABLE FOR THE
DRAGON 32**

3D SPACE WARS

You have assumed complete control of your world's last fighter-killer class spacecraft. It is only you who can prevent the ultimate disaster... the destruction of your civilisation by the SEIDDAB, an unscrupulous race of murderers, intent on total control of your star system. Locate the enemy fleet on your Radar. Chase the SEIDDAB craft across space against a background of stars. Fire your laser bolts when you have them in your sight. Refuel and go on the offensive again. The game gets progressively harder. Fleet after fleet of SEIDDAB ships attack. Keyboard or joystick control. Fast machine code Hi-Res action.

£7.95



**ANOTHER GREAT
DRAGON PROGRAM
FROM HEWSON'S
DRAGONFLY II**



Hi-Res flight simulation.
Two runways, flap, speed,
bank and attitude control.
Heading, bearing,
instrument landing system etc.
Joystick or keyboard control.

£6.95

**Available
from all leading
software stockists.**

Mail order to: HEWSON CONSULTANTS
60A ST MARY'S STREET
WALLINGFORD OXON OX10 0EL



HEWSON CONSULTANTS

(listing continued from page 87)

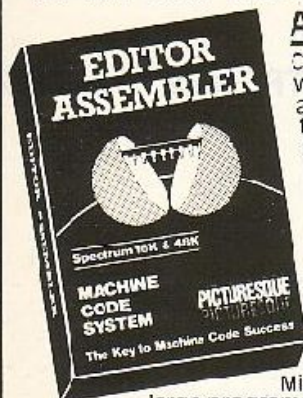
```
970 TA(T,1)=(RND(21)*2)-21
980 TA(T,3)=0
990 TA(T,2)=RND(100)+48:IFTA(T,2)<50 THEN990
1000 IFTA(T,1)>2 ANDTA(T,3)=0 THENPUT(TA(T,1),TA(T,2))
-(TA(T,1)+17,TA(T,2)+11),BO,PSET
1010 RETURN
1020 CLS3:FORT=32 TO 160 STEP32:PRINT@T,STRING$(32,207
);:NEXT
1030 PRINT@480,STRING$(31,233);
1040 PRINT@0,STRING$(32,233);
1050 FORT=32 TO 448 STEP32
1060 PRINT@T,CHR$(233);:PRINT@T+31,CHR$(233);:NEXT
1070 POKE1535,233
1080 P=1159
1090 FORT=0 TO 19:READA:POKEP+T,A+64:NEXT
1100 P=P+32:FORT=0 TO 19:READA:POKEP+T,A+64:NEXT
1110 P=P+32:FORT=0 TO 19:READA:POKEP+T,A+32:NEXT
1120 P=P+32:FORT=0 TO 19:READA:POKEP+T,A+32:NEXT
1130 A$=STRING$(30,42)+"YOUR ORDERS:-ARE TO SINK THE E
NEMY CONVDY SAILING CLOSE TO YOUR SHORES BY USING YOUR
GUN POSITIONED AT THE BOTTOM LEFT OF THE SCREEN. USE
THE RIGHT JOYSTICK TO CONTROL THE BEARING & AZIMUTH AN
D THE BUTTON TO FIRE"+STRING$(12,175)
1140 PRINT@303,"BY";:PRINT@362,"VINCE COCKETT";
1150 PRINT@456,"INSTRUCTIONS (Y/N)";
1160 I$=INKEY$:IFI$="" THEN1160
1170 IFI$="N" THEN1240
1180 IFI$<>"Y" THEN1160
1190 FORT=1 TOLEN(A$)
1200 SO=1+(PEEK(1502)AND11)
1210 PLAY"T10;V5;"+STR$(SO)
1220 PRINT@449,MID$(A$,T,30);
1230 NEXT
1240 PRINT@454," PLEASE WAIT A MOMENT ";
1250 RETURN
1260 PRINT@454,STRING$(24,175);
1270 IFSC+(NS*6)>3 THENPRINT@295,"WELL DONE GUNNER****
";:ELSEPRINT@295,"BACK TO THE TRENCHES";
1280 PRINT@359,"YOU SANK "SC+(NS*6)"SHIPS";
1290 FORD=1 TO 1000:NEXTD
1300 PRINT@455,"PRESS SPACE TO PLAY";
1310 IFINKEY$<>" " THEN1310
1320 FORT=1 TO 4:PCOPYT+4 TO T:NEXT
1330 SCREEN1,1
1340 GOSUB950
1350 HA=1:G=0:NS=0:SC=0:GOTO60
```


The Key to Spectrum Machine Code Success.

Picturesque's MACHINE CODE SYSTEM is used and recommended by professional software writers, yet the excellent documentation and the friendly, easy-to-use programs have been highly recommended for beginners.

You will only buy one Machine Code System, so buy the best, the one the professionals use.

NEW IMPROVED PROGRAMS — MICRODRIVE COMPATIBLE



ASSEMBLER

Completely self-contained with its own line editor, giving an easy-to-read 40 column tabulated listing. Auto line numbering, line renumbering and auto tabulation make this one of the fastest and easiest Assemblers to use. 5-character label names. Decimal, Hex or ASCII constants. SAVE/LOAD/VERIFY both the listing and Machine Code to cassette/MICRODRIVE/NETWORK. Assemble from cassette or Microdrive into memory for very large programs. Customise to most Centronics printer interfaces, or RS232 (with Interface 1) for 80 column printout. FAST ASSEMBLY — 1k 0" code in 7 seconds. Assembler Directives:— ORG, END, DEFB, DEFW, DEFM, EQU, DEFL. (Microdrive and Centronics facilities only operate with 48K machines.)

£8.50

INCL. VAT & P&P.



MONITOR

The ideal tool to help the beginner get started, yet it contains all the commands for the experienced programmer to run and de-bug machine code programs. Inspect and alter memory contents in Hex or ASCII. Breakpoints and full Register display. NOW WITH SINGLE STEPPING through RAM or ROM. Disassemble any part of memory, RAM or ROM. Dec-Hex-Dec number converter. Printer output to ZX printer or via RS232 (with Interface 1) or customise to most Centronics printer interfaces. General memory management commands include Hex dump, Insert, Delete, Fill and Move. Can reside in memory with the Assembler (48K machines only) to give a complete Machine Code programming system.

£7.50

INCL. VAT & P&P.

Programs supplied on cassette with option to save onto Microdrive (cartridge not supplied). Existing owners can obtain the new programs by returning the cassette only to Picturesque, along with a cheque/PO, for £1.50 per program (incl. VAT & P&P). New cassettes will be supplied by return of post.

Available from the "SPECTRUM" chain of stores, branches of John Menzies and all good computer shops, or by mail order by sending cheque/PO to:

PICTURESQUE, 6 Corkscrew Hill, West Wickham, Kent, BR4 9BB. Send SAE for details.

PICTURESQUE
PICTURESQUE
PICTURESQUE

NOW
3RD
GREAT
YEAR!

HIRE SPECTRUM and ZX81 PROGRAM TAPES

ADVENTURE GAMES

ARCADE and SIMULATION GAMES

BUSINESS and PRACTICAL PROGRAMS

UTILITIES

M/C COMPILERS

EDUCATIONAL

FROM OVER 50 TOP SUPPLIERS

ALL WITH PERMISSION!

YOUR FIRST TAPE FREE IF YOU JOIN NOW!

Formerly Sinclair Owners' Swap Library

FREE

ILLUSTRATED QUARTERLY MAGAZINE WITH

TIPS, NEWS, REVIEWS

DISCOUNT OFFERS PLUS

OUR TOP 60 TAPES CHART

BASED ON THOUSANDS OF SCORES!

JOIN OVER 3,000 DELIGHTED MEMBERS!

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

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

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

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

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

NOW READ THE FACTS

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

WHY SETTLE FOR LESS?

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

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

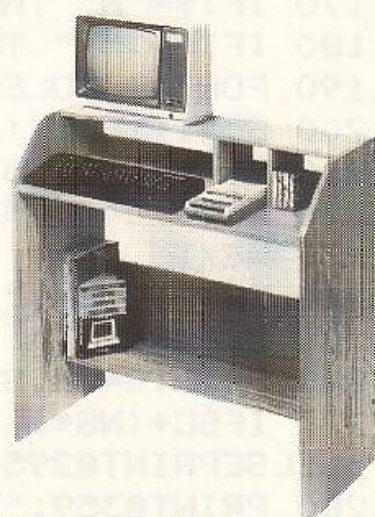
ADDRESS.....

Special offer from this issue: LIFE MEMBERSHIP £6

(normally £5.50). Overseas (Europe only) £10, or join a local branch: Scandinavia: Peder Lykkesvej 33, 2300 Copenhagen S. Benelux: Jacobsmidslaan 75, B-2400 MOL, Belgium. W.Germany: Postfach 7809, 4800 Bielefeld. S.Africa: PO Box 1709, Manzini, Swaziland. Eire: 122 South Circular Rd., Dublin 8. YC

A BUREAU FOR YOUR COMPUTER

ONLY £29.95 - £6 P&P



- * Easy to assemble
- * Robustly built
- * Rich teak finish
- * Adjustable divider positions
- * Big storage shelf for manuals & libraries
- * Approx size: width 37" height 36" depth 13"

PLEASE ALLOW 21 DAYS FOR DELIVERY POST THIS COUPON TODAY!

Please send me a Computer Bureau I enclose a cheque/postal order for £35.95 (incl. P&P).

Name

Address

Post Code

Send to: Stuart Tables, Unit-1, Stechford Trading Estate, B'ham B338BX

Listing 1.

```

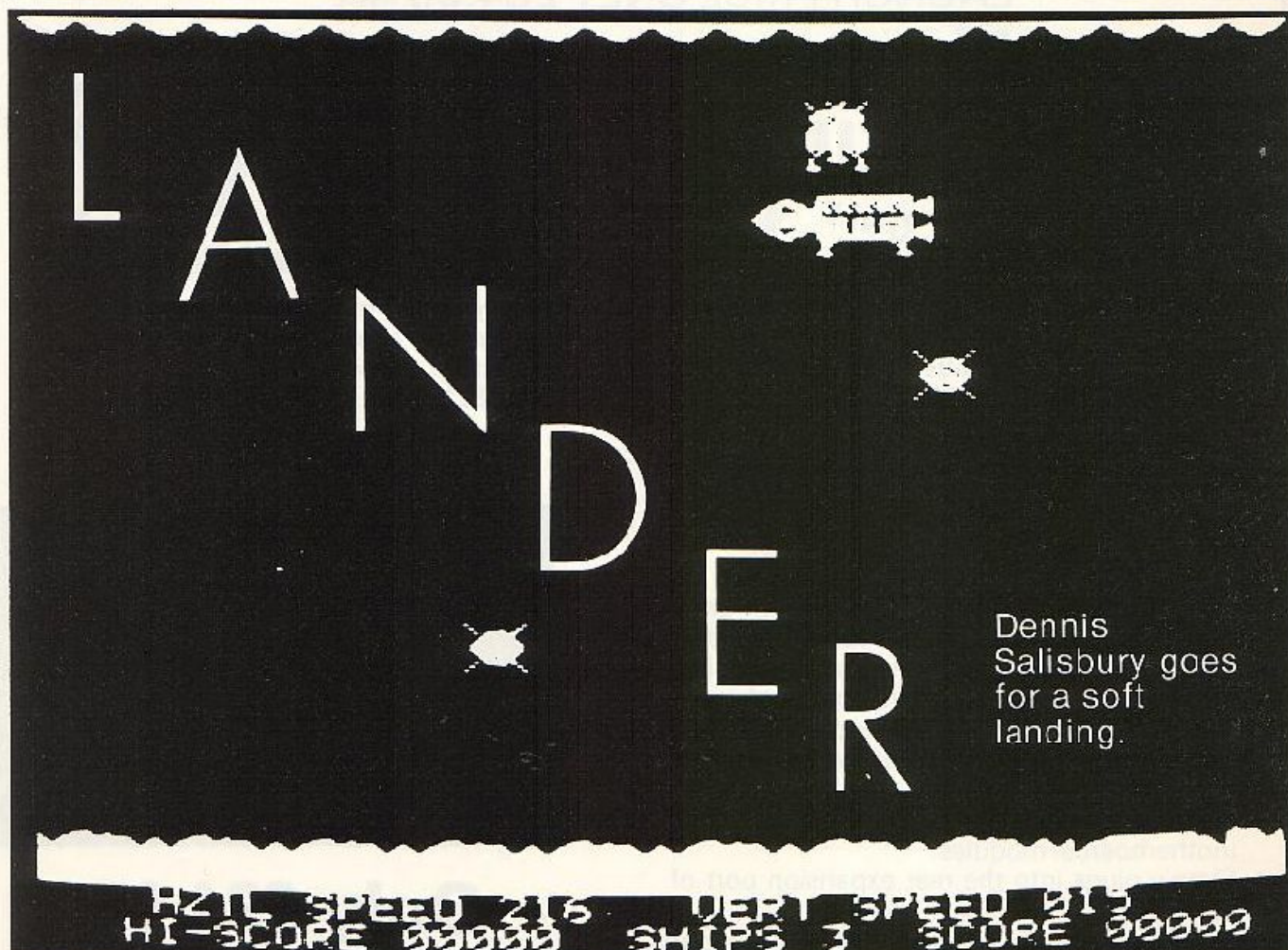
2 DOKE#9C,#9A0
5 GOSUB 1000
10 PRINTCHR$(6)
15 CLG:INK 7:PAPER 4:PRINT CHR$(17)
30 PLOT 5,1,10:PLOT 5,2,10
40 PLOT 11,1,"ORIC LANDER"
50 PLOT 11,2,"ORIC LANDER"
60 PLOT 11,3,""
70 PLOT 10,5,"By D.Salisbury"
75 PLOT 10,6,""
80 PLOT 3,10,"Controls :-"
90 PLOT 6,12,"Cursor Up - Thrust Up"
100 PLOT 6,14,"Cursor Down - Thrust Right"
110 PLOT 6,16,"Cursor Left - Thrust Left"
130 PLOT 6,18,"P - Pause On"
135 PLOT 6,20,"S - Pause Off"
140 PLOT 9,24,"Press any key to start"
150 PLOT 8,24,12
190 GET D$
200 INK0:PAPER7:HIRE5
205 INK7:PAPER0:PRINT CHR$(17)
207 CALL#1578
210 CALL#115D
211 POKE#8C,3:POKE#87,0
212 POKE2,2:POKE1,255
213 POKE7,50:POKE4,255
214 POKE11,250:POKE7,250
215 POKE#55,5:POKE#BFD1,53
220 CALL#12DB
230 RESTORE
240 FOR I=C TO 7
250 READ A

```

```

260 NEXT
265 X=0:Y=0
270 FOR I=1 TO 53
280 READ AS
290 CURSET 50+X,70+Y,0
300 CHAR AS,0,1
310 X=X+7
320 IF I=24 THEN X=-20:Y=50
330 NEXT I
335 DATA 0,63,0,0,0,0,0
340 DATA 80,82,69,83,83,32,73,32,70,79,82,32,73,78,83,
84,82
350 DATA 85,67,84,73,79,78,83,80,82,69,83,83,32,82,69,
84,85
360 DATA 82,78,32,70,79,82,32,65,78,79,84,72,69,82,32,
71,65,77,69
400 GET A$
410 IF ASC(A$)=/3 THEN IE:GOTO 15
420 IF ASC(A$)<>13 THEN 400
430 FOR I=0 TO 4
440 POKE#66+I,48
450 POKE#BFD4+I,4E
460 NEXT I
470 POKE#80,3
475 CALL#1978
480 CALL#1177
490 GOTO 211
900 END
1000 FOR I=0 TO 7
1010 READ X
1020 POKE 46840+I,X
1030 NEXT I
1050 RETURN

```



THIS GAME IS written for the 48K Oric-1 micro and involves trying to land your spaceship on the surface of a planet where there is only one small area flat enough to land on.

You start off on the back of the mothership from which you must take off without flying into the acid clouds at the top of the screen. Since gravity is continually pulling you towards the planet you will need to use your

thrusters to control your descent. Having taken off you must navigate your way past the mothership and avoid the satellites to reach the landing site which may be anywhere on the surface.

Your relative speeds are shown on the horizontal and vertical speed indicators. To land safely your vertical speed must be below about 25 and both feet of your spacecraft must

be on the flat area. If you land successfully you will be given a certain number of points depending on how fast you did it, and the next landing will be harder.

You are given five ships to start with and you will lose a ship if you hit the mothership or a satellite, fly into the acid clouds at the top of the screen or land in the wrong place. You

(continued on page 93)

PRODUCTS FOR THE VIC-20 + SPECTRUM

SPECTRUM OWNERS! NOW AVAILABLE

THE ULTIMATE IN JOYSTICK INTERFACES

THE FOX PROGRAMMABLE INTERFACE –
AN INTERFACE WITH:

- ★ Complete compatibility with all programs.
 - ★ In-built memory to store up to 16 different games keysets at one time.
 - ★ Battery back-up so no loss of memory after power off. (Battery recharged during use so no replacements are required).
 - ★ One switch only for simplicity of use.
 - ★ Full casing.
 - ★ Through port for further expansion.
 - ★ Proven compatibility with the microdrive
 - ★ Built-in pseudo Rom facility with room for personnel tool kit.
 - ★ Compatible with all Atari-type joysticks.
- The superior interface without awkward trailing leads, just plug in and start your game.

LAUNCH PRICE ONLY £34.95 INCL



FOX ELECTRONICS LTD.

SPECTRUM UPGRADES

ONLY **£21.00**

INCLUSIVE (Issue 2 machines only)



FOX ELECTRONICS LTD.

A high quality kit at a new low, low price which simply plugs into existing socket within your Spectrum, no soldering is required and step by step instructions are supplied. Takes your 16K to 48K in simple steps.

PROBABLY THE BEST KIT AVAILABLE AT DEFINITELY THE LOWEST PRICE

AND FOR THE VIC-20

Vixen RAM Cartridge
Switchable between 16K or 8K + 3K.

Gives you the option of full 16K RAM or 8K and 3K RAM in one package. When added to a standard VIC-20 gives 16384 bytes of extra memory in memory blocks 1 and 2 or 3092 bytes of extra memory into the 3K memory block AND 8192 bytes of extra memory switchable between memory blocks 1 and 3

- Fully compatible with available motherboards/modules.
- Simply plugs into the rear expansion port of computer.
- No re-addressing of existing BASIC programs needed.



Only **£34.95**



SEND NOW TO

**FOX
ELECTRONICS**

141 ABBEY ROAD, BASINGSTOKE, HANTS. TEL: 0256 20671

CALLERS
WELCOME

Please send me: –

Joystick interface ☐ Name.....
Spectrum upgrade ☐ Address.....
Vixen Ram ☐
Catalogue ☐

I enclose £.....

Listing 2.

```

20 PRINT "INPUT START ADDRESS IN HEX"
30 PRINT "(PRECEDED BY A HASH CHARACTER)"
40 INPUT S
50 PRINT "READ OR WRITE (R/W)"
60 INPUT A$
70 IF A$ = "R" THEN GOTO 135
80 FOR N=S TO #1A00
90 PRINT HEX$(N),
100 INPUT I
110 POKE N,I

```

```

120 NEXT
130 STOP
135 PRINT "PRESS ANY KEY"
140 FOR N = S TO #1A00 STEP 10
150 PRINT HEX$(N); " - ";
160 FOR B=0 TO 9
170 PRINT HEX$(PEEK(N+B)); " ";
175 X$=KEY$: IF X$ = " " THEN 175
177 X$=""
180 NEXT
190 PRINT
200 NEXT

```

(continued from page 91)

will also lose a ship if your vertical speed is too high when you land or if the mothership reaches the acid clouds before you land.

The controls are: cursor up — thrust up; cursor left — thrust left; cursor down — thrust right; p — pause on; s — pause off.

To enter the program, you must first type in the machine code by running the short program in listing 2. Should you wish to save the machine code on tape at any time you should type:

CSAVE "MC", A#1000, E#1A00
(RETURN)

and then type:

CLOAD "MC", A#1000, E#1A00
(RETURN)

when you wish to continue. When you have entered all the machine code type
NEW (RETURN)
and then enter the Basic program in listing 1.

You can run the program

Then type:

DOKE #9C, #1A00 (RETURN)
CSAVE "LANDER", AUTO (RETURN)

You should then be able to run the program. Should you ever need to press the reset button in the middle of a game, type:

POKE #87, 0 (RETURN)

immediately afterwards.

If you wish to make landings easier or harder then type:

POKE #168E, X (RETURN)

where X is a number from 0 to 255. A value of 255 will make landing almost impossible and 0 will make it very easy.

If you wish to change the number of ships then change line 215 to:

POKE #59, No. of ships : POKE
#BFD1, 48 + No. of ships

and type:

POKE #115E, No. of ships

the number of ships must be between 1 and 9.

Machine code dump.

```

#1000 - #40 #48 #5E #40 #61 #7F #7F #61 #73 #7F
#1004 - #7F #7F #7F #7F #7F #7F #7F #7F #7F
#1011 - #40 #40 #40 #40 #40 #40 #40 #40 #40
#1015 - #40 #40 #40 #40 #40 #40 #40 #40 #40
#1023 - #40 #7F #7F #7F #40 #7F #7F #7F #47
#1032 - #7C #7F #7F #7F #4F #7F #7F #7F #5F
#1033 - #51 #62 #62 #61 #7C #4F #7F #5E #5A
#1045 - #6C #40 #7E #5F #57 #7A #7F #7F #57
#1050 - #7F #7F #6A #55 #64 #49 #72 #5C #42 #50
#1054 - #47 #7B #44 #7F #7F #7F #4C #4C #5C #6B
#1064 - #6A #6A #70 #41 #7C #77 #5C #77 #5C #47
#1065 - #3D #6B #5A #5A #47 #4A #5A #5A #40 #5A
#1073 - #7F #5F #40 #7F #5E #7F #7F #7F #44 #53
#1082 - #52 #71 #7F #5F #5C #7F #5E #7F #47 #4C
#1083 - #7C #7F #5E #7F #5C #47 #5C #7F #7F #7F
#1095 - #70 #41 #4A #4A #40 #54 #4C #40 #40 #5A
#10A0 - #40 #5B #40 #40 #40 #42 #4C #50 #40 #40
#10A4 - #40 #47 #40 #7B #40 #40 #4C #40 #40 #49
#10B4 - #40 #40 #40 #40 #40 #40 #40 #40 #40 #10
#10B6 - #20 #48 #49 #2D #53 #43 #4F #52 #45 #20
#10C0 - #50 #30 #30 #30 #30 #30 #30 #30 #30 #49
#10C2 - #50 #53 #20 #35 #20 #20 #53 #4C #47 #52
#10C3 - #45 #20 #30 #30 #30 #30 #30 #30 #30 #18
#10E5 - #00 #00 #6 #6 #00 #31 #6 #00 #9 #13
#10F0 - #00 #4 #00 #0 #30 #9 #00 #A #10 #00
#10FA - #3A #12 #00 #00 #12 #00 #11 #9 #00 #2
#1104 - #20 #00 #A #26 #00 #32 #11 #00 #4 #C
#110E - #00 #10 #00 #00 #20 #3 #1 #20 #2 #10
#1118 - #34 #B #3B #7 #1C #E #2E #1D #36 #1B
#1122 - #3C #F #1B #6 #34 #3 #2 #10 #1 #20
#112C - #10 #7 #20 #20 #4B #5A #24 #4C #20 #53
#1136 - #50 #45 #45 #44 #20 #30 #3C #30 #20 #20
#1140 - #20 #36 #45 #52 #54 #20 #5C #50 #45 #45
#114A - #44 #20 #30 #30 #30 #20 #20 #20 #20 #20
#1154 - #7F #7F #7F #7F #7F #7F #7F #7F #7F #7F
#115E - #5 #55 #59 #49 #30 #42 #5 #95 #65 #4A
#1168 - #00 #FB #82 #00 #BD #BC #10 #90 #B8 #BF
#1172 - #EB #E0 #28 #00 #F5 #BD #5 #3 #85 #60
#117C - #A9 #00 #B5 #B7 #A0 #B #B5 #76 #B5 #7B
#1186 - #A9 #A0 #B5 #77 #A0 #B5 #B7 #A0 #77
#1190 - #B5 #70 #A9 #B5 #B7 #A0 #B5 #76 #B5 #72
#119A - #A5 #71 #B5 #73 #A2 #00 #A2 #4 #BD #00
#11A4 - #10 #91 #72 #EB #B8 #DC #F7 #A5 #72 #1B
#11AF - #A9 #7A #B5 #77 #A0 #7F #A7 #5F #F0 #14
#11B8 - #00 #E6 #A5 #70 #1B #6A #4 #B5 #70 #90
#11C2 - #2 #E6 #71 #A5 #70 #C9 #9F #30 #CB #A5
#11CC - #A0 #B5 #72 #A9 #B5 #B5 #73 #A2 #00 #A0
#11D0 - #5 #A0 #14 #10 #91 #72 #EB #B8 #DC #F7
#11D2 - #A5 #72 #1B #6A #72 #00 #5C #7F #7F #2 #5E
#11E4 - #73 #E0 #28 #00 #E6 #A5 #2 #B5 #72 #A9
#11F4 - #A4 #B5 #73 #A2 #00 #A2 #2 #BD #3C #10
#11FE - #91 #72 #EB #B8 #DC #F7 #A5 #72 #1B #6A
#1208 - #2B #B5 #72 #90 #2 #E6 #73 #E0 #20 #D0
#1212 - #6B #A9 #7F #B5 #72 #A9 #A5 #B5 #73 #A2
#121C - #00 #A0 #6 #BD #5C #10 #91 #72 #EB #B8
#1226 - #D0 #F7 #A5 #72 #1B #6A #28 #B5 #72 #90
#1230 - #2 #E6 #73 #E0 #A0 #D0 #E6 #A5 #23 #B5
#123A - #70 #A9 #A4 #B5 #71 #A5 #70 #B5 #71 #A9
#1244 - #A4 #B5 #73 #A2 #00 #A2 #2 #BD #3C #10
#124E - #A9 #B5 #B5 #A1 #A9 #0C #B5 #7E #A9 #2
#1258 - #B5 #2 #B5 #5 #A9 #1 #B5 #A4 #A5 #76
#1262 - #B5 #72 #A5 #77 #B5 #73 #A5 #7B #B5 #7A
#1264 - #B5 #7F #B5 #7F #A2 #0C #B5 #72 #BD #14
#1276 - #11 #1B #6A #A0 #91 #72 #91 #7A #E3 #B3
#1280 - #D0 #F7 #A5 #72 #1B #6A #28 #B5 #72 #90
#128A - #2 #E6 #73 #E0 #A0 #D0 #E6 #A5 #23 #B5
#1294 - #90 #2 #E6 #7B #E0 #1B #D0 #D6 #A9 #00
#129E - #B5 #7C #A2 #00 #BD #2C #11 #90 #91 #B7
#12A8 - #E8 #E0 #2B #D0 #F5 #A0 #00 #B5 #72 #A9
#12B2 - #A0 #B5 #73 #A2 #00 #A2 #00 #B5 #51 #11
#12B6 - #91 #72 #BD #55 #11 #C8 #9F #72 #C3 #C0
#12C2 - #20 #20 #F0 #B5 #72 #1B #6A #28 #B5 #72
#12D0 - #EB #B5 #E0 #B #D0 #E1 #B0 #63 #A5 #00
#12DA - #B5 #1 #20 #1D #A9 #00 #B5 #D0 #B5 #2
#12E4 - #C9 #00 #D0 #9 #20 #5C #14 #20 #7B #16
#12EE - #18 #90 #A #C9 #1 #D0 #6 #20 #B5 #14
#12F8 - #20 #70 #16 #E6 #40 #B5 #3 #E5 #4 #D0
#1302 - #1D #A9 #00 #B5 #3 #A5 #5 #C9 #00 #D0
#130C - #9 #20 #4D #15 #20 #7B #16 #1B #90 #A
#1316 - #C9 #1 #D0 #6 #20 #F #25 #20 #7B #16
#1320 - #E6 #3 #A5 #6 #C5 #7 #20 #23 #E6 #7C

```

```

#132A - #A5 #7C #C5 #B0 #E0 #F #A9 #00 #B5 #A
#1334 - #B5 #7C #E4 #E4 #E4 #20 #E2 #17 #20 #1D
#133E - #19 #20 #D9 #15 #A5 #7E #C9 #1 #D0 #3
#134B - #20 #78 #16 #E6 #A #A5 #B #C5 #9 #D0
#1352 - #7 #20 #7F #13 #A5 #0C #B5 #B #E6 #B
#135C - #A5 #7E #C9 #1 #D0 #3C #A5 #A #C5 #B
#1366 - #D0 #A9 #A0 #B5 #A #A5 #5 #C9 #00
#1370 - #D0 #9 #C6 #4 #D0 #2 #E6 #14 #16 #70
#137A - #47 #C5 #1 #D0 #D #C2 #1 #D0 #4 #A4
#1384 - #42 #B5 #5 #18 #90 #B #A9 #00 #B5 #5
#138E - #A9 #FF #B5 #1 #E4 #B #A5 #C9 #C9 #00
#139B - #F0 #3 #A4 #C8 #12 #B0 #63 #A5 #7E #C9
#13A2 - #1 #F0 #1 #A0 #A0 #B #12 #C9 #D0 #C0
#13AC - #7 #A0 #B #2 #C9 #B6 #D0 #F7 #A0 #B
#13B6 - #2 #C9 #B6 #20 #3C #A2 #E2 #A5 #F7 #20
#13C0 - #E6 #A #A5 #2 #C5 #00 #20 #C5 #C6 #7
#13CA - #D0 #2 #E6 #1 #44C #5A #14 #C9 #1 #D0
#13DA - #B5 #E4 #1 #D0 #A #A9 #5 #B5 #2 #A7
#13DE - #5A #14 #A9 #00 #B5 #2 #A9 #F7 #B5 #1
#13EB - #1B #90 #6F #D9 #E4 #D0 #30 #42 #E2 #A0
#13F2 - #FF #20 #6C #F4 #B5 #2 #C9 #A0 #D0 #E
#13FC - #E6 #1 #D0 #A #A9 #2 #B5 #2 #1B #90
#1406 - #C0 #C7 #1 #D0 #9 #C6 #1 #D0 #2 #E6
#1410 - #1 #1B #90 #B5 #A5 #1 #B5 #2 #A9 #FF
#141A - #B5 #1 #16 #90 #3F #C5 #9C #D0 #33 #A2
#1424 - #E2 #A0 #FF #D0 #C6 #A #A5 #5 #C9 #C0
#142E - #D0 #E6 #4 #D0 #A #A9 #2 #B5 #5
#143B - #1B #90 #1F #D9 #1 #D0 #9 #C6 #4 #D0
#1442 - #2 #E6 #A #1B #90 #12 #A9 #1 #B5 #5
#144C - #A9 #FF #B5 #A #1B #90 #7 #A2 #FF #A4
#1456 - #FF #20 #6C #F4 #B5 #2 #C5 #A5 #70 #B5 #72
#1460 - #A5 #71 #B5 #72 #C9 #1B #A5 #A5 #A0 #D0
#146A - #A2 #3 #B1 #72 #B5 #20 #C5 #20 #D0 #17
#1474 - #C6 #72 #A5 #72 #C9 #FF #D0 #2 #C5 #73
#147E - #1B #B1 #72 #B5 #1 #91 #72 #E5 #72 #C0
#148B - #2 #E6 #73 #B1 #72 #A #9 #A0 #29 #7F
#1492 - #91 #72 #C8 #D4 #C0 #B4 #C6 #55 #70 #E
#149C - #1B #A5 #72 #A9 #2B #B5 #72 #00 #2 #E6
#14A6 - #77 #1B #90 #B5 #C6 #A4 #D0 #1 #A9 #2
#14B0 - #B5 #A1 #C6 #70 #A5 #70 #C9 #FF #D0 #2
#14BA - #C6 #71 #B0 #A5 #70 #B5 #72 #A5 #71
#14C4 - #B5 #73 #A9 #15 #B5 #A5 #B0 #3 #A2 #A
#14CC - #1B #B1 #72 #A9 #70 #B5 #B1 #72 #A9
#14D8 - #1F #91 #72 #B5 #B1 #72 #A9 #70 #A0 #29
#14E2 - #91 #72 #B5 #C4 #D0 #E5 #C6 #55 #F0
#14EC - #E6 #1B #A5 #72 #A9 #2B #B5 #72 #A0 #2
#14F6 - #E6 #73 #1B #90 #C6 #E6 #A4 #B5 #64 #C9
#1500 - #7 #D0 #A #A9 #1 #B5 #A4 #E6 #70 #D0
#150A - #2 #E6 #71 #A5 #70 #B5 #A5 #70 #B5 #72 #A5
#1514 - #7 #B5 #73 #A5 #72 #B5 #B5 #2B #B5 #72
#151E - #B5 #2 #C5 #73 #B1 #72 #A9 #B1 #72 #A9
#152B - #A0 #C0 #91 #72 #A0 #29 #B1 #72 #A0 #1
#1532 - #A9 #72 #A0 #2A #B1 #72 #A0 #2 #91 #72
#153C - #A5 #72 #1B #A9 #2B #B5 #72 #90 #2 #E6
#1546 - #73 #C4 #D0 #A4 #60 #A0 #A9 #A0 #91 #72
#1550 - #C8 #91 #72 #C8 #91 #72 #B5 #A5 #70 #E9
#155A - #2B #B5 #70 #D0 #2 #C5 #7 #A5 #71 #C9
#1564 - #A0 #10 #A #A9 #00 #B5 #5 #B0 #63 #A5
#156E - #70 #B5 #72 #A5 #1 #B5 #73 #E6 #73 #E6
#1570 - #73 #A5 #72 #10 #B5 #B0 #B5 #72 #90 #2
#1582 - #E6 #73 #A2 #11 #A0 #B0 #B1 #72 #A0 #2B
#158C - #9 #72 #A0 #1 #B1 #72 #A0 #29 #91 #72
#1596 - #A0 #2 #B1 #72 #A0 #2A #91 #72 #3B #A5
#15A8 - #72 #E7 #2B #65 #72 #A2 #C6 #73 #C6
#15BA - #D0 #A4 #1B #A5 #10 #A9 #2B #B5 #70 #E9
#15C2 - #2 #E6 #73 #A2 #10 #A0 #1 #B1 #72 #B5
#15C4 - #2 #E6 #71 #A0 #2 #A5 #A5 #74 #B5 #72 #F5
#15C6 - #7F #B5 #73 #C6 #72 #A5 #72 #C9 #FF #D0
#15D0 - #2 #E6 #73 #A2 #10 #A0 #1 #B1 #72 #B5
#15D2 - #9 #72 #C8 #C8 #C8 #B #D0 #F5 #A5 #72
#15DC - #1B #A9 #2B #B5 #72 #90 #2 #E6 #73 #C4
#15E6 - #D0 #E5 #C6 #74 #A5 #74 #C9 #FF #D0 #2
#15F0 - #C6 #73 #A5 #74 #C9 #A0 #30 #9 #A5 #75
#15FA - #C9 #A0 #D0 #3 #20 #B0 #17 #A5 #7E #C9
#1604 - #A0 #D0 #3 #20 #C6 #16 #A0 #63 #A5 #7E
#160E - #C9 #A0 #D0 #3 #A5 #70 #B5 #72 #A5 #71
#1618 - #B5 #72 #C6 #72 #A5 #72 #C9 #FF #D0 #2
#1622 - #73 #A2 #10 #A0 #1 #B1 #72 #B5 #71
#162C - #72 #C8 #C8 #C8 #C8 #F5 #A5 #72 #1B
#1636 - #9 #2B #B5 #72 #70 #2 #E6 #73 #C4 #C0
#1640 - #E5 #C6 #70 #A5 #70 #C9 #FF #D0 #2 #E6
#164A - #A0 #B #2 #C9 #9C #D0 #A9 #1
#1654 - #B5 #7E #A9 #C8 #B5 #2 #A9 #2B #B5 #1
#165E - #A5 #71 #C8 #B5 #2B #B5 #72 #A5 #71 #B5

```

```

#166B - #73 #B0 #2 #C6 #73 #B1 #72 #C9 #A0 #F0
#1672 - #3 #20 #B5 #17 #A0 #63 #A5 #B7 #C9 #1E
#167C - #F0 #3 #B5 #B7 #A0 #3B #A9 #B0 #B5 #1
#1686 - #B5 #C8 #B8 #A9 #00 #E5 #4 #B5 #5D #20
#1690 - #F6 #1B #B5 #70 #B5 #72 #A5 #71 #B5 #73
#169A - #7F #56 #73 #1B #A5 #72 #A9 #B5 #B5
#16A4 - #72 #90 #2 #E6 #73 #A5 #72 #C5 #A0 #D0
#16A6 - #A4 #A5 #73 #C5 #B1 #D0 #E6 #A5 #1 #C9
#16D0 - #C6 #0 #7 #20 #C6 #17 #A4 #E4 #A4 #A4
#16C2 - #E6 #A0 #3F #2 #B5 #7E #A5 #7 #3B #E9
#16CC - #C2 #B5 #7 #B0 #2 #C6 #B0 #A9 #2 #B5
#16D6 - #C5 #B5 #2 #B8 #A5 #75 #E9 #A0 #B5 #A4
#16E0 - #20 #34 #1B #A9 #FF #3B #E5 #74 #B5 #A4
#16EA - #20 #B6 #1B #20 #A2 #1B #A2 #F1 #A0 #F6
#16F4 - #20 #A6 #7A #B5 #E5 #B5 #72 #A2 #FF #A0
#16F6 - #A0 #C0 #D0 #C4 #D0 #F6 #A6 #72 #D0
#1700 - #F2 #20 #7B #19 #20 #77 #41 #E4 #E4 #E4
#1712 - #A0 #A0 #1 #B1 #70 #C9 #A0 #D0 #A #20
#171C - #B6 #17 #50 #A5 #A4 #C9 #1 #20 #C #A0
#1726 - #A #B1 #73 #C9 #C1 #F0 #A #20 #B5 #17
#1730 - #A0 #A5 #70 #B5 #72 #A5 #71 #B5 #73 #A5
#173A - #72 #3B #19 #29 #B5 #72 #A0 #2 #C6 #73
#1744 - #A0 #A0 #C1 #72 #C7 #A0 #D0 #3E #C5 #B0
#174E - #4 #D0 #F5 #A2 #11 #A0 #4 #A5 #72 #1B
#175E - #A9 #2B #B5 #72 #90 #2 #E6 #73 #B1 #72
#1762 - #C9 #B0 #C9 #A0 #D0 #19 #A0 #30 #B1 #72
#176C - #29 #41 #C9 #A0 #D0 #F6 #C4 #30 #E6 #72
#1776 - #B1 #72 #C9 #A0 #D0 #5 #C0 #1 #D0 #F5
#1780 - #A0 #20 #B6 #17 #A0 #63 #C6 #70 #A5 #70
#178A - #C9 #FF #D0 #2 #C6 #71 #A2 #C9 #A0 #F4
#1794 - #20 #C6 #F4 #B0 #B5 #72 #A5 #71 #B5
#1796 - #73 #A2 #30 #A0 #3 #B5 #72 #A5 #71 #B5
#17A8 - #A0 #E1 #72 #B5 #B8 #D0 #F4 #A5 #72 #1B
#17B2 - #A9 #2B #B5 #72 #90 #2 #E6 #73 #E0 #C0
#17B6 - #D0 #E3 #A9 #A #E5 #72 #A2 #F7 #A0 #FF
#17C6 - #B6 #C0 #D0 #C4 #D0 #F6 #A6 #72 #D0 #F7
#17D0 - #C6 #39 #A5 #29 #1B #A9 #30 #B0 #D1 #F6
#17DA - #20 #7B #19 #20 #77 #11 #A0 #63 #A5 #76
#17E4 - #B5 #72 #A5 #77 #B5 #73 #C6 #72 #A5 #72
#17EE - #C9 #FF #D0 #2 #C6 #73 #A2 #C #A0 #2
#17F8 - #B1 #72 #B5 #71 #72 #C8 #B5 #C0 #5 #B5
#1802 - #F5 #B5 #72 #1B #A5 #2B #B5 #72 #90 #2
#180C - #E5 #73 #A0 #D0 #E5 #C6 #76 #A5 #76 #C9
#1816 - #FF #D0 #2 #C6 #77 #A0 #3 #A5 #7B #B5
#1820 - #2 #A5 #79 #B5 #73 #C6 #72 #A5 #72 #C9
#182A - #FF #D0 #2 #C6 #77 #A2 #C #A0 #1 #B1
#1834 - #72 #C8 #91 #72 #B8 #B8 #C0 #FF #D0 #F5
#183E - #1B #A5 #72 #A9 #2B #B5 #72 #90 #2 #E6
#1847 - #73 #A2 #D0 #E5 #E6 #7B #D0 #2 #E6 #7F
#1852 - #A0 #B5 #B5 #6C #C9 #D0 #F6 #13 #A6 #A6
#185C - #B5 #7F #D0 #F6 #C9 #3A #D0 #B #B5 #D0
#1866 - #A9 #30 #B5 #67 #C4 #D0 #E6 #A6 #A6 #A5
#1870 - #A5 #29 #A0 #D0 #2B #A6 #A6 #E6 #A9 #A5
#187A - #C9 #C9 #A0 #D0 #1E #E6 #A6 #A6 #A9 #B5
#1884 - #A9 #A5 #A6 #C9 #A0 #D0 #12 #E6 #A6 #A9
#188E - #A5 #B5 #A6 #A5 #A7 #C9 #3A #D0 #A #A9
#1898 - #30 #B5 #A6 #E6 #A6 #C4 #D0 #D7 #A0 #63
#18A2 - #A5 #A9 #B5 #D0 #B5 #1B #A6 #B5 #D0 #E6
#18AC - #A5 #A7 #B5 #D0 #B5 #A5 #A6 #B5 #D0 #E6
#18C4 - #A7 #A0 #C6 #D0 #B6 #A6 #A6 #A6 #D0 #C4
#18D0 - #B5 #30 #31 #D0 #1B #A5 #A6 #C6 #C5 #B0
#18DA - #30 #2B #D0 #12 #A5 #A6 #C6 #C6 #B5 #F0
#18E4 - #1F #D0 #9 #A5 #A9 #C0 #C7 #D0 #30 #16
#18DE - #F0 #14 #A5 #A6 #D0 #C4 #B5 #A5 #A6 #B5
#18E8 - #2B #B5 #A6 #A6 #D0 #C4 #B5 #A5 #A6 #B5
#18F2 - #C7 #B5 #A6 #A6 #A9 #A0 #A0 #A0 #A0 #A0
#18FC - #A0 #2 #B5 #72 #A5 #72 #A5 #72 #A5 #72
#1906 - #2B #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1910 - #A5 #D0 #17 #A9 #30 #A0 #A1 #2 #E6 #A0
#191A - #2 #A3 #A0 #2 #C9 #A0 #B5 #A5 #A5 #A5
#1924 - #3D #A0 #2 #E6 #FF #2 #C4 #D0 #C6 #FF
#192E - #30 #3D #B0 #B5 #B5 #B1 #B5 #B5 #B5 #B5
#1938 - #35 #B5 #C9 #D0 #F6 #A6 #A6 #A6 #A6 #A6
#1942 - #B5 #A6 #D0 #F6 #A6 #A6 #A6 #A6 #A6 #A6
#1946 - #C9 #A0 #D0 #F6 #A6 #A6 #A6 #A6 #A6 #A6
#1950 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1954 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1958 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1962 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1966 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1970 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1974 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1978 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1982 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1986 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1990 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1994 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#1998 - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6
#199C - #A5 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6 #A6

```


LASER-DUEL is a two-player game for the ZX-81 where each player is in control of a V-shaped battle machine which he must use to collect gold in the playing area. If a player is shot all his gold is left where he was shot and he is sent back to his corner. The game ends when the time runs out and the winner is the player with the most gold. Controls are with the instructions printed before the game starts.

To enter the game you first need to enter a Rem 1100 characters long to hold the machine code. To enter this Rem first enter:

1 REM with 94 0's

Then using the edit alter the line number so that lines 1 to 11 are all Rems with 94 0's.

Then enter.

12 REM

When all these Rem's have been

entered type:

POKE 16514,118

POKE 16515,118

POKE 16510,0

POKE 16511,78

POKE 16512,4

You have now entered the Rem. Next enter listing 1 and type Run. Type in the address where you are going to put the machine code. This will be 16514 unless you have already entered part of the hex. The address is then the first column in the hex dump. Enter each of the lines in the hexadecimal dump except for the address in the first column but include the number at the end of each line as this is a check.

If the message Error please re-enter appears type in the line again as you must have made a typing error. You do not have to enter all the machine code in one go but when you restart the hex loader remember the address will not be 16514. When all the hex has been entered save the program on tape and enter:

RAND USR 7527

This is to check that the game works. If the game fails to work check the machine code by:

RUN 1000

As an initial check you can just check the final numbers of each line. Correct any wrong lines by entering Run and the correct address. When the machine code is working delete all of listing 1 except line 0 and enter listing 2. When all of this has been entered type Run 1000 to save and run the program.

LASER

David Ives throws down the gauntlet — it's lasers at dawn in this fight to the death on the ZX-81.

Hex dump

```

16514 17875268+128135821307 783
16524 2FFDFFFF0000100220021 102F
16534 30020FFFFFDE2A0C4033 1A31
16544 47623552355802310FR03
16554 516E03834403E0FA85733
16564 7262355823081E1A8583F
16574 720043002130021A00780
16584 304360818023500231310
16594 4E83802300D020A367803
16604 7068235802310F8367803
16614 12A3E1933000E583C401
16624 2FE002808FDCB40FC0933
16634 34040210440856F7E1203
16644 43C402230E40C9C0B80233
16654 504040CB45200130C84D00
16664 5013266073C404055C800
16674 7203E218040057E585483
16684 34E280C4A00922C407843
16694 9002355FE1B22C8FE8493
16704 004FE972005FDCB40FE13
16714 1FE80200836002A44083
16724 222444012092A3C408720
16734 342223C40CB5AC0FDCB43
16744 47E00C404040660324340
16754 52A3C40227140C93A4340
16764 60B7FC8218C4087358F45
16774 7234E8A414036C0097EFE

```


DUEL

Listing 2.

```

50 CLS
10 PRINT "      1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100"
20 PRINT "      1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100"
30 PRINT "      1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100"
40 PRINT "      1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100"

50 PRINT "=====
60 PRINT " EACH PLAYER HAS A "
"U" SHAPED BATTLE MACHINE WHI
CH HE MUST USE TO GET AS MUCH GOL
D EACH PLAYER MUST ALSO AVOID HI
S OPPONENT AS"
70 PRINT "IF YOU GET SHOT THE
GOLD YOU HAVE COLLECTED IS BL
OWN FROM YOU IN THE EXPLOSION."
80 PRINT " KEYS ARE AS BELOW: -

90 PRINT " OPERATION LEFT AN
D RIGHT PLAYER"
100 PRINT " FIRE ""1""-""
""5"" ""6"" ""0""
110 PRINT " MOVE ""0""-""T
""Y"" ""P""
120 PRINT " ROTATE ""A""-""B
""H"" ""0""
130 PRINT " ROTATE ""Z""-""U
""B"" ""0""

140 PRINT " ENTER SPEED 0 (FAST
)-10 (SLOW)"
150 INPUT SPEED
155 IF SPEED<0 OR SPEED>10 OR S
PEED<>INT SPEED THEN GOTO 150
160 POKE 17448,250-SPEED
170 POKE 17465,INT (50/(5+SPEED
))
180 POKE 17540,INT (50/(5+SPEED
))
190 RAND USR 17527
200 FOR A=1 TO 100
210 NEXT A
220 CLS
230 LET L=PEEK 15452+255*PEEK 1
6453
240 LET R=PEEK 15462+255*PEEK 1
6463

```

Listing 1.

```

5 REM **ENTER PROGRAM**
10 PRINT "ENTER ADDRESS"
20 INPUT A
30 INPUT A$
40 IF A$(1)<>(STR$ A) (4) THEN
GOTO 160
50 LET A$=A$(2 TO )
60 LET T=0
70 FOR B=1 TO 10
80 LET H=16*CODE A$+CODE A$(2)
-476
90 POKE A,H
100 LET T=T+H
110 LET A=A+1
120 LET A$=A$(3 TO )
130 NEXT B
135 PRINT A;" "A$
140 IF T<>VAL A$ THEN GOTO 160
150 GOTO 30
160 PRINT "ERROR - PLEASE RE-EN
TER"
170 GOTO 10
995 REM **CHECK PROGRAM**
1000 PRINT "ENTER START ADDRESS"
1010 INPUT B
1020 FOR A=B TO 17614 STEP 10
1040 PRINT A;" " (STR$ A) (4);
1050 LET T=0
1060 FOR B=0 TO 9
1070 LET P=PEEK (A+B)
1080 LET T=T+P
1090 PRINT CHR$ (28+INT (P/16));
CHR$ (28+P-16*INT (P/16));
1100 NEXT B
1110 PRINT " ";T
1120 NEXT A

```

```

250 PRINT AT 10,0;"THE FINAL SC
ORE WAS :-"
260 PRINT " LEFT PLAYER "
;L;"0"
270 PRINT " RIGHT PLAYER ";R
;"0"
280 PRINT " UELL DONE "
;
290 IF L>R THEN PRINT "LEFT PLA
YER"
300 IF R>L THEN PRINT "RIGHT PL
AYER"
310 IF L=R THEN PRINT AT 16,5;"
ITS A DRAW"
320 FOR A=1 TO 100
330 NEXT A
340 RUN
1000 SAVE "LASER DUE"
1010 RUN
9999 REM

```

16704	80020000001022414009C9F	750	17064	62A00400112300092200C40	061	17344	40250402244040700048044	090
16704	80B438E7E262810FE8429	1248	17074	7223E4038000C92A464036	847	17354	52B224E403A5540A22021	651
16804	03AFE1222814FE812810FE	1049	17084	800E05B404014FAE002808	787	17364	6216A407A87232321F3078	940
16814	13B2200CFE322203FE1329	856	17094	9FDC84AFE993A4A402184	1346	17374	748234E2A46407B093028	534
16824	204FE072005F0C84AFEC9	1287	17104	040855FF7E222A46402248	734	17384	8FC7FEF8220103A5540B2	1121
16834	3FE082204FE6C20033597	940	17114	140C0C0DB8023A4A10CB70	1133	17394	93255402244E4023224540	592
16844	409FE972303FE84C0C3600	1329	17124	22001300C555200130E607	724	17404	01808FE0020F336600C62	930
16854	5093E9C015400B7ED4230	1056	17134	3324A405505B5203E5180	852	17414	1AFB2E0B215011C3A5340	931
16864	50B7C28F83D12093E8C01	9228	17144	44037555545234E2A4640	8028	17424	2FEFF20AF2A0C4001F502	1282
16874	70B0B138FE042030B7023	042	17154	5092246407FEF03020C0F	803	17434	3022245403244038000C	930
16884	8F8381283570C39C1312C3	1053	17164	8B22033FE8423047F780	963	17444	43A3123FEF220F93EFFF3	1326
16894	82A044801070009EB2A44	430	17174	795F0CB4AFEC0FE802008	1427	17454	534403A5240332524000	753
16904	030CD74121070019EB2A4	881	17184	836082A4E40232244013	473	17464	83E0A3252402A50402B22	531
16914	15040CDD741210A0019EB	9038	17194	9092816407FEF042224640	833	17474	750407C85C0C0FFB30B1A	1578
16924	22A4F40CD741092A0C40	9038	17204	0CB62C070C8457EC0A1A	1476	17484	8AB8980909C9C9C308080	1432
16934	30118037FEF8420023597	827	17214	140F6303240402A464022	839	17494	991909C9C9C9C9C9C9C9C	1578
16944	4FE97200235B4230B78B1	1016	17224	24B40C23A40400CB7FC821	1102	17504	0ACAD89809C9C9C9C9C9C	1547
16954	500E0C9F0CB407EC32A3C	1118	17234	35C4037855743234E2A46	863	17514	15B0C4013012000214944	393
16964	54035092305E403500F0CB	793	17244	14035092305E403500F0CB	800	17524	2E080C030000400050440	1450
16974	740B5E110101AF02554026	657	17254	5B2244B40C9F0CB40FEFF	1572	17534	3C800255040350A325240	645
16984	844070B4234A2B224440	750	17264	9282810FE842319FE10E	8653	17544	43EFF32404032440C0C0	915
16994	93A5540A23021218A407A	808	17274	74AF81283570C39C1312C	1078	17554	5420C0A943C0D7941D4B3	1535
17004	0B723231F03FA65234E2A	808	17284	8822808FE132304FE0720	783	17564	60D3042C0A944C0D0A41C	1006
17014	15C407B093020FC0FE80	1105	17294	905F10B40FE0C9FE802004	1265	17574	755404042C0D0A41C0C07	9
17024	220103A5340B23255402A	870	17304	0FE820033597C9FE8723	1283	17584	841C04843C0DFE41C02432	1282
17034	34440232244401806FE00	617	17314	103FE84C003500C9F0CB4A	1114	17594	90D7941C04843C0D244403	1242
17044	420F3368C0B22AFBA2089	1284	17324	27EC82A454033002A4840	734	17604	098441C01C101C101C10	442
17054	54011C3A5340FEFF20AF	972	17334	32503FDCB4ABE110101A	988	17614	11C10C101C107500251300	282

Every computer needs
CHATTERBOX II
"Listen creep, I am the leader...."

For ZX81
SPECTRUM
BBC
TRS 80
APPLE
NASCOM
VIC/PET/64
(Please state)



SPEECH
SYNTHESIS
by
WILLIAM
STUART
SYSTEMS

NEW!
EXCLUSIVE!

**PITCH
CONTROL**

**£49
COMPLETE
OR £39 (DIY KIT)**

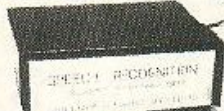
CHATTERBOX II™ can say anything!

Genuine phoneme synthesis - not just recorded speech - hence unlimited vocabulary. Programmable pitch for more natural intonation (exclusive to Wm Stuart Systems) - solid tone cabinet for quality sound - integral beep/music amplifier. **PLUS** expansion socket for BIG EARS voice recognition system. Full instructions technical notes and software supplied with this outstanding educational unit. **DEALER ENQUIRIES WELCOME**

As seen on BBC TV "Computer Programme"

BIG EARS

**SPEECH
INPUT
FOR ANY
COMPUTER**



Hugely successful Speech Recognition System, complete with microphone, software and full instructions
BUILT TESTED & GUARANTEED
PLEASE STATE COMPUTER: UK101, SPECTRUM, ATOM, NASCOM2, Vic 20, Micron, ZX80/81, PET, TRS80, M280K, APPLE II, BBC MICRO

ONLY £49

ZX81/SPECTRUM

**MUSIC SYNTHESIZER (Stereo)
+ 16 LINE CONTROL PORT**

Play 3-part music, sound effects, drums etc. Full control of attack, decay and frequency. Input/Output: lines provide control and monitor facility for Home Security, Robot Control, Model Railway etc. etc. Works with or without 16K RAM.

Full instructions/software included.
Add keyboard to make a live performance polyphonic synthesiser!
Note: up to 3 units can be used simultaneously; giving 9 music channels & 48 I/O lines

**AMAZING VALUE
AT ONLY
£19.50 (KIT)
£25.50 (BUILT)**

NEW!

**VIBRATO
CONTROL**



**S
O
F
T
W
A
R
E**

THE COMPOSER

Synthesiser Music Programme
Enter & play 3 part harmony.
Includes demonstrations.
(Spectrum ZX81) recommended **£7**

TALKING HANGMAN

For Chatterbox!
The classic game claims its victims with a dry vocal accompaniment (Spectrum) **£6**

ZX ARP/DRUMSEQ

Fascinating synthesiser demonstrations. Generates automatic sequences and plays from keyboard. Some weird effects (Spectrum) **£6**

CHROMACODE?????

Can you defuse the bomb by cracking the secret combination before time runs out? With Chatterbox voice output (Spectrum) **£6**

COLOUR MODULATOR

RGB in, PAL/UFH out (not for ZX)

KIT £16

BUILT £22

Please add VAT at 15% to prices.
Barclay/Access orders accepted by telephone

All enquiries
S.A.E. please

**WILLIAM
STUART
SYSTEMS Ltd**

Quarley Down House
Choberton
Nr. Salisbury
Wiltshire, SP4 0DZ
Tel: 098 064 235



NEW

SPECIAL OFFER for CBM 64

80-COLUMN/GRAPHICCARD

- Digital clock
- Mixpossibility of 80-column screen with Hires CBM64-screen (also in colour)
- Graphic pictures; can be switched to background
- Upper line can be locked (for comments etc.)
- Adjustable line spacing for greater clarity on text screens

FREE ADDED! Sophisticated Wordprocessor with extended manual

£ 59.95

Warning: Beware of inferior imitations on ZERO-products!

...Surprising bargains for VIC 20 and CBM 64

<p>EXPANSION UNIT with 2 slots</p> <p>£ 5.95</p>	<p>EPROM CARD two 2k/4k EPROM sockets.</p> <p>Addresses are changeable.</p> <p>£ 5.95</p>												
<p>40/80 COLUMN CARD Turn your VIC 20 into a professional computer. 40 or 80 columns instead of 22, very sharp and stable picture. Try it out without obligation!</p> <p>£ 55.95</p>	<p>EPROM PROGRAMMER for 2716, 2732, 2764, 27121, 2532 EPROMS. Can be easily connected to your computer. £31 Control software in EPROM £6.50</p>												
<p>64 k RAM + 2k EPROM £ 55.95 With software for RAM files. Easily connected.</p>	<p>EPROM-ERASER £ 25.50 erases 4 EPROMS simultaneously</p>												
<p>EXPANSION UNIT With 5 slots, fully buffered, switches for selecting slots, and on-board power supply</p> <p>VIC 20 £ 29.95 * CBM 64 £ 36.95</p>	<p>MACH3 PRINTER BUFFER</p> <table border="1"> <tr> <td></td> <td>18k</td> <td>32k</td> <td>48k</td> </tr> <tr> <td>par. input</td> <td>£ 86</td> <td>£ 118</td> <td>£ 109</td> </tr> <tr> <td>serial input</td> <td>£ 94</td> <td>£ 129</td> <td>£ 123</td> </tr> </table> <p>for all our products: Dealer inquiries invited.</p>		18k	32k	48k	par. input	£ 86	£ 118	£ 109	serial input	£ 94	£ 129	£ 123
	18k	32k	48k										
par. input	£ 86	£ 118	£ 109										
serial input	£ 94	£ 129	£ 123										

**zero
ELECTRONICS**

149 KINGSTREET + GT. YARMOUTH NR30 2PA + TEL: (0493) -2023
(NASH HOUSE)

- All prices exclude VAT. Shipping costs £ 1.50
- Supplier to schools, universities and government departments.
- We have good documentation of all our products, free of charge.
- All equipment can be tried out without obligation; if returned undamaged within 10 days, you only pay postage and packing costs.

ORIC SOFTWARE

THE SINGLE SOURCE SUPPLY
FOR ALL YOUR ORIC SOFTWARE
PERIPHERALS AND BOOKS



Catalogue with every purchase
or send £1.00 which will be
deducted from your first order.

SOME OF THE TITLES WE HAVE AVAILABLE:

Airline	48K	7.95	Operation Grenlin	48K	£ 95
Blorhythms	16/48K	5.95	Oric Trek	48K	5.98
Breakout - 30 maze	48K	7.50	Oriscope	48K	17.55
Candy Floss #			Reverse	48K	6.50
Hangman	48K	7.50	Synthesizer	48K	7.95
Chess	16/48K	9.95	Word Processor	48K	17.95
Cute Crazy	48K	7.95	Xenon 1	48K	8.60
Uales	48K	7.95	Zodiac Adventure	48K	9.95
Digger	48K	6.95	Zorgons Revenge	48K	8.50
Dinky Kong	48K	6.95			
Fantasy Quest	48K	6.50			
Flight	48K	7.95			
Forth	48K	17.95			
Franklin's Tomb	48K	9.95			
Grail	48K	8.95			
Harrier Attack	16/48K	5.95			
Hobbit	48K	14.95			
Invaders	16/48K	7.50			
Jogger	48K	6.95			
Mario	48K	6.95			
Mulliganes	16/48K	7.95			

BOOKS

The Oric-1 and how to get the most from it **5.95**
The Oric-1 Companion **6.95**
An Introduction to Programming the Oric **1.95**

Postage

Books 50p for 1 - 25p per book thereafter
Cassettes 50p for 1 to 7 free if 8 or over

**Oric Software, 118 Worcester Road,
Malvern, Worcs. WR14 1SS.
Tele Malvern (06845) 62467**

ANOTHER PUZZLE FROM IMAGINE

£5.50
A PIECE

MOLAR MAUL

(Any Spectrum)

*A totally new experience;
an oral extravaganza!*

BEWITCHED

(VIC-20)

*This game
makes Hampton
Court look a
doddle!*

PEDRO

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

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

JUMPING JACK

(Any Spectrum)

*20 levels of crazy, zany
fun.*

ALCHEMIST

(48K Spectrum)

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

ARCADIA

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

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

Ah Diddums

(Any Spectrum)

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

ZZOOM

(48K Spectrum)

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

ZIP ZAP

(48K Spectrum)

*Heart stopping
tension -
supersmooth
animation*

LEGGIT

(Dragon & Atari)

*Leap your way
through hazard
filled screens.*

STONKERS

(48K Spectrum)

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

WACKY WAITERS

(VIC-20)

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

WINNER
of the
CVG GOLDEN JOYSTICK AWARD
1983

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

Imagine Software Ltd.

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



**..the name
of the game**

SATELLITES, LASERS and microelectronics have made big changes to the work of surveyors and map-makers. Measurement of the rate at which glaciers flow and the movement of the Antarctic ice have been largely eliminated by serial Landsat photographs. However, for some jobs the traditional methods of the surveyor are still the best way to approach the problem. Although it is used less in this country than in North America and on the Continent, the plane table is a rugged and effective surveying instrument.

Rathbone, a 16th Century English surveyor, said that the plane table was "A most excellent and absolute instrument for this our purpose in survey." It was used extensively by the British in the Survey of India and has the advantage over other surveying methods that the plan is produced directly with no complicated recording of a multitude of angles and less chance of missing out an important detail.

A flat piece of wood

A plane table consists simply of a flat piece of wood, usually about 20 inches square, mounted on to a tripod to bring it up to a convenient height for the observer. The tripod should have an adjustable head so that the table can be levelled. A sheet of paper is clipped to the top surface of the table and an instrument called an alidade is also necessary. An alidade is simply a ruler with a straight edge and a sight at each end which can be lined up with distant objects that you wish to make on your map.

Figure 1 shows the principle of plane tabling. You must choose a baseline for your survey with an observation point at each end. If you want your map to have a defined scale, for example one inch on the map to represent 100 yards — a scale of 1 in 3600, the two points must be a known distance apart. Either you know this in advance or it can be measured using a long tape measure. Surveyors use steel link chains that are 20 or 30 metres long.

Standing at one observation point, you put the alidade on to the paper fastened to the

John Dawson explains a BBC program to simulate plane tabling, a surveying method, to produce maps and plans.

MAP PLOTTER

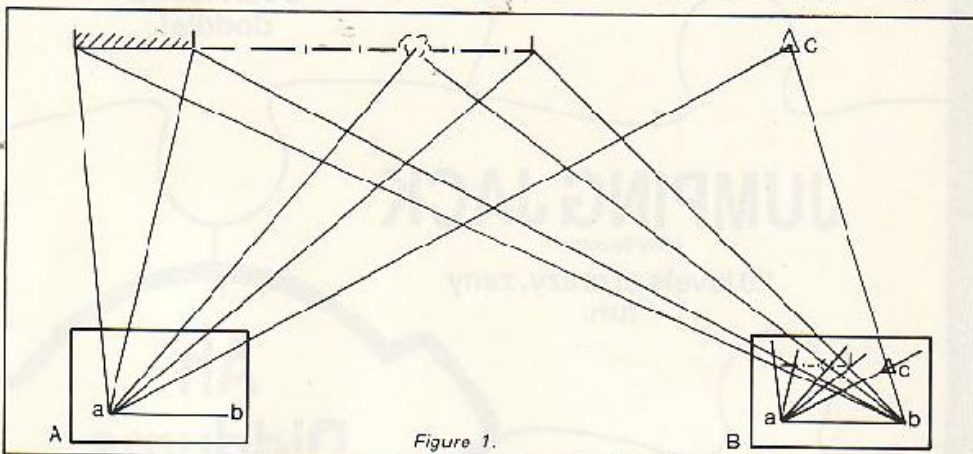


Figure 1.

plane table and place the edge of the ruler so that it runs through the observation point marked on the paper. The alidade is then lined up with an object that you want to record on the map; you draw a line from the observation point to the edge of the paper, and record what the bearing is to. For example, you can write "church" or "end of fence" on the margin of the paper, or simply give the bearing a number and keep a separate record in a notebook.

The first half of the process is now complete. The alidade is turned until it is in line with each of the distant objects and more lines are drawn from the observation point mark to the edge of the paper. Move the plane table to the second observation point and

repeat the process for the same objects. The places where the various lines cross on the piece of paper mark the position of the objects. You can see immediately that the scale of the map is set by the length of the baseline on your piece of paper.

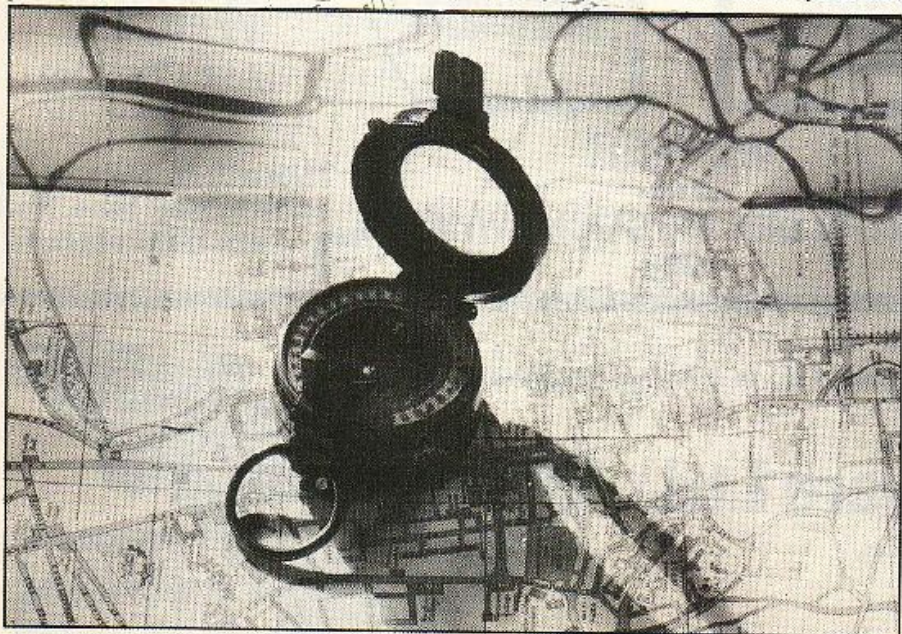
If the baseline is short, the distant objects will be closer together and the scale of the map is smaller, for example 1 inch to the mile — in 63360. A further observation point can be chosen and marked by angles from the two original base stations and the process can be continued using one of the original base stations and the new point. In this way the survey can be extended as far as you wish, over hills and through villages or towns.

Plane tabling problems

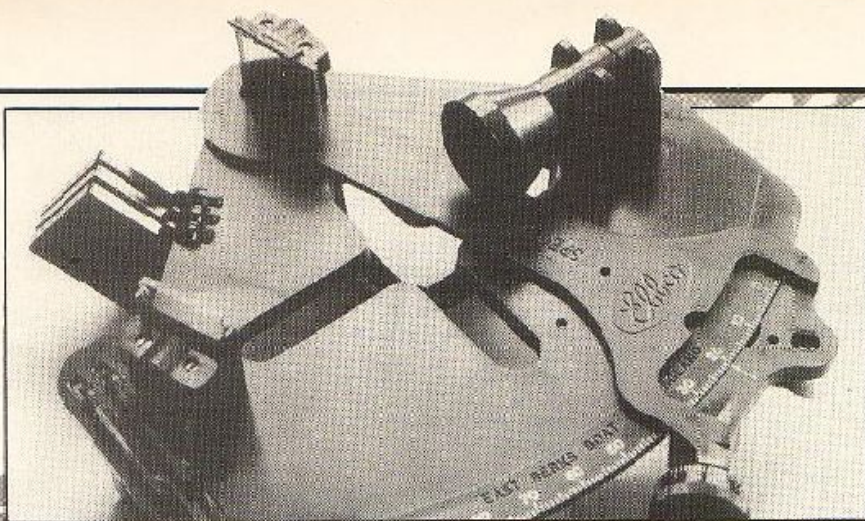
The problems with plane tabling are that the scale of the map is fixed forever once it is committed to paper and work is very difficult in a persistently wet or windy climate.

An alternative method of surveying which is used widely in the United Kingdom consists of measuring a number of distances and angles, and then constructing the plan or map in the relative comfort of the surveyor's office. Theodolites are normally used for measuring horizontal and vertical angles but the two instruments shown in figures 2 and 3 can give useful results.

If you are going to record the data from a survey rather than plotting it on to paper at the time, you will need some way of measuring the position of objects so that their positions can be modelled in your computer. Normally this is done by measuring the angle between two objects, one of which is in a known position. An alternative method which is used for quick reconnaissance sketching makes use of a prismatic compass — figure 2



Below: Figure 2.



Above: Figure 3.

B and using that as the Y co-ordinate, with D-C as the X co-ordinate in a BBC micro-computer Move instruction.

The program consists of the following sections:

Lines 50-80 fill the two dimensional array with dummy values to stop the program having to allocate more space while it is running. OBS\$ will be used to hold a series of bearings from two observation points with a short description of the object. Remember that the statement DIM OBS\$(2,50) actually sets aside memory for an array three items wide and 51 items deep as both dimensions start from zero in BBC Basic.

Establishes text window

Line 70 establishes a text window in the bottom three lines of the screen and line 180 sets the graphics origin to the left hand edge of the screen and just above the text window. The largest vertical or Y value that can be displayed on the screen is now 1024-200.

Lines 730-850 are the definition of the initialisation procedure. The Repeat...Until loop continues until you have entered the co-ordinates for all the observation points. The purpose of line 790 is to prevent a line being drawn from somewhere off the screen to the first base. After you have entered the first base, the subsequent bases are linked by lines 800 and 810.

Line 300 sets a flag to a known state at the start of the loop before the character typed in by the user is checked and acted upon. PROCangle, lines 390-490, either crawls a new bearing on the screen, or clears an existing bearing depending on the state of the flag. PROCclear, lines 950-980, sets the flag to the opposite state and then calls PROCangle to unplot a bearing by plotting it again in the current background colour, line 450.

I will show how the output from the program can be plotted next month using the Oric four colour plotter/printer.

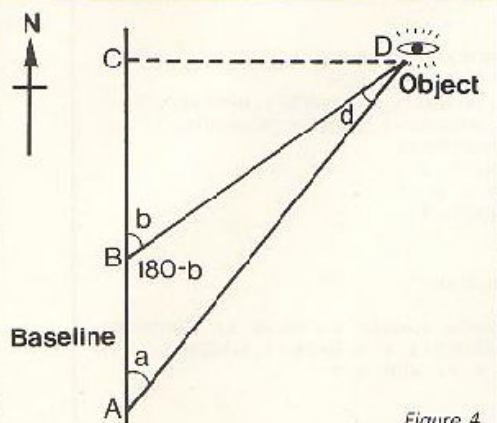


Figure 4.

— to measure the angle between the object and Magnetic North.

The prismatic compass is strongly made and can produce readings accurate to about plus or minus half a degree. The triangular prism at the rear of the compass reflects the image of the edge of the compass card just below the backsight. When the observer looks through the backsight it is possible to line up the hairline on the front glass with an object and take a reading of the bearing at the same time.

The sextant shown in Figure 3 is intended for use at sea and is actually made of polycarbonate plastic. This material changes its shape less than brass when the air temperature varies. The vernier scale on the circular drum allows a user to take readings accurate to 0.2 minutes. A minute is 1/60 of a degree.

I can connect either an Epson MX80 FT or an Oric MCP 40 printer to my BBC micro-computer. Using a high resolution dump from the screen to the Epson printer or using the excellent plotting commands in the Oric printer I thought it should be possible to combine the computer with a prismatic compass or a sextant to produce maps or plans like those from a plane table. The advantage would be that they could be plotted automatically and scaled electronically.

From two observation points it is possible to find the height and distance of a far point. Figure 4 shows the simplest arrangement of angles to find the distance of a point from a line extended through the baseline. For the moment I have assumed that the baseline runs in a North/South direction. The baseline is represented by the line A-B in the figure. The formula or algorithm for finding the distance along the line running from point D to point C is:

$$D-C = \frac{A-B \sin(180-b) \cdot \sin a}{\sin d}$$

The angles inside a triangle must add up to 180 degrees so angle d can be found by adding angle a and angle 180-b together and subtracting the result from 180. I have subtracted b from 180 degrees in the formula because the bearing that you measure originally is the acute angle CBD.

The distance C-B can be found using the formula:

$$C-B = \frac{D-C}{\tan(b)}$$

When you have these two results it is an easy matter to plot the position of the object by adding the distance B-C to the baseline A-



```
10 REM MAP PLOTTING PROGRAM
20 REM STARTED 29 JANUARY 1984
30
40 DIM OBS$(2,50): DIM BASE$(1,10)
50 FOR Z = 0 TO 2
60   FOR ZZ = 0 TO 50
70     OBS$(Z,ZZ) = "*****"
80     NEXT ZZ: NEXT Z
90
```

```
100 X = 0: Y = 0: XOR = 0: YOR = 0: D = 1200: BASE
```

```
ANGLE = 0
110 BASEX% = 1: BASEY% = 2: B% = ".,."
120
130 MODE 0
140 *KEY 9 "MODE 7 IN IN LIST IN"
150 *KEY 0 "RUN IM"
160
170 VDU 28,0,51,79,28
180 VDU 29,0,0,200:
```

(listing continued on next page)

(listing continued from previous page)

```

150
200 PROCinitialise
210
220 REPEAT
230   CLS
240   PRINT "Current base: ";BASENO% " at ";BASE(0
,BASENO%);,BASE(1,BASENO%)
250   PRINT "Input <A>ngle <B>ase change <P>rint s
creen <C>lear bearing";
260
270   REPEAT
280     K% = INKEY$(100)
290     UNTIL K% <> ""
300     CF = FALSE
310     IF K% = "A" THEN PROCangle
320     IF K% = "C" THEN PROCclear
330     IF K% = "B" THEN PROCbasechange
340     IF K% = "P" THEN PROCprint
350     UNTIL K% = "Q"
360   END
370
380
390 DEF PROCangle
400   CLS
410   INPUT "Input angle of bearing: "A
420   Y = D*COS(RAD(A))
430   X = D*SIN(RAD(A))
440   IF CF = FALSE THEN 470 ELSE 450
450   PLOT 3,;Y
460   GOTO 480
470   PLOT 1,;Y
480   PLOT 4,XOR,YOR
490   ENDPROC
500
510 DEF PROCcorn
520   CLS
530   PRINT "Input X and Y coordinates for base numb
er "; BASENO% ,
540   INPUT "X: "X
550   INPUT "Y: "Y
560   PROCcross (X,Y)

```

```

570   ENDPROC
580
590 DEF PROCcross (X,Y)
600   B% = STR$(BASENO%)
610   XOR = X: YOR = Y
620   MOVE XOR-B,YOR
630   DRAW XOR+B,YOR
640   MOVE XOR,YOR+B
650   DRAW XOR,YOR-B
660   MOVE XOR-40,YOR+50
670   VDU 5
680   PRINT B%
690   VDU 4
700   MOVE XOR,YOR
710   ENDPROC
720
730 DEF PROCinitialise
740   CLS
750   INPUT "How many bases ?" BASESX
760   REPEAT
770     -PROCcorn
780     BASE(0,BASENO%) = X: BASE(1,BASENO%) = Y
790     IF BASENO% = 1 THEN 820
800     MOVE BASE(0,BASENO%+1),BASE(1,BASENO%+1)
810     DRAW BASE(0,BASENO%),BASE(1,BASENO%)
820     BASENO% = BASENO%+1
830     BASESX = BASESX-1
840     UNTIL BASESX = 0
850     BASENO% = BASENO%-1
860   ENDPROC
870
880 DEF PROCbasechange
890   CLS
900   INPUT "Input base number to move to "BASENO%
910   X = BASE(0,BASENO%); Y = BASE(1,BASENO%)
920   MOVE X,Y: XOR = X: YOR = Y
930   ENDPROC
940
950 DEF PROCclear
960   CF = TRUE
970   PROCangle
980   ENDPROC

```

*We will not be beaten on the price of
Star or Juki Printers.*

PRINTER BARGAINS

STAR DP 8480.....	£230.00 INC VAT
STAR GEMINI 10X.....	£250.00 INC VAT
STAR DP 515.....	£275.00 INC VAT
STAR DELTA 10.....	£368.00 INC VAT
JUKI 6100.....	£420.00 INC VAT

Ring for sample Printout, Full Spec and latest Price

Securicor delivery £8.00

Cables for BBC/Oric/Dragon/etc £10.00

BEC Packs available includes:—
Printer Cable, Screen Dump, Software
delivery, fact sheet and VAT
£20.00 for all above printers

BBC Model B	£399.00
BBC Model B + DI.....	£469.00
ELECTRON	£199.00

Phone/Credit card orders welcome

CJE MICROCOMPUTERS
Dept YC, 78 Brighton Rd, Worthing,
West Sussex.
(0903) 213900

GET IT ALL TOGETHER WITH MICRO BUREAU



ALWAYS NEAT & TIDY ★
BIG STORAGE AREA ★
COMFORTABLE TO USE ★
SPACE SAVING ★
— SLIDING SHELF

Roomy enough for your Computer TV/
Monitor, Cassette recorder/Disk drive
plus Magazines, Books and Tapes,
this fun to assemble kit in rich
mahogany veneer gives you that well
organised feeling.

Please allow 21 days for delivery

ONLY £39.95 — £4.95 P & P



Please send me a Micro Bureau for my.....(micro).

I enclose a cheque/P.O. for £44.90 (incl. siva).

Name.....

Address.....

Post Code.....

Send to:

Micro Bureau, 52 Brown Avenue, Church Lawton, Cheshire ST7 3EP
(or send S.A.E. for further information).

NEW

For home or business the IBM compatible Advance 86^a

16 Bit Micro-Computer

Under £350*



For the home user start with Model A with its massive 144K RAM, 64K ROM and outstanding typewriter style keyboard that fits within the base unit for portability and storage.

Note the large return key and position of the numeric keyboard. Fast retrieval from storage and fast action on games is achieved by the use of the Intel 8086 16 bit micro-processor running at 4.77 MHz. The Advance 86A runs IBM PC software.

Specification

CPU Type	16-bit 8086 running at 4.77 MHz.
RAM	128K or 256K with parity plus 16K video
ROM	64K.
ROM Contents	Diagnostics, Basic, Cassette I/O
Languages Included	EASIC
Type of Keyboard	Full 84 keys tactile
Keyboard Facilities	10 programmable keys
Character Set	256 in ROM
Method of Display	TV, RGB Comp/Sync colour or monochrome monitor
Display Facilities	Full screen handling, 4 screen paged
Text	80 x 25 or 40 x 25
Graphics Resolution	320 x 200 or 640 x 200
Colours Available	16
Graphics Facilities	Scroll, reverse image
Cassette Recorder	Audio
Interfaces Included	Cassette port, light pen, joystick, Centronics
Sound	Built-in speaker
Operating System	Built-in ROM
Printers	Any using Centronics parallel interface
Comments	Hardware and software compatible with IBM PC User-upgradeable to Model B Provision for 8087 Arithmetic Processor



The business user can upgrade to Model B by adding the Advance Expansion box containing 2 x 5.25" disc drives providing 720K storage at £902.13.

The Advance 86 Model B offers the business micro-computer buyer an IBM compatible disk-based system with twin drives, with Perfect writer, Calc, Filer and Speller software (IMS/DOS) for only £1250 plus VAT & Delivery.

Advance 86 Models A & B are designed and marketed by Advance Technology UK Ltd.

128K expansion £125 + VAT

Delivery within 30 days from receipt of payment.

*Ex VAT.

Advance Technology UK Ltd.
8A Hornsey Street, London N7 8HB

01-609 0061

To Advance Technology UK Ltd., 8A Hornsey Street, London N7 8HB

YC

- ☐ Please send Model 86A, Micro-Computer & Keyboard I enclose £404.99 including VAT & Delivery.
- ☐ Please send Model 86B which includes Model 36A plus Expansion Box & Software. I enclose £1250 plus £187.50 VAT plus £10 Delivery
- ☐ 128K expansion £125 + VAT

Cheque/Bardaycard/Access No. _____

Name _____ Company _____

Address _____ Address _____

VISION STORE

South London's Largest Specialist
Micro Computer Centres Offer

INTEREST FREE CREDIT

on
Micro Computers
and Peripherals

In addition to offering computers and peripherals at low, low prices, Vision Store now offer Interest Free Credit i.e. paying over 6 or 9 months with no interest charge. To take advantage of our Interest Free Credit Scheme come to one of our stores where our friendly staff will help you complete the form. Then subject to status, after paying the deposit, you can take the goods away with you. It's as simple as that!

COMPUTERS

COMMODORE

Price Deposit Payments

CBM 64 with FREE Software
£199.95
Interest Free
Deposit £19.95 + 6 monthly payments of £30.00



CBM 64 with C2N Cassette	£249.95	£33.95	6x£36.00
CBM 1541 Disk Drive inc £105 worth software	£219.95	£27.95	6x£32.00
CBM 801 Dot Matrix Printer	£225.95	£30.95	6x£32.50
CBM 1526 Letter quality dot printer	£339.95	£39.95	6x£50.00
CBM 1701 Colour Monitor	£229.95	£31.95	6x£33.00

SX64 Portable Computer
including Disk Drive and Colour Monitor plus £21C of FREE Software
£895.90
Interest Free
Deposit £89.59 + 9 monthly payments of £89.59



VIC 20 PACKAGE inc VIC 20 C2N Cassette Joystick 5 Game Cassette Game Cartridge Usual Price £169.95	£149.95	£17.95	6x£22.00
--	---------	--------	----------

ATARI

Atari 800XL 64K computer with FREE Software
£249.99
Interest Free
Deposit £33.99 + 6 monthly payments of £36.00



600XL with 1010 Cassette Deck	£209.90	£23.90	6x£31.00
800XL with 1010 Cassette Deck	£299.90	£35.90	6x£44.00
800XL with 1050 disk drive	£549.90	£57.90	6x£82.00
1050 disk drive	£299.90	£35.90	6x£44.00
1020 Colour printer/plotter	£199.90	£19.90	6x£30.00
1027 Letter quality printer	£299.90	£35.90	6x£44.00

Interest Free Credit available to Mail Order Customers. Phone or write for details.

DRAGON

Price Deposit Payments

Dragon 32 32K Computer with FREE Software
£169.95
Interest Free
Deposit £19.95 + 6 monthly payments of £25.00



Dragon 64	£224.95	£29.95	6x£32.50
Dragon Disk Drive inc Controller	£275.95	£39.95	6x£40.00

BBC

BBC Model B + computer cassette deck and cables
£439.95
Interest Free
Deposit £49.95 + 6 monthly payments of £65.00



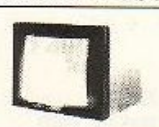
BBC B with Disk I/F plus 100K Cumana Disk Drive	£485.95	£95.95	6x£99.00
---	---------	--------	----------

Cumana CS100 Disk Drive
£219.95
Interest Free
Deposit £27.55 + 6 monthly payments of £32.00



CUMANA 2x200K Disk Drive CS200	£255.95	£37.95	6x£37.00
CUMANA 2x100K Disk Drive CD200	£395.95	£39.95	6x£60.00
CUMANA 2x200K Disk Drive CD400	£445.95	£53.95	6x£66.00
CUMANA 2x400K Disk Drive CD800	£539.95	£71.95	6x£78.00

Microvitec Cub RGB Colour Monitor
£249.95
Interest Free
Deposit £33.95 + 6 monthly payments of £30.00



SANYO 14" RGB Monitor Std	£249.95	£33.95	6x£36.00
TORCH 280 Disk Pack inc C/PM Programs Perfect Speller Perfect Writer Perfect Fier	£859.95	£259.95	6x£100.00

PRINTERS

DOT MATRIX

Epson RX80 Dot Matrix Printer
£279.95
Interest Free
Deposit £39.95 + 6 monthly payments of £40.00



EPSON FX80	£439.95	£49.95	6x£55.00
EPSON MX100 F/T	£489.95	£57.95	6x£72.00
EPSON FX100 F/T	£579.95	£63.95	6x£86.00
SEIKOS-IA GP100A	£199.95	£19.95	6x£30.00
SEIKOS-IA GP100VC	£209.95	£23.95	6x£31.00
SEIKOS-IA GP250VC	£259.95	£37.95	6x£37.00
SEIKOS-IA GP100A	£419.95	£47.95	6x£52.00
SHINWA CP80	£279.95	£39.95	6x£40.00
STAR DP51C	£279.95	£39.95	6x£40.00
STAR DP51F	£319.95	£43.95	6x£46.00
STAR GEMINI 10X	£299.95	£35.95	6x£44.00

DAISY WHEEL LETTER QUALITY

Price Deposit Payments

Smith-Corona TPI Daisy Wheel Printer
£259.95
Interest Free
Deposit £37.55 + 6 monthly payments of £37.00



JUKI 6100	£439.95	£49.95	6x£65.00
BROTHER HR15	£455.95	£53.95	6x£67.00

Memotech MTX500 32K
£274.95
Interest Free Deposit £34.95 + 6 monthly payments of £40.00



Memotech MTX512 64K
£314.95
Interest Free Deposit £44.95 + 6 monthly payments of £45.00

New Additions - Just In

Lynx Laurel 128K CP/M System inc. perfect speller, perfect writer, perfect fier, perfect calc.
£999.00
Interest Free Deposit £99.99 + 9 monthly payments of £99.99

Coleco Adam Word Processor inc. Printer
£669.95
Interest Free Deposit £75.95 + 6 monthly payments of £99.00

Selkosh GP500A Dot Matrix Printer
£239.95
Interest Free Deposit £29.95 + 6 monthly payments of £35.00

Selkosh GP550A Correspondance quality Dot Matrix Printer
£289.95
Interest Free Deposit £43.95 + 6 monthly payments of £41.00

Silver Reed EXP500 Daisy Wheel Printer
£349.95
Interest Free Deposit £49.95 + 6 monthly payments of £50.00

Cash Sales Only

Sinclair Spectrum 48K inc. 2 Free Games Programs	£129.95
BBC Model B inc. 2 Free Games Programs	£399.95
Accm Electron	£199.95
Commodore Vic-20 inc. 4 Games Cartridges (worth £39.96)	£99.95
Oric - 1 inc. £100 Software FREE:	£139.95
Oric Forth. OricBase. Oric Mon. OricFlight. Oric Munch. Super Advanced Breakout. Multi Games 1	

SOFTWARE

Don't forget - We are London's largest stockist of Micro Computer Software. Over 1,000 programmes in stock for games, educational and business. Continuous deliveries.

EXPORT

All our hardware and software is available tax-free to overseas customers, please send for our comprehensive list. Please contact our Croydon office.

MAIL ORDER

We send our whole range anywhere in the UK by FREE Insured Securicor Delivery. Please contact our Croydon office.

All Prices include VAT

VISION STORE

VISIONSTORE KINGSTON
3 Eden Walk Precinct, Kingston,
Surrey. Tel: 01-546 8974

VISIONSTORE CROYDON
96-98 North End, Croydon,
Surrey. Tel: 01-681 7539



MULTI-PROGRAMMING

Mark Jones with a routine which will enable your Spectrum to hold up to 10 Basic programs at once — each one directly and easily accessible.

Program: A.

```

3 GO TO 10
4 CLS : CLEAR : FALSE 20: PRI
NT "Press Y to continue
Any other key to abandon"
5 POKE 23458,0
6 IF INKEY$="" THEN GO TO 6
7 IF INKEY$<>"y" THEN GO TO 8
000
10 LET rp=30000
11 IF rp<30000 THEN PRINT "RP
must be larger than 25999"
20 INPUT "NUMBER OF PROGRAMS 1
-9 ? ";n
21 IF n<1 OR n>9 THEN GO TO 20
22 LET rtop=PEEK PEEK 23732+25
6*PEEK 23733-21*8: LET b=rtop-rp
25 DIM a(n)
30 FOR f=1 TO n
40 PRINT AT 19,0;"BYTES LEFT="
;b;" "
50 PRINT AT 20,0;"PROGRAM ";f
51 RANDOMIZE USR 35E2
55 INPUT "Number of Bytes assi
gned to program ";(f);" ? ";
y
60 IF y<200 THEN PRINT £0;"TOD
Ew BYTES !": PAUSE 50: GO TO 5
5

```

```

70 LET b=b-y: IF b-(n-f)*200<0
THEN PRINT £0;"Not enough room
for rest of programs !": PAU
SE 50: LET b-b+y: GO TO 55
75 PRINT AT 19,0;y;" bytes": R
ANDOMIZE USR 35B2: RANDOMIZE USR
35B2
80 LET a(f)=y: NEXT f
85 LET tot=30000
86 LET p=29000
90 FOR f=1 TO n
100 LET p=p+12
101 POKE p-1,INT (tot/256): POK
E p,256*(tot/256-PEEK (p+1))
110 LET tot=tot+a(f)
120 NEXT f
125 LET p=p+12: POKE p+1,INT (r
top/256): POKE p,256*(rtop/256-P
EEK (p+1))
130 POKE 29154,n
140 RANDOMIZE USR 29152
8000 INPUT "Prog ? 0-";(PEEK 291
54);" ";a: POKE 23729,a
8010 RANDOMIZE USR 29643: BEEP 0
.2,0: GO TO 8000
999E SAVE "Prog" LINE 9999: STOP
9999 CLEAR 28999: LOAD ""CODE :
RUN

```

WHEN CLIVE SINCLAIR brought out the 1K ZX-81, his first customers found great limitations in its use. The unexpanded ZX-81 had limited memory, crude graphics and a most strange display system, which varied in size. Yet a whole host of impressive software developed for this computer, pushing it to its limits and further. Sinclair's next computer, the Spectrum, had a far more impressive specification but was still lacking in comparison say, to the BBC.

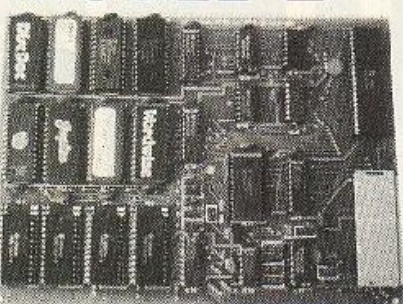
However, programmers have occasionally managed to produce excellent games for the Spectrum showing up even the games-oriented machines such as the Atari. Admittedly, the Spectrum will never quite be in the class of these other more expensive machines but at least by using clever techniques, one can push it toward their level. I hope this routine takes the Spectrum one step nearer.

This routine is written to allow the

(continued on page 105)



SIR ROM MODEL 2



EXPANSION BOARD

THE ULTIMATE ROM/RAM EXPANSION SYSTEM FOR THE BBC MICRO

NEW IMPROVED FACILITIES!

- 12 extra ROM sockets complement those already provided by the micro to allow up to 256K ROM space.
- Four of these sockets can support either ROM or Static RAM (up to 16K maximum RAM).
- The Model 2 board allows switching between multiples of 2K, 4K, 8K or 16K ROM/RAM.
- Fully buffered design.
- Additional features include the ability to transfer paged firmware to disc, and then load back into sideways RAM for future use — giving you no limit to the number of effective ROMs accessible!

NOW EVEN EASIER TO FIT!

- NO soldering, plug-in design.
- Fits easily inside BBC case.
- Plugs into CPU socket via short flexible connector.
- Improved plug design allows the Model 2 board to connect securely to any type of BBC CPU socket with no harm to micro or board.
- Board is held in place by sturdy supports.
- Full instructions provided.

SIR BBC ROM EXPANSION BOARD MODEL 2: PRICE £40.00 + VAT

SIR RESEARCH PRESENTS: OUR RANGE OF PERIPHERALS FOR THE NEW ACORN ELECTRON

SIRELECTRON 12-ROM BOARD

- Provides for up to 192K of ROM space (16K of this will support either ROM or RAM).
- Fully buffered design.
- Easy to install, just plugs in, no soldering necessary.
- Allows further expansion via rear edge connector.
- Permits use of most BBC ROM-based software (such as VIEW, PASCAL, FORTH, etc).
- Price: £40.00 + VAT

SIR ELECTRON PRINTER & JOYSTICKS INTERFACE

- CENTRONICS printer interface.
- Analogue-to-Digital Converter (ADC) allows use of any BBC-compatible joysticks.
- Full firmware support.
- No soldering, plug-in design.
- Built-in, versatile edge connector provides for further expansion.
- Price: £45.00 + VAT

AVAILABLE SOON: INPUT/OUTPUT PORT, RS423 INTERFACE, and more!

BBC MICROCOMPUTER

BBC Model B.....	£399.00
BBC Model BD.....	£469.00

DISC DRIVES

Single 100K.....	£199.00
Dual 100K.....	£349.00
Dual 400K.....	£669.00

PRINTERS

Dot Matrix:	
Shinwa CP-80.....	£263.32
Epson RX-80.....	£275.00
TX-10 F.T.....	£289.00
Epson TX-80.....	£399.00
Daisywheel:	
Smith-Corona TP1.....	£258.75
Juki 6100.....	£399.00

MONITORS

Sanyo B/G 12".....	£85.00
Microvitec 14" RGB.....	£229.00

SOFTWARE

We have over 200 titles currently in stock including RCM based programs such as VIEW (£59.80), HCCS PASCAL (£49.50), Computer Concepts' GRAPHICS ROM (£39.95), WORDWISE (£39.95) and DISC DOCTOR (£25.95). Please telephone for full details of software range and current stock.

TORCH UNICORN RANGE

CP/M compatible extensions to the BBC Microcomputer System:

ZEP 100: Z80 2nd processor card; 48K RAM; FREE SOFTWARE.....£375 + VAT

ZXP 280 Disc Pack: ZEP 100; 2 x 400K floppy disc drive; FREE SOFTWARE.....£839 50

ZHDP-20: 6800 processor; 20 Megabyte hard disc drive; 400K floppy disc drive full System 3 UNIX Operating System.....£2,895 + VAT

Also: As ZHDP-20 but with basic UNIX.....£2,400 + VAT

TORCH C-500: Complete self-contained unit (NO BBC MICRO REQUIRED) comprising BBC Micro system, ZDP, hi-res colour monitor & British Telecom-approved communication card.....right us for a competitive quotation.

FREE 'PERFECT' SOFTWARE: Perfect Writer (word processor); Perfect Calc (spreadsheet); Perfect Filer (database filing system); plus 'COMANEX' business management game. Complete software package normally worth about £1,000!!

THE MEMOTECH MTX SERIES THE ALL-PURPOSE SYSTEM

A new departure in micro-computer technology, the Memotech MTX series is already capable or very easily adaptable to almost every application. Just glance through the standard features below...

HARDWARE — 32K RAM on the MTX500, 64K on the MTX512 RAM expandable to 512K 40 column text 265/192 high-resolution graphics with all 16 colours available 32 easily moveable user defined graphics characters Sprites electronics printer port two joystick ports cassette port 11%0 port separate TV and Video Monitor ports 4 channel sound with hi-fi output real time clock full-moving 79 key keyboard with numeric keypad and 8 twin-function keys plus dedicated cartridge port

SOFTWARE — 24K ROM contains as standard languages: MTX BASIC, MTX LOGO commands, NODDY (authoring language); ROM routines include ASSEMBLER/DISASSEMBLER and screen display of Z80 CPU registers, memory and program which can be manipulated from the keyboard; machine code programs are easily called from BASIC; Virtual Screen facility enables up to eight sections of screen to work independently with full screen facilities; PASCAL is available as an add-on ROM pack.

MEMOTECH MTX 500.....	£275.00
MEMOTECH MTX 512.....	£315.00

We have a range of alternative Word Processing/Business packages based around the BBC Microcomputer system available at special prices. The following two systems represent our best value Basic and Executive packages:

Basic Package:

BBC Micro (with disc interface & word processor ROM);
100K single disc drive;
Smith-Corona TP-1 Daisywheel printer;
Back/Green 12" monitor;

ONLY £1,066 (incl. VAT)

Executive Package:

BBC Micro (with disc interface);
TORCH Z80 disc pack with 'WORDSTAR' wordprocessor program;
Juki 6100 Daisywheel printer;
Back/Green 12" monitor;

ONLY £1,799 (incl. VAT)

The above packages are also available as expansions for those users already owning a BBC Micro at suitably reduced prices.

Please telephone us for a quotation.

All our prices are inclusive of VAT unless stated otherwise.

Postage and Packaging

Please add £1 P&P (small items: ROM Boards, etc.); £10 P&P large items: Printers, Monitors, etc.)
Access/Barclaycard Telephones orders welcome.

SIR COMPUTERS Ltd.

91 Whitchurch Road, Cardiff CF4 3JP

Telephone: Cardiff (0222) 621813



Program B.

```

5 CLEAR 29148
10 DATA "c32473f30609c578cd327
25e235623e521af15011500ed0e11bc
d2a/215cd2a/2cd2a723e801213cd2a7
23e0d12133e801223235e23562b2b2b1
bcd2a72c110c5af32b05c3e06ed47ed5
efbc973237223c95ab05ccb271747178
016005f21487119c9cd"
11 DATA 13291
20 DATA "2f72dd214f5cdd6e72dd2
1575cdd6e72dd21535cdd6e72dd214b5
cdd6e72dd21595cdd6e72dd21b25cdd6
e72c9fcdcb4744280b5e235623cd7300d
d7201c9dd5e00dd560173237223c9cd4
072d5ebd5b3d5cafed52223d5c2a4f5
ce53ah15c37h05cfdcb"
21 DATA 14526
30 DATA "47c6cd4072d12a515cafe
d52ed5b4f5c1922515c2ab25ced5b3d5
cafed52223d5cd1cd0f73210000226c5
c220b5cdd6b0162a3d5c7efe032810232
3ed5bb25c1b1b1b732372fcdcb47d63a2
b74fef280832445c3eff322b742a615
c2b22555c210000226e"
31 DATA 13910
40 DATA "5caf32705cc9626bafed7
2444d0303ced5bb25cedb81313ebf9c

```

```

9fff3f5c5d5e5dce5fd36470001fe7fe
d781f38751f3872112c743e03cda1743
ae271c630cdcb743a3b5c5f5dcb01dea
f32085ccdbf02f1323b5cfdcb01ae3a0
85cfe50281bfef702817"
41 DATA 14624
50 DATA "fe61cad4742:e271d6303
8d24604b830cd21b05cbe200e3ab05cf
53e02112c74cda174181232b15c45cdc
b731f38113e01112c74cda174f1c630c
dbc74cdbe73fcdcb475e2008dde1e1d1c
1f1fbc9fbc+0c06012100fa2b7cb520f
b10f6c921e271fd3647"
51 DATA 14100
60 DATA "003ab15c4604b83818f57
e32b15c112c74afcd174f1c630cdcb7
43e01323a5cc932b15ca718092104002
2425c322b74cd8a723ab15ca7201ffdc
b475628153eccc810f3e34cd810f3e0
d32085cfdcb01ee1804fcdcb47deaf9f
fff20202020202020202020202020202
61 DATA 13765
70 DATA "20202020202020204e4f205
35543482050574f477e4f202020202020
02020202020202020202020202020202
02050726f672e4f2020202020202020202
0202020202020202020202020202020202
26f672eff41314e45572d2d503d45534
34150452d2d2d2d5052"

```

```

71 DATA 11448
80 DATA "4f472a3470302df471014
022d07421201822d274cd410c1ae67fc
dbc74131a8730f5c9d52ad074ed4bd27
4cd240b22d074ed43d274d1c91e40031
82ab25c363e2bf92b2b223d5c2a4f5cf
bc33812ed56c9ed5ec9"
81 DATA 11580
5000 LET c=0: LET f=29149
5010 FOR h=1 TO 8: READ a$
5020 FOR s=1 TO LEN a$: STEP 2
5030 LET a=CODE a$(s): LET b=CODE
E a$(s+1)
5040 LET c=c+b+a
5050 IF a>96 THEN LET a=a-39
5060 IF b>96 THEN LET b=b-39
5070 LET a=a-48
5080 LET b=b-48
5090 POKE f,a*16+b
5100 LET f=f+1
5110 NEXT s
5111 PRINT h
5120 READ tot: IF tot<>c THEN PR
INT "Error at line ";h+10: STOP
5125 LET c=0
5130 NEXT h
5131 IF f>29933 THEN PRINT "wro
ng number of data bytes": STOP
5200 SAVE "code"CODE 29149,800

```

(continued from page 103)

Spectrum programmer the benefit of having up to 10 Basic programs stored in the computer at any one time—a facility normally found only on more expensive machines. Each program is directly accessible by two simple key strokes. Also, jumps to particular lines in different programs can be made from any Basic program. For example you might jump from line 200 of program 4 to line 50 of program 6. Thus program 1 might be used as a menu, calling up games or utilities stored in programs 2-9.

The program is easily stored in the computers: Type in program A and save using line 9998 then type in program B. When this runs error free save the code, after program A on the tape.

When loaded, program A will auto-run picking up the code from program B. You will then be asked how many programs you want 1-9. Having selected a number you will then step through each program deciding how many bytes to allocate. A minimum is 200, the maximum number of bytes is determined by the memory you have free. Once a fixed amount of memory is allocated to each program, it is not possible to change this without deleting all the programs.

Finally you will be asked which program you wish to initially select. Having selected a program, program A will "disappear" leaving you with a blank Basic program ready for your programming. Program A can be recalled at any time by selecting program 0.

If program 0 is selected using keys it will autostart at line 4. If you are sure you will not need to reassign memory to the programs. Incidentally, this has the effect of Newing all the programs other than program 0 at one go. You can New program 0. There is little point though since you have nine other program stores at your disposal.

The multiprogram routine uses the interrupts to check the keys pressed. To change the program you are currently handling simply press Capshift and Break/Space.

You will then be given the following message:



A = NEW P=ESCAPE----- WHICH
PROG? X

where X is the number of programs you are handling. Pressing P will bring you back to your current program. Key A will New the current program.

Do not use the Sinclair New command as this may crash the computer. Otherwise selecting a number will exchange your current program with the program selected. All the program variables, current data read position and Microdrive channels of the old program will be saved. It is therefore very easy to hop between programs.

Switching programs

The other way to switch programs is from within a program itself. Use the following method to do this:

```

Routine C 9000 POKE 23619, NT
(L/256): POKE 23618,
INT (256 * L/256 -
PEEK 23618)
9010 POKE 29739,S
9020 POKE 23729,P
9030 RAND USR 29642

```

where L = line number to jump to; S = statement number — normally C and P = program.

Thus for a menu routine which calls three different programs you might use the following method:

```

10 PRINT "GAME 1"
20 PRINT "GAME 2"
30 PRINT "GAME 3"
40 INPUT "WHICH GAME 1-3 ?" : P
50 LET S = 0 : L = 0
60 GO TO 9000 Routine C)

```

For those of you who program in machine

code it is still possible to have a RAMtop area free for code. Do this by altering the variable RTO? in line 22 of program A.

Different programs occur at different places in memory so the first byte of a line 1 Rem statement is not necessarily 23760.

When using the printer you will need to turn the interrupt routine off. Do this by typing:

RAND USR 29827

Turn it on again by typing:

RAND USR 29830

You can jump between programs with the interrupt routine turned off using Routine C.

The following is a list of subroutines used by the machine code routine:

Address	Function
29149	Interrupt vector sends interrupt routine here. JP to 29475.
29152	Initialisation routine
29226	Number store routine for above
29231	Calculates address of system variable storage area for each program
29248	Routine to either retrieve or store necessary system variables
29322	Main routine to swap system variables
29455	Routine to move machine stack below new program RAMtop
29475	Interrupt routine
	— Reads keyboard + check for Capshift, Space/Break
	— Waits for P, A or number
	— Calls different routines depending on what is entered
29630	Delay loop
29643	Main routine which calls swap routine 29322 and checks for errors. If the program number is too high an error message will be given
29857	Print a string routine
29883	Print a character routine
29927	Int. routine off
29930	Int. routine on

For tape copies of the program please send £2.30 and a stamp addressed envelope to Mark Jones, 17 Park Walk, London SW10 0AS. Please state that you require Multiprogram.

ELECTRON USER...



See us on Stand 134



...this is the add-on you have been waiting for.

A switched joystick interface for the Electron user.

Only £24.95 incl. VAT

- Compatible with all "Atari-style" 9-pin joysticks
- Plug in cartridge design
- Tough plastic casing
- Does not interfere with keyboard operation
- Available from your dealer or direct by mail order
- 12 month guarantee
- Games coming soon from most software houses
- Extends the versatility of your Electron computer

STOP PRESS - Now available for use with our interface "Cylon Attack" by A&F Software



First Byte, Dept. VC,
10, Castlefields,
Main Centre, Derby.
DE1 2PE Tel: Derby
(0332) 365280

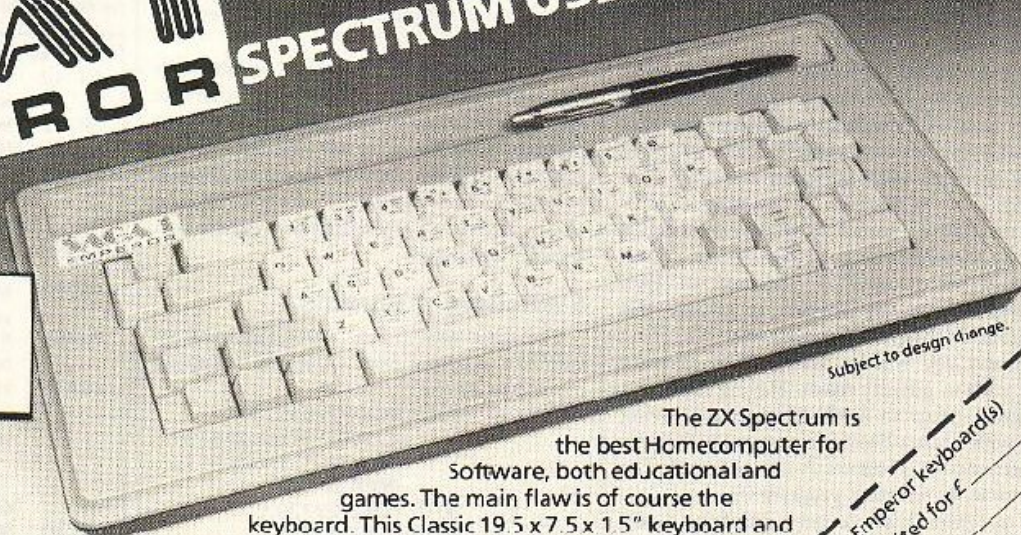
A Genuine First Byte Add-on

MAIL ORDER FORM
First Byte S-J Interface
I wish to pay by ☐ Access ☐ Visa
I enclose a cheque made payable to F B C Systems Ltd.
No. _____ Expiry date _____
Name _____ Address _____
Tel. _____

**SAGA III
EMPEROR**

SPECTRUM USERS!

**£54.45
EACH
+ £1.15
FOR POST & PACKING**



**NEW
ZX81
SPECTRUM
KEYBOARDS...
APPLE II
COMPATIBLE
COMING SOON**

WOKING COMPUTER CENTRE

32 Chertsey Road, Woking, Surrey. Telephone: Woking (048 62) 23845

The ZX Spectrum is the best Homecomputer for Software, both educational and games. The main flaw is of course the keyboard. This Classic 19.5 x 7.5 x 1.5" keyboard and housing are designed to accommodate the ZX81 and Spectrum personal computer. A professional full size "Qwerty" keyboard has been designed, with full travel keys and a full size space bar. Special functions are strategically placed for rapid programming and ease of use. Designed today for users of tomorrow, you can play the fastest of games with the greatest of ease. Its easy to assemble too, you need 1 Screwdriver and 5 Minutes — Simple! Available in a White or Beige housing with grey and white key caps.

Please send me:
I enclose Cheque/P.O. payable to Saga Systems Limited for £ _____
or: Please debit my Access/Barclaycard for £ _____

Card Number _____
Signature _____
Name _____
Address _____

Please fill in this coupon and your address (which is also block letters) to ensure prompt delivery.

QL

Competition



SINCLAIR'S NEW QL micro has generated more excitement than any of his previous computers so *Your Computer* is giving you a chance to win one.

The biggest selling point of the QL will not be the massive 128K RAM, nor the fast 68000 32-bit processor at its core, nor even the QL's ability to put windows up on screen with different programs running in them.

Everything in a package

No, the best thing about the QL is that everything comes in one package. For £400 you will have a computer with two built-in microdrives to give mass storage which comes with four pieces of software, the Quill word

processor, Abacus spreadsheet, Archive filing system and Easel for displaying charts.

All you need to do is add a printer of your choice to put together a complete system. Compare Sinclair's tidy QL box with the spiders web of wires and desk full of expansion RAMpacks, drives and interfaces which you would need to achieve that sort of performance from most micros.

Here's the catch

Here's the catch — that's exactly what we want you to do compare the set-up you have at present with the QL. Fill in the coupon and then in the space for the "before" picture sketch an outline of what your system looks like at the moment.

If you would rather you can draw it on another piece of paper and paper: clip it to the coupon or even enclose a black and white or colour photograph of your set-up.

RULES

- The winner of the competition will be the person who sends in the sketch or photo which most amuses the editor and in the view of the editor, completes the unfinished sentence in the most interesting way.
- The name of the winner will be printed in the June issue of *Your Computer*.
- All entries must arrive at the *Your Computer* offices by the last working day in April 1984.
- Each person may enter the competition only once.
- Entries to the competition cannot be acknowledged.
- No employees of Business Press International or their relatives may enter the competition.
- The decision of the editor is final.
- No correspondence on the result of the competition will be entered into. Business Press International assumes no responsibility or liability for any complaints arising from this competition.

WIN A SINCLAIR QL COMPETITION

Before

After

If you want to win the new Sinclair QL in addition to putting in your sketch or photo you must complete this sentence in 12 words or fewer and send this coupon to *Your Computer*, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. "I think the QL in Sinclair QL stands for

Name _____

Address _____



PSYCLAPSE & BANDERSNATCH

COMMODORE 64

48K SPECTRUM

REINFORCEMENTS ARRIVE!



After eight weeks of total concentration by our four master programmers Psychlapse & Bandersnatch, the two most original computer games ever conceived are entering the final phase of creation. Now the Imagine 'A Team' have been joined by (from left to right) Steve Cain, Ally Noble, Dawn Jones, Abdul Ibrahim and Fred Gray.

Steve, Ally and Dawn are three of the most accomplished graphic artists in the country and Abdul and Fred are two highly respected musicians.

Their task is to enhance these magnificent games with dazzling animation, stunning effects and electrifying music.

Psychlapse & Bandersnatch, a treat for your senses, coming soon from Imagine.



Imagine Software Limited, 5 Sir Thomas Street, Liverpool, Merseyside L1 6BW. Dealer Enquiries Contact Sharon O'Brien on 051-236 8100 (20 lines).

SNAPMAN

AFTER SEEING A version of the Pac-Man game in action, I decided to write a version for the Commodore 64, and this is the result.

Graphics are very extensive. There are two different mazes produced from user-defined graphics, containing pills and power pills, each worth 10 points. Also, at random intervals, fruit appears beneath the ghosts' lair, and can either be a cherry — 100 points, strawberry — 500 points, or the Commodore logo — 1000 points. There are four multi-colour ghosts with mobile eyes and edible bodies, and one Snapman.

Movement of the Snapman is controlled by a joystick — port one — or the keyboard. Ghosts have the logic for angry, fearful, random or homeward motion, and move at half speed after you eat a power pill. They flash white when they are about to return to normal. They can also hide beneath one another to confuse you.

The Snapman scenario

If the details above have persuaded you that the game is worthwhile, here is its scenario: You are a little hungry Snapman, lost in the food maze. To keep going you must eat the pills and fruit of the maze, while at the same time avoiding the angry ghost monsters, whose touch means death. However, you do have a weapon against them. They become edible when they turn blue after you have eaten a large power pill — ghost scores are 1st: 200; 2nd: 400; 3rd: 800; 4th: 1600. After all the pills in one maze have been eaten, you escape to a new and faster maze. This continues until all your three lives are lost.

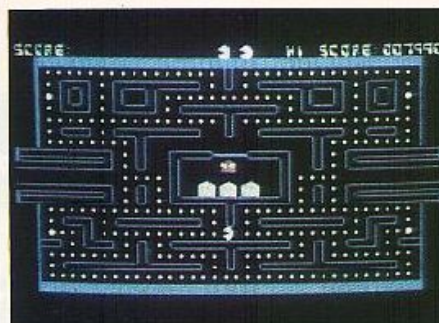
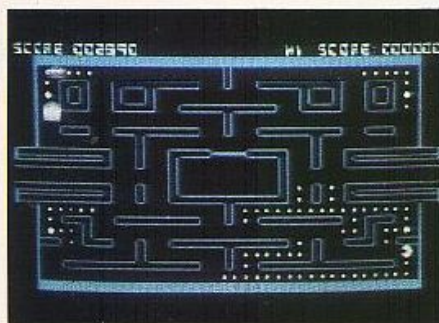
Snapman comes in two parts, a Basic section to handle registers, the maze and scoring, and a code section which stores graphics and the main game. The code is loaded as a set of hexadecimal numbers.

To help with entering the code, I have included a third program. If you Run it, you can start at any point along the code and enter the numbers. After you have finished, use

RUN 700

This will display totals of numbers in the sections of memory, and the correct totals. If these do not agree, there is an incorrect

David Rees gets to grips with the grizzly ghosts.



number in that section of memory. You can then use

RUN 900

This gives a screen listing from any point along the code, in the same format as the magazine listing, and you can use it to find the mistake.

After the mistake has been found, you can use the first input routine to correct it. Finally, when you think that all the code is correct, you can save it directly after the Snapman Basic program on the tape by using

RUN 1100

It is best to save the code after the Basic, because the program loads the code shortly after you have Run it.

If there is still something wrong with the code after it has been saved, use the Basic Snapman program to Load the code, stop the Basic, Load the input program, and carry on

as if you had found a mistake as above.

My highest score on the standard game is 224640. However, if you want to make it harder — or easier — for yourself, it's fairly easy to change the format of the game for your own use.

L gives the number of lives that you have left. Although only a maximum of two lives are displayed on the screen, L can be any number in the floating point range. Also, in line 540, the Stop and Restore keys are disabled, to stop anyone from ruining the game just when you are reaching a record score. If you want to be able to stop the game, simply change the number at the end of the line to 255.

TD is another important variable, controlling the speed of the main program, with a normal value of 2048. However, if the start speed is too fast all you have to do is increase TD, and for a more challenging game, simply reduce TD. For the fastest game possible, TD should equal zero, where the speed will be 300 moves per second. Also, if you want the speed to increase at a different rate, simply change the number 100 in line 5110.

Loading graphics into RAM

SC controls the type of maze used, so if you want to use only the big maze or the small maze, keep SC constant by changing line 5120. By varying this line, mazes can appear in any order, and by changing lines 860-900, provision can be made for more mazes to be added in the gap between 2000 and 4899.

Care does have to be taken with one section of the program, lines 45 to 95. This loads normal graphics into RAM. To do this, Input/Output memory has to be switched out of main memory. This means that functions, like key input, must be switched off, so if there is an error in this section of program, there is no way to restart the computer, except by switching it off and then on.

Finally, if the program seems too long to type in, and you would prefer to receive it on a C15 cassette, send your name, address, and £3 to: David Rees, The Georgian House, Brooks Close, Weybridge, Surrey KT13 0LX.

Hex loader.

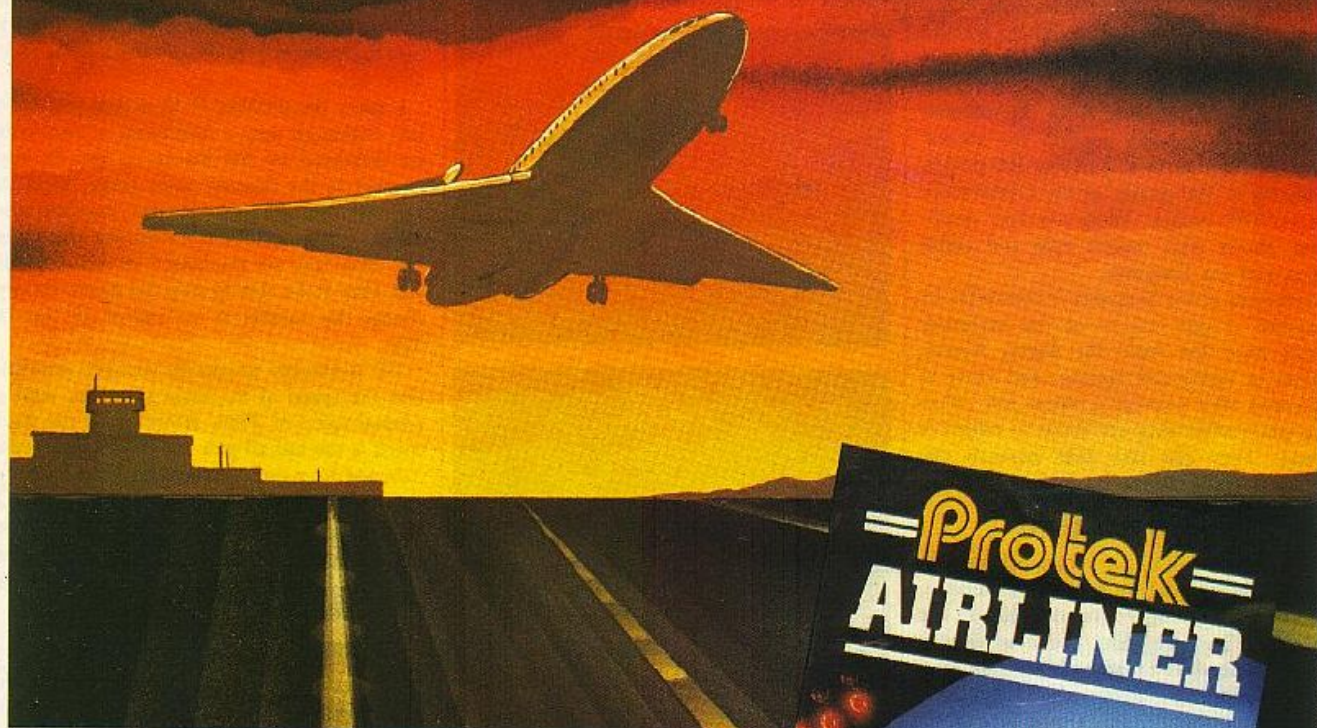
```
1: REM*****
2: REM*HEX CODE INPUT*
3: REM* PROGRAM *
4: REM* INCLUDING *
5: REM* ROUTINES FOR *
6: REM*CHECKS +SAVING*
7: REM* BY *
8: REM* DAVID REES *
9: REM*****
10: REM*ENTER NUMBERS*
11: GOSUB500
12: POKES2,55:POKES6,55:GOTO200
13: B=0:K=14#1024:J=20591
14: INPUT"START POSITION",A$
15: IF LEN(A$)<4 THEN GOTO 30
16: FORN=1 TO 4
17: B=B+MID$(A$,N,1)
18: FORM=0 TO 15
19: IF B$=A$(M) THEN J110
20: NEXT M
21: B=B+(2+(4*(4-N)))#M
```

```
120: NEXTN
130: IF ECKOR(B) THEN GOTO 20
140: RETURN
200: GOSUB20
210: GOSUB500:PRINTB$
220: GOSUB550:FN=16 THEN GOTO 220
230: C=FN#16:PRINTA$
240: GOSUB550:FN=16 THEN GOTO 240
250: POKES,B+N:B=B+1:PRINTA$
340: IF ECK(J) THEN GOTO 10
350: END
500: DIMA$(15)
510: FORN=0 TO 9:A$(N)=RIGHT$(STR$(N),1):NEXT N
520: FORN=10 TO 15:A$(N)=CHR$(N+55):NEXT N
530: RETURN
550: GETA$:IF A$="" THEN GOTO 550
560: FUNN=0 TO 15:IF A$(N)=A$(N) THEN K110N
570: NEXT N
580: N=16:RETURN
600: C=INT(15/2):D=(BAND240)/16
610: E=(BAND36+0)/256:F=(BAND28672)/4096
620: B$=A$(C)+A$(E)+A$(D)+A$(F)
630: RETURN
699: REM*CHECKSUMS*
```

```
700: M$(0)="3800":M$(0)=14336:M$(1)="3800"
710: M$(1)=15104:M$(2)="4000":M$(2)=16384
720: M$(3)="4400":M$(3)=17408:M$(4)="4800"
730: M$(4)=18432:M$(5)="4800":M$(5)=19200
740: M$(6)="5000":M$(6)=20480:M$(7)="50D3"
750: M$(7)=20691
760: T(0)=67588:T(1)=83622
770: T(2)=107791:T(3)=114244
780: T(4)=99513:T(5)=135898
790: T(6)=22370
800: FORN=0 TO 6
810: T(0)=A$(N):B$(N)=M$(N)
820: FORM=ATC:B=T+PEEK(M):NEXT M
830: PRINTM$(N) TO "M$(N+1)"
840: PRINT" CORRECT="T(N),"ACTUALLY="T
850: NEXTN
899: REM*PEEK CHECK*
900: GOSUB500:GOSUB20
910: E=BAND32768
920: GOSUB500
930: FORM=0 TO 7
940: F=PEEK(B+M):Q=PAND15:R=(BAND240)/16
```

(Hex loader continued on page 111)

HIGH FLYING EXCITEMENT FROM PROTEK.



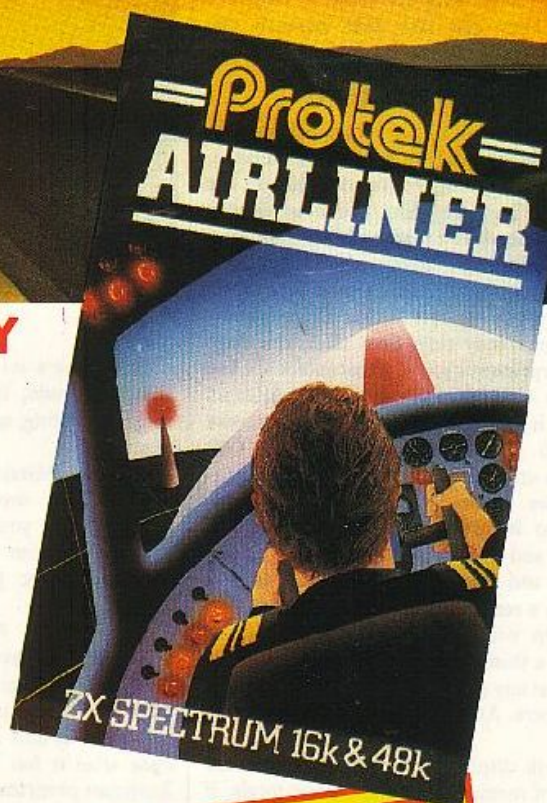
HAVE YOU THE SKILL TO FLY AND LAND AN AIRLINER?

From take off to touch down you're in control. Flight control is totally in your hands. Keeping your aircraft in full flight will be as complex as controlling the real thing.

You'll be able to take off, manoeuvre, navigate, and land the aircraft using realistic aircraft controls. You'll chart your present position on a map or view the runway as you land without losing sight of vital instruments.

In fact, you'll hardly be able to tell the difference thanks to 'Airliners' range of features.

Have you got what it takes to be a high flyer?



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

£5.95
Available for the BBC
and Commodore 64 soon.

Protek=

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




```

1100 FORN=0TQ35
1110 READR POKE40704+N,A
1120 NEXTN
1130 SYS40704
1200 DATA169,56,133,252,165,81,133,254
1210 DATA169,133,251,133,253
1220 DATA162,1,160,255,32,186,255
1230 DATA169,0,32,189,255,169,251
1240 DATA166,253,164,254,32,216,255,96

```

```

950 B$=B$+" "+A$(R)+A$(Q)
960 NEXTM
970 PRINTB$:B=3+B
980 IFB>J+8THENEND
990 GETF$:IF A$="" THEN990
1000 GOTO920
1099 REM*SAVE*

```

```

0100 00105010
0101 FORM=7107STEP=0.2 POKEV+35,N NEXTN
0110 1010=100 IF D(1)NEXTN
0120 00105020
0130 00105030
0140 00105040
0150 00105050
0160 00105060
0170 00105070
0180 00105080
0190 00105090
0200 00105100
0210 00105110
0220 00105120
0230 00105130
0240 00105140
0250 00105150
0260 00105160
0270 00105170
0280 00105180
0290 00105190
0300 00105200
0310 00105210
0320 00105220
0330 00105230
0340 00105240
0350 00105250
0360 00105260
0370 00105270
0380 00105280
0390 00105290
0400 00105300
0410 00105310
0420 00105320
0430 00105330
0440 00105340
0450 00105350
0460 00105360
0470 00105370
0480 00105380
0490 00105390
0500 00105400
0510 00105410
0520 00105420
0530 00105430
0540 00105440
0550 00105450
0560 00105460
0570 00105470
0580 00105480
0590 00105490
0600 00105500
0610 00105510
0620 00105520
0630 00105530
0640 00105540
0650 00105550
0660 00105560
0670 00105570
0680 00105580
0690 00105590
0700 00105600
0710 00105610
0720 00105620
0730 00105630
0740 00105640
0750 00105650
0760 00105660
0770 00105670
0780 00105680
0790 00105690
0800 00105700
0810 00105710
0820 00105720
0830 00105730
0840 00105740
0850 00105750
0860 00105760
0870 00105770
0880 00105780
0890 00105790
0900 00105800
0910 00105810
0920 00105820
0930 00105830
0940 00105840
0950 00105850
0960 00105860
0970 00105870
0980 00105880
0990 00105890
1000 00105900

```

```

10 1000000
11 10 045240 11155(99)
24 POKEV=32:8:POKEV=31:0
34 PRINT "*****"
45 IF EDCUT=0:GOTO 142
46 POKE3231:FEED=52314:POKE25
55 POKE17:17AND255
61 FOR=0:101:POKE14:3268:PEEK(1453248):NEXT
62 FOR=0:104:PEEK1:POKE107015
63 POKE12576:14531:PEEK(51248+POB*N)2
70 NEXTN=1
71 FOR=0:10:READA:POKE1-8737
72 POKE12556+4831:PEEK(1453248+POB*N)1
85 NEXTN=1
95 DAT151.14.1.15.15.95.195
96 POKE1:PEEK(17344:POKE55134:PEEK(515344)30
100 POKE=2:0
110 POKE14:POKE182:44
120 POKE55:8:POKE156:44
130 POKE107015
140 REMOR POKE33936+N:R
150 NEXTN
160 IN R162:1.162.255.162.255.162.255
170 IN R16169.93.169.255.162.255.169.255
180 IN R52:125.255.96
195 FOR=0:105:POKE14:3268:PEEK(1453248):NEXT
200 POKE107015:PEEK310:PEEK1
210 PR NT "BLORDID QZ DATA"
220 51533353
230 POKE14569:24:POKE14569:6:POKE14569:6:POKE1466:54
240 POKEV=24:28:POKEV=35:5:POKEV=17:PEEK(1453248):POKEV=35:6
250 NT "*****"
260 PR NT "135791113151719212325"
270 PR NT "135791113151719212325"
283 PR NT "135791113151719212325"
295 PR NT "135791113151719212325"
305 PR NT "135791113151719212325"
315 PR NT "135791113151719212325"
325 PR NT "135791113151719212325"
335 PR NT "135791113151719212325"
345 PR NT "135791113151719212325"
355 PR NT "135791113151719212325"
365 PR NT "135791113151719212325"
375 PR NT "135791113151719212325"
385 PR NT "135791113151719212325"
395 PR NT "135791113151719212325"
405 PR NT "135791113151719212325"
415 PR NT "135791113151719212325"
425 PR NT "135791113151719212325"
435 PR NT "135791113151719212325"
445 PR NT "135791113151719212325"
455 PR NT "135791113151719212325"
465 PR NT "135791113151719212325"
475 PR NT "135791113151719212325"
485 PR NT "135791113151719212325"
495 PR NT "135791113151719212325"
505 PR NT "135791113151719212325"
515 PR NT "135791113151719212325"
525 PR NT "135791113151719212325"
535 PR NT "135791113151719212325"
545 PR NT "135791113151719212325"
555 PR NT "135791113151719212325"
565 PR NT "135791113151719212325"
575 PR NT "135791113151719212325"
585 PR NT "135791113151719212325"
595 PR NT "135791113151719212325"
605 PR NT "135791113151719212325"
615 PR NT "135791113151719212325"
625 PR NT "135791113151719212325"
635 PR NT "135791113151719212325"
645 PR NT "135791113151719212325"
655 PR NT "135791113151719212325"
665 PR NT "135791113151719212325"
675 PR NT "135791113151719212325"
685 PR NT "135791113151719212325"
695 PR NT "135791113151719212325"
705 PR NT "135791113151719212325"
715 PR NT "135791113151719212325"
725 PR NT "135791113151719212325"
735 PR NT "135791113151719212325"
745 PR NT "135791113151719212325"
755 PR NT "135791113151719212325"
765 PR NT "135791113151719212325"
775 PR NT "135791113151719212325"
785 PR NT "135791113151719212325"
795 PR NT "135791113151719212325"
805 PR NT "135791113151719212325"
815 PR NT "135791113151719212325"
825 PR NT "135791113151719212325"
835 PR NT "135791113151719212325"
845 PR NT "135791113151719212325"
855 PR NT "135791113151719212325"
865 PR NT "135791113151719212325"
875 PR NT "135791113151719212325"
885 PR NT "135791113151719212325"
895 PR NT "135791113151719212325"
905 PR NT "135791113151719212325"
915 PR NT "135791113151719212325"
925 PR NT "135791113151719212325"
935 PR NT "135791113151719212325"
945 PR NT "135791113151719212325"
955 PR NT "135791113151719212325"
965 PR NT "135791113151719212325"
975 PR NT "135791113151719212325"
985 PR NT "135791113151719212325"
995 PR NT "135791113151719212325"

```

[illegible]

3300	00	00	00	18	00	00	00
3308	FF	FF	FF	FF	FF	FF	00
3310	FF	FF	FF	FF	FF	FF	00
3318	FF	FF	FF	FF	FF	FF	00
3320	FF	FF	FF	FF	FF	FF	00
3328	FF	FF	FF	FF	FF	FF	00
3330	00	07	00	00	00	00	00
3338	F0	F0	F0	F0	F0	F0	00
3340	0F	0F	0F	0F	0F	0F	00
3348	00	FF	00	00	00	FF	00
3350	00	FF	00	00	00	00	00
3358	00	FF	00	00	00	F0	00
3360	00	E0	30	30	30	30	00
3368	00	C0	00	00	00	00	00
3370	30	30	30	30	30	30	00
3378	00	C0	00	00	00	07	00
3380	30	0F	00	00	00	0F	00
3388	00	FA	00	00	00	FF	00
3390	30	30	30	30	30	E0	00
3398	00	07	00	00	00	07	00
33A0	00	E0	30	30	30	E0	00
33A8	F0	FF	F0	F0	F0	FF	00
33B0	F0	FF	00	00	00	FF	00
33B8	00	E0	30	1F	30	E0	00
33C0	00	00	FF	FF	00	00	00
33C8	00	07	00	F0	00	07	00
33D0	0F	FF	0F	0F	0F	FF	00
33D8	0F	FF	01	01	01	FF	00
33E0	00	FF	00	00	00	FF	00
33E8	00	FF	01	01	01	FF	00
33F0	F0	FF	FF	FF	FF	FF	00
33F8	00	FF	FF	FF	FF	FF	00
3300	00	00	00	00	00	00	00
3308	0F	FF	FF	FF	FF	FF	00
3310	00	00	00	00	00	00	00
3318	3E	20	23	3E	03	3F	00
3320	3E	20	23	20	30	30	00
3328	3E	22	22	22	32	32	00
3330	3E	22	22	3C	24	32	00
3338	3E	20	23	3E	30	3E	00
3340	00	00	13	3C	3C	18	00
3348	00	01	02	02	1E	1A	00
3350	00	00	03	40	38	60	00
3358	01	07	0F	07	07	03	00
3360	00	E0	53	30	E0	C0	00

3368	03	0F	1C	18	18	1C	0F	03
3370	00	00	E0	C0	C0	E0	00	00
3378	00	00	00	00	00	00	00	00
3380	7E	42	42	62	62	52	7E	00
3388	10	10	10	18	18	18	10	00
3390	7E	02	02	7E	60	50	7E	00
3398	7E	02	02	7E	06	06	7E	00
33A0	48	48	48	7E	18	18	48	00
33A8	7E	40	40	7E	06	06	7E	00
33B0	40	40	40	7E	62	52	7E	00
33B8	7E	02	02	02	06	06	00	00
33C0	7E	42	42	7E	46	46	7E	00
33C8	7E	42	42	7E	06	06	00	00
33D0	00	00	10	00	00	10	00	00
33D8	1C	7F	FF	1F	07	1F	07	7E
33E0	00	00	00	00	00	00	00	00
33E8	F3	F6	F7	F6	F3	F8	F3	F8
33F0	F3	F8	F8	F8	F3	FD	FC	FC
33F8	F7	F7	F7	F7	00	00	7F	7F
3400	22	22	22	3E	32	32	32	00
3408	7F	7F	00	00	7F	7F	00	00
3410	FF	FF	00	00	FF	7F	00	00
3418	7F	7F	00	00	7F	7F	00	00
3420	FF	FF	00	00	FF	FF	00	00
3428	7F	7F	00	00	7F	7F	00	00
3430	FF	FF	00	00	FF	FF	00	00
3438	7F	7F	00	00	7F	7F	00	00
3440	CD	A8	03	F0	06	0D	A9	A3
3448	8	90	27	8D	FB	03	C9	00
3450	F0	06	29	02	C9	00	D0	00
3458	AD	9C	03	18	69	02	18	0D
3460	A9	A3	18	9A	P6	AD	9A	A3
3468	8D	A9	03	49	E1	18	8D	AC
3470	03	60	C9	00	F0	06	29	02
3478	C9	00	D0	0D	FD	9C	03	18
3480	69	02	18	8D	FB	03	18	90
3488	06	AD	9A	03	ED	AB	03	49
3490	01	18	8D	AC	E3	06	00	00
3498	7F	7F	00	00	7F	7F	00	00
34A0	FF	FF	00	00	FF	FF	00	00
34A8	7F	7F	00	00	7F	7F	00	00
34B0	FF	FF	00	00	FF	FF	00	00
34B8	7F	7F	00	00	7F	7F	00	00
34C0	9D	A9	03	49	E1	18	9D	AD
34C8	03	C9	00	F0	06	29	02	C9
34D0	00	D0	0D	AD	5C	03	18	69
34D8	02	18	8D	AC	E3	18	90	03

3AB0	HJ	YH	03	8D	AA	03	CD	AE
3AB2	03	F0	60	8D	A8	03	A3	A4
3AF0	02	B9	5C	03	AD	A7	03	AD
3AF8	AA	03	49	01	18	80	AC	03
3B00	HY	FF	50	FF	00	00	FF	FF
3B08	80	80	FF	FF	80	83	FF	FF
3B10	00	00	FF	FF	00	03	FF	FF
3B18	80	80	FF	FF	80	83	FF	FF
3B20	00	00	FF	FF	00	03	FF	FF
3B28	80	80	FF	FF	80	83	FF	FF
3B30	00	00	FF	FF	00	03	FF	FF
3B38	80	80	FF	FF	80	83	FF	FF
3B40	AF	FF	8D	02	DC	23	9F	FF
3B48	20	E4	FF	85	02	A3	7F	8D
3B50	02	IC	60	FF	00	00	FF	FF
3B58	80	80	FF	FF	80	83	FF	FF
3B60	00	00	FF	FF	00	03	FF	FF
3B68	80	80	FF	FF	80	83	FF	FF
3B70	00	00	FF	FF	00	03	FF	FF
3B78	80	80	FF	FF	80	83	FF	FF
3B80	00	00	FF	FF	00	03	FF	FF
3B88	80	80	FF	FF	80	83	FF	FF
3B90	00	00	FF	FF	00	03	FF	FF
3B98	80	80	FF	FF	80	83	FF	FF
3BA0	00	00	FF	FF	00	03	FF	FF
3BA8	80	80	FF	FF	80	83	FF	FF
3BB0	00	00	FF	FF	00	03	FF	FF
3BB8	80	80	FF	FF	80	83	FF	FF
3BC0	00	00	FF	FF	00	03	FF	FF
3BC8	AF	50	FF	FF	80	80	FF	FF
3BD0	00	00	FF	FF	00	03	FF	FF
3BD8	80	80	FF	FF	80	83	FF	FF
3BE0	00	00	FF	FF	00	03	FF	FF
3BE8	80	80	FF	FF	80	83	FF	FF
3BF0	00	00	FF	FF	00	03	FF	FF
3BF8	80	80	FF	FF	80	83	FF	FF
3C00	0A	80	00	2A	80	00	AA	AA
3C08	00	FE	FA	00	9E	78	00	AA
3C10	AA	00	AA	AB	02	AA	AS	00
3C18	AA	AA	00	88	8E	00	00	00
3C20	00	00	00	00	02	00	00	00
3C28	00	00	00	00	02	00	00	00
3C30	00	00	00	00	02	00	00	00
3C38	00	00	00	00	02	00	00	00
3C40	0A	80	00	2A	80	00	AA	AA

(Hex dump continued on next page)

3FAE

3F8E
3F8F
3F9C
3FD2
3FDE
3FE2
3FE8
3FF0
4000
4008
4010
4018
4020
4028
4030
403C
4048
404A
4050
4058
4060
4068
4070
4078
4080
4088
4090
4098
40A0
40B0
40C0
40C8
40D0
40DE
40E8
40F0
40F8
4100
4108
4110
4118
4120
4128
4130
4138
4140
4148
4150
4158
4160
4168
4170
4178
4188
4190
4198
41A0
41B0
41B8
41C0
41C8
41D8
41E0
41F0
41F8
4200
4208
4210
4218
4220
4228
4230
4238
4240
4248
4250
4258
4260
4268
4270
4278
4280
4288
4290
4298
42A0
42B0
42B8
42C0
42C8
42D0
42D8
42E0
42E8
42F0
4300
42F8
4308
4310

4320
4322
4330
4338
4344
4346
4350
4352
4356
4358
4360
4362
4364
4366
4368
4370
4372
4374
4376
4378
4380
4382
4384
4386
4388
4390
4392
4394
4396
4398
4400
4402
4404
4406
4408
4410
4412
4414
4416
4418
4420
4422
4424
4426
4428
4430
4432
4434
4436
4438
4440
4442
4444
4446
4448
4450
4452
4454
4456
4458
4460
4462
4464
4466
4468
4470
4472
4474
4476
4478
4480
4482
4484
4486
4488
4490
4492
4494
4496
4498
4500
4502
4504
4506
4508
4510
4512
4514
4516
4518
4520
4522
4524
4526
4528
4530
4532
4534
4536
4538
4540
4542
4544
4546
4548
4550
4552
4554
4556
4558
4560
4562
4564
4566
4568
4570
4572
4574
4576
4578
4580
4582
4584
4586
4588
4590
4592
4594
4596
4598
4600
4602
4604
4606
4608
4610
4612
4614
4616
4618
4620
4622
4624
4626
4628
4630
4632
4634
4636
4638
4640
4642
4644
4646
4648
4650
4652
4654
4656
4658
4660
4662
4664
4666
4668
4670
4672
4674
4676
4678
4680
4682
4684
4686
4688
4690
4692
4694
4696
4698
4700



WHO ARE *the*
LOARDS
of
WODSTEST

The first SPECTRUM
Game to feature
LANDSCAPING

(Hex dump continued from page 112)

4698	01	3E	E9	18	18	05	FE	10	49E8	4D	03	EE	4C	03	4C	C0	43	4D60	98	03	A9	00	8D	99	03	8D
4699	4A	1E	4A	18	4A	18	0A	18	49F0	C9	02	D0	05	A9	04	18	90	4D68	9A	03	60	7F	00	00	7F	7F
469A	0A	1E	0A	18	C5	FE	F0	01	49F8	00	00	00	00	00	00	18	4D70	00	00	FF	7F	00	00	FF	7F	
469B	60	A4	FD	B9	01	D0	18	69	4A00	90	0F	EE	4C	03	A9	06	18	4D78	00	00	7F	7F	00	00	7F	7F
469C	01	3E	E9	32	18	05	FE	18	4A08	00	00	00	00	FF	FF	00	00	4D80	20	C0	4C	B9	33	D0	38	ED
469D	4A	1E	4A	18	4A	1E	0A	18	4A10	FF	FF	00	00	FF	FF	00	00	4D88	01	D0	90	0C	18	8D	99	E3
469E	0A	1E	0A	18	C5	FE	F0	01	4A20	FF	FF	00	00	FF	FF	00	00	4D90	A9	00	8D	9C	23	18	90	18
469F	60	A4	FD	B9	01	D0	18	69	4A28	FF	FF	00	00	FF	FF	00	00	4D98	AD	01	DE	38	19	03	D0	18
46A0	0A	1E	0A	18	C5	FE	F0	01	4A30	FF	FF	00	00	FF	FF	00	00	4DA0	8D	9B	0C	A9	31	8D	9C	E3
46A1	60	A4	FD	B9	01	D0	18	69	4A38	FF	FF	00	00	FF	FF	00	00	4DA8	E0	01	DE	10	9D	9C	03	49
46A2	0A	1E	0A	18	C5	FE	F0	01	4A40	FF	FF	00	00	FF	FF	00	00	4DB0	01	8D	9C	03	9D	9A	03	49
46A3	60	A4	FD	B9	01	D0	18	69	4A48	FF	FF	00	00	FF	FF	00	00	4DB8	01	8D	9C	03	9D	9A	03	49
46A4	0A	1E	0A	18	C5	FE	F0	01	4A50	FF	FF	00	00	FF	FF	00	00	4DC0	ED	9B	0C	B0	13	AD	99	E3
46A5	60	A4	FD	B9	01	D0	18	69	4A58	C9	01	F0	0F	A4	FF	C0	C0	4DC8	C9	00	DE	0C	50	01	F0	0C
46A6	0A	1E	0A	18	C5	FE	F0	01	4A60	0A	D0	E7	AD	A0	03	A4	02	4DD0	AD	9C	03	18	59	02	18	60
46A7	60	A4	FD	B9	01	D0	18	69	4A68	99	5C	03	60	FF	FF	00	00	4DD8	E0	01	F0	F4	AD	9A	03	60
46A8	0A	1E	0A	18	C5	FE	F0	01	4A70	FF	FF	00	00	FF	FF	00	00	4DE0	00	00	FF	FF	00	00	FF	FF
46A9	60	A4	FD	B9	01	D0	18	69	4A78	FF	FF	00	00	FF	FF	00	00	4DE8	00	00	7F	7F	00	00	7F	7F
46AA	0A	1E	0A	18	C5	FE	F0	01	4A80	FF	FF	00	00	FF	FF	00	00	4DF0	00	00	FF	FF	00	00	7F	7F
46AB	60	A4	FD	B9	01	D0	18	69	4A88	20	40	3A	A4	02	19	5C	03	4DF8	00	00	7F	7F	00	00	7F	7F
46AC	0A	1E	0A	18	C5	FE	F0	01	4A90	8D	AA	03	AD	A0	03	8D	AD	4E00	98	0A	A8	23	00	49	A4	02
46AD	60	A4	FD	B9	01	D0	18	69	4A98	03	4C	40	4A	FF	FF	00	00	4E08	C9	01	F0	03	4C	CB	4E	A9
46AE	0A	1E	0A	18	C5	FE	F0	01	4AA0	FF	FF	00	00	FF	FF	00	00	4E10	05	99	8D	03	4C	5F	4F	00
46AF	60	A4	FD	B9	01	D0	18	69	4AA8	FF	FF	00	00	FF	FF	00	00	4E18	FF	FF	00	00	FF	FF	00	00
46B0	0A	1E	0A	18	C5	FE	F0	01	4AB0	FF	FF	00	00	FF	FF	00	00	4E20	FF	FF	00	00	FF	FF	00	00
46B1	60	A4	FD	B9	01	D0	18	69	4AB8	FF	FF	00	00	FF	FF	00	00	4E28	FF	FF	00	00	FF	FF	00	00
46B2	0A	1E	0A	18	C5	FE	F0	01	4AC0	FF	FF	00	00	FF	FF	00	00	4E30	FF	FF	00	00	FF	FF	00	00
46B3	60	A4	FD	B9	01	D0	18	69	4AC8	FF	FF	00	00	FF	FF	00	00	4E38	FF	FF	00	00	FF	FF	00	00
46B4	0A	1E	0A	18	C5	FE	F0	01	4AD0	FF	FF	00	00	FF	FF	00	00	4E40	AD	9B	03	C9	00	F0	0C	4C
46B5	60	A4	FD	B9	01	D0	18	69	4AD8	FF	FF	00	00	FF	FF	00	00	4E48	CB	4E	AD	99	03	C9	00	DE
46B6	0A	1E	0A	18	C5	FE	F0	01	4AE0	FF	FF	00	00	FF	FF	00	00	4E50	F6	AD	9B	03	C9	00	DE	EF
46B7	60	A4	FD	B9	01	D0	18	69	4AE8	FF	FF	00	00	FF	FF	00	00	4E58	A4	02	A9	04	99	8D	03	4C
46B8	0A	1E	0A	18	C5	FE	F0	01	4AF0	FF	FF	00	00	FF	FF	00	00	4E60	44	4F	00	00	FF	FF	00	00
46B9	60	A4	FD	B9	01	D0	18	69	4AF8	FF	FF	00	00	FF	FF	00	00	4E68	FF	FF	00	00	FF	FF	00	00
46BA	0A	1E	0A	18	C5	FE	F0	01	4B00	20	C0	3A	C9	FF	D0	03	4C	4E70	FF	FF	00	00	FF	FF	00	00
46BB	60	A4	FD	B9	01	D0	18	69	4B08	4E	4A	1D	AA	03	49	01	18	4E78	00	00	A2	28	20	00	41	AD
46BC	0A	1E	0A	18	C5	FE	F0	01	4B10	01	AC	23	AA	02	B9	5C	03	4E80	1B	D4	29	03	C9	00	00	00
46BD	60	A4	FD	B9	01	D0	18	69	4B18	00	00	7F	FF	00	00	7F	7F	4E88	A9	01	A4	02	99	8D	03	60
46BE	0A	1E	0A	18	C5	FE	F0	01	4B20	00	00	7F	FF	00	00	7F	7F	4E90	C9	01	F0	F4	C9	02	D0	03
46BF	60	A4	FD	B9	01	D0	18	69	4B28	00	00	7F	FF	00	00	7F	7F	4E98	A9	00	A4	02	99	8D	03	60
46C0	0A	1E	0A	18	C5	FE	F0	01	4B30	00	00	7F	FF	00	00	7F	7F	4EA0	A9	02	A4	02	99	8D	03	60
46C1	60	A4	FD	B9	01	D0	18	69	4B38	00	00	7F	FF	00	00	7F	7F	4EA8	A9	02	A4	02	99	8D	03	60
46C2	0A	1E	0A	18	C5	FE	F0	01	4B40	AD	18	4A	29	03	8D	A9	03	4EB0	FF	FF	00	00	FF	FF	00	00
46C3	60	A4	FD	B9	01	D0	18	69	4B48	49	01	18	8D	AF	03	A4	02	4EC0	A0	00	84	02	A9	02	85	FD
46C4	0A	1E	0A	18	C5	FE	F0	01	4B50	39	5C	03	8D	AF	03	A4	02	4EC8	18	90	0D	A4	02	C8	84	02
46C5	60	A4	FD	B9	01	D0	18	69	4B58	03	00	AC	03	4C	40	4A	7F	4ED0	C0	04	D0	01	60	0C	F0	13
46C6	0A	1E	0A	18	C5	FE	F0	01	4B60	00	00	7F	FF	00	00	7F	7F	4ED8	AD	10	D0	25	FD	18	8D	88
46C7	60	A4	FD	B9	01	D0	18	69	4B68	00	00	7F	FF	00	00	7F	7F	4EE0	03	9A	0A	A8	99	02	D0	13
46C8	0A	1E	0A	18	C5	FE	F0	01	4B70	00	00	7F	FF	00	00	7F	7F	4EE8	69	01	38	E9	18	1A	85	FE
46C9	60	A4	FD	B9	01	D0	18	69	4B78	00	00	7F	FF	00	00	7F	7F	4EF0	18	4A	18	4A	18	4A	18	0A
46CA	0A	1E	0A	18	C5	FE	F0	01	4B80	A9	02	8D	A9	03	AA	22	B9	4EF8	18	0A	18	0A	18	C5	FE	D0
46CB	60	A4	FD	B9	01	D0	18	69	4B88	5C	03	29	01	AT	A4	23	49	4F00	CA	B9	03	D0	A4	02	18	69
46CC	0A	1E	0A	18	C5	FE	F0	01	4B90	01	18	8D	AF	03	4C	40	4A	4F08	01	38	E9	32	18	85	FE	13
46CD	60	A4	FD	B9	01	D0	18	69	4B98	00	00	7F	FF	00	00	7F	7F	4F10	4A	18	4A	18	4A	18	0A	13
46CE	0A	1E	0A	18	C5	FE	F0	01	4BA0	00	00	7F	FF	00	00	7F	7F	4F18	0A	18	0A	18	C5	FE	D0	AB
46CF	60	A4	FD	B9	01	D0	18	69	4BA8	00	00	7F	FF	00	00	7F	7F	4F20	B9	5C	03	49	01	0D	A9	03
46D0	0A	1E	0A	18	C5	FE	F0	01	4BB0	00	00	7F	FF	00	00	7F	7F	4F28	B9	5C	03	C9	03	D0	11	93
46D1	60	A4	FD	B9	01	D0	18	69	4BB8	B9	02	8D	38	E9	AF	90	21	4F30	0A	A8	1A	20	40	4C	A4	02
46D2	0A	1E	0A	18	C5	FE	F0	01	4BC0	18	90	9B	03	AD	13	D0	25	4F38	20	80	4A	A4	02	4C	A4	02
46D3	60	A4	FD	B9	01	D0	18	69	4BC8	FD	C9	00	D0	09	8D	99	03	4F40	C9	04	D0	08	20	C0	4A	A4
46D4	0A	1E	0A	18	C5	FE	F0	01	4BD0	A9	00	8D	9A	03	63	A9	01	4F48	00	49	A4	02	C9	01	D0	15
46D5	60	A4	FD	B9	01	D0	18	69	4BD8	8D	99	03	9A	00	8D	9A	03	4F50	B9	28	D0	C9	F0	00	08	98
46D6	0A	1E	0A	18	C5	FE	F0	01	4BE0	60	A9	AF	38	F9	02	30	18	4F58	18	69	02	18	99	28	D0	20
46D7	60	A4	FD	B9	01	D0	18	69	4BE8	BD	90	03	AD	10	D0	25	FD	4F60	60	4B	4C	C8	4E	AD	1B	D4
46D8	0A	1E	0A	18	C5	FE	F0	01	4BF0	C9	00	D0	09	8D	99	03	A9	4F70	29	FE	18	C9	FC	D0	03	20
46D9																										



WE DARE YOU TO PLAY WITH THE FUTURE

1994 £6.95
(10 YEARS AFTER)
ZX SPECTRUM VS 07-48

Visions
THE NAME IN VIDEO GAMES

FANS PLEASE NOTE! ALSO AVAILABLE MAIL ORDER
FROM VISIONS (SOFTWARE FACTORY) LTD
1 FELGATE MEWS, STUDLAND STREET, LONDON W6
TELEPHONE: 01-748 7478

Visions (Software Factory) Limited software is available from Centre Soft, Currys (selected stores), Ferranti and Davenport, Greens, Laskys, Lewis Meeson, Lightning dealers Makro, Menzies, Prism dealers Record Fayre, Rumbelows, Software City, Spectrum dealers SupaSnaps (selected stores)

Keith Miles with a Basic program for the BBC Micro that makes use of EOR printing and multi-colour characters. This makes Squares shorter to type in and faster to play.

SQUARES IS A variation on an arcade game written by several software houses.

The aim of Squares is to guide your boot around the grid, colouring each line and square traversed. The values shown in the squares are added to your score as they are made. To make it interesting a monster is pursuing you. This creature will erase all lines you have coloured that do not form a part of a square. There are also immobile monsters that periodically jump to new locations which you should be careful not to run into. As you proceed to higher levels the number of these latter monsters increases as does the frequency of their movements.

The particular features of this game that make it different from most games previously written in Basic is that it makes extensive use of Exclusive Or — EOR — colour printing and multicolour characters.

Shorter and faster

When printing at the Graphics Cursor — VDU 5 — it is possible to superimpose defined or any other characters on top of each other. Using different colours for the different features of the character to be created, the character is assembled by moving the cursor to the required location and successively selecting the foreground colour of the part of the character to be printed, printing it and moving the cursor back over the character.

In Basic this would take the form:

```
VDU5: MOVE X,Y: GCOL3,Y1:
PRINT CHR$(X1): VDU8: GCOL3,Y2:
PRINT CHR$(X2)
```

etc., where X,Y are the desired screen coordinates, Y1 the colour of character X1 and Y2 the colour of character X2. The VDU commands cause printing to take place at the graphics cursor and move the cursor one space left respectively. The man, squares and walls in the game are constructed on this way. These commands can all be replaced and strung together as VDU commands eg, MOVE is VDU25,4,X,Y; GCOL is VDU18,3,Y1 and PRINT is simply VDUX2. For example, the above line of Basic would now read:

```
VDU5,25,4,X,Y:18,3,Y1,X1,8,18,3,Y2,X2
```

Not only is this shorter but it executes faster. This is very important for the more complicated a character is the longer it takes to print and the slower movement will be.

EOR printing is important when coloured characters are to be moved. Refer to the User Guide for a detailed explanation, but when printing graphics characters colour is chosen with GCOL x,y where function x determines how colour y will be printed. x can have five values 0,1,2,3,4 which respectively print the colour. Or it with the colour already there. And if the colour already there, EOR it etc and Invert it etc. EOR (3) is used because it is

Program 1

```
10MODE2
20VDU23,1,0;0;0;0;0;
30VDU23,224,31,23,31,23,127,255,0,0,23,225,0,0,0,0,
0,0,255,215:REM Boot, sole
40VDU23,226,126,255,153,153,255,255,170,23,227,
0,0,68,102,0,0,0,0:REM Monster, eyes
50COLOUR1:PRINTTAB(6,1)"SQUARES":COLOUR2:PRINT""
GUIDE YOUR BOOT"" AROUND THE GRID OF"" SQUARES
CORING"" POINTS FOR EACH"" COMPLETED SQUARE,"" WHILE
AVOIDING THE"" BLUE MONSTERS."
60COLOUR4:PRINT"" LINES CAN BE REMOVED BY THE PURSU
ING"" MONSTER IF THEY DO"" NOT FORM A SQUARE."
70COLOUR3:PRINT"" YOUR MOVEMENT IS"" CONTROLLED B
Y THE"" CURSOR KEYS."
80COLOUR1:PRINT"" <RETURN> TO PLAY""
90COLOUR1
100VDU28,3,31,17,23
110*FX21,0
120IFINKEY(-74) MODE7:CHAIN"Square2"
130GOTO110
```

possible to predict the outcome of function and by careful manipulation of the colour palette using VDU 19 to enable characters to move over other characters.

For example, Red — colour 1 — EORed with Blue — colour 4 — gives Magenta — colour 5 — if a red character is printed on top of a blue character, but if colour 5 is redefined to be red — VDU19,5,1,0,0 — that part of the red character over the blue character will show red not magenta. The EOR values needed are mathematically derived but can be easily found by using the BBC's own EOR function — type 1 EOR 4 to check the above example.

The game itself consists of a series of linked procedures which are called from within a Repeat Until loop which controls the game.

Program 2

```
10KEYO=TIME:MODELET1:SIMONIZ=0 TO TOP-PAGE STEP4
15NEOCHX=1:MOONEX1:PAGE=40:GOTOEND:RUN
20FX138,0,128
30END
REM Delete lines 1 to 5: i.e. Disc interface not fitted
101HX(17),YX(10),GX(6,9),LINEARSS(16,10),LINEDO
WZ(7,9),YX(17),YX(6)
20GOTO:VDU4,30:REPORT:PRINT:END
30HX=0
40MODE2
50PROCcolour
60PRCnewgame
70PROCinit
80PROCgrid
90FVIX=9:VIX=9
100PROCboot(bootX,bootY)
110PROCmonster(bootX,bootY:monsterX)
120PROCkillmonster
130REPEAT
140IFINKEY(-26)ANDbootX<32ANDbootY<20ANDbootX=
bootX+64:RIGHTX=colourX+FNpt(bootX+20,bootY-16):P
ROCBboot(bootX+64,bootY):PROCBboot(bootX,bootY):GOTO
180
150IFINKEY(-122)ANDbootX<116ANDbootY<20ANDbootX=
bootX+20ANDbootX=0:colourX=FNpt(bootX-20,bootY-16)
:PROCBboot(bootX-20,bootY):PROCBboot(bootX,bootY):GOTO
180
160IFINKEY(-58)ANDbootX<976ANDbootY<32ANDbootX=
bootX+5:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
170IFINKEY(-42)ANDbootX<112ANDbootY<32ANDbootX=
bootX-3:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
180FVIX=1:VIX=1:ELSE CIX=7
190FVIX=1:VIX=1
200GOTO5,COIX
210FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
220FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
230FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
240FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
250FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
260FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
270FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
280FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
290FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
300FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
310FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
320FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
330FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
340FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
350FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
360FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
370FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
380FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
390FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
400FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
410FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
420FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
430FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
440FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
450FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
460FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
470FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
480FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
490FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
500FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
510FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
520FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
530FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
540FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
550FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
560FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
570FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
580FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
590FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
600FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
610FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
620FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
630FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
640FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
650FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
660FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
670FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
680FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
690FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
700FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
710FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
720FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
730FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
740FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
750FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
760FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
770FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
780FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
790FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
800FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
810FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
820FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
830FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
840FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
850FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
860FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
870FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
880FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
890FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
900FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
910FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
920FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
930FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
940FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
950FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
960FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
970FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
980FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
990FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1000FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1010FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1020FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1030FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1040FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1050FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1060FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1070FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1080FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1090FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1100FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1110FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1120FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1130FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1140FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1150FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1160FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1170FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1180FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1190FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1200FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1210FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1220FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1230FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1240FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1250FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1260FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1270FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1280FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1290FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1300FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1310FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1320FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1330FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1340FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX-1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1350FVIX=1:VIX=1:ANDbootX<32ANDbootY<32ANDbootX=
bootX+1:DOWNX=colourX+FNpt(bootX,bootY-20):PROCB
boot(bootX,bootY-20):PROCBboot(bootX,bootY):GOTO190
1360FVIX
```


3	5	8	6	9	3
4	6	2	1	3	5
5	5	4	5	7	4
8	5	1	8	4	5
8	5	9	2	1	4
4	8	3	3	9	3
3	5	1	7	5	9
4	2	7	6	9	4
9	6	1	1	4	6

HI-SCORE
13

linecross%(X,Y)—status of horizontal lines (0 not traversed or wiped by monster, 1 traversed, 2 secure in a square).
linedown%(X,Y)—status of vertical lines.
MX(—),MY(—)—horizontal and vertical locations of still monsters.

BBC

```

13001 LX=RND*(7+1)+1;Z2=RND*(10)-1;MX(12)=X*(150-32)*MYX
(12)=Y*(12)+1
1310PASC=FPT(PXX(12)+48,MY(12)-44):IFPasc=1THENL290
1320PASC=CONSTR(MX(12),MYX(12))
1330MYX=V
1340ENDPASC
1350DEFPASC=anconstrator
1360 LX=RND*(7+1)+1;Z2=RND*(10)-1;MX(12)=X*(150-32)*MYX
(12)=Y*(12)+1;Z2=RND*(10)-1;MX(12)=X*(150-32)*MYX
(12)=Y*(12)+1
1380Pasc=FPT(PXX(12)+48,MY(12)-44):IFPasc=1DOPasc=3
THEN1370
1390PASC=CONSTR(MX(12),MYX(12)):PASC=CONSTR(MX(12),MYX(12))
1400MYX=V
1410G1PASC=anconstrator
1420IFdown<3anconstratorTHEN1480
1430IFSBN(HORZ)=1AND1ineacross(HORZ,VERT)=1:1ineac
ross(HORZ,VERT)=0:GOTO1470
1440IFSBN(HORZ)=1THEN1480
1450IF1ineacross(OLDX,OLDY)=1:1ineacross(OLDX,OLD
Y)=0:GOTO1480
1460GOTO1490
1470OLDX=EX(OLDX),%(OLDY):DRAWXX(HORZ),%(VERT):GOT
O1480
1480ENDPASC
1490DEFPASC=anconstrator
1500IFasc=0anconstratorTHEN1560
1510IFSBN(VERT)=1AND1ineadown(X(HORZ,VERT)=1:1ineadown
(X(HORZ,VERT)=0:GOTO1590
1520IFSBN(VERT)=1THEN1560
1530IF1ineadown(X(HORZ,VERT)=1:1ineadown(OLDX,OLDY)=
0:GOTO1590
1540GOTO1560
1550MOVEXX(OLDX),%(OLDY):DRAWXX(HORZ),%(VERT)
1560ENDPASC
1570G1PASC=anconstrator
1580VDU19,1,7,0:IFEM 11 whte
1590VDU19,7,10,19,9,1,0,19,15,10:REM 7,9,15 red
1600VDU19,8,4,0,19,14,4,0:REM 14,14 blue
1610VDU19,3,5,0:REM 5 yellow
1620VDU19,1,5,0:REM 15,12,3:REM 13,12 magenta
1630VDU19,
1640DEFFNPT(dx,ex)
1650=POINT(dx,ex-1)
1660DEFFNpt(dx,qx)
1670=POINT(dx+2,qx)

```

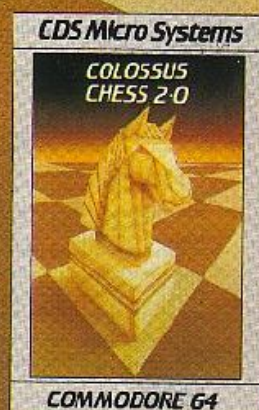
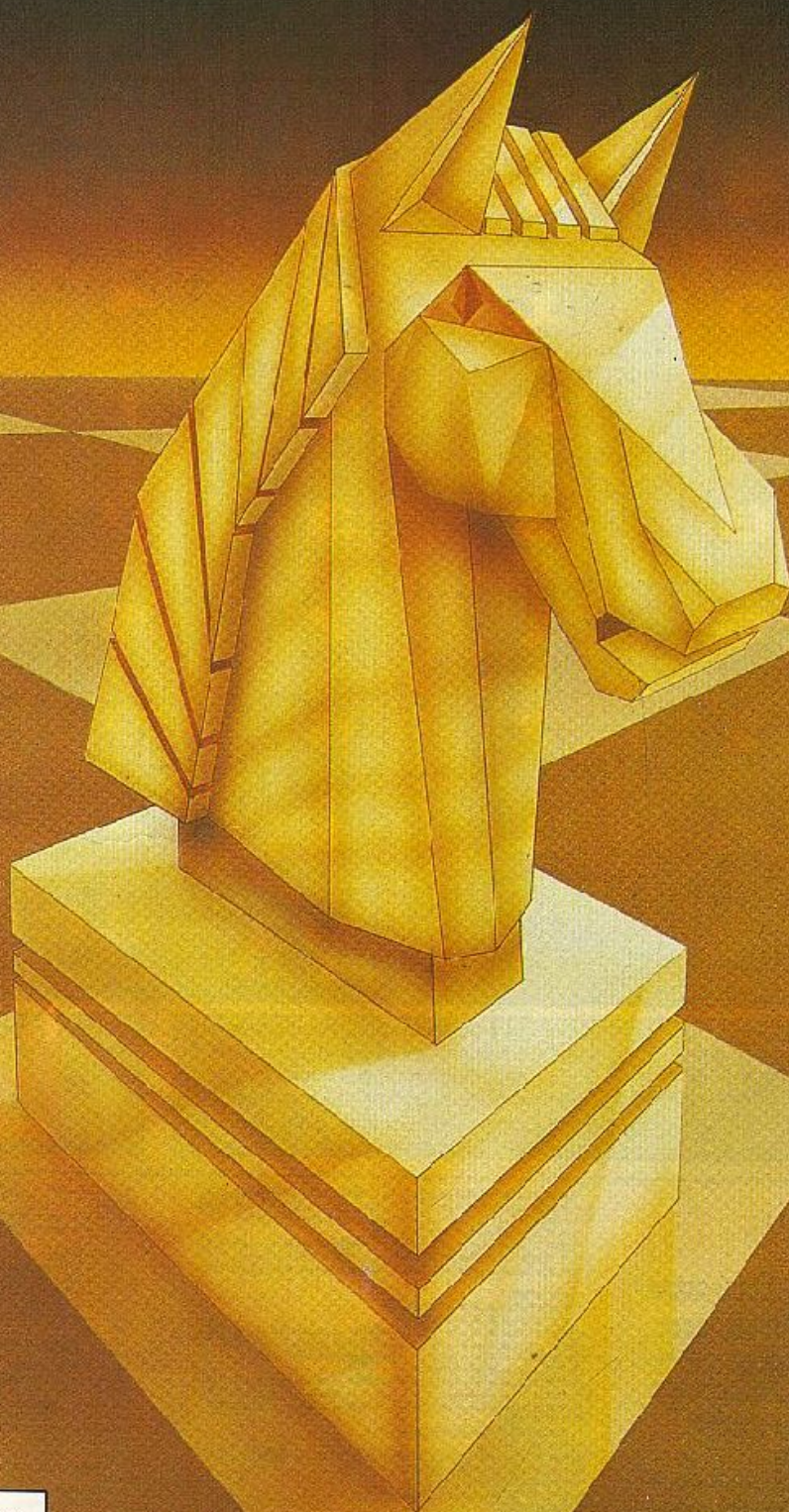

The CDS experience, m

a

...
C
C
C
W
A
C
*A

SP
GOE
CAT
LEA
REV
3 D
BOZ
FOO

C
SP



CDS Micro Systems

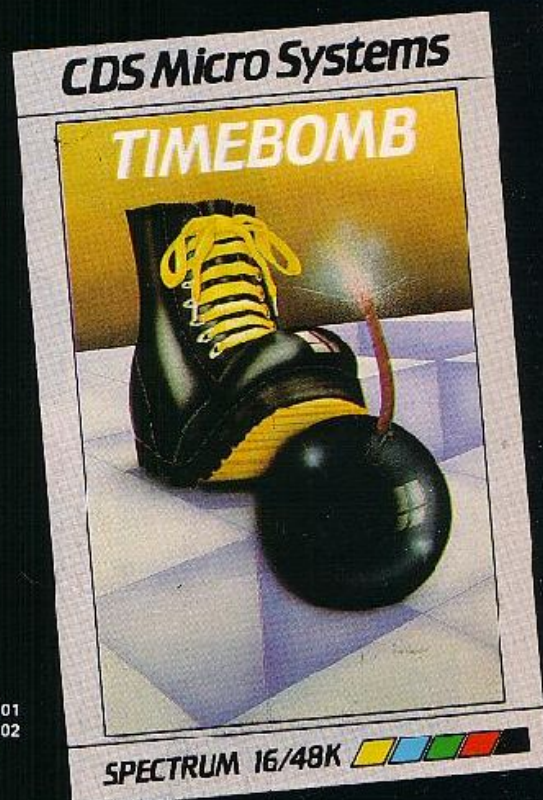
ONLY £5.95 each at W.H. Smiths, *Boots, John Men
Send Cheque or P.O. To CDS 10, Westfield Close, Ti

...more action... more adventure...

....and now the ultimate challenge 'COLOSSUS CHESS 2-0', the finest chess program ever written.

Available for the Commodore 64
*£9.95

new... Spectrum
Arcade action



SPECTRUM

GOBBLE A GHOST
CATERPILLAR
LEAPFROG
REVERSI
3 D PAINTER
BOZY BOA
POOL

XXX 1001
XXX 1002
XXX 1003
XXX 1004
XXX 1005
XXX 1006
XXX 1007

ZX81

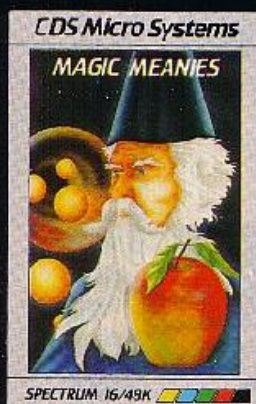
DODGEMS/CONNECT 4
CASTLE ADVENTURE
BREAKOUT
BRICK-STOP
REVERSI

XXX 2001
XXX 2003
XXX 2004
XXX 2005
XXX 2006

ORIC

BOZY BOA
REVERSI

XXX 3001
XXX 3002



tems... Commodore 64, Spectrum, Oric 1...

John Menzies and other leading Computer Stores, or... Available direct from CDS Micro Systems
Field Close, Tickhill, Doncaster DN11 9LA. Tel: (0302) 744129. (Trade enquiries welcome) * Selected titles only

**THE
LUNA 25
FIGHTER**



Will you accept this mission?

In your Z5 Luna Hover Fighter you must penetrate the 3 successive Seiddab defensive zones and destroy their command base.

The state of your fighter and its armaments along with status reports of the Seiddab defences is given below.

Good luck. May the power be with you.



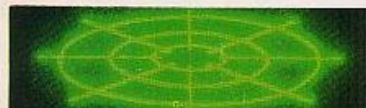
• LASERS •

Short range weapon system. Iridium powered. Powered up and operational.



• MISSILES •

Long range weapon system. Radar homing duodec warhead. Armed and ready to fire.



• RADAR •

Long range, over the horizon sensors. Tuned to the plasma output of Seiddab hover fighters.



• NAVIGATION •

Locked on to the Seiddab command base. Head up path display.



• SHIELDS •

Di-lithium powered. Combat power level. Status all green.



• GAUGES •

Long range propellene tanks. Status full. Combat shielded. Hull temperature status low.



£5.95

£7.95

£5.95

This is the latest and most difficult mission in the long running struggle against Seiddab aliens – are you prepared to accept this mission?

Available for 48K Spectrum from all leading software dealers including Boots, John Menzies, Spectrum Computer Centres, etc.

Available for other popular home micros soon.



Hewson Consultants
56B Milton Trading Estate,
Milton, Abingdon, Oxon OX14 4RX.

KNOW YOUR ENEMY



• DAB TANKS •

Robotically controlled. Ytsan missiles – armed. Susceptible to laser strikes.



• SEIDDAB HOVER FIGHTERS •

High power, low manoeuvrability strike craft. Plodium missiles – armed. Susceptible to missile or laser strikes.



• AERIAL MINES •

Contain proximity fuses, explodes on detecting hoverfighter. Susceptible to laser strike.



• MISSILE SILO •

Final line of defence – self activating. Hewson Warhead. Susceptible to laser strike.



• COMMAND BASE •

Your objective – heavily defended requires many strikes to destroy – you must not fail.

Microspeech
Compatible

3D LUNATACK

SPACE QUEST — for the 16 or 48K ZX Spectrum makes use of fast machine code and high resolution colour graphics to create a fast shoot-'em-up game.

You are alone in your gleaming nuclear powered spaceship as you steer through the hazardous space lanes until, unwarned, you are attacked by the blue budgies a violent race of creatures who get their kicks out of dropping bombs on passing space ships. If you can survive long enough to kill them all you have to do is steer through and destroy a whole asteroid belt. Next you come across a band of butterfly banditos who like the budgies enjoy bombing passing spaceships. If you can destroy all of these, you have to destroy another asteroid belt and only then can you get back on the space lanes.

This game allows a large number of keys to be used; any key from Caps Shift to V is left, any key from B to spacebar is right and any key from J to Enter is fire in rounds 1 to 4 and thrust in the space lanes.

To enter the program type in listing 1 and save it to tape with

SAVE "SPACE" LINE 1

Next comes the 3K of machine code. Type in listing 2 and run it. When run it will Poke the machine code onto the screen so do not worry if the screen starts getting messy — this is because there is not enough room for the data and the machine code if stored normally. A checksum is used on the data so the computer will tell you the line of any error it finds. If an error does occur, check and correct it and rerun the program. When it Pokes in all the machine code without an error it will save the resultant code.

The program is ready

If you now rewind the cassette the program is ready. Type

LOAD ""

and after loading the Basic program it will auto run and load the machine code into the correct place.

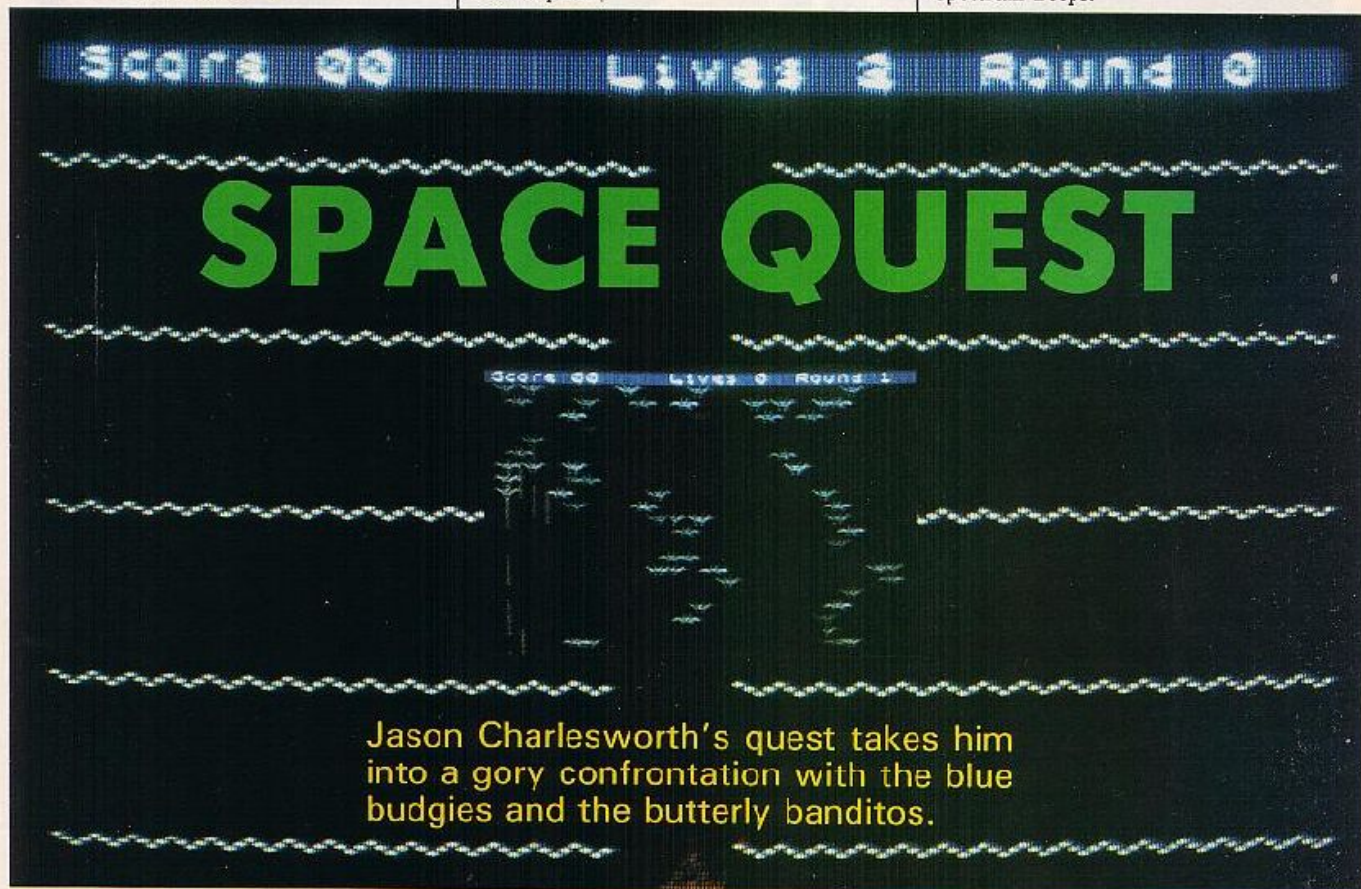
The game is now ready and the instructions should be printed on the screen. When your game is over, if you got a high enough score you will be asked for your name for the high score table. If you wait about 10 seconds when it has printed the instructions a demo mode will be played of all the rounds except the space lanes.

For those who find the game too easy or hard, here are two addresses which could help.

Address 29562 holds how many lives you start off with, normally three, so by Poking it to nine you start with nine lives.

Address 29567 holds how long the pause is. Normally the game is too fast so during the game the program uses this number as the length of the pause between moves, normally 30. A low number makes the game very fast, a high number makes the game slow.

Finally thank-you to, Robert Rhodes, a friend of mine who translated the music to Spectrum Beeps.



Space Quest — listing 1.

```
1 POKE 23675,72: POKE 23676,1
27
10 BORDER 0: PAPER 0: INK 7: C
LEAR 29399: LOAD "CODE 29400
20 DIM a$(5,10): DIM a(5)
21 LET a$(1)="Jason C.": LET a
(1)=2730
30 CLS: PRINT AT 0,2: INK 5;"
": INK 6;" ": INK 7;" space Que
st ": INK 6;" ": INK 5;"
40 PRINT AT 7,7:"Caps to v = L
eft":AT 9,7:"b to space = Right"
50 PRINT AT 11,7:"j to enter =
Fire/Thrust"
60 PRINT AT 13,7:"h = Halt":AT
15,7:"s = Start"
70 PRINT AT 2,6:"By Jason Char
lesworth"
80 FOR a=1 TO 1000: IF INKEY$=
```

```
"s" OR INKEY$="S" THEN GO TO 100
0
90 NEXT a: RANDOMIZE USR 29400
100 GO TO 30
1000 POKE 23300,0: LET 1=USR 295
51: LET sc=100*(PEEK 23296+256*P
EEK 23297)+10*PEEK 23298
1010 GO SUB 2000: IF NOT sc THEN
GO TO 1060
1020 FOR a=1 TO 5: IF sc<a(a) TH
EN NEXT a: GO TO 1060
1030 IF a<>5 THEN FOR b=5 TO a+1
STEP -1: LET a$(b)=a$(b-1): LET
a(b)=a(b-1): NEXT b
1040 INPUT "Name please ":a$(a)
1050 LET a(a)=sc
1060 CLS: PRINT PAPER 1: BRIGHT
1: INK 7;" Hi-Score tab
le
1070 FOR a=1 TO 5: IF a(a) THEN
```

```
PRINT AT 5+2*a,5: INK 5;a$(a);"
":a(a): NEXT a
1080 PAUSE 200: GO TO 30
2000 LET a=20/76: LET b=a/2: LET
c=a*3: RESTORE: FOR q=1 TO 36
2010 READ d: IF d=50 THEN PAUSE
1+INT (a*3.33): GO TO 2010
2020 READ e: BEEP d,e: NEXT q
2030 RETURN
2040 DATA a,0,c,7,50,b,0,c,7,50,
b,0,a,7,1.5*b,7,.5*b,7,a,12,a,16
2050 DATA a,7,1.5*b,7,.5*b,7,a+b
,7,50,50,a,16,a,19,a,16,a,12,a,1
9
2060 DATA b,16,b,12,a,19,b,16,b,
12,a,7,1.5*b,7,.5*b,7,a+b,7,a,0,
c,7,50,b,0,a
2070 DATA 7,1.5*b,7,.5*b,7,c,12,
c,16
```

(Listing 2 is on page 123)

DICKY'S DIAMONDS

Another cliff-hanger for the 64



ONE OF OVER 60 GAMES
FOR 10 COMPUTERS

ROTTIK

272 Argyll Avenue, Slough SL1 4HE

Available from Dixons, John Menzies, W.H. Smith, Boots and all good computer stores.

Space Quest — listing 2.

```

1 DEF FN x(a$)=16*(CODE a$-48
- (39 AND a$(1)))+(CODE a$(2)
-48-(39 AND a$(2))>"")
10 LET x=16394: FOR a=0 TO 52:
READ a$: LET t=VAL a$( TO 4): L
ET a$=a$(5 TO ): FOR b=0 TO 63:
LET y=FN x(a$(b*2+1 TO b*2+2)):
POKE x,y: LET t=t-y: LET x=x+1:
NEXT b: IF NOT t THEN NEXT a: G
O TO 40
20 PRINT "error line ";a*10+100
30 STOP
40 SAVE "Quest"CODE 16384,3367
100 DATA "6849cd537c3e0132045bc
dab7706c8c50e043e05328f5ccd6376c
d95793a045cfeff12073c110e8cd4c7b3
e0232045bcdab7706c8c50e0c3e03328
f5ccd4776cd2176"
110 DATA "69623a045cfeff204ec11
0e8cd37c3e0332045bcdab7706c8c50
e083e06328f5ccd6376cd95793a045cfe
ff2029c110e8cd4c7b3e0432045bcdab
7706c8c50e0c3e"
120 DATA "723802328f5ccd4776cd2
1763a045cfeff2004c110e8c9c1e9773
2005b32015b32025b3e0332035b3e1e3
20b5bcd475cd3a373cdcc74cda373cd5
a75cda373cd473"
130 DATA "6284cda373cd5274cda37
318e0218403113200cd6503212c01115
000cd6503218403113200cd650360327
610fcd9cd537-3e0332045b97320a5bc
dab77cd37cccd47"
140 DATA "713678cdd17ccd4f783a0
d5bfe00203bcd3176fe0028330e083e0
6328f5ccd6376cd9579cd478cd4f78c
d3176fe002819cd4f78cdd17ccd4f78c
d3176fe0028093a"
150 DATA "55830d5bfe00200318b6c
997320d5bcd2-77212e5b06197efe0f3
803d60a7723232310f3210e5b061e360
u2310f3a035b3c32035bfe00c2d073c
19cdcf7b3e0432"
160 DATA "7058045bcdab77cd37c9
7320a5b9cd17cccd4f783a0d5bfe00203
5cd4-780e0c3e02328f5ccd4776cd47
8cd2176cd4f783a0d5bfe002018cd4f7
8cdd17ccd4f783e"
170 DATA "55810d5bfe002008cd317
6fe0020bfc9212e5b06197efe0f3803d
60a7723232310f397320d5bcd2c773a0
35b3d32035bfe00208bcb1c9cd537c3e0
132045b97320a5b"
180 DATA "7685cdab77cd37cdd4-7
8cdd17ccd4f783a0d5bfe00203bcd317
6fe0028330e043e05328f5ccd6376cd9
579cd4f78cd4f78cd3176fe002819cd4
f78cdd17ccd4f78e"
190 DATA "5235cd3176fe0028093a0
d5bfe00200318b6c997320d5bcd2c772
12e5b06197efe0f3803d60a772323231
0f32:0e5b061e36002310f3a035b3d3
2035bfe00c2d874"
200 DATA "7025c1c9cdcf7b3e02320
45bcdab77cd37c97320a5bcd17ccd4
f783a0d5bfe002035cd4f780e0c3e033
2ef5ccd4776cd4f78cd2176cd4f783a0
d5bfe002018cd4f"
210 DATA "647978cdd17ccd4f783a0
d5bfe002008cd3176fe0020bfc9212e5
b06197efe0f3803d60a7723232310f39
7320d5bcd2c773a035b3d32035bfe002
08bcb1c9cdab77cd"
220 DATA "7163b37c9732045bcd127
701bc02c5cdd17ccd4f763a0d5bfe002
01acd2176cdcf78cd4f783a0d5bfe002
00ac:0b97b920dcb820d9c9c197320d5
bcd2c773a035b3d"
230 DATA "584232035bfe0020b5c1c
93a0b5bfe00c847c5e0010f1e110f8c
9212d5b06197e232323e680fe8020041
0f497c93e01c93a0a5b602fe0220040
60218020601cd09"
240 DATA "56367b3a0a5b3ce603320
a5bc93a0a5b602fe022004060218020
601cd6c/b3a0a5b3ce603320a5bc93a0
55b4f5fea730030c0c0cc501febfed7
8e60f1c1fe0f280c"
250 DATA "55430d0d0d0d0d3e3cb93
8020e3cf1b9c8cd5d4b055b1e01cd5e7
dc11e003a065b47cd5e7d7932055bc90
605212d5b5c5e4e234cd07a0c0c0c7
9febcd382e0e0823"
260 DATA "6050234697b820043a2e5
b47cdde7b7de6036fcb7c28057885471
80378954778fe1c3802061c78fe0c3300
20603e1e5712370cdad7ae12323c110b
4c9010e0021e77"
270 DATA "5685112d5bedb0c9080f2
d0f520:760f9b0f000000000640c5783
de607328f5cd4b055b971e00cdac7d7
9c6084f3e02cdac7cc1c5783de607672
47e0c1110500cd65"
280 DATA "734303c110d23e07328f5
c3e0fed4b055b5f5ccde7be5c57ce6036
723110a00cd6503c1e17ce60732f77f7
de6032f7f7f1e003e15cdac7d9732477
f32ff7f1e013e15"
290 DATA "708376cdac7d0df13dfc0
020c43e151e00cdac7dc93e07328d5cc
d6b0cdcd1f21e67706233e4f328f5c7
ed72310fb3e16d797d73e14d73a035bc
630d73e16d797d7"
300 DATA "51923e1dd73a045bc630d
797cd0978c91600002053636f7265202
02020202020204c67766573202020205
26f756e642020202020e5c5f5473a025b2
a005b80fe0a3803"
310 DATA "6115d60a2332025b22005
b473e4f323f5c3e16d73e00d73e07d79
7bc2003bd2807ed4b005bcd1b1a3a025
bc630d73e0c77320d73e0c1e1c93a0
75bfe00201e01fe"
320 DATA "5137bfed78e50ffef0c83
e0132075b2a055b2d2d2d2d2d2d2d2d2d
2085bc9cd4b0c85b1e013e11cd727e0d0
d0d0d3e08b938059732075bc9ed43085
bc5040404cd5b7e"
330 DATA "6218fe00202704cd5b7ef
e00201f0cccd5b7efef0020170c0cccd5b7
efe00200e3e07328f5c1e003e11cd7
27ec9c13a045b601fe01285f78e6f81
f:1f14779e6f81f"
340 DATA "53081f1f4f212d5b1e197
e2323feff283e7eb8203a2b7e23b9203
42b2b36fcdd6b7a3a045bcd097897320
75b234e23463e02328f5c3e12cd237a3
e06328f5c3e13cd"
350 DATA "6227237a3e00328f5c3ef
fcd237ac9231d97bb20b5c978c603e6f
01f1f1f4779e6f81f1f1f4f212d5b1e1
97e2323feff2846d7e23b920407eb32
8093db828053c3c"
360 DATA "5889b820337732075b232
b36f234e2346cd6b7a3a045bcd09773
e02328f5c3e12cd107a3e03328f5c3e1
3cd107a977328f5c3efcd107ac9231d9
7bb20adc9210e5b"
370 DATA "4776060ac57efe0028232
34e23461e013e10cd727e79c6044f4eh
438062b2b3600180f2b711e003e07328
f5c3e10cd727e2bc123232310cc210e5
b112d5b060ac57e"
380 DATA "4872fe00202d1ae680fe8
0200d1313:33e76bb30f11:2d5b18ec1
31aa717171714f131aa717171c605471
33601237123702b2bc123232310c7c9c
d237a043c20013d"
390 DATA "7154cd237a053dfefef200
13cc9e5c5d5f5feff200511003d1810e
d5b7b5ca7cb17cb17cb17833001145f7
8e61fcb17cb17cb174779e61fcb17cb1
7cb174fcd227f3e"
400 DATA "73518f5c77cd027f0c6081
a13772410faf1dc1e1c9e5d5c5f5063
2211900110100e5d5c5cd6503c1d1e12
32310f3f1cd1e1c9e5d5c5f5500c603c
50600cd027f051d"
410 DATA "609779ba2003232323360
02310f4c10c10e8f1cd1e1c9e5d5c5f
5500600cd027f061d7ab82003232329
7bec4017b36c02310ef0c0600cd027f0
61d7ab820032323"
420 DATA "59852397bec4017b36332
310ef0c0600cd027f061d7ab82003232
32397bec4017b360c2310eff1cd1e1c
9f53e01320d5bfc1c93e02b820010c783
27c5b79327d5b06"
430 DATA "660419212d5b35a7c5bb
e203e234e23463effcd237ae5cdde7be
be10c779f1e1638020e017f7e803010e60
23d8047fe2020014678feff200146702
b713a7d5bcb4728"
440 DATA "6248033d18013cd237a20
b7eee0377232323c110b1c93e02b8200
20c0c78327c5b79327d5b212d5b06:9c
53a7c5bbbe204c234e23463effcd107ae
5cdde7bebe17be6"
450 DATA "5448023d5f7ae6023d577
883477824f2bfe0020014e79fe16200
14e2378fe0020014678fe1e200146702
b712b3a7d5bcb4f28043d3d18023c3cc
d107a7eee0377c1"
460 DATA "589323232310a3c9f5c52
929292929292929292929292929292929
9ed4b795c0922765cc1f1c921087c112
d5b014b0c0cd60c9ff10134f010f4f070
8ff0505ff091301"
470 DATA "07880a1c0103040108010
1030601020702041b020b0c8020a16010
914020603020f04020113020a0c02:00
f02090401100d01031101c2180203150
2061a216e7c112d"
480 DATA "18325b014b0c0ed097210
e5b061e7710fcd901030501030a01030
f01031401031902050402c50902050f0
2051502051a01070501070a01070f010
714010719020907"
490 DATA "369902090c02091202091
7010b0a010c0f010b14020d09020d150
10f0f21cc7c11055b010500ed0ed4b0
53b1e00cd5e7d797320d3bc9a77800000
0978ed40c05bcd80"
500 DATA "74017d3effcd807d3e01c
d807dcd227d797bac00232028ed4b055
b6f78fe00200a7dfe0428c597cd807dc
978fe0f20067dfe042001c91e01cd5e7
d1e007d8047ed43"
510 DATA "8399055bde5e7d7acd807
d97cd807dc9c5f501febfed78e61fe0
0200b01fefded78e602fec020f511000
001fefeed78e61fe1f280216ff01fe7
fed78e61ffe1f28"
520 DATA "6197021601f1c1c997bb2
8073e07328f5c18053e02328f5c97cda
c7d79c084f3e02cdac7d79d6084f9cd
5c557fe0120063e0f804716ff1e0fcd5
b7efe002805320d"
530 DATA "71505b180e3effba20030
c1801041d97bb20e6cd1dc9f5c5d5e52
ab5bc8f8f8f8f8f8f8f8f8f8f8f8f8f8f
05c3a8f5c5f:607788247cd227f7378c
60847cd227f737a"
540 DATA "7186814cd227f7378d60
847cd227f73789247cd227f7379924fc
d227f73cd027f32b15c7a08c5ed4bb05
cdd5e00dd560877b0200a7cb1bcb1a1
f10f49797b92810"
550 DATA "64027b2fa677237a2fa67
723782fa677:80b7eb377237eb277237
eb077dd232b2b7cc13c6e0720060ccd0
27f0d25240c79febf20050e00cd027f0
83dfeff20a5e1d1"
560 DATA "8094c1f1c9c5e5cd027f4
eee0747fe00280ac1910f79e601e1c
1c9f5c5d5e52a7b5c8078787853001246
fe5cdel7b32b05c3a8f5c5f1e0778824
7cd227f737a814f"
570 DATA "7032cd227f73789247cd2
27f7379924fcd227f73cd027f32b15c7
a08c5ed4bb05cdd5e009757b82807a7c
b1bcb1a10fab972807b2fa677237a2fa
677180f1eb5f125"
580 DATA "71367eb277dd232b7cc13
ce60720060cd027f0d25240c79febf2
003e00cd027f083cfeff20b4e1d1c1f
1c979e6c01f:1f16779e63817176f79e
607e4c6406778be"
590 DATA "4042f81f1f1f856f78e60
7c9c879e6f826006f92978e6f81f1f1
f856f3e58846708c9000000000000000
00000000000000000010101030306050
00000008080c040"
600 DATA "68294c4c5b7f7c7942056
464b4fc7c3c844002027bdf87040a004
040debfe1205000046bb1d070402022
046cd8be02040407289b5c3c:1b38d714
e71adc383cd18e"
610 DATA "59980219252b292b25194
098a4d494d4a4981c1e7effff7e78100
83c7efe7f7fe:c183c7ee7dbd8e77e3c3
c7ee7c3c3e77e3c0000010101028101
028281010280000"
620 DATA "616000c00241812400000
03c424242423c00c3240000024c3c30
078eedbdf4f7d000c1e7de7fbfbfec02
16c1b095e2356237ab3283eb09d5e55
e2356eb09ebef173"

```


NOMINATED
SOFTWARE
PROGRAM
OF THE YEAR
C.T.A

Unlock Your Imagination

SCOPE

Computer Graphics Language

- ★ A VERY POWERFUL, TRUE MULTITASK LANGUAGE
- ★ AS FAST AS MACHINE CODE
- ★ SIMPLER THAN BASIC

Write Machine Code in a fraction of the time currently required

SCOPE is available from most good quality dealers and selected branches of

WHSMITH

For details of how to get your games published commercially contact
ISP Marketing

TECHNICAL DETAILS

SCOPE is a fully structured multitask language specifically for writing *graphics, animation and sound*.

Being fully compatible with BASIC it is ideal for writing both arcade and adventure style games. Additionally, with SCOPE present in high memory it can be used as an assembler with SCOPE words as plain language mnemonics. Therefore no knowledge of machine code is required.

The language is extremely easy to comprehend and is very powerful indeed providing many features not available from BASIC.

**SCOPE HAS TO BE USED
TO BE BELIEVED**

48K SPECTRUM



CLIP THE COUPON NOW AND UNLOCK YOUR IMAGINATION
Post to: ISP Marketing Ltd, Crown House, 38c High Street, Godalming, Surrey
Tel: Godalming 04868 21151 Please rush me copies of the SCOPE computer
graphics language tape and instruction manual at £11.95 (p&p free).
(Cheques payable to ISP Marketing Ltd)

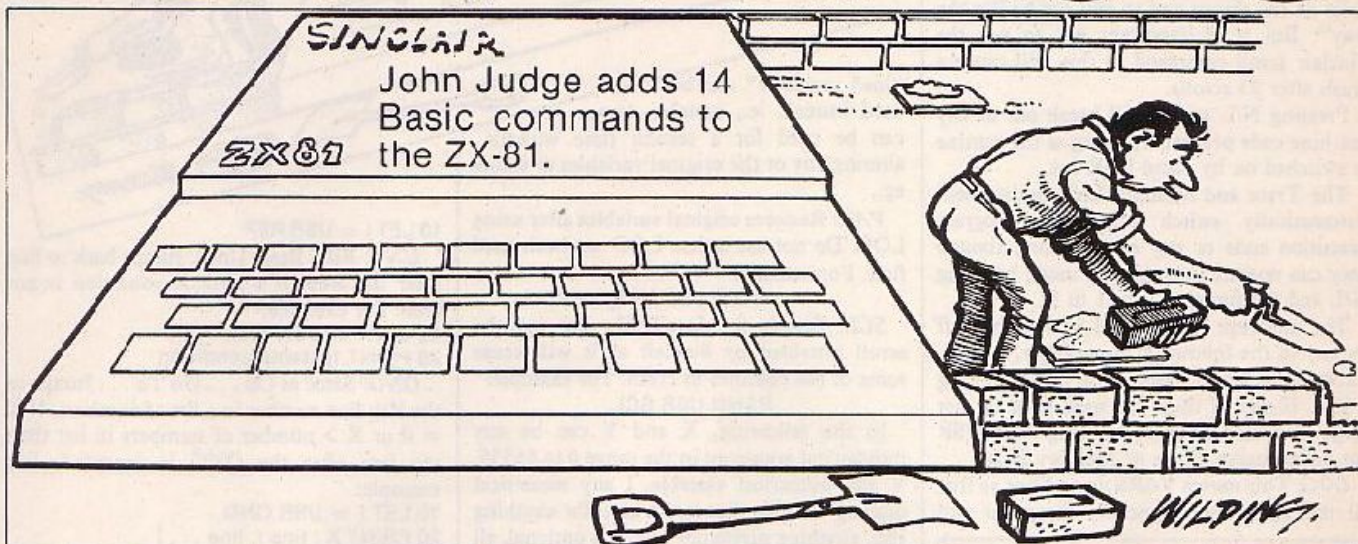
Black capitals please

Dealer Enquiries
Welcome

PRICE

£11.95

BETTA BASIC



THIS SET OF machine-code routines provides the 16K ZX-81 with 14 new Basic statements and commands usually found only on much larger and more expensive machines. The routines take up 1336 bytes in a Rem statement and are designed for ease of use with full error codes. Two of the routines are interrupt driven and allow you to add your own interrupt driven routines.

To enter the program, a 16K ZX-81 with the New run has to be used, it may be possible to use less memory, but some of the routines will crash if the display file is collapsed, i.e., RAM is less than 3/4K.

First, line 1 Rem followed by 128 zeros — four lines — is entered. This is then duplicated as line 2 and so on up to line 10. When this has been done, the following are entered as direct commands.

```
POKE 16511,56
POKE 16512,5
POKE 16509,0
POKE 16510,0
POKE 16514,118
POKE 16515,118
1 REM BETTA BASIC
POKE 16419,1
NEW LINE
```

You should now have

```
1 REM BETTA BASIC
```

on the screen. Anything else means that you have probably done something wrong and it is

best to start again.

If all is well then enter the hex-loader program 1, ignoring line 0 as this should already be in memory. Type Run N/L then enter the start address for the machine code data, which will be 16514 if you are just starting or another number if you are continuing from another day or after saving partly completed data. You can now enter the hexadecimal data, as many of the numbers as you like before pressing Newline, but remembering not to enter any of the spaces. There is a check-sum number after each line of data which you can compare with the check-sum number on the screen, if it is different then press S N/L and you can enter the line that is wrong. By pressing Q N/L, you can break out of the program to save it.

Looking through data

Program 2 is for looking through the data for any that is wrong. To use it, type Run 200 then enter the start address. Type Cont after each screenfull.

If all the data is entered and correct, then delete lines 5 onwards and enter program 3. Do not use New to delete the lines. The program is now finished and ready to use, unless some bugs have escaped detection.

You must have Betta Basic present in the computer before you start typing in your

program. In this way the machine code routines are saved as you save your program that uses them. Now, whenever you type Run, the variables are initialised ready for use.

INT: Switches on the interrupt routine by Ranc USR Int to give the following features:

TRACE ON by POKE TRN, 1 or pressing N/L and 1 together;

MEMORY ON by POKE TRN, 2 or pressing N/L and 5;

MEM/TRACE OFF by POKE TRN, 0 or pressing N/L and 2;

ROUTINE OFF by pressing N/L and 3 or Fast then Slow;

Break out of any program — even machine code — by pressing N/L and 4. This also switches routine off;

TRACE SPEED by POKE LEN, r where n is the length of the pause at each interrupt. Initially 3;

USER ROUTINE: Three bytes — USE, USE + 1 and USE + 2 — are set aside to add to call to your own interrupt driven routine. Initially all are NOPS. Make sure the routine is Off by using Fast followed by Slow before you start Poking or a crash will occur as soon as you Poke in the first number.

When using the trace or memory left

(continued on next page)

Program 1.

```
1 REM 0000000 ETC....
5 SCROLL
3 SCROLL
10 PRINT AT 16,0;"START ADDRESS
37"
15 LET A$=""
20 INPUT 3
30 FOR X=5 TO 17785 STEP 7
40 SCROLL
50 PRINT AT 19,0;X:
55 LET C=0
60 FOR T=X TO X+6
70 IF A$="" THEN INPUT A$
```

```
80 IF A$="S" THEN RUN
84 IF A$="Q" THEN STOP
86 IF LEN A$/2<>INT (LEN A$/2)
THEN LET A$=""
88 IF A$="" THEN GOTO 70
90 LET N=16+CODE A$+CODE A$(2)
-475
100 POKE T,N
110 LET C=C+N
120 PRINT " ";A$(1 TO 2);
125 LET A$=A$(3 TO )
130 NEXT T
140 PRINT " ",C
150 NEXT X
```


(continued from previous page)

features, the number will take up the first five characters in the top left corner of the screen. These numbers are only printed up during the interrupt and the original text or graphics are put back into the screen before control is handed back to the ROM. So as far as the ROM is concerned, the numbers do not even exist on the screen and so will not be "in the way". But it is important not to use the Sinclair scroll command as this will cause a crash after 23 scrolls.

Pressing N/L and 4 will break out of any machine code programs as long as the routine is switched on by Rand USR Int.

The Trace and Memory Left routines will automatically switch off when program execution ends or any error occurs, though they can operate in command mode by using N/L and the function keys 1 to 5.

The interrupt routine will be switched off by any of the following: Fast, Copy, LPrint, LList, Save, Load, Pause, New or by entering a line. If any of these are used then do not forget to switch on again by using Rand USR Int before using Trace or Memory Left.

LOC: This moves VARS up to Eline so that all the variables temporarily disappear and

"load variables" can be used instead, i.e., variable names can be used for a second time without altering any of the original variables or values eg.,

VAR: Restores original variables after using LOC. Do not use unless LOC has been used first. For example

FAND USR VAR.

SC: Stands for Scroll. Do not use the scroll provided by Sinclair as it will cause some of the routines to crash. For example:

RAND USR SC.

In the following, X and Y can be any numerical argument in the range 0 to 65535, V any numerical variable, I any numerical dummy variable that is not used for anything else, anything surrounded by [] is optional, all Print statements will be changed to Rem: by the routine, and should be changed back to Print if ever the line is edited. The Print lines after the USR lines hold the arguments for each routine.

Function has three uses

PRT: This has three uses, two of which are concerned with the ports.

a) OUT (port), byte. For example:

10 LET I = USR PRT

20 PRINT X, Y I; X, Y . . . I

b) IN variable, (port) or LET variable = IN (port). For example:

10 LET I = USR PRT

20 PRINT; X where X = port 0 to 255

c) LD I, X. For example:

10 LET I = USR PRT

20 PRINT; X where X = char set 0 to 255

This one changes the character set and can be used for games or with a graphics ROM. — initially 30.

REP: Same as BBC Basic Repeat. The line numbers are stored in RS. Up to 15 Repeats can be nested — inside each other — before an error occurs. For example:

ERROR CODES.

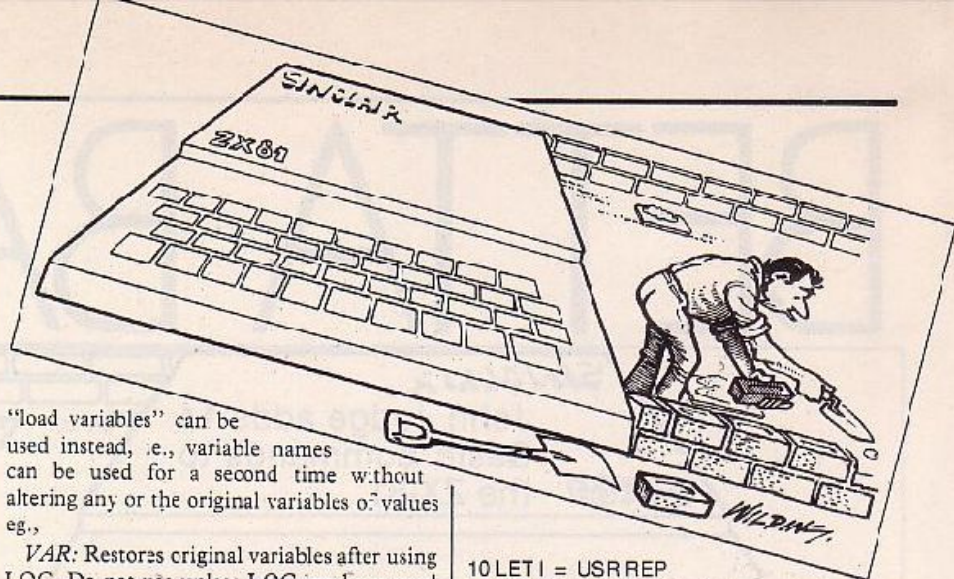
- Z variable not found, eg., R\$ in Rep. Proc name etc
- 4 out of memory
- R integer out of range, ie a number less than 0 or greater than 65535 has been used in a routine
- C number error, ie a number or expression has been left out or does not make sense so the computer can not change it to an integer for it to use.
- D break
- Q missing;
- R too many repeats (max 17)
- S syntax error, eg no data or expressions
- T missing
- U until without repeat
- V R\$ error eg., R\$ has been DIMed or is too short so that Rep and Unt can not use it.
- W Rand too high for LST
- X Proc name error, eg too short (minimum three characters or non-existent)
- Y incorrect string variable in line after DYN

Program 2.

```

100 STOP
200 PRINT "START ADDRESS ?"
210 INPUT I
220 FOR X=I TO 17795 STEP 7
230 PRINT X;
240 LET C=0
250 FOR T=X TO X+6
260 LET N=PEEK T
270 LET C=C+N
280 PRINT " ";CHR$(INT (N/16)+
28) ;CHR$(N-16*INT (N/16)+28);
290 NEXT T
300 PRINT " . ";C
310 NEXT X

```



10 LET I = USR REP

UNT: BBC Basic Until. Jumps back to line after last Rep. If a testable condition is not true. For example.

10 LET I = USR UNT

20 PRINT testable condition

ONG: Same as On . . . Go To . . . Jumps to the Xth line number in a list of numbers. If X = 0 or X > number of numbers in list then the line after the ONG is executed. For example:

10 LET I = USR ONG

20 PRINT X; line [, line . . .]

Up to 255 lines can be put on the list.

PRC: Def Proc. This is a simulation of procedures, using names instead of line numbers. Each 'procedure' has the following structure:

10 REM PROCNAME

20 Subroutine or procedure

30 RETURN

where Name will be the name of the procedure. PRC is called only once at the beginning of the program. For example:

10 LET I = USR PRC

The routine then searches for all the "Rem Procname"s and puts the names into the variables area with their line numbers so that a procedure can be called by:

GOSUBNAME

The name must be three or more characters long and contain only characters legal as a variable name, see page 38 of the Sinclair manual. There is no space between the Proc and the Name.

DYN: Dynamic procedure. This routine tells you whether a name held a string variable is a procedure or not so that it may be used with VAL without an error occurring. If it does not exist, eg.,

10 INPUT A\$

20 IF USR DYN THEN GOTO VAL AS

30 REM A\$

40 GOTO 10

The above example Gotos a procedure entered in line 10 if it exists, otherwise it waits for you to enter another. The A\$ in lines 10, 20 and 30 can be changed to any other string variable.

LST This is a fast scrolling list with a few extra features. To use:

Rand line to list from Rand USR LST

In this routine you can press:

Space to break out of the routine;

Z to copy the screen to the printer;

K to "normal list" the last line on the screen in order to edit;

D to list through slowly;

(continued on page 131)



**THE EXCLUSIVE U.K. DISTRIBUTORS OF
SCOTT ADAMS PRODUCTS**



ADVENTURELAND



**NOW FOR SPECTRUM,
COMMODORE 64
& BBC MODEL
B**

SCOTT ADAMS ADVENTURES AN OVERVIEW

By definition, an adventure is a dangerous or risky undertaking, a novel, exciting, or otherwise remarkable event or experience. On your personal computer, adventure is that and more.

Playing any of the Adventure series consists of three elements: you, the user; the games themselves; and the author, Scott Adams of Orlando, Florida.

If you're tired of video games, of bouncing balls or shooting targets if you're ready for an intellectual challenge that transports you to new worlds of experience, if you want to see what a skilled programmer can do with a micro, invest in one of Scott Adams' games. An early Adventure (Adventureland or Pirate Adventure) is a good place to start because the more Adams creates, the tougher his puzzles get.

1. ADVENTURELAND - Wander through an enchanted realm and try to uncover the 13 lost treasures. There are wild animals and magical beings to reckon with as well as many other perils and mysteries. This is the Adams Classic that started it all!
Difficulty Level: Moderate.

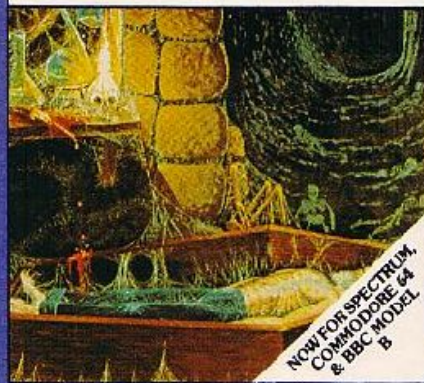
2. PIRATE ADVENTURE - Only by exploring this strange island will you be able to uncover the clues necessary to lead you to your elusive goal - recovering the lost treasures of Long John Silver. Difficulty Level: Beginner.

3. SECRET MISSION – In this exciting Adventure, time is of the essence as you race the clock to complete your mission in time or else the world's first automated nuclear reactor is doomed! If you survive this challenging mission, consider yourself a true Adventurer!
Difficulty Level: Advanced.

4. VOOODOO CASTLE – The Count has fallen victim to a fiendish curse placed on him by his enemies. There he lies, with you his only possible hope. Will you pull off a rescue, or is he really down for the count?!
Difficulty Level: Moderate.



VOODOO CASTLE



**NOW FOR SPECTRUM,
COMMODORE 64
& BBC MODEL
B**



PIRATE ADVENTURE



**NOW FOR SPECTRUM,
COMMODORE 64
& BBC MODEL
B**



SECRET MISSION



NOW FOR SPECTRUM,
COMMODORE 64
& BBC MODEL
B

SPECTRUM AND COMMODORE 64 VERSIONS

£9.95

including V.A.T.
Postage & Packing

BBC Model B Version £7.95
including V.A.T. Postage & Packing.

**Commodore
& Spectrum
versions with
graphics**

DEALER & DISTRIBUTOR

**Enquiries welcome
also
Panic Buyers welcome!**



119, JOHN BRIGHT STREET, BIRMINGHAM B1 1 BE

Telephone: 021-643 5102

Exclusive distributor of SCOTT ADAMS PRODUCTS



DEALER & DISTRIBUTOR

**Enquiries welcome
also
Panic Buyers welcome!**



Post to: Adventure International (U.K.), 119 John Bright St., Birmingham B1 1BE. Tel: 021-643 510

QUANTITY	ITEM	COMPUTER	PRICE
			Total

I enclose my Cheque/P.O. for £
OR Please debit my Access/Barclaycard no:

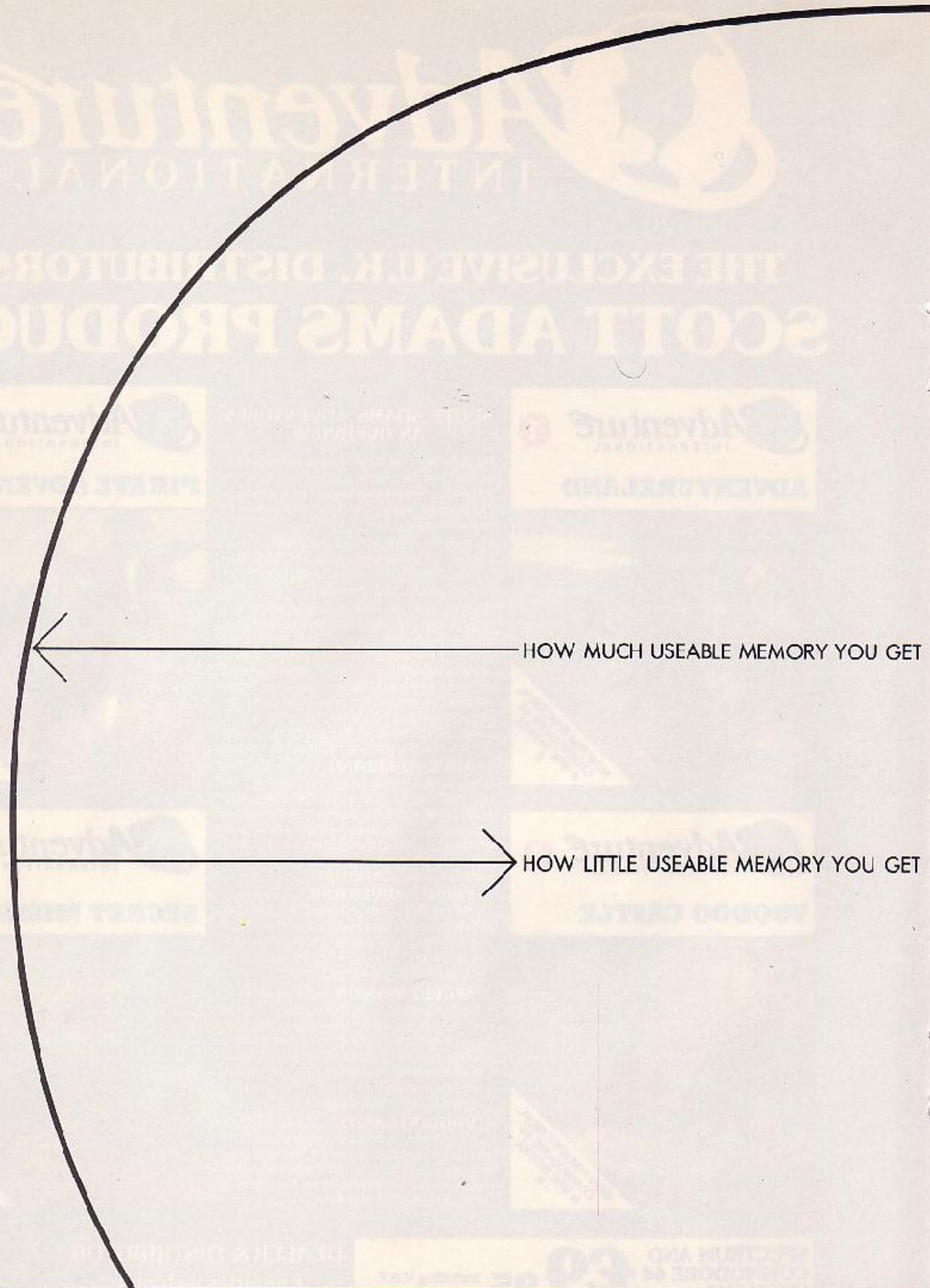
Name: _____ Address: _____

YCA 84

**PAYABLE BY
SUCCESSOR
PAYOR**

YCA.34



■ If you saw a computer labelled 32K, 48K or 64K you'd assume it had a large memory. Right?

Wrong. These figures bear little relationship to the actual amount of useable memory left once the computer is performing functions like text, colour, sound and even more importantly, high resolution graphics.

The Commodore, for instance, claims an "elephantine" 64K memory, yet uses up 26K producing high resolution graphics.

Under the same conditions, the Dragon 32K leaves 24K of useable memory, the Lynx 48K just 14K.

And the BBC Micro and Acorn Electron leave the operator a miserly 9K to play with.

However, there is one computer specifically designed to cope with these normal working functions as a matter of course.

The new Oric Atmos 48K.

Why, even when you add peripherals like the new micro disc drive unit and colour printer (see technical details overleaf), its useable memory is never less than a healthy 37K.

Which not only caters for all the standard applications you'd expect from any home computer, but also for advanced

WITH THE NEW ORIC ATMOS.

WITH OTHER HOME COMPUTERS.

programming and very sophisticated games.

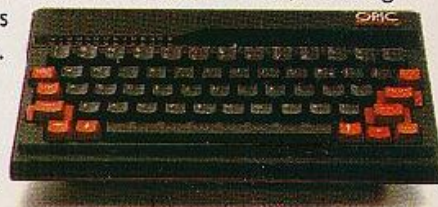
Talking of games, the new Oric Atmos starts off with a major advantage over most new computers, since it takes most of the software already written for the Oric-1.

And like the Oric-1, it has a powerful loudspeaker and amplifier inside its case.

The same unit, in fact, that prompted "Which Micro" (November) to quote... "At full volume this machine can compete with most arcade games. Its sound facilities have more in common with the £400 Beeb, than the rather pathetic beep of the Spectrum..."

Yet the Oric Atmos 48K costs a modest £170, including all the leads and adaptors you need to get it going.

But then what else would you expect from a British Company recognised for offering so much for so little?



The new Oric Atmos 48K. **ORIC**

Now we've whetted your appetite, here's something to get your teeth into.

Printer

Technical Specifications

Printer/Plotting system	Ball Point Pen, 4 colour
Plotting speed: (horizontal)	52 mm/sec (2.05ips)
(vertical)	73 mm/sec (3.08ips)
Printer Speed	17 characters per second
Resolution	0.2 mm/step (0.00787 inch)
Effective plotting range	96 mm (3.804 inch) x axis, divided into 480 steps. (No limit in y direction)
Characters per line	30 or 40 text mode (determined by software in graphics mode)
Characters per line	$INT((480/n+1)*6)$ for $0=n=15$
Accuracy (repetition)	0.2 mm max
(movement)	0.3 mm max
(distance)	0.5% max x-axis 1% (y-axis)
Pen life	250 metres (825 feet)
Parallel interface	8-bit parallel Uses STROBE and ACKNOWLEDGE
Temperature range	18.3 to 35°C (65 to 96°F)
storage	-40 to 71°C (-40 to 160°F)
Humidity range	10% to 80% relative non-condensing
Power supply	Switching power supply input 100-170 VAC 200-240 VAC
Dimensions	10 3/4" wide 5 7/8" deep 2 1/2" high

Atmos

Technical Specifications

CPU	6502 A
Memory	Choice of 16K or 48K RAM
Memory (48K Model)	Minimum 48K RAM, max 64: 16K ROM external control signals allow use of full 64K RAM or may be used externally to increase ROM/RAM
Language	Extended Microsoft Basic
Keyboard	Typewriter style and pitch, 57 keys, standard computer layout, additional cursor control keys, autorepeat facility, tactile and acoustic feedback
Display	Output for B&W or colour TV, RGB output for colour monitor.
Text format	40 in x 28 rows
Character set	Similar to Teletext format standard ASCII double height, flashing, 80 user definable characters
Graphics	240 x 200, 3 colours
Graphic Facilities	Points, lines, circles
Sound	Internal loudspeaker and amplifier. 3-Channel sound synthesiser envelope control, amplitude control 8 octaves, noise channel
Storage	Most cassette recorders via DIN socket 300 or 2400 EAUD. Disc Drive.
Interface	Centronics, expansion port, Hi-fi, RGB Monitor, UHF TV, cassette recorder
Other	Warm reset to regain control without clearing program or data

Micro Disc

Technical Specifications

Formatted Capacity	160K bytes per side (double density as standard)
No. of Tracks	40 (80 available as option at a future date)
No. of Sectors	16
Bytes per Sector	256
Transfer Rate	250K Bits/Sec
Supports up to 599 files per side, four drives single or double sided, 40 or 80 track. User definable configuration allows mixing of drive types including 5 1/4" (five and a quarter inch) Extensive wild card facilities Copy allows merging of basic and machine code files	
<u>Utilities</u>	
The Utilities are as follows:	
1. Backup	Copy a whole disc
2. Copy	Copy a file to another
3. Del	Delete a file allowing wildcards
4. Dir	Display directory listing
5. Drv	Set the default drive number
6. Format	Format and initialise a disc
7. Load	Load a file (code data or basic)
8. Protect	Change protect status of file
9. Recall	Recall a basic array from a file
10. Ren	Rename a file
11. Save	Save a file (code, data or basic)
12. Store	Store a basic array as a data file
13. Sys	Change system configuration

Prices and data correct at time of going to press.
Specifications on the above models may change without notice.

Available at Dixons, Laskys, Comet, Wigfalls, Rumbelows and all good computer stockists.



ORIC

N/L to list through fast.

```
08F5h PRINT AT B,C:
```

```
0808h PRINT CHR$(A); Chars 0-33 and
      their inverses
094Bh PRINT CHR$(A); Chars 64-127 and
      192-255
```

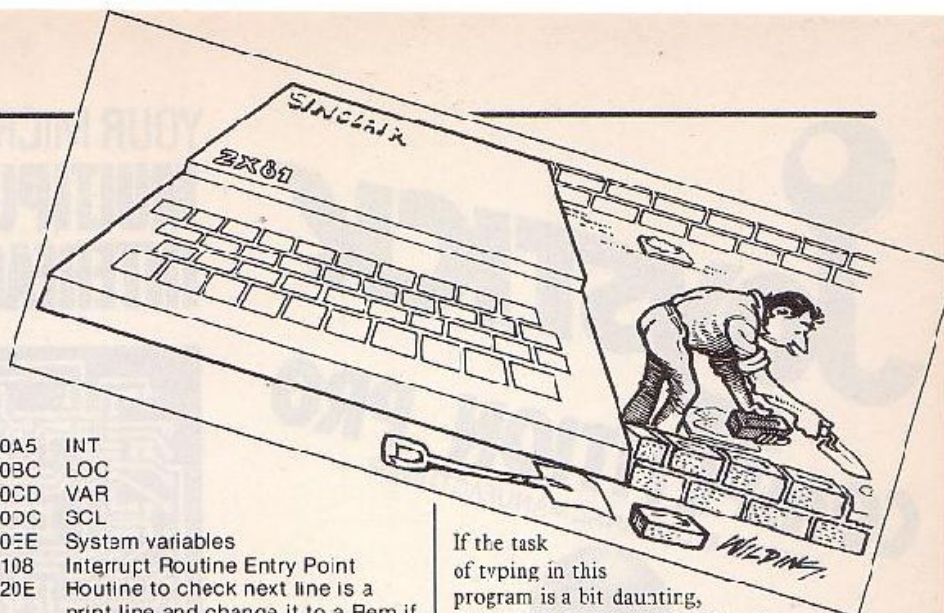
```
0A98h PRINT BC;
0AZAh CLS
063Eh LIST
```

Same as pressing

0369h	COPY	
1520h	STK BC	Puts BC on calc

0EA7h UNSTK BC	point number Takes BC off calc. stack
111Ch LOOKVARS	Finds variable pointed to by CH- ADD and puts its address into HL

If you wish to disassemble the routines, then here are the addresses you will need in hexadecimal:



If the task of typing in this program is a bit daunting, then send £3.00 to the following address and I will send you a copy of the finished program on tape: J D Judge, 147 Hesters Way Road, Cheltenham, Gloucestershire, GL51 3SD.

40A5	INT		
40B0	LOC		
40C0	VAR		
40D0	SCL		
40E0	System variables		
4108	Interrupt Routine Entry Point		
420E	Routine to check next line is a print line and change it to a Rem if necessary.		
4227	PRT	436Z	DYN
4270	REP	43EE	PRC
42BA	UNT	44A6	LST
430D	ONG	4585	asl address

BOOKS

```

10 LET D# = " "
11 LET INT = 10016
12 LET LOC = 10010
13 LET VAR = 10022
14 LET SOL = 10026
15 LET PRT = 10028

```

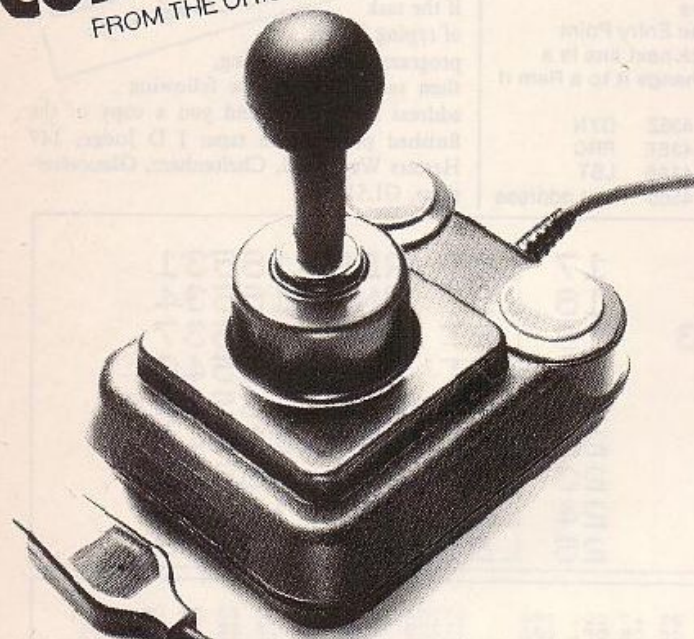
17	LET	REP = 10031
18	UNT	= 10034
19	ONG	= 10037
20	LET	DYN = 10040
21	LET	PRO = 10043
22	LET	LST = 10046
23	LET	LEN = 10039
24	LET	TRN = 10036
25	LET	USE = 10038

[illegible]

Joystick

COMPETITION PRO

FROM THE ORIGINAL MANUFACTURER



**WITH NEW IMPROVED
MICROSWITCH ACTION
AT THE EXCEPTIONALLY
LOW PRICE OF**

£11-99

SEND CHEQUE OR P.O. PAYABLE TO MOS CONSULTANTS

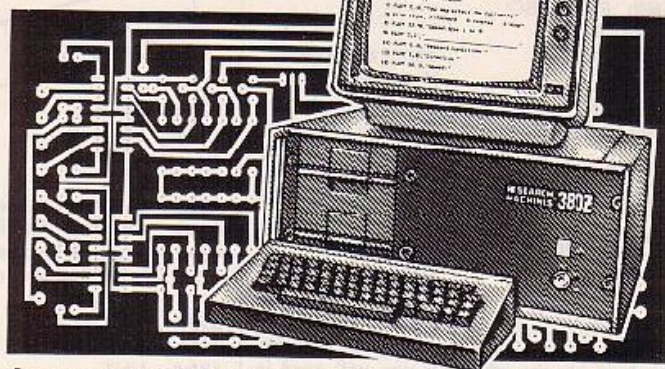
MOS CONSULTANTS, 434 CORN EXCHANGE,
HANGING DITCH, MANCHESTER M4 3EY.

Name _____

Address _____

Tel. _____

YOUR MICRO IN CONTROL WITH OUR MULTIPURPOSE COMPUTER INTERFACE...



An easy-to-build, inexpensive Add-on for any micro equipped with a parallel Printer Port or User Port (with + 5V supply).

This unit provides eight independently controllable power switches under software management. The article contains full, easy-to-follow constructional and testing details. There are software examples for the RM3802 and VIC-20 Micro-computers for controlling model train speed and direction.

EVERYDAY ELECTRONICS and computer PROJECTS

APRIL ISSUE 90p ON SALE 16th MARCH

ORIC AND SINCLAIR COMPUTERS

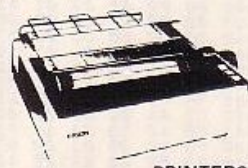


Oric 1 computers 48K £143 (£141)
£151. Oric colour printer £134 (£123)
£140. New Sinclair QL Computer £495
(£455). £176. Sinclair Spectrum 48K
£131 (£131) £143. Spectrum 15K
£101 (£105) £117. Microdrive £70
(£65) £75. RS232 interface £70 (£65)
£75. Blank microdrive cartridges £8
(£8) £9. 32K memory upgrade kit for
15K Spectrum (issue 2 and 3 only) £31
(£28) £30. Fuller Master Unit for the
Spectrum including speech unit, sound
synthesizer, amplifier and joystick port
£56 (£56) £62. Fuller full sized FDS
keyboard for the Spectrum with proper
space bar £52 (£52) £62. Spectrum
printer interfaces with cables:—
Centronics £57 (£53) £58. RS232 £55
£53 (£53). ZX printer £41 (£40) £50. 5
printer rolls £13 (£16) £21. ZX81
computer £45 (£44) £54. ZX81 16K
rim packs £28 (£25) £30.

Disc drives £233 (£209) £234. 1525
Printer £235 (£220) £245. 1526
Printer £350 (£330) £360.

ACORN COMPUTERS

Electron £203 £209 £229. BBC
Model E £404 (£378) £405. 14"
Colour monitor £228 (£229) £319.
Kenca double density disk interface
system for beeb £139 (£125) £135.
We stock the whole range of Curiana
disc drives for the beeb e.g. 100K
single £230 (£220) £240. Double 2 x
400K £625 (£560) £680.



PRINTERS

Epson RX80 £306 (£271) £302. Epson
RX80F/T £346 (£316) £348. Shinwa
CTI CP80 £225 (£218) £248. Epson
FX8C £440 (£408) £438. Epson
MX100/3 £494 (£466) £495. Oki
Microline 80 £213 (£197) £238. Oki
Microline 84 £831. The Ultra 21
combined daisy wheel and electric
typewriter £438 (£415) £445. The
brother EP22 combined matrix printer
and electric typewriter £173 (£166)
£186. Juki £100 proportional daisy
wheel printer £423 (£404) £454.
MCP40 colour printer £134 (£123)
£140. Star STX30 thermal printer
£158 (£143) £163. Interfaces to run
the above printers from Vic and
Commodore £4 £45 £44 £50. We
can supply interfaces to run the above
printers from Sharp computers £58
£52 £55.

COMMODORE COMPUTERS

Commodore 64 £204 (£134) £204.
Vic 20 £104 (£97) £117. Converter to
allow most ordinary mono cassette
recorders to be used with the Vic 20
and Commodore 64 £10.95 (£11) £13.
Bargain package:— cassette converter
+ compatible cassette recorder £37
(£38) £44. Commodore cassette
recorder £43 (£44) £50. Centronics
printer interfaces for Vic-20 and
Commodore 64 £45 (£44) £50. 1541

SWANLEY ELECTRONICS

The Computer Export Specialists.

Dept YC, 32 Goldsel Rd., Swanley, Kent: BR8 8EZ. England.

Tel: SWANLEY (0322) 64851

Nothing extra to pay. All prices are inclusive. UK prices are shown first and include post and VAT. The second price in brackets is for export customers in Europe and includes insured air mail postage. The third price is for export customers outside Europe (including Australia etc) and includes insured airmail postage. Official orders welcome.

LABYRINTH

Enter the depths with
Paul Hadler and his Vic-20.

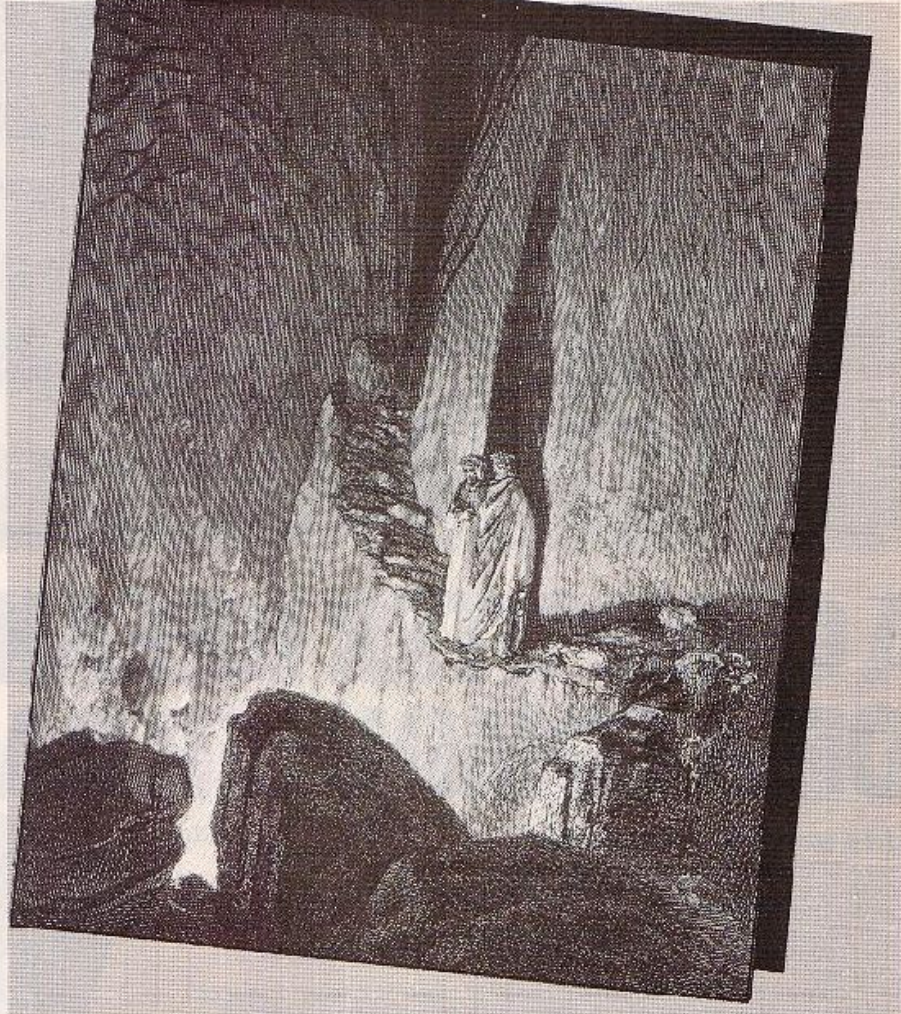
THIS PROGRAM WAS inspired by a program I had a game of one dark and chilly winter evening last year. The aim of that game was to make your way through a plan of a maze randomly chosen by the computer in as short a time as possible. Points were awarded for speed and agility around the maze. This led me to start work on a game which would be displayed in three dimensions visually on the screen so as to give the impression of actually walking the corridors of the labyrinth. It would also have extra features to help a hopelessly lost computer games addict reach the exit.

The program itself runs on a Vic-20 with 16K memory expansion and I must say takes a fair old time to load from the faithful cassette unit of the Vic-20.

As with some other programs, there are no fuss and bother items before loading the program with Peeks and Pokes or anything else for that matter. Just simply run the program once loaded into the computer and let it do the work.

Once loaded and run the program will ask for vertical and horizontal dimensions of the maze, the maximum sizes of which are 18 by 18 cells. The computer will then build the maze starting with a random entry point in the south wall. On completion of the maze build the user is then required to state if he or she would like to see a two dimensional view of the maze.

The program then draws up on the screen a
(continued on page 135)



```

10 REM*****
12 REM*
20 REM* LABYRINTH *
30 REM*
40 REM* BY P. HADLER *
50 REM*
60 REM*****
70 REM
80 REM
90 REM
100 POKE36879,8:PRINT"#"
110 PRINT:GOTO1
120 PRINT:GOTO1
130 PRINT:GOTO1
140 PRINT:GOTO1
150 PRINT:GOTO1
160 PRINT:GOTO1
170 PRINT:GOTO1
180 PRINT:GOTO1
190 PRINT:GOTO1
200 PRINT:GOTO1
210 PRINT:GOTO1
220 PRINT:GOTO1
230 PRINT:GOTO1
240 PRINT:GOTO1
250 PRINT:GOTO1
260 PRINT:GOTO1
270 PRINT:GOTO1
280 PRINT:GOTO1
290 PRINT:GOTO1
300 PRINT:GOTO1
310 PRINT:GOTO1
320 PRINT:GOTO1
330 PRINT:GOTO1
340 PRINT:GOTO1
350 PRINT:GOTO1
360 PRINT:GOTO1
370 PRINT:GOTO1
380 PRINT:GOTO1
390 PRINT:GOTO1
400 PRINT:GOTO1
410 PRINT:GOTO1
420 PRINT:GOTO1
430 PRINT:GOTO1
440 PRINT:GOTO1
450 PRINT:GOTO1
460 PRINT:GOTO1
470 PRINT:GOTO1
480 PRINT:GOTO1
490 PRINT:GOTO1
500 PRINT:GOTO1
510 PRINT:GOTO1
520 PRINT:GOTO1
530 PRINT:GOTO1
540 PRINT:GOTO1
550 PRINT:GOTO1
560 PRINT:GOTO1
570 PRINT:GOTO1
580 REM**CHOOSE DIRECTION OF MOTION**
590 REM
600 RV=INT((NF+EF+SF+WF)*RND(1))+1
610 IF RV=1 THEN GOTO1150:REM**FIND END/START OF NEXT BUILD**
620 IF RV=2 THEN GOTO1120:REM**FIND END/START OF NEXT BUILD**
630 IF RV=3 THEN GOTO1130:REM**FIND END/START OF NEXT BUILD**
640 IF RV=4 THEN GOTO1140:REM**FIND END/START OF NEXT BUILD**
650 IF RV=5 THEN GOTO1150:REM**FIND END/START OF NEXT BUILD**
660 IF RV=6 THEN GOTO1160:REM**FIND END/START OF NEXT BUILD**
670 IF RV=7 THEN GOTO1170:REM**FIND END/START OF NEXT BUILD**
680 IF RV=8 THEN GOTO1180:REM**FIND END/START OF NEXT BUILD**
690 IF RV=9 THEN GOTO1190:REM**FIND END/START OF NEXT BUILD**
700 IF RV=10 THEN GOTO1200:REM**FIND END/START OF NEXT BUILD**
710 IF RV=11 THEN GOTO1210:REM**FIND END/START OF NEXT BUILD**
720 IF RV=12 THEN GOTO1220:REM**FIND END/START OF NEXT BUILD**
730 IF RV=13 THEN GOTO1230:REM**FIND END/START OF NEXT BUILD**
740 IF RV=14 THEN GOTO1240:REM**FIND END/START OF NEXT BUILD**
750 IF RV=15 THEN GOTO1250:REM**FIND END/START OF NEXT BUILD**
760 IF RV=16 THEN GOTO1260:REM**FIND END/START OF NEXT BUILD**
770 IF RV=17 THEN GOTO1270:REM**FIND END/START OF NEXT BUILD**
780 IF RV=18 THEN GOTO1280:REM**FIND END/START OF NEXT BUILD**
790 IF RV=19 THEN GOTO1290:REM**FIND END/START OF NEXT BUILD**
800 IF RV=20 THEN GOTO1300:REM**FIND END/START OF NEXT BUILD**
810 REM
820 IF RV=1 THEN GOTO1150:REM**FIND END/START OF NEXT BUILD**
830 IF RV=2 THEN GOTO1120:REM**FIND END/START OF NEXT BUILD**
840 IF RV=3 THEN GOTO1130:REM**FIND END/START OF NEXT BUILD**
850 IF RV=4 THEN GOTO1140:REM**FIND END/START OF NEXT BUILD**
860 IF RV=5 THEN GOTO1150:REM**FIND END/START OF NEXT BUILD**
870 IF RV=6 THEN GOTO1160:REM**FIND END/START OF NEXT BUILD**
880 IF RV=7 THEN GOTO1170:REM**FIND END/START OF NEXT BUILD**
890 IF RV=8 THEN GOTO1180:REM**FIND END/START OF NEXT BUILD**
900 IF RV=9 THEN GOTO1190:REM**FIND END/START OF NEXT BUILD**
910 IF RV=10 THEN GOTO1200:REM**FIND END/START OF NEXT BUILD**
920 IF RV=11 THEN GOTO1210:REM**FIND END/START OF NEXT BUILD**
930 IF RV=12 THEN GOTO1220:REM**FIND END/START OF NEXT BUILD**
940 IF RV=13 THEN GOTO1230:REM**FIND END/START OF NEXT BUILD**
950 IF RV=14 THEN GOTO1240:REM**FIND END/START OF NEXT BUILD**
960 IF RV=15 THEN GOTO1250:REM**FIND END/START OF NEXT BUILD**
970 IF RV=16 THEN GOTO1260:REM**FIND END/START OF NEXT BUILD**
980 IF RV=17 THEN GOTO1270:REM**FIND END/START OF NEXT BUILD**
990 IF RV=18 THEN GOTO1280:REM**FIND END/START OF NEXT BUILD**
1000 IF RV=19 THEN GOTO1290:REM**FIND END/START OF NEXT BUILD**
1010 IF RV=20 THEN GOTO1300:REM**FIND END/START OF NEXT BUILD**
1020 REM
1030 IF RV=1 THEN GOTO1150:REM**FIND END/START OF NEXT BUILD**
1040 IF RV=2 THEN GOTO1120:REM**FIND END/START OF NEXT BUILD**
1050 IF RV=3 THEN GOTO1130:REM**FIND END/START OF NEXT BUILD**
1060 IF RV=4 THEN GOTO1140:REM**FIND END/START OF NEXT BUILD**
1070 IF RV=5 THEN GOTO1150:REM**FIND END/START OF NEXT BUILD**
1080 IF RV=6 THEN GOTO1160:REM**FIND END/START OF NEXT BUILD**
1090 IF RV=7 THEN GOTO1170:REM**FIND END/START OF NEXT BUILD**
1100 IF RV=8 THEN GOTO1180:REM**FIND END/START OF NEXT BUILD**
1110 IF RV=9 THEN GOTO1190:REM**FIND END/START OF NEXT BUILD**
1120 IF RV=10 THEN GOTO1200:REM**FIND END/START OF NEXT BUILD**
1130 IF RV=11 THEN GOTO1210:REM**FIND END/START OF NEXT BUILD**
1140 IF RV=12 THEN GOTO1220:REM**FIND END/START OF NEXT BUILD**
1150 IF RV=13 THEN GOTO1230:REM**FIND END/START OF NEXT BUILD**
1160 IF RV=14 THEN GOTO1240:REM**FIND END/START OF NEXT BUILD**
1170 IF RV=15 THEN GOTO1250:REM**FIND END/START OF NEXT BUILD**
1180 IF RV=16 THEN GOTO1260:REM**FIND END/START OF NEXT BUILD**
1190 IF RV=17 THEN GOTO1270:REM**FIND END/START OF NEXT BUILD**
1200 IF RV=18 THEN GOTO1280:REM**FIND END/START OF NEXT BUILD**
1210 IF RV=19 THEN GOTO1290:REM**FIND END/START OF NEXT BUILD**
1220 IF RV=20 THEN GOTO1300:REM**FIND END/START OF NEXT BUILD**
1230 REM
1240 IF RV=1 THEN GOTO1150:REM**FIND END/START OF NEXT BUILD**
1250 IF RV=2 THEN GOTO1120:REM**FIND END/START OF NEXT BUILD**
1260 IF RV=3 THEN GOTO1130:REM**FIND END/START OF NEXT BUILD**
1270 IF RV=4 THEN GOTO1140:REM**FIND END/START OF NEXT BUILD**
1280 IF RV=5 THEN GOTO1150:REM**FIND END/START OF NEXT BUILD**
1290 IF RV=6 THEN GOTO1160:REM**FIND END/START OF NEXT BUILD**
1300 IF RV=7 THEN GOTO1170:REM**FIND END/START OF NEXT BUILD**
1310 IF RV=8 THEN GOTO1180:REM**FIND END/START OF NEXT BUILD**
1320 IF RV=9 THEN GOTO1190:REM**FIND END/START OF NEXT BUILD**
1330 IF RV=10 THEN GOTO1200:REM**FIND END/START OF NEXT BUILD**
1340 IF RV=11 THEN GOTO1210:REM**FIND END/START OF NEXT BUILD**
1350 IF RV=12 THEN GOTO1220:REM**FIND END/START OF NEXT BUILD**
1360 IF RV=13 THEN GOTO1230:REM**FIND END/START OF NEXT BUILD**
1370 IF RV=14 THEN GOTO1240:REM**FIND END/START OF NEXT BUILD**
1380 IF RV=15 THEN GOTO1250:REM**FIND END/START OF NEXT BUILD**
1390 IF RV=16 THEN GOTO1260:REM**FIND END/START OF NEXT BUILD**
1400 IF RV=17 THEN GOTO1270:REM**FIND END/START OF NEXT BUILD**
1410 IF RV=18 THEN GOTO1280:REM**FIND END/START OF NEXT BUILD**
1420 IF RV=19 THEN GOTO1290:REM**FIND END/START OF NEXT BUILD**
1430 IF RV=20 THEN GOTO1300:REM**FIND END/START OF NEXT BUILD**
1440 REM**BUILD COMPLETE**
1450 REM**IF SO MAKE EXIT IF NECESSARY**

```

(listing continued on page 135)

PRIORITY NUMBER ONE REPAIR SERVICE
FOR SPECTRUM & ZX81.
RETURNED WITHIN 72hrs OF RECEIPT.
ADD EXTRA £15 FOR SPECTRUM,
£10 FOR ZX81 ON THE ONE OFF REPAIR SERVICE.



A COMPUTER BREAK DOWN, OR A COMPUTER BACK-UP?

WITH A MICROCARE WARRANTY

Some of the small print with a MICROCARE WARRANTY:

1. You may send your computer in for repair as often as necessary during the warranty period.
2. Your computer receives expert attention and care.
3. After repair it is thoroughly tested and returned as promptly as possible.
4. MicroCare's liability extends to the repair of electronic faults, includes all parts, or replacement of the computer if found to be irreparable.

You're purchasing an extra 12 months peace of mind... at very little cost. Just think: no need to scrap your computer if it goes wrong after the end of guarantee... no hassle with manufacturers... no problem with finding someone capable of professional repairs.

With a MICROCARE WARRANTY you can have your equipment up and running in days — not weeks! And there's no limit on the number of repairs during the warranty period!

So if you own a popular computer, there's a MICROCARE WARRANTY that's right for your machine. Why not buy a year's peace of mind now? **The sooner you do, the cheaper it could be**

Write today, or phone your Access/Barclaycard number. There's no need to have a breakdown if your computer breaks down. With MICROCARE you'll always have professional back-up!



MicroCare

Model	SCHEME A Cost of 12 months warranty if less than 90 days old	SCHEME B Cost of 12 months warranty if more than 90 days old	SCHEME C Cost of 12 months warranty if manu- facturer's guarantee has expired.	ONE-OFF REPAIR SERVICE
Spectrum	£12.90	£18.90	£25.90	£22.40
ZX81	£9.50	£13.90	£19.90	£15.50
Atari 400	£14.90	£21.90	£29.90	£25.90
Atari 800	£14.90	£21.90	£29.90	£25.90
BBC A	£14.90	£21.90	£29.90	£25.90
BBC B	£14.90	£21.90	£29.90	£25.90
Commodore Vic 20	£14.90	£21.90	£29.90	£25.90
Commodore C64	£14.90	£21.90	£29.90	£25.90
Dragon	£12.90	£18.90	£25.90	£22.50
Acorn Electron	£14.90	£21.90	£29.90	£24.90
Oric	£12.90	£18.90	£25.90	£22.50
Comex 35	£12.90	£18.90	£25.90	£22.90
Lynx	£12.90	£18.90	£25.90	£22.90
Sirius	£12.90	£18.90	£25.90	£22.50
Jupiter Ace	£12.90	£18.90	£25.90	£22.50
Texas TI99/4a	£12.90	£18.90	£25.90	£22.50

Please add £1.50 P&P.


7-9 Thane Works, Thane Villas, London N7 7PH. Tel: 01-609 7919

Please send me warranty/warranties for scheme/s

..... for computer/s model/s

serial number/s

I enclose cheque for made out to MicroCare.

I don't would like to pay by Access or Barclaycard 

and I enter my number and signature accordingly,

Name Occupation

Address

Signature Date

Please note that if you are applying for warranty under scheme A or B, please enclose the original manufacturer's warranty. It will be returned with your MicroCare warranty.

(continued from page 133)

three dimensional representation of the maze of whichever way you are facing to the maze. You then proceed into and around the maze to hopefully search for the way out.

To manoeuvre yourself around the maze use the following control keys:

L — Left turn; R — Right turn; F — Forward;
A — About turn.

If you should find your quest for the exit is not progressing as fast as you would like there is another command which has been incorporated into the program for your assistance. This command is called Help and is further subdivided into commands which will tell you certain information about the maze. But, before a description of each command is given a word in your ear. In this command — Help — a truthful account of your position and general status is not always given, so beware, or you would be led up the garden path. Sorry.

The help commands are H followed by:

X — This may give you your current position in the maze.

D — This gives you a distance in moves to the exit.

S — For a suggested next move — very dodgy.

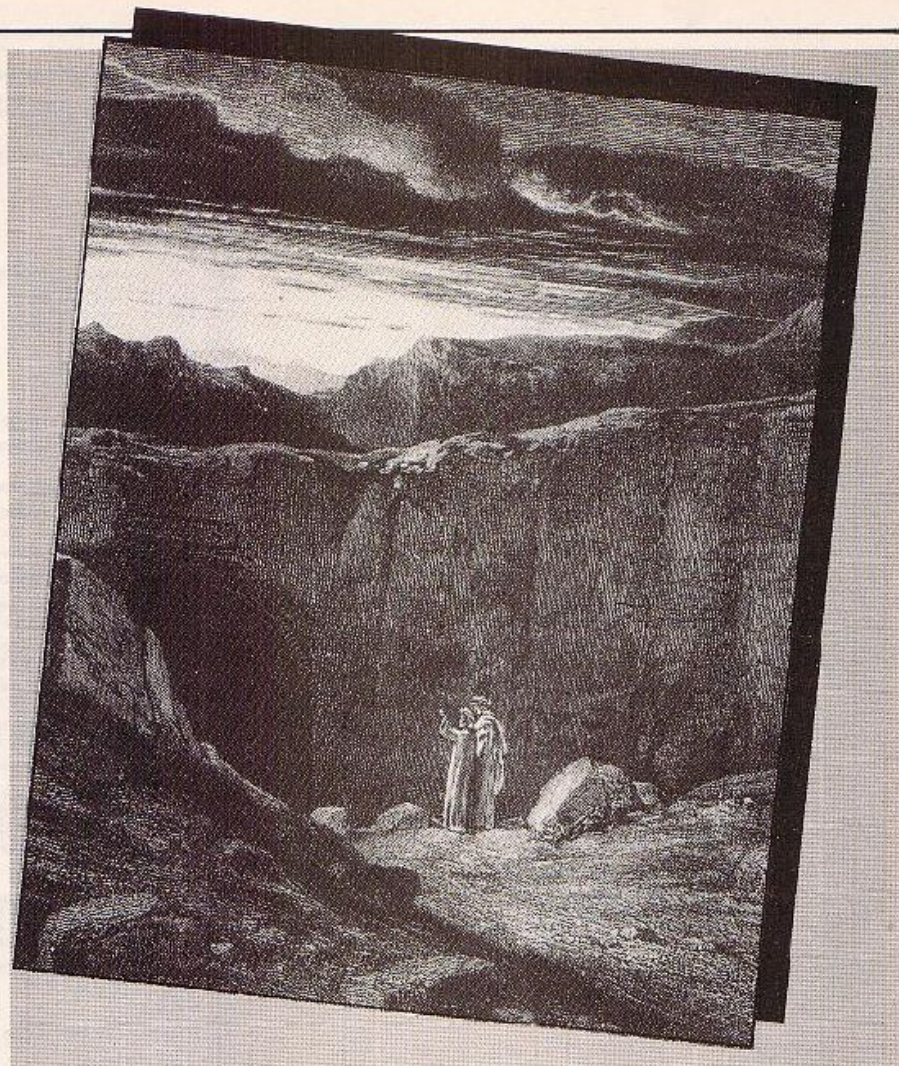
At this point I would like to point out that a wrong move — or suggested wrong move — may cause you to fall out of the maze if lurking around the start position in the maze; so be careful. And finally:

P — For a plan of the maze.

To get out of the Help routine and back to the maze display type I.

Lines

100-250 Begin the maze build.
400-440 Random entry point in south wall.
500-570 Find allowed direction for next move.
600-750 Choose direction of motion.
900-960 Move north.
1000-1040 Make exit in north wall.
1100-1150 Move east.
1200-1250 Move south.
1300-1340 Move west.



1400-1470 If build complete make exit if necessary. Put player at start position.
1500-1560 Begin new maze build.
1600-2190 Code complete information about each cell in array P(X,Y).
2200-2290 Determine direction through maze.
2600-2820 Display depth 1.
3000-3220 Display depth 2.

3400-3620 Display depth 3.
3800-4020 Display depth 4.
5000-6690 Accept commands and execute end games.
6800-6870 Another game.
6900-6960 Index to next cell.
7000-7260 Calculate L, R and F.
7300-7460 Subroutines.
7500-7610 Determine direction of next move.

(listing continued from page 133)

```
1420 REM
1430 IF C=V THEN C=C+1:GOTO530 REMNEXT MOVE*
1440 IF C=1000:GOTO1400:REMEXIT ANDE*
1450 X=INT(HRND(1)/4)+V:P(X,Y)=P(X,Y)+1:W=X
1460 X=X:Y=Y:Z=1:REMPUT PLAYER IN START POSITION*
1470 GOTO1520
1500 REMWIND START OF NEXT BUILD*
1510 REM
1520 IF X=0 THEN X=1:GOTO1550
1530 IF Y=0 THEN Y=1:GOTO1550
1540 X=1:Y=1
1550 IF C=X:Y=0:GOTO1520
1560 GOTO530
1580 REM IS PLAN REQUIRED*
1590 REM
1620 PRINT:THE MAZE HAS NOW BEEN PRINTED. WOULD YOU LIKE TO SEE A
PLAN
1630 PRINT:OK (Y=YES AND N=NO)
1640 GETA$
1670 IF A$="Y" THEN GOTO1695
1680 IF A$="N" THEN GOTO1900
1690 GOTO1640
1695 REMPRINT PLAN OF MAZE*
1697 REM
1700 PRINT:OK*
1710 FOR J=V TO STEP-1
1720 FOR I=0 TO H
1735 IF P(I,J)=4 THEN P(I,J)/4
1740 IF P(I,J)=PRINT*
1750 IF P(I,J)=PRINT*
1760 IF P(I,J)=PRINT*
1770 IF P(I,J)=PRINT*
1780 IF P(I,J)=PRINT*
1790 NEXT I
1800 X=0:Y=0:Z=2*(2+V)+X
1802 IF Z=1 THEN Z=158
1804 IF Z=2 THEN Z=190
1806 IF Z=3 THEN Z=150
1808 IF Z=4 THEN Z=188
1810 P=PEEK(W)
1820 FOR I=1 TO 8
1830 POK(W,Z) FOR J=1 TO 183:NEXT:POKE(W,P) FOR J=1 TO 180: NEXT
1840 NEXT
1850 IF A$="P" GOTO2400
1860 POK(W,30)
1870 PRINT:PLEASE WAIT*
```

```
1900 REM**INIT INSTRU LUNS**
1910 REM
2100 REMCODE COMPLETE INFORMATION*
2110 REMABOUT EACH CELL*
2120 REMIN ARRAY P(X,Y)*
2130 REM
2140 FOR I=1 TO H:FOR J=1 TO W
2150 IF INT(P(I,J)/4)=INT(P(I-1,J)/4)+.5 THEN P(I,J)=P(I,J)+8
2160 IF P(I,J)=1/2=INT(P(I,J-1)/2)+.5 THEN P(I,J)=P(I,J)+4
2170 NEXT J
2180 REMDETERMINE OPTIMAL ROUTE**
2210 REMTHROUGH MAZE**
2220 REM
2230 C(0,1)=H/2:(0,2)=V-1:I=1:R=0:B=V:GOTO2270
2240 I=I+1
2250 GOSUB2520:REM*OPTIMAL DIRECTION*
2260 GOSUB2520:REM*INDEX TO NEXT CELL*
2270 C(I,1)=R:C(I,2)=B
2280 IF C(A,B)>1300:GOTO2240
2290 C=I
2400 REM**PRINT PERSPECTIVE VIEW**
2410 REM
2420 PRINT:OK*
2430 A$=B$
2440 FOR I=1 TO 4
2450 GOSUB2520:REM*EVALUATE L,F & R*
2460 IF A$=200:GOTO2510
2470 ON TOSUB:GOTO2520,2520,2520,2520
2480 IF A$=100:GOTO2510
2490 Z=C:GOSUB2520:REM*INDEX TO NEXT CELL*
2500 NEXT
2510 GOTO580:REM*ACCEPT INSTRUCTIONS*
2560 REM**DISPLAY DEPTH 1**
2610 REM
2620 IF I=2:R(L=1:AND Z=3):GOTO2648
2630 FOR I=1 TO 17:POKE4163+22*I,183:NEXT
2640 IF R=2:R(R=1:AND Z=3):GOTO2668
2650 FOR I=1 TO 17:POKE4181+22*I,181:NEXT
2660 ON (4-L)/100:GOTO2720,2680,2670,2700,2710
2670 POKE4181,77:POKE4182,77
2680 POKE4559,78:POKE4560,78
2690 GOTO2720
2700 POKE4162,180:POKE4163,180
2710 POKE4558,99:POKE4559,99
2720 ON (4-F)/100:GOTO2780,2740,2738,2760,2770
2730 POKE4191,78:POKE4192,78
2740 POKE4577,77:POKE4578,77
```

(listing continued on next page)

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

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



IS HERE!

Extra responsive action

Trigger Fire Button

Diamond Cut 'Arcade' Style Grip

Extra long 4 ft Cord

Rubber Suction Cups for One Hand Operation

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

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

☐ Manic Miner
☐ Jetpack
☐ Cooke
☐ PSSST
☐ Tmeigate

☐ 3D Tunnel
☐ Cosmos
☐ Cyber Rats
☐ Galaxians
☐ Spookyman

☐ Slippery Sid
☐ SS Enterprise
☐ Nite Flie
☐ Meteoroids
☐ Guzman

☐ Cosmic Guerilla
☐ Kong
☐ Armageddon
☐ Mission Impossible
☐ Ark Atak

☐ Brain Damage
☐ Last Sunset. . .
☐ Mazeman
☐ Galaxians
☐ ETX

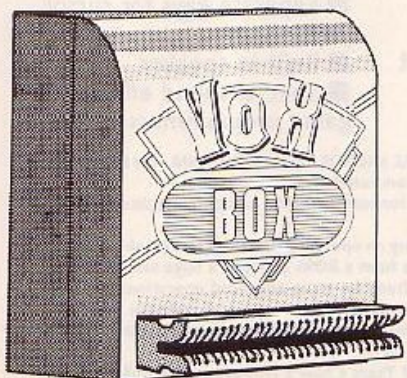
☐ Frenzy
☐ Astroblaster
☐ Knot in 2D
☐ Joust
☐ Spectres

☐ Jeuman
☐ Frogger
☐ Blind Alley
☐ Galactic Jailbreak

☐ Transam
☐ Robotics
☐ Armageddon
☐ Terminator
☐ Detective

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

Also available for Commodore/Atari/BBC/



**SPEECH
SYNTHESIZER
WITH BUILT
IN JOYSTICK
INTERFACE**

FOR THE SPECTRUM

**ONLY
£29.99**

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

☐ Triga Command Spectrum **£19.99**
☐ Triga Command Atari **£12.99**
☐ Triga Command Commodore **£12.99**

☐ Triga Command BBC **£19.99**
☐ Vox Box, Spectrum **£29.99**
☐ Vox Box and Triga Command **£39.99**

TRADE ENQUIRIES WELCOME

ALLOW 7 DAYS

Postage Please Add £1.50

**DATTEL
ELECTRONICS**

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

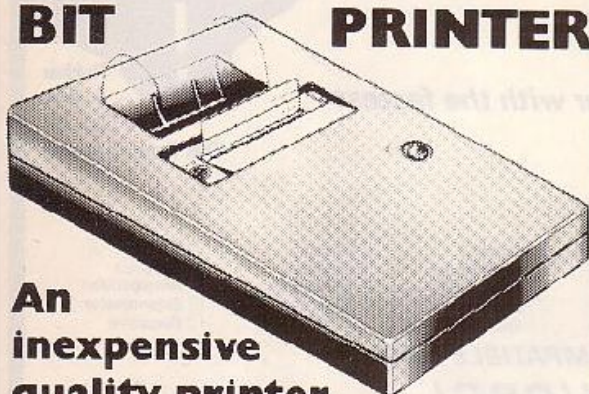
24 HR CREDIT
CARD LINE



Spectrum

The very latest **NEWS** from Spectrum

BIT PRINTER



An
inexpensive
quality printer
for the BBC 'B'

Just look at our fantastic low price on this super Dot Matrix printer! The ideal machine for the home user, the Bit Printer combines practicality with low cost - now you can list programs for debugging without spending a three-figure sum.

The Bit Printer interfaces directly with the BBC 'B' and you can see it at your local Spectrum dealer now!

SPECTRUM
PRICE ONLY

£89⁹⁵

Now available! **COMPUTAPE**

C15 Reel to reel cassettes for under £1 - see your local SPECTRUM dealer for details.

Fantastic Value from Spectrum! **SUPER-SAVER CASSETTE RECORDER**

For COMMODORE 64 &
VIC-20 ONLY **£39.95**

LATEST NEWS

• For up-to-date news, information & offers from SPECTRUM - see PRES-TEL page 600181 or full details

COMPUTER DEALERS

(or prospective Computer dealers!) If you would like to know more about becoming a SPECTRUM APPOINTED DEALER on an exclusive area basis, please write to MIKE STERN or DUDLEY LANGMEAD Spectrum (UK) Ltd., Burrowfield, Welwyn Garden City, Herts. or Telephone (07073) 34761

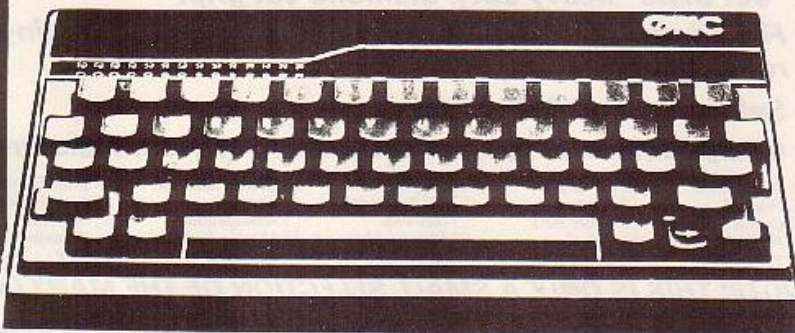
UP TO £1,000 Instant Credit With your Spectrum Chargecard



• There's up to £1,000 worth of Instant Credit available on a Spectrum Chargecard. See your local SPECTRUM dealer for written details (UK mainland only) Typical APR - 30.6%

Another first from
SPECTRUM!
Introducing the exciting new

ORIC ATMOS



- Lots of exciting programs available
- Built-in certronics printer interface (no RS232 needed - just plug in your printer)
- Full-featured keyboard with

- sculptured keys
- Separate keys for cursor control
- Built-in speaker
- Special sound effects for game programmers

HERE'S ANOTHER FANTASTIC FIRST IN HOME MICROS FROM SPECTRUM - the brand new and tremendously exciting ORIC ATMOS 48K computer!

The ATMOS has taken a remarkable step forward in home computer technology. But how?

Most Micros 'waste' a large amount of memory on operating functions like graphics, colour and sound. Oric saw that by running these tasks from a ROM memory, a huge amount of the ATMOS's valuable 48K RAM capacity could be freed for more advanced operations.

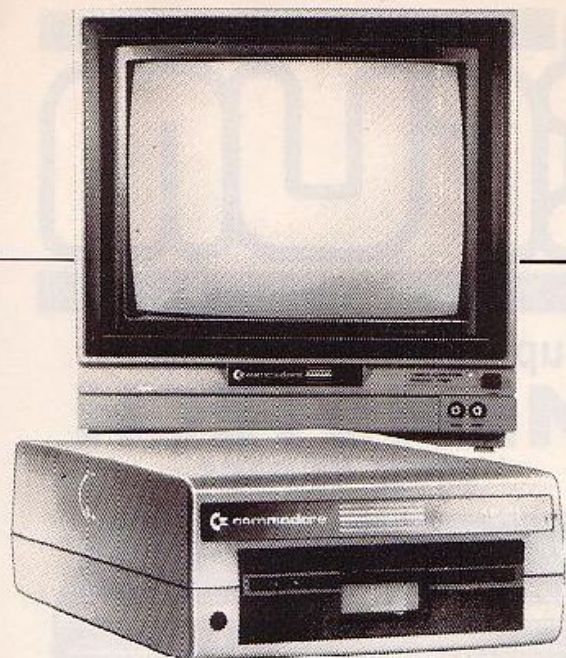
So the colour capability (8 graphics, 8 background), powerful sound synthesis and high-resolution graphics of the ATMOS are achieved with fewer demands on computing power than its competitors.

So what else makes the ATMOS so exciting? There's now a typewriter-style full-response keyboard; it's directly compatible with most domestic cassette players; and there's a wide choice of software. The ATMOS is designed for convenience, too - it uses extended Microsoft BASIC - your printer plugs in without an RS232; and it comes complete with leads and everything you need to get going.

We've a 4-colour Oric printer (which accepts normal paper) at a terrific value-for-money price. Soon, a 3" Microdisc Drive will be available, too, to complete the system. Take a look at the superb new ORIC ATMOS, in its highly distinctive black-and-red trim, at your Spectrum dealer NOW!

SPECTRUM PRICE

£169⁹⁹



Now from Spectrum - a complete business computer system for under £900



COMMODORE 64

BUSINESS PACKAGE

■ Extremely simple to use - no computer experience required
■ Complete & ready to run with Sales/Invoicing & purchase ledger programs. ■ Complete end-of-month reports at the touch of a button - including Creditors/Debtors lists Sales & cash lists, statements, VAT balances etc.

Includes ■ COMMODORE 64
■ DISK DRIVE ■ COLOUR MONITOR ■ COMMODORE PRINTER ■ PURCHASE LEDGER PROGRAM ■ SALES LEDGER PROGRAM
■ EASY SCRIPT PROGRAM
Plus! ■ FREE! GAMES DISK WITH SIX GAMES

FROM ONLY
£899⁹⁵
WITH MPS01 Printer

Just Arriving! It's the new, superb COMMODORE SX64 PORTABLE



BIG NEWS from Spectrum - stocks are just arriving of the incredible new Commodore SX 64 Portable Colour Computer - a dream come true for the travelling executive! This superb, compact Micro incorporates all of the top-selling Commodore 64's functions and features a detachable full function keyboard plus built-in colour monitor AND single disk drive. We're very excited - you can see it at your local Spectrum dealer now!

FREE! FREE! FREE!

• FREE with each SX64 Portable three superb programs - Easy Script, Future Finance and Easy Stock.

SPECTRUM PRICE

£895

COMMODORE VIC-20

Super Value!

STARTER PACK

A complete Home Computer system including the VIC-20 Computer, a Cassette Unit, introduction to BASIC part 1 - a simple explanation of computer programs - Blitz, Type-A-Tune, Race & Hopbit. A fantastic deal!! and great value-for-money. But HURRY! offer only while stocks last.

SPECTRUM PRICE

£139⁹⁹

Also available:

VIC-20 £99.95
Including 4 FREE ROM GAMES



Commodore VIC-20, SOFTWARE PACKS at HALF PRICE

• Multipack 1: Omega Race, Voodoo Castle, Cosmic Crunch, Avenger
• Multipack 2: Golf, Adventureland, Raid on Fort Knx, Mole Attack
• Multipack 3: Sargon Chess, The Count, Mission Impossible, Cosmic Cruncher
• Multipack 4: Sargon Chess, Pirate Cove, Rat Race, Super Lander
• Multipack 5: Omega Race, The Count, Menagerie, Mole Attack

Each Pack Only **£19.98** WHILE STOCKS LAST

For the COMMODORE 64 HOME USER

VIC 1520 Printer Plotter £99.99
COMMODORE 64 with 4 FREE GAMES £199.99
SINGLE DISK DRIVE £230.00
AZTEC Centronics Interface £29.90
VISCOUNT Cassette Interface ... £12.95
Plus! 100's of Software Titles now available.

COMMODORE 64 HOME ENTERTAINMENT Package

SAVE £50

Includes: COMMODORE 64, COMPATIBLE CASSETTE RECORDER, CASSETTE WITH 4 GAMES, ZETA CRACKSHOT JOYSTICK (Normal Total Price £290.30)

SPECIAL PRICE £239.95

All these items can also be purchased separately - see your local Spectrum dealer

Commodore 1520 PRINTER - PLOTTER



The 1520 printer plotter draws in 4 colours, and prints characters and numbers.

£99.99

Just Arriving! COMMODORE 1526 PRINTER



Superb Dot Matrix (near letter quality printer)

£345.00

ACCESSORIES FOR COMMODORE

Viscount Cassette Interface £12.95
Aluhacom 42 Printer with VIC 20 Interface £99.90
Stack Light Pen £28.75
Plus 80 16K RAM £37.99
Viscount 64K RAM £69.95
4 Slot Motherboard £24.95
Adman Chatterbox £49.95
Stonechip 16K switchable RAM £34.95

Turn the page for more super offers from Spectrum . . .

Spectrum

The Top 50 SOFTWARE TITLES

Selected by Britain's leading Software Distributor
MICRO DEALER UK



PROGRAM	SUPPLIER	MACHINE	PRICE
Hunchback	Dumas	Spectrum	£6.95
At c Atac	Ultimate	Spectrum	£5.50
Manic Miner	Software Projects	Spectrum	£5.95
3-D Ant Attack	Quicksilver	Spectrum	£6.95
Alchemist	Imagine	Spectrum	£5.50
Revenge of Mutant Camels	Lamasoft	CBM 64	£7.50
Death Chase	Micro Mega	Spectrum	£6.95
Fighter Pilot	Digital	Spectrum	£7.95
Wheeler	Microsphere	Spectrum	£5.95
Mr Wimpy	Ocean	Spectrum	£5.90
Rammels	Crystal	Spectrum	£6.50
Revenge	Ulamsoft	CBM 64	£7.50
Huver Euvver	Voyager	CBM 64	£5.99
Quaser 64	Anirog	CBM 64	£7.95
Galaxy 64	Ultimate	Spectrum	£5.50
Lunar Jetman	Protek	Spectrum	£7.95
Hunter Killer	Imagine	Spectrum	£5.50
Zoom	Abbas	Spectrum	£5.95
Krakatos	Ultimate	Spectrum	£5.50
Jel Pac	Durrell/ Martek	Spectrum	£5.50
Scuba Dive	Software Projects	CBM 64	£7.95
Crazy Balloons	Crystal	Spectrum	£7.50
Halls of the Things	DK Tronics	Spectrum	£5.95
Speed Duel	Legend	Spectrum	£14.95
Valhalla	theSion	Spectrum	£5.95
Horace and the Spiders	Bubblicus	CBM 64	£6.99
Kick Off	C.D.S.	Spectrum	£5.95
Pool			

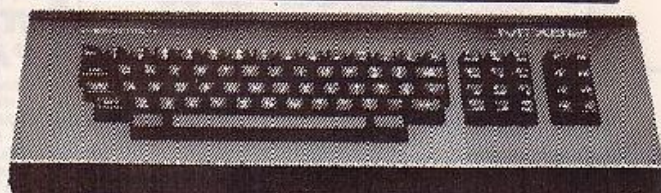
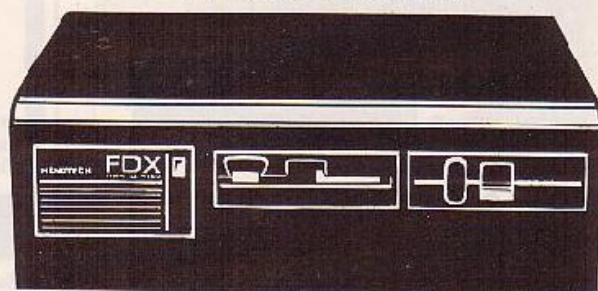
Attack of the Mutant Cunch	Lamasoft	CBM 64	£7.50
3-D Combat zone	Artic	Spectrum	£5.95
Harrier Attack	Durrell/ Martek	Spectrum	£5.95
Hobbit	Melbourne House	CBM 64	£14.95
Android Two	Vortex	Spectrum	£5.95
Invasion of Body Snatchers	Crystal	Spectrum	£6.50
Jet Pac (VIC)	Ultimate	VIC 20	£5.50
Lunar Crabs	Micromega	Spectrum	£6.95
Arcadia 64	Imagine	CBM 64	£5.50
Hunchback 64	Ocean	CBM 64	£6.90
Microbot	Softek	Spectrum	£5.95
Metagalactic	Lamasoft	VIC 20	£6.90
Llamas	DK Tronics	Spectrum	£5.95
Mazicks	Imagine	Spectrum	£5.50
Stonkers	CRL	Spectrum	£6.95
The Omega Run	Gemini	BBC	£9.95
Vissie Control	Richard Shepherd	Spectrum	£6.50
Jurban Uptart	Bug-Byte	Spectrum	£5.95
Birds and the Bees	Software Projects	Spectrum	£5.95
Push Off!	Bug-Byte	BBC	£9.50
Twin Kingdom Valley	Artic	Spectrum	£5.95
I'm in Shock	Software Projects	Spectrum	£5.95
Thrusa	Taskset	CBM 64	£6.90
Super Pipeline	Ask to see these super titles at your local Spectrum dealer NOW!		

ACCESSORIES From SPECTRUM

C12 DATA CASSETTES	£0.50
C16 DATA CASSETTES	£0.58
VISCOUNT SINGLE SIDED, DOUBLE DENSITY (10) (FOR APPLE, COMMODORE, ATARI, TANDY)	£21.25
VISCOUNT SINGLE SIDED, SINGLE DENSITY (10)	£21.25
VISCOUNT DOUBLE SIDED, DOUBLE DENSITY (10) (FOR SHARP SUPERBRAIN, ETC.)	£33.81
VISCOUNT SINGLE SIDED, DOUBLE DENSITY 96 TRACK (10) (FOR NASCOM, COM-	

MODORE 8050, ETC.)	£5.36
EMPTY DISK CASES (FOR 5 1/4" DISKETTES)	£1.95
DISK HEAD CLEANER KIT	£16.10
TELEVISIONS	
12" 780 RAW PORTABLE	£29.95
CTP131 14" COLOUR PORTABLE	£229.95
COMPUTER CASSETTE RECORDERS	
ZETA Joystick for ATARI COMMODORE, VIC-20 & 64, SPECTRUM & ORC. ONLY	£10.95

Superb value-for-money! MEMOTECH MTX SERIES



MEMOTECH MTX 512 64K RAM

16 User definable Function Keys • 12 Key Numeric Pad
• Z80A at 4MHz • 24K ROM containing MTX BASIC •
MTX NODDY FRONT PANEL DISPLAY • ASSEMBLER •
DISASSEMBLER Video Display Processor with 16K
video-RAM • 64K User RAM Twin RS232 Communi-
cations Board ROM Expansions: Node Systems • MTX
PASCAL • MTX FORTH Eight User Definable Virtual
Screens • Up to 32 SPRITES

SPECTRUM PRICE

£315

Also available MTX 500
32K RAM £275

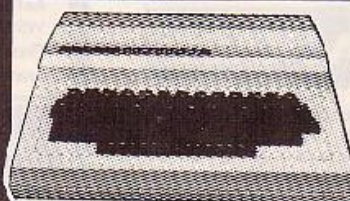
FDX DISK DRIVE

Up to eight Floppy Drives • Colour 80
Column Board (optional) Fast Access Silicon
Discs • Powerful Floppy Disc Controller
Board CP/M 2.2 Supplied • Teletext
Compatible

SPECTRUM PRICE £995.00

Memotech 32K RAM Expansion	£50
Memotech 64K RAM Expansion	£85.00
Memotech 128K RAM Expansion	£160.00
Memotech RS232 Communication Port	£60.00
SEPERATE EXPANSION ITEMS	
Silicon Disc (256K)	£385.00
80 Column Colour Board	£100.00
Floppy Disc Controller Board	£230.00
7 Way Bus & Support Software for S.O.	£50.00
MEMOTECH SOFTWARE	
Backgammon (Cassette)	£3.95
Chess (Cassette)	£9.95
Blobbo (Cassette)	£5.95
Kilopede (Cassette)	£5.95
Super Minefield (Cassette)	£5.95

DRAGON



DRAGON 32

Check with your local
SPECTRUM dealer for
our LOW price

DRAGON 64 £225.00

SHARP



SHARP MZ-711

(MZ-700 Series Computer)
FREE! 10 CASSETTE BASED GAMES
The super new colour computer from
SHARP. Now available in limited quantities
- including 10 FREE CASSETTE RASPD
GAMES from SPECTRUM

£249.95

With FREE Cassette Recorder

SHARP PRINTER	£29.95
CASSETTE RECORDER	£39.95

SHARP MZ80A £399

NEW!



ATARI 800XL

• 16K RAM expandable to 48K • Full-stroke keyboard • Full sound with 3½ octave range • 11 Graphic Display modes • Full colour (256 Colours - 128 colours can be displayed at one time) Ask to see this super new micro at your local SPECTRUM dealer NOW!

SPECTRUM PRICE

£**249⁹⁵**

ATARI 600XL £159.99

1010 CASSETTE RECORDER £49.99
1050 DISK DRIVE £299.99
1077 LETTER QUALITY PRINTER £299.99
1020 PRINTER PLOTTER £199.99

TOUCH TABLE, TRACK BALL £19.99
SOFTWARE £19.99
DIG DUG £29.99
LOVE RAIDER £14.99
And many more

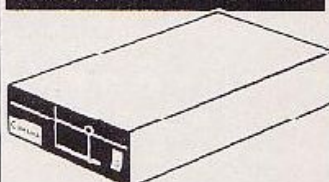
ORIC-I



For the more serious user - the better programming machine
ORIC-1 16K.... **£99.95**
ORIC-1 48K.... **£139.95**
HALF PRICE OFFER

Bring a copy of this ad when you purchase an Oric-1 16K or 48K and get either the Oric-1 16K or 48K Software pack at HALF PRICE (Titles may vary in each pack)

CUMANA DISK DRIVES



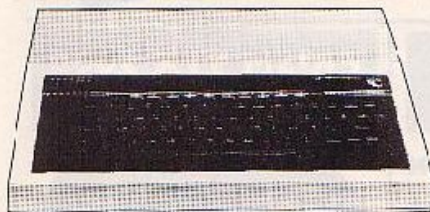
FOR BBC

CS100E £217.35
CS100 £244.95
CS200E £254.15
CS200 £831.75

FOR DRAGON

CDS250 £355.95
CDS500 £401.80
CDS1000 £503.95
CDD500 £557.60

BBC



Model B

SPECTRUM PRICE

£**399**

Sensational Offer for BBC Owners!

OPUS DISK DRIVE

for BBC Model 'B'
SPECTRUM LOW PRICE

£**189**



Including: MANUAL & UTILITIES DISC

ACCESSORIES for BBC

Limited Offer!
BBC Dual Disk Drive
SAVE £53.85
ONLY £750.00

BBC BUGGY
£189.00

Now available:
RC DIGITAL TRACER for the BBC
£55.50

GRAF PAD Graphics Tablet £143.75
PROLINK Joystick Interface £9.95
BIT-PRINT ZX Printer £89.95
BBC Single Disc Drive £265.00
BBC Disk Interface Kit (inc. fitting) £57.00
Acorn Software Cassette-Based from £9.95
Acorn Disk-Based software £11.50
BBC Disk-Based software from £9.95
BBC BUGGY Spectrum Price £189.00
BBC Disk Manual & Utilities Disc £34.50
QUICK-110 JOYSTICK Especially for the BBC Spectrum Price £19.95

Sensational PRINTER OFFERS from Spectrum

Incredible Value! from Spectrum



NEW!

SEIKOSHA Model GPI00A MkII

SPECTRUM LOW PRICE

£**199⁹⁵**

- Printing speed 50 C.P.S.
- Full Graphics capability
- Double width character output under software control
- Centronics type parallel interface
- Paper width is adjustable up to 10 inches

Other Printer Bargains

SEIKOSHA GP100 VC £199.95
SEIKOSHA GP100 AS £199.95
SEIKOSHA GP250 X £249.95
EPSON FX 80 £491.95
EPSON RX 80 £314.95
EPSON RX 80 F.T. £366.85
ALPHACOM 42 for VIC-20, Commodore 64, Dragon, Atari, BBC with required interface £99.90
ALPHACOM 3C for ZX Spectrum £59.95
MICROLINE 82A with RS-232 £299.95
MICROLINE 82A with Graphics £299.95
MICROLINE Model 92 £450.00
MICROLINE Model 83A £499.95
QUENDATA 60CPS Printer £229.00
BIT PRINT 24 for the BBC £89.95

ALPHACOM



ALPHACOM 41 For DRAGON, BBC, COMMODORE, ATARI (Interfaces extra)
..... Spectrum price £79.95
ALPHACOM 31 For ZX SPECTRUM
..... Spectrum Price £59.95
Paper Rolls for Alphacom printers
Box of 5 Rolls £6.00

STACK LIGHT RIFLE



For Commodore 64, VIC-20 & ZX Spectrum

Available for the SPECTRUM, VIC 20 and the COMMODORE 64 (Arriving Now!), comes complete with 12 feet of cable and three exciting action software games including "MIDNIGHT NOON SHOOTOUT" with full sound effects

Spectrum Price **£29.95**

Including 3 FREE Games

spectrum
CHARGE CARD

UP TO £1,000 Instant Credit

• There's up to £1,000 worth of Instant Credit available on a Spectrum Chargecard. See your local SPECTRUM dealer for written details (UK mainland only) Typical APR - 30.6%

Turn the page for more super offers from Spectrum . . .

spectrum

Everything you've ever wanted for your

ZX SPECTRUM

Superb ZX add-on's from your local Spectrum dealer

DK'Tronics KEYBOARD

For ZX SPECTRUM
SPECTRUM PRICE

£ **45**



New & exclusive to Spectrum!

INDESCOMP

Superb quality add-on's for the ZX SPECTRUM

**SOUND
AMPLIFIER**



£10.95

**32K RAM
PACK**



£39.95

**JOYSTICK
Interface**



£14.95

**DOMESTIC
CONTROLLER**



£49.95

ALPHACOM Thermal printer for ZX SPECTRUM -
NOW DOWN TO £59.95

DIGITAL TRACER

From RD Labs
for the ZX
Spectrum

£55.50



STONECHIP ACCESSORIES For the ZX SPECTRUM

ECHO AMPLIFIER

£19.95

PROGRAMMABLE JOYSTICK

INTERFACE £24.95

Coming soon . . .

SPECTRUM KEYBOARD WITH
SOUND NO NEED TO TAKE
YOUR SPECTRUM APART

£59.95



ZX SPECTRUM

16K

£99.95

ZX SPECTRUM

48K

£129.95

Spectrum Computer Centres have no
connection whatsoever with the ZX
Spectrum Computer manufactured
by Sinclair Research Ltd.

VISCOUNT DISK DRIVE

Now from SPECTRUM a Disk Drive for the ZX
SPECTRUM. The VISCOUNT 5 1/4" DISK
DRIVE with interface system and complete
with all leads.

ONLY
£ **245**



CHEETAH

32K RAM
Pack

£39.95



KEMPSTON

Joystick £15
Interface

(Joysticks opt. extra)

CURRAH Speech Synthesiser. £29.95

DK'IRONICS Lightpen. £19.95

DK'IRONICS DUALPORT Joystick

Interface. £14.95

STACKLIGHT Rifle with

3 FREE GAMES. £29.95

Sinclair ZX INTERFACE 2

The new ROM Cartridge/Joystick interface.

Loads programs instantly! Takes two joysticks!

Just plug in and play. **ONLY £19.95**

Plus New ROM cartridge software.

PRISM VTX 5000 MODEM



NOW, YOUR ZX SPECTRUM IS YOUR KEY TO THE
WORLD with the incredible PRISM VTX 5000
MODEM

■ Versatile modem for ZX Spectrum (16K or 48K)
versions ■ Slim design fits easily, matches your
micro ■ Instant access to Prestel & Micromet 800
information services ■ Instant communication
with other ZX Spectrum users ■ Use the Prism VTX
5000 with a Sinclair printer - and print Prestel
frames

SPECTRUM PRICE **£99.95**

MONITORS



**Commodore
Model 1701**

A superb Colour Mon-
itor with sound

SPECTRUM PRICE

£ **230**

PHOENIX Amber

FIDELITY CM14 Colour. £126.50

SANYO 14" Colour TV (ideal as a monitor) £199.95

SANYO CDD 3125NB Colour Monitor. £229.95

SANYO 12" Green Monitor. £285.35

SANYO 12" Green Monitor. £99.95

BOOKS

GRANADA PERSONAL COMPUTING TITLES

The ZX Spectrum and how to get the

most from it. £5.95

The Spectrum Programmer. £5.95

The Spectrum Book of Games. £5.95

Introducing Spectrum Machine

Code. £7.95

The Apple II programmers

Handbook. £10.95

Programming with Graphics. £5.95

The Dragon & how to make the

most of it. £4.95

Computing for the Hobbyist &

small Business. £6.95

Simple Interfacing Projects. £6.95

The BBC Micro: An expert

guide. £6.95

Commodore 64 Computing. £5.95

The Onic-1 and how to get the

most from it. £5.95

The Dragon 32 book of games

Computer Languages and their

uses. £5.95

Lynx Computing. £4.95

21 Games for the BBC Micro. £5.95

Choosing a Microcomputer. £4.95

Databases for fun & profit. £4.95

Introducing the BBC Micro. £5.95

SUNSHINE

The Working Spectrum. £5.95

Functional Forth for the BBC. £5.95

The Working Dragon 32. £5.95

Dragon 32 Games Master. £4.95

The Working Commodore 64. £5.95

Commodore 64 Machine Code

Master. £6.95

The Working Dragon. £5.95

The Working Spectrum. £5.95

The Working CBM 64. £5.95

Dragon 32 Games Master. £5.95

and many more!

There's a Spectrum Centre near you..

AVON

BATH Software Plus, 12 York St
Tel: (0225) 61676
BAISTON Bessal Computers Ltd.
24 Park Row Tel: (0272) 294186
WESTON-S-MARE K & K Computers,
32 Alfred St Tel: (0934) 415324

BEDFORDSHIRE

DUNSTABLE Dormans 7-11 Broad Walk
Tel: (0582) 65515
LEIGHTON Buzzard The Computer Ctr
at Milton Keynes Music, 17 Bridge St.
Tel: (0525) 376622
LUTON Terry-More, 49 George St
Tel: (0582) 233972

BERKSHIRE

BRACKNELL Computer Centre, 44 The
Broadway, Tel: (0344) 427317
READING David Saucers, 8 Yield Hall
Place Tel: (0734) 580719

BUCKINGHAMSHIRE

BERKSHIRE MU Games and Computers
245 High St Slough, Tel: T.3.A.
BLITHELEY Ram Computer Centre,
117 Queensway, Tel: (0908) 647744
CRESHAM Reed Photography & Computers,
113 High St Tel: (0494) 733373

CAMBRIDGESHIRE

CAMBRIDGE K. P. Computers Ltd, 19/20
Market St. Tel: (0223) 312240
(Open 6 Days)
PETERBOROUGH Pthrg Communications,
91 Midland Rd. Tel: (0733) 41067

CHANNEL ISLANDS

GUERNSEY Gruts, 3-5 The Pellet,
St Peter Port Tel: (0481) 24682
JERSEY Audio & Computer Centre,
7 Peter St, St Helier, Tel: (0534) 74000

CHESHIRE

ALTRINCHAM Mr Micro 28 High St.
Tel: (061) 941 6213
CHESTER Oakleaf Computers Ltd
100 Boughton Tel: (0244) 310099
CREWE Microman Unit 2,
128 Northwich Rd. Tel: (0278) 216014
ELLSWORTH PORT RFR Computers, 1
Pooltown Rd, Whitley, Tel: 051 355 41-0
MACCLESFIELD Camera & Computer Centre,
116 Mill St Tel: (0625) 27463
NORTHWICH Camera & Computer Centre,
3 Town Square Tel: (0625) 45629
STOCKPORT Wilding Ltd,
1 Little Underbank Tel: (061) 480 3435
WARRINGTON Wildings, 111 Bridge St.
Tel: (0925) 38290
WIDNES Computer City, 78 Victoria Road,
Tel: (051) 420 3333
WILMSLOW Swift of Wilmslow, 4-6 St
Ames Parade, Tel: (0625) 526213

CLEVELAND

MIDDLSBOROUGH McKenna & Brown,
206 Linthorpe Rd. Tel: (0642) 222368

CORNWALL

ST AUSTELL A B & C Computers, Duchy
House, 6 Lower Aviner Sq
Tel: (0726) 67337

CUMBRIA

BARROW-IN-FURNESS Barrow Computer
Centre, 46 Church St. Tel: (0229) 38353
CARLISLE The Computer Shop, 56-58
Lowther St. Tel: (0228) 277 0
PENRITH Penrith Communications,
14 Castlegate, Tel: (0768) 67146
Open Mon-Fri till 6pm
WHITEHAVEN P. C. Hendren 15 King St.
Tel: (0946) 2363

DERBYSHIRE

ALFRETON Gordon Harwood 69-71 High
St. Tel: (0775) 832078
CHESTERFIELD The Computer Centre,
14 Stephenson Place Tel: (0246) 208802
DERBY J. T. Electronics, at Camera Thorpe,
The Spot Tel: (0332) 360456

DEVON

EXETER Seven Counties (Computers) Ltd, 7
Paris Street, Tel: (0392) 211212
EXMOUTH Open Channel, 30 The Strand.
Tel: (0395) 234403
PLYMOUTH Syntax Ltd, 76 Cornwall
St. Tel: (0752) 28705
TIVERTON Adcom Micro Computers,
37 Barton St. Tel: (0884) 252854
TORQUAY Devon Computers, 8 Torhill Rd.,
Castle Circus, Tel: (0803) 526303

DORSET

Bournemouth Lansdowne Computer Ctr
1 Lansdowne Crescent, Tel: (0202) 20165

DURHAM

DARLINGTON McKenna & Brown,
102 Bondgate, Tel: (0325) 459744

ESSEX

BASILDON Godfrey's 28-32 East Walk,
Tel: (0268) 289379
BASILDON Godfrey's Computer Centre, 5
Laindon Main Centre Laindon, Tel: (0268)
416747
CHELMSFORD Maxton Haymen Ltd,
5 Broomfield Rd. Tel: (0245) 354595
COLCHESTER Colchester Computer Ctr,
16 St Botolphs St. Tel: (0206) 47242
CRAYS H. Reynolds, 79 Orsett Rd.
Tel: (0875) 5946
ILFORD Woolmans, 76 Ilford Lane,
Tel: (01) 478 1337
LOUGHBOROUGH Micro & Movie Channel,
309 High Rd. Tel: (01) 508 1215
ROMFORD Computer Centre, 72 North St.
Tel: 0708 752862

HAMPSHIRE

ALDERSHOT David Saunders, 51 Station
Rd. Tel: (0252) 20130
ANDOVER Andover Audio, 105 High St.
Tel: (0264) 58251
BASINGSTOKE Fishers, 2-3 Market
Place, Tel: (0256) 22679
PORTSMOUTH Cygnus Computers Ltd,
251 Commercial Rd., Tel: (0705) 833938
PORTSMOUTH (Waterloo) G B
Microland, 7 Queens Parade,
Tel: (07014) 59911
SOUTHAMPTON RJ Parker & Son Ltd.,
11 West End Rd, Bitterne,
Tel: (0703) 445026
WINCHESTER Winchester Camera &
Computer Centre, 75 Parchment St.
Tel: (0562) 53982

HEREFORD

HEREFORD Melroy Hi-Tech Ltd,
43 Broad St. Tel: (0432) 275737

HERTFORDSHIRE

BOREHAMWOOD Master Micro,
35 Stanley Rd. Tel: (01) 953 6368
HITCHIN Camera Arts (Micro Computer
Division), 66A Hermitage Rd.,
Tel: (0462) 39285
POTTERS BAR The Computer Shop,
197 High St. Tel: (0727) 44417
ST ALBANS (Herts) Clarks Computer
Centre 14-16 Holywell Hill
Tel: (0727) 52991
STEVENAGE D J Computers, 11 Tower
Square, Tel: (0438) 65601
WATFORD SHS Microsystems Ltd, 9c The
Parade High St. Tel: (0923) 26802
WELWYN GARDEN CITY D. Computers, 40
Fleetline Rd., Tel: (07073) 28435/28444

HUMBERSIDE

BEVERLEY Computing Word, 18 Swaby's
Yard Dyer Lane, Tel: (0482) 881831
GRIMSBY FC Jonsor Ltd, 22 -riargate,
Rivthead Centre Tel: (0472) 42031
HULL The Computer Centre,
26 Anlaby Rd. Tel: (0482) 26297

ISLE OF MAN

DOUGLAS T.H. Cableborn Ltd,
57-61 Victoria St Tel: (0624) 3482
(Just Opening)

ISLE OF WIGHT

COWES Belet & Son, 15 Bath Rd. Tel:
(0983) 29781

KENT

DOVER Kent Photos & Computers, 4 King St.
Tel: (0304) 202020
GRAVSEND Marshall's Computers &
Cameras, 3 Windmill St. Tel: (0474) 65930
ORPINGTON Ellis Marketing Ltd, 25 Station
Sq., Paris Wood, Tel: (0689) 39476
RAINHAM Microway Computers Ltd, 39
High St, Medway Towns,
Tel: (0634) 376732
SEVENOAKS Ernest Fielder Computers,
Dorset St. Tel: (0732) 456800
SITTINGBOURNE Computers Plus, 65 High
St. Tel: (0795) 25677
TUNBRIDGE WELLS Modara Cnptrs Ltd,
28-30 St Johns Rd. Tel: (0692) 41555

LANCASHIRE

ACCINGTON PV Computers,
36A Water St. Tel: (0254) 36521/32611
BLACKBURN Tempo Computers, 9 Railway
Rd. Tel: (0254) 691333
BURNLEY IMO Computer Centre, 39/43
Stanhill St. Tel: (0282) 54299
BURY (Lancs) Micro-North, 7 Broad St.
Tel: (061) 797 5764
PRESTON Wilding's, 49 Fishergate,
Tel: (0772) 556250

LEICESTERSHIRE

LEICESTER Youngs, 40/42 Belvoir St.
Tel: (0533) 544774
MARKET HARBOUR Harbrough Home
Computers, 7 Church St.
Tel: (0535) 63356

LINCOLNSHIRE

GRANTHAM Oakleaf Computers Ltd, 121
Dudley Rd. Tel: (0476) 78994/30000
LINCOLN MKD Computers, 24 New ends,
Tel: (0522) 25907

LONDON

EG Percivals, 85 High St. York, East Ham.
Tel: (01) 472 8941
EB McGowans, 244 Graham Rd., Hackney.
Tel: (01) 533 0335
EC1 Sidney Levy, 17-19 Leather Lane,
Tel: (01) 242 3456
EC2 Devron Computer Centre, 155 Mincrogate
Tel: (01) 638 3339/830
N14 Logic Sales, 19 Broadway, The Bourne,
Sauldgate, Tel: (01) 382 4942
N20 Castlehurst Ltd, 1291 High Rd.
Tel: (01) 446 2280
NW4 Da Vinci Computer Store, 112 Albert
St., Hendon Tel: (01) 202 2272
SE1 Vic Odden's 8 London Bridge Walk,
Tel: (01) 403 1988
SE9 Square-Deal, 373-375 Footscray Rd.,
New Eltham, Tel: (01) 855 1516
SE11 Galvick Computers, 328 Kennington
Park Rd. Tel: (01) 587 0336
Adjacent to Oval Tube
SE15 Gas Jiburst Ltd, 152 Hye Lane,
Beckham, Tel: (01) 639 2205
SE25 Ellis Marketing, 79 High St., South
Norwood, Tel: (01) 633 4224
SW16 Butler Micro Shop, 310 Streatham
High Rd. Tel: (01) 769 2837
SW18 Ercorn, 31 High St, Wimbledon, Tel:
(01) 947 7578
W1 Computers of Wigmore St., 67 Wigmore
St. Tel: (01) 486 0373
W1 GK Photo & Computers, 92-34 Wardour
St. Tel: (01) 437 0112
W1 Sonic Foto & Micro Centre, 256
Tottenham Court Rd. Tel: (01) 580 5826
W2 Devron, 4 Edgware Rd.
Tel: (01) 724 2373
W3 Thames Computing 163 High St Acton
Tel: (01) 932 6888
W7 TK Electronics, 11/13 Boston Rd.,
Hanwell, Tel: (01) 579 2842
WC2 City Camera Exchange, 115 Kingsway
Tel: (01) 435 0446

MANCHESTER GREATER

BOLTON Wilding Ltd, 23 Deansgate
Tel: (0204) 33512
MANCHESTER Linnox Ltd, 8 Exchange St.
St. Ann's Square, Tel: (061) 832 6167
OLDHAM Home & Business Computers Ltd,
54 Yorkshre St. Tel: (061) 6331608
ROCKDALE Home & Business Computers,
75 Yorkshre St. Tel: (0706) 344654
SWINTON Mr Micro Ltd, 69 Parlington
Lane, Tel: (061) 728 2282
Late Night Friday
WIGAN Wilding Ltd, 11 Mesnes St.
Tel: (0942) 44332

MERSEYSIDE

BIRKENHEAD Fairs Cameras & Hi-Fi, Dacre
Hill, Rock Ferry, Tel: (051) 645 5006
BESWALL Thorncroft Computer Systems,
46 Pansby Rd. Tel: (051) 342 1516
BUYTON Ian Houghton 5 Hutton Hay Rd.
Tel: (051) 489 5765
LIVERPOOL Beaver Radio, 20-22 White
chapel, Tel: (051) 709 9858
LIVERPOOL (Aintree) Hargreaves, 31-37
Warbeck Moor, Tel: (051) 525 1782
SOUTHPORT Central Computers, 575 Lord
St. Tel: (0704) 2188
ST HELENS Studio 55, 55 Ormskirk St.
Tel: (0744) 39496

MIDDLESEX

EDGWARE GK Photographic & Computers
106 High St. Tel: (01) 961 1000
NARROW Camera Arts, (Micro Computer
Division) 24 St. Anne's Rd.
Tel: (01) 427 5469
HAYES Chipshot, 1000 Uxbridge Rd.
Tel: (01) 573 2511

STAINES Spithorne Microsystems Ltd, 2
Kingston Rd., Tel: (0784) 55659/55554
TELDON Andrews, Broad St.
Tel: (011) 977 4716
UXBRIDGE J. K. Computers, 7 Windsor St.
Tel: (0896) 51815

NORFOLK

FANENHAM Fastview, 12 Norwich Rd.
Tel: (0328) 513119
NORWICH Sound Marketing, 52 St.
Benedicts St. Tel: (0603) 667725
THETFORD C B & Micros, 21 Guildhall St.
Tel: (0842) 61645

NORTHAMPTONSHIRE

NORTHAMPTON Dormans, 22 Princess Walk
Grosvenor Centre, Tel: (0604) 37031

NOTTINGHAMSHIRE

NOTTINGHAM Caneos Computer, 8/9/10
Trinity Walk, Tel: (0602) 742912
NOTTINGHAM Jackson Computers, 13
Middlegate Newark, Tel: (0636) 72594
(Just Opening)
WORKSOP Computergraphics, 132 Airgate
St. Tel: (0909) 472248

NORTHERN IRELAND

BELFAST Arthur Heaton Ltd., 37 Great Victoria
St. Tel: (0232) 246335
DR ARMAR Pedlows, 16 Market St.,
Partdown Craigavon, Tel: (0732) 332225
LONDONDERY Fayle Computer Systems,
3 Bhop St. Tel: (0504) 268337
NEWRY Kewin Computer Centre, 34
Moreghat St. Tel: (0693) 66545

OXFORDSHIRE

ABINGDON Ivar Fields Computers, 21 Sturt
St. Tel: (0235) 21207
BANBURY Computer Plus, 2 Church Lane
Tel: (0295) 55890
HENLEY-ON-THAMES Family Computers
Ltd., 40A Bell St. Tel: (0491) 375734
OXFORD Ivar Fields 7 St Ebbs St.
Tel: (0865) 247082

SCOTLAND

ABERDEEN North East Computers, 1-3 Elks
St., Peterhead, Tel: (0775) 79900
AYR Vennals, 6A New Bridge St.
Tel: (0291) 264124
DUMFRIES Vennals, 71 English St.
Tel: (0381) 54547
EDINBURGH The Silicon Centre,
6-7 Antigua St. Tel: (031) 557 4546
GLASGOW Victor Morris Ltd., 340 Argyle St.
Tel: (041) 221 8958
HAMILTON Tom Dickson Computers, 8-12
Cadow St. Tel: (0698) 283198
KILMARNOCK Vennals, 49 Foregate,
Tel: (0563) 32175
KIRKCALDY Kirkaldy Photographic Services,
254E High St., Fife, Tel: (0592) 204734
STIRLING R. Kilpatrick, 58 Port St.
Tel: (0786) 5532

SHROPSHIRE

SHREWSBURY Computaram, 15 Cast-
legate, Tel: TBA
TELFORD Computer Village, 4 Hazeldine
House, Tel: (0952) 504666

SOMERSET

TAUNTON Grays, 1 St James St.
Tel: (0825) 72986

STAFFORDSHIRE

STAFFORD Computarams, 59 Fargate St.
Tel: (0785) 41899
STOKE-ON-TRENT Computaram, 11 Mkt
Square Arcade Hanley, (0782) 268620
STOKE-ON-TRENT The Microshop, 67 Sta-
tion Rd. Biddulph Tel: (0782) 511559

SUFFOLK

BURY ST EDMUNDS Bury Computer
Centre, 11 Guildhall St.
Tel: (0284) 705772
IPSWICH Brainwave, 24 Crown St.
Tel: (0473) 50965
LOWESTOFT John Wells, 44 London Rd
North, Tel: (0502) 3742

SURREY

CAMBERLEY Camera Arts (Micro Comput-
Division), 36 High St. Tel: (0276) 65848
CHEERTSEY Cheertsey Computer Centre,
Windsor St. Tel: (09328) 64563
CRUDDEN Cassic Cameras 16 St George
Walk, Tel: (01) 686 2012
EPSOM The Micro Workshop, 12 Stck
Approach Tel: (03727) 21533
HASLEMER Haslemere Computers, 25
Junction Pl. (Adj. Rex Cinema)
Tel: (0428) 54426
NEW MALDEN Surrey Micro Systems 3
High St. Tel: (01) 942 0478
RICHMOND Crest Computer Services, 8H
St. Tel: (01) 340 4635
WALLINGTON Surrey Micro Systems Ltd
53 Woodcote Rd. Tel: (01) 617 5636
WOKING Hapers, 71-73 Commercial Wa
Tel: (0462) 61061

SUSSEX

BEXHILL-ON-SEA Computware, 22 St.
Leonards Rd. Tel: (0424) 223340
CHAWLEY Gatwick Computer Services, 6
Boulevard, Tel: (0293) 37842
LITTLEHAMPTON Allan Chase Ltd, 39 High
St. Tel: (09064) 5374

WALES

ABERDARE Inkey Computer Services Ltd
70 Mill St. Tel: (0424) 223340
Tel: (0685) 831828
ABERYSTWYTH AorData at Galloways 2
Pier St. Tel: (0970) 615522
CARDIFF Randall Cox, 18-22 High S.
Arcade, Tel: (0222) 31560
LLANDUDNO (Gwynedd) Computer Plus
Discount, 15 Clonmel St. Tel: (0492) 7994
NEWPORT (Gwent) Randall Cox, 118
Commercial St. Tel: (0633) 67378
PENBROKE Randall Cox, 19 Main St.
Tel: (064) 682876
WREXHAM T E Roberts, 26 King St.
Tel: (0918) 364404/364527

WARWICKSHIRE

LEAMINGTON SPA IC Computers, 4
Russell St. Tel: (0926) 36244
RUGBY The Rugby Micro Centre, 9-11
Regent St. Tel: (0768) 70522

WEST MIDLANDS

BIRMINGHAM Sherwoods, 6t Western
Arcade, Tel: (021) 236 7211
COVENTRY Greens, 22 Market Wcy.
Tel: (0223) 28342
DUDLEY Central Computers, 35 Church H.
Precinct, Tel: (0384) 235169
WEST BROMWICH Bell & Jones, 39 Queen
Square, Tel: (021) 553 0620

WILTSHIRE

SALISBURY Whymark Computer Centre, 21
Milford St. Tel: (0722) 26688

WORCESTER

KIDDERMINSTER Central Computers, 20
21 Blackwell St. Tel: (0562) 746941
WORCESTER David Waring Ltd, 1 Marmion
House High St. Tel: (0905) 27551

YORKSHIRE

BRADFORD Erricks, Fotosonic House Row
son Square, Tel: (0274) 309266
DEWSBURY Home & Business Computers
59 Daisy Hill, Tel: (0924) 455300
DOUGLAS The Soft Centre 6 Queens
gate Waterdale Centre Tel: (0302) 20088
Huddersfield Rchards (Formerly
Laimes) 12 Queen St. Tel: (0484) 25334
HULL Computer Centre 26 Anlaby Rd. Tel:
(0482) 23297
LEEDS Bass & Bligh, 4 Lower Briggate,
Tel: (0532) 454451
SKIPTON Look & See 45 Belmon: Brigg
Tel: (0753) 60078
YOKE York Computer Centre 7 Stonegate
Arcade, Tel: (0904) 641882

Q.E.D. Systems

experts in business systems now bringing professionalism into the home market for the SPECTRUM, ORIC, DRAGON and APPLE II micro-computers.

GAMES

THE VIDEO CHALLENGE SUITE
These are not just any games but Q.E.D. quality action video programs. Award yourself the VCI!

Spectrum VCI — Photon, Aces & Ladders, Microtheloid Phantoms £6.95

Spectrum VCI — Tower of Logic, Burjblast, Link, Four and Seven £6.95

ORIC VCI — Photon, Link four, Microtheloid and Phantoms £6.95

Apple II VCI — Grand National, Star Trek, Link four, Burjblast and Microtheloid £6.95

Dragon VCI — Photon, Link four, Microtheloid and Phantoms £6.95

Dragon VCI — Dragons Demean, Carls, Drax and Kwan £6.95

NEW FOR THE DRAGON — ATLANTIS
An exciting and challenging game where your mission is to destroy the city of ATLANTIS. But beware, as the game progresses your mission becomes increasingly more complex! £5.95

THE VARIETY PACK 25 specially selected programs to realise the potential of your new micro. The best value around today! £5.95

Spectrum, ORIC, Dragon Apple II £5.95

(LESS THAN 24p per program!)

NEW UTILITY FOR THE SPECTRUM

ORIC and DRAGON

Q.E.D. TOOLKIT

A MUST FOR EVERY SERIOUS DESIGNER. THE TOOLKIT CONTAINS A HOST OF INVALUABLE MACHINE CODE ROUTINES TO ASSIST YOU WITH YOUR PROGRAM DEVELOPMENTS £6.95

NEW GAME FOR THE SPECTRUM

100% MACHINE CODE

MILLIPEDE

THE BEST VERSION OF THIS EVER POPULAR ARCADE GAME.

SOFTWARE YOU WILL NOT BE

DISAPPOINTED WITH!

£6.95

HOME MANAGEMENT

HOME ACCOUNTS MANAGEMENT
Run all your financial affairs with this Q.E.D. quality system. Features include budget control, maintenance and balance of all accounts (including credit cards). Full monitoring of expenses against budget and complete expense reporting. The system is supplied with full documentation and operating instructions. £10.95

Spectrum, ORIC, Dragon £10.95

Apple II £10.95

UTILITIES

THE DRAGON 6809 ASSEMBLER/EDITOR

With this powerful software realise the full potential of this splendid micro by writing your own machine code programs and routines. Full operating instructions are included. £7.95

THE ORIC 6802 ASSEMBLER/EDITOR

Probably the best ORIC program on the market. With this powerful software realise the full potential of the ORIC by writing your own machine code programs and routines. Full operating instructions are included. £7.95

Spectrum, ORIC, Dragon £7.95

Apple II £7.95

(All programs are supplied on quality cassette, unless otherwise stated)

Please send me on cassette/disc

for my MICRO with memory.

I enclose my cheque/postal order for £ payable to Q.E.D. Systems.

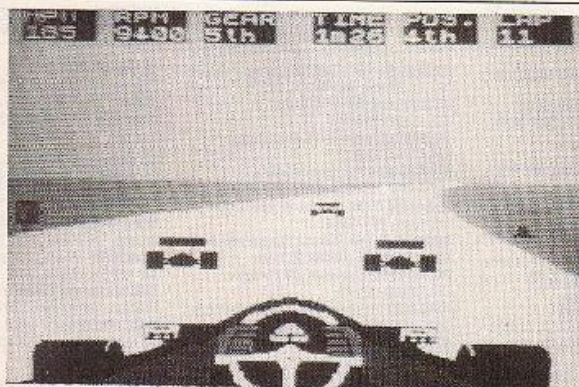
Name Telephone No.

Address

Q.E.D. SYSTEMS, LIVER HOUSE, 96 BOLD ST., LIVERPOOL, ENGLAND.

OVERSEAS
please add
£1.00 carriage
OFFER — BUY ANY TWO
AND GET £1 OFF!

DESPATCH WITHIN
48 HOURS



FORMULA ONE AND STEERING WHEEL

For Sinclair ZX Spectrum 16K & 48K

THE GAME

Based on current formula one levels of acceleration, braking and roadholding, with 10 circuits to choose from (one on 16K version) including Silverstone, the world's fastest grand prix circuit, this program has been developed for the ultimate in realism with the help of The Jim Russell International Racing Drivers' School at Silverstone. It has four stages — Instruction, Practice, Qualifying, and Race — with eight cars racing against you in wet or dry conditions. Incredible sound effects and smooth 3D vector graphics give you all the speed and excitement of motor racing. 100% machine code.

THE STEERING WHEEL

Naturally you cannot steer a racing car effectively by pushing buttons or wiggling a joystick so we have developed a steering wheel that fits to the Spectrum. With one hand on the wheel (the other free for braking and accelerating) it gives the level of precision needed to steer the car on the fastest line through the corners and correct a skid when you overdo it. The wheel is strongly made and thanks to a brilliantly simple design we have been able to keep the cost down to a minimum. It will be used for many years in the future but is now only available with FORMULA ONE.

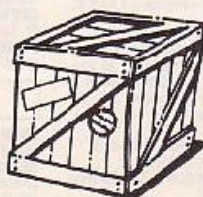
To order Formula One and Steering Wheel send cheque or P.O. for £8.95 to:

SPIRIT SOFTWARE
1½ Pembroke Mews, London W.8.

MICRO—><

your
EXPORT
specialist
for

ALL MICRO COMPUTERS - SOFTWARE &
PERIPHERALS - INCLUDING ORIC -
SINCLAIR - MEMOTECH - LYNX
COMMODORE & MANY
MORE !!



Please Contact:

MICRO-X LIMITED
5 COVERDALE ROAD,
BRONDESBURY, LONDON NW2 4DB
TELEPHONE 01-459 1089
TELEX 295931 UNICOM G.



SPRITES

Gary Priest presents a sprite routine for the Dragon.

AS MOST PEOPLE know the Dragon 32 does not have the ability to mix text and high resolution graphics or control sprites.

A Basic program that uses moving high resolution graphics is usually very slow, jerky, and wastes a lot of memory by having to keep checking for collisions etc. The main advantage of sprites are that once they are defined they can be forgotten about and they will continue to move until they come to the edge of the screen. This means that the characters move faster and smoother around the high resolution screen.

My sprite program can handle up to 30 sprites although if you use all 30 sprites at once they will move extremely slowly. In spite of this, they will still move faster than if you used the Dragon's Get and Put commands.

Each sprite has its own x and y co-ordinates and places in memory to store information such as the direction of the sprite.

The machine code, sprite and attributes and graphics data occupy about 4.5K at the top of memory.

(continued on page 147)

Listing 1.

```

10 REM *****
20 REM **EXTENDED SPRITE BASIC**
30 REM **BY GARY PRIEST (C)1983*
40 REM ****FOR THE DRAGON 32****
50 REM *****
60 REM listing one
70 REM INITIALISE
80 DATA 75,36,A6,B0,BD,B0,CC,B1,00,26,F7,BE,7D,63,BF
  ,01,26,10,9E,B1,CA,A6,A0,A7,E0,10,3C,B2,2C,23,F6,B6,A1
  ,07,E0,10,9E,B2,30,A6,A0,A7,E0
90 DATA 10,3C,B2,93,23,F6,BE,7D,E7,BF,01,28,10,8E,6E,69
  ,10,AF,B8,36,BE,74,BE,BF,01,52,BE,74,93,BF,01,95,B6,7E
  ,B7,01,91,B7,01,94,39
100 REM WHICH COMMAND
110 DATA 74,B9,5F,10,9E,A6,A6,A4,A1,B4,26,20,A6,B0,B
  ,1,80,24,06,A1,A0,25,16,20,F4,B4,7F,A1,A0,26,0C,10,9F,A
  ,6,58,BE,75,0F,3A,AE,84,6E,B4,30,1F,A6,B0,B1,80,25,FA,5
  ,C,C1,13,25,CC,7E,B8,BD
120 REM MOVE SPRITES
130 DATA B6,01,B7,7E,6F,C6,01,B7,7E,6F,3D,C3,7E,71,1F,0
  ,1,E6,80,B7,7F,65,BF,7F,66,C1,00,26,0A,B6,7E,6F,4C,B1,7
  ,5,35,25,E0,39,C1,01,27,1A,C1,02,10,27,00,CA,C1,03,27,6
  ,0,C1,04,10,27,00,8D,B6,7E,6F,4C,B1,75,35,25,C2,39
140 REM UP
150 DATA B6,7E,6F,C6,02,3D,C3,7E,95,1F,01,BF,7F,6B,A6,8
  ,0,E6,84,BD,6F,D3,C1,00,27,1B,5A,BE,7E,68,A7,80,E7,B4,B
  ,D,70,2D,BD,7C,00,B6,7E,6F,4C,B1,75,35,25,91,39,BD,70,2
  ,D,3D,70,00,B6,7E,6F,C6,01,3D,C3,7E,71,1F,01,6F
160 DATA B4,B6,7E,6F,4C,B1,75,35,10,25,FF,72,39
170 REM DOWN
180 DATA B6,7E,6F,C6,02,3D,C3,7E,95,1F,01,BF,7F,6B,A6,8
  ,0,E6,84,BD,6F,D3,C1,16,27,C8,5C,BE,7F,68,A7,80,E7,B4,B
  ,D,70,2D,BD,7C,00,B6,7E,6F,4C,B1,75,35,10,25,FF,3F,39
190 REM LEFT
200 DATA B6,7E,6F,C6,02,3D,C3,7E,95,1F,01,BF,7F,6B,A6,8
  ,0,E6,84,BD,6F,D3,B1,00,27,95,4A,BE,7F,68,A7,80,E7,B4,B
  ,D,70,2D,BD,7C,00,B6,7E,6F,4C,B1,75,35,10,25,FF,0C,39
210 REM RIGHT
220 DATA B6,7E,6F,C6,02,3D,C3,7E,95,1F,01,BF,7F,6B,A6,8
  ,0,E6,84,BD,6F,D3,B1,1E,10,27,FF,60,4C,BE,7F,68,A7,80,E
  ,7,34,BD,70,2D,BD,7C,00,B6,7E,6F,4C,B1,75,35,10,25,FE,D
  ,7,39
230 REM PRINT OLDCHR
240 DATA 34,06,B7,7E,91,F7,7E,93,B6,7E,6F,C6,04,3D,C3,7
  ,F,AR,1F,01,A6,80,B7,7E,D5,A6,80,B7,7E,D7,A6,80,B7,7E,D
  ,9,A6,80,B7,7E,DB,BD,70,02,35,06,39
250 REM PRINT SPRITE
260 DATA 34,06,B7,7E,91,F7,7E,93,B6,7E,6F,C6,04,3D,C3,7
  ,E,DD,1F,01,A6,80,B7,7E,D5,A6,80,B7,7E,D7,A6,80,B7,7E,D
  ,9,A6,84,B7,7E,DB,BD,70,02,35,06,39,34,06,B7,7E,91,F7,7
  ,E,93,BD,70,01,F7,7E,D5,7C,7E
270 DATA 91,BD,70,81,F7,7E,D7,7A,7E,91,7C,7E,93,BD,70,8
  ,1,F7,7E,D9,7C,7E,91,BD,70,81,F7,7E,DE,7A,7E,91,7A,7E,9
  ,3,C6,04,B6,7E,6F,3D,C3,7F,6B,1F,01,B6,7E,D5,A7,80,B6,7
  ,E,D7,A7,80,B6,7E,D9,A7,80
280 DATA 7C,DD,A7,04,35,06,39,B6,7E,91,F6,7E,93,8E,0
  ,6,00,30,B6,30,B9,01,00,5A,26,F9,C6,0B,10,8E,7F,5D,A6,8
  ,4,A7,A0,30,8B,20,5A,26,F6,C6,00,F7,7F,F3,10,8E,7F,5D,B
  ,4,08,3D,C3,75,69,1F,01,CA
290 DATA 08,A6,60,A1,B0,26,07,5A,26,F7,F6,7F,F3,39,F6,7
  ,F,F3,5C,F7,7F,F3,C1,00,26,DA,F6,7F,F3,39,B6,7E,D5,F6,7
  ,E,91,F7,7F,ED,F6,7E,93,F7,7F,EB,BD,71,0F,7C,7E,91,B6,7
  ,E,D7,BD,71,0F,7A,7E,91,7C
300 DATA 7E,93,B6,7E,D9,BD,71,0F,7C,7E,91,B6,7E,DB,BD,7
  ,1,0F,B6,7E,ED,F6,7F,EB,B7,7E,91,F7,7E,93,39,C6,0B,3D,C
  ,3,7D,69,1F,02,8E,06
310 DATA 00,B6,7E,91,F6,7E,93,30,B6,30,B9,01,00,5A,26,F
  ,9,C6,0B,A6,A0,A7,B4,30,8B,20,5A,26,F6,39
320 REM **COMMANDS**
330 REM CHAR
340 DATA BD,8E,83,BC,00,FF,10,22,1A,4D,BF,7E,5F,B6,7E,6
  ,0,C6,0B,3D,C3,75,69,1F,02,C6,0B,F7,7E,69,10,BF,7E,61,B
  ,D,89,AA,BD,8E,83,BC,00,FF,10,22,1A,29,BF,7E,5F,10,BE,7
  ,E,61,B6,7E,60,A7,A0,7A,7E,69,26,DE,16,03,0C
350 REM MOTION
360 DATA BD,8E,83,BF,7E,6F,BD,89,AA,BD,8E,83,BF,7E,5F,B
  ,6,7E,7C,C6,01,3D,C3,7E,71,1F,01,B6,7E,60,A7,80,16,02,E
  ,A
370 REM LOCATE
380 DATA BD,8E,83,BF,7E,6F,BD,89,AA,BD,8E,83,BF,7E,91,B
  ,D,89,AA,BD,8E,83,BF,7E,93,B6,7E,70,C6,02,3D,C3,7E,95,1
  ,F,01,B6,7E,72,A7,80,B6,7E,74,A7,80,16,02,3A
390 REM SPRITE
400 DATA BD,8E,83,BF,7E,6F,BD,89,AA,BD,8E,83,BF,7E,D5,B
  ,D,89,AA,BD,8E,83,BF,7E,D7,BD,07,AA,BD,0C,03,DF,7C,D7,D
  ,D,89,AA,BD,8E,83,BF,7E,DB,B6,7E,70,C6,04,3D,C3,7E,DD,1
  ,F,01,B6,7E,D6,A7,80,B6,7E,DB,A7,80,B6,7E,DA,A7,80,B6,7
  ,E,DC,A7,80,1A,02,AF
410 REM PX
420 DATA BD,8E,83,BF,7E,6F,B6,7E,70,C6,02,3D,C3,7E,95,1
  ,F,01,E6,80,7E,8C,36
430 REM PY
440 DATA BD,8E,83,BF,7E,6F,B6,7E,70,C6,02,3D,C3,7E,95,1
  ,F,01,30,01,E6,80,7E,8C,36
450 REM FLASH
460 DATA BD,8E,83,BF,7F,EF,BD,89,AA,BD,8E,83,BF,7F,F1,B
  ,E,7F,EF,B6,FF,22,8A,0B,B7,FF,22,10,BE,7F,F1,31,3F,26,F
  ,C,B6,FF,22,80,0B,B7,FF,22,10,BE,7F,F1,31,3F,26,FC,30,1
  ,F,26,DC,16,02,07
470 REM KEY
480 DATA BD,8E,85,27,FB,1F,89,7E,8C,36
490 REM TRIG1
500 DATA F6,FF,00,C4,01,7E,8C,36
510 REM TRIG2
520 DATA F6,FF,00,C4,02,54,7E,8C,36
530 REM XDIST
540 DATA BD,8E,83,BF,7E,6F,BD,89,AA,BD,8E,83,BF,7E,5F,B
  ,6,7E,70,C6,02,3D,C3,7E,95,1F,01,A6,84,B7,7E,91,B6,7E,6
  ,0,C6,02,3D,C3,7E,95,1F,01,A6,84,B7,7E,93,B6,7E,91,B1,7
  ,E,D7,A7,80,B6,7E,D9,A7,80

```

(listing 1 continued on page 147)

TASWORD TWO THE WORD PROCESSOR

64 CHARACTERS PER LINE ON THE SCREEN AND TO PRINTERS!
MICRODRIVE COMPATIBLE — instructions supplied

48K
SPECTRUM

"The number of on-screen prompts, together with the excellent manual, make it ideal — even for an absolute beginner."

PERSONAL COMPUTER WORLD September 1983

"What makes a word processor more or less versatile is its control features. Tasword Two offers an impressive selection and the tutor program succeeds in demonstrating them admirably."

ELECTRONICS AND COMPUTING November 1983

"Tasword is showing a degree of sophistication that business computers took many years to develop."

WHAT MICRO? October 1983

TASWORD TWO The Word Processor*

Your Spectrum becomes a professional word processor with TASWORD TWO. TASWORD TWO gives you an amazing 64 characters per line on your screen. This is ideal for standard A4 paper and TASWORD TWO prints your text just as it appears on your screen.

Tasword Two drives the following interfaces:

Cobra RS232 I/O Port	ADS interface
Euroelectronics Interface	Kempston Interface
Hilderbay Interface	Morex Interface
Sinclair ZX Interface 1	Tasman Interface

The same program drives these interfaces. A short easy to follow set of instructions takes you through setting up your Tasword Two to drive the interface you have or choose to buy. Tasword Two also drives the ZX printer.

Tasword Two is readily adapted for the microdrives to give super-fast saving and loading of both program and text. The microdrive instructions are supplied with the Tasword Two manual.

£13.90 fully inclusive mail order price.

TASWORD TWO TUTOR

TASWORD TWO comes complete with a manual and a cassette. The cassette contains your TASWORD TWO and TASWORD TWO TUTOR. This teaches you word processing using TASWORD TWO. Whether you have serious applications or simply want to learn about word processing, TASWORD TWO and TASWORD TWO TUTOR make it easy and enjoyable.

TASWORD TWO £2 Demonstration Cassette

See for yourself the powerful features of TASWORD TWO. Send just £2 for the Tasword Two demonstration cassette. A voucher is included which gives you £1 off the price of TASWORD TWO.

All prices include VAT and post and packaging

* Available from larger branches of Boots

For further information on all these products send an s.a.e. with "Tasman Brochure" written on the flap.



Send cheque/P.O. or Access number with order.
Telephone Access code's: Leeds (0532) 433301

TASPRINT

A must for dot matrix printer owners! Print your program output and listings in a choice of five impressive print styles. Drives all the printer interfaces listed under Tasword Two and all dot matrix printers with bit image graphics capabilities. You can also use TASPRINT to print Tasword Two text files. TASPRINT gives your output originality and style! Send s.a.e. for brochure which includes TASPRINT output.

£9.90 fully inclusive mail order price

TASWIDE — 64 characters per line!

A machine code utility program, TASWIDE doubles the information that your own programs can display. Make a simple change to your print statements and your output appears on the screen at 64 characters per line instead of the normal 32. Both print sizes can be mixed on the screen. 16K and 48K versions supplied on the same cassette.

£5.50 fully inclusive mail order price

TASMATH 1

Mathematics education. Three programs on one cassette: TASIMEQ — simultaneous equations
TASQJAD — quadratic equations
TAS-TRIG — trigonometry of right angled triangles.
Available for the 16K and 48K Spectrum and for the BBC model B.

£5.95 fully inclusive mail order price

TASMAN PARALLEL PRINTER INTERFACE

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable and driving software. The cassette includes LLIST, LPRINT, and text screen copy software for all centronics printers. The user changeable interface software makes it easy to send control codes to your printer using the method so successfully pioneered with Tasword Two. The cassette also contains fast machine code high resolution screen copy software for Epson, Star, Seikosha, Shinwa, and Tandy Colour Graphic (in colour!) printers. Send s.a.e. for brochure which includes sample print-outs and a full list of printers supported by screen software. Compatible with microdrives/ZX Interface 1.

£45 fully inclusive mail order price

TASMAN RS232 PRINTER INTERFACE

Specification and software as above but drives printers fitted with the RS232 standard interface. A low cost route to printing — especially suitable for use with the Tandy Colour Graphic printer and the Brother portable typewriter/printers. Supplied complete with cable — please specify whether 4 pin DIN or 25 way D plug required.

£38 fully inclusive mail order price

TASMAN SOFTWARE

Dept. YC

17 HARTLEY CRESCENT LEEDS LS6 2LL


```

E,93,22,05,25,0D,14,01,DD,00,7E,93,1F,E9,7E,BC,36,B6,7
E,93,B0,7E,91,1F,89,7E,8C,36
550 REM YDIST
560 DATABD,BE,B3,BF,7E,6F,8D,85,AA,8D,8F,83,BF,7E,5F,B
6,7E,70,C6,02,3D,C3,7E,95,1F,01,30,01,A6,84,B7,7E,91,B
6,7E,60,C6,02,3D,C3,7E,95,1F,01,30,01,A6,84,B7,7E,93,B
6,7E,91,B1,7E,93,22,B2,25,B8,14,01,5D
570 REM C0INC
580 DATABD,BE,B3,BF,7E,6F,B6,7E,70,B7,7E,6F,C6,02,3D,C
3,7E,95,1F,01,A6,80,E6,84,B7,7E,91,F7,7E,93,36,01,B7,7
E,70,C6,02,3D,C3,7E,95,1F,01,A6,80,B1,7E,91,26,15,A6,8
0,B1,7E,93,26,0E,B6,7E,6F,B1,7E,70,27,C6,F6,7E,70,7E,8
C,36,B6,7E,70,B1,1F,10,27,01
590 DATABD,4C,20,CD
600 REM BLSPR
610 DATABD,BE,B3,BF,7E,6F,B6,7E,70,B7,7E,6F,C6,02,3D,C
3,7E,95,1F,01,A6,80,E6,84,BD,6F,D3,14,C0,EC
620 REM LASER
630 DATABA,32,B6,FF,23,BA,08,B7,FF,23,EE,00,01,B6,FD,B
7,FF,20,8D,19,7F,FF,20,BD,14,30,01,8C,0C,9B,25,FD,BA,F
F,23,B4,F7,B7,FF,23,35,32,16,00,BF,1F,12,31,3F,26,FC,3
9
640 REM NUM
650 DATABD,BE,B3,8C,00,1E,22,0C,BF,7E,5F,B6,7E,60,B7,7
5,35,16,00,A4,7E,8B,8D
660 REM CURSET
670 DATABD,BE,B3,BF,7E,5F,BD,B7,AA,B6,7E,60,31,20,22,E
D,B7,75,67,BD,8E,83,BF,7E,5F,B6,7E,60,81,18,22,DD,B7,7
5,6B,20,7C
680 REM PRINT ROUTINE
690 DATABA,21,FC,75,67,34,06,A6,80,B1,CD,26,0E,35,06,

```

```

6,75,67,81,1B,22,04,4C,B7,75,68,39,C6,0B,3D,C3,7E,69,1
F,02,35,06,8D,74,41,4C,81,20,25,0B,4F,5C,C1,1B,25,D2,5
A,BD,74,5E,20,CC,34,36,8E,06,00,30,86,30,B9,01,0C,5A,2
6,F9,C6,0B,A6,A0,A7,84,30,88
700 DATA20,5A,26,F6,3B,34,39,33,34,3C,C4,0D,34,04,BE,74,6
F,35,04,5A,26,F6,35,36,3C,CC,00,00,0,08E,06,0C,0E,C6,2
0,AE,C1,AF,A1,5A,26,F9,4A,26,F6,39
710 REM ROUTINES
720 DATA$F,7E,8C,36,F7,7E,6A,9E,6B,8C,FF,FF,26,0D,39,3
4,10,8E,FF,FF,3F,7E,5D,35,90,20,ES,8F,7E,6B,8E,7E,5B,8
C,FF,FF,27,EB,32,62,BD,BA,C3,0F,6F,BE,7E,6D,9F,A6,7E,8
5,A8
730 REM TABLE
740 DATA3,4B,41,D2,4D,4F,54,49,4F,CE,53,50,52,45,54,C
5,4C,4F,43,41,54,C5,50,D8,50,D9,46,4C,41,53,C8,54,52,4
9,47,B1,54,52,49,47,B2,4B,45,D9,5B,44,49,53,D4,55,44,4
9,53,D4,43,4F,49,4E,C3,42,4C,53,50,D2,4C,41,53,45,D2,4
6,52,45,C9,4D,4F,56,C9,4E,55
750 DATACD,43,55,52,53,45,D4
760 REM DISPATCH
770 DATA71,36,71,7B,71,C0,71,9A,72,16,72,2C,72,44,72,D
7,72,8F,72,7D,72,9B,72,E7,73,27,73,7A,73,9B,8C,31,6E,A
4,73,CC,73,E3
780 REM DATA
790 DATAOD,45,5B,54,45,4E,44,45,44,20,53,50,52,49,54,4
5,20,42,41,53,49,43,20,31,2E,30,0D,28,43,29,31,39,38,3
3,20,47,41,52,59,20,50,52,49,45,53,54,2E,2E,2E,0,0A,0A
800 POKE$H7E69,1
810 FOR A=$H7E7A TO $H7FF5:POKE A,32:NEXT
820 FOR A=$8180 TO $H756B
830 READ A$:POKE A,VAL("&H"+A$)
840 NEXT

```

[illegible][illegible]

Before you type in the listing of the main machine code — listing 1, type:

```
CLEAR 200,28179
```

Then type in listing 1.

When you have checked that all the data is correct you can save the machine-code routine with the command:

```
CSAVEM"SPRITES",28180,32766,28180
```

You can now execute the machine code by typing:

You are now in extended sprite Basic. To get some idea of what is possible with your new extended Basic enter the sprite demonstration program in listing 5. This program sets up the sprite attributes for the first eight sprites and defines four characters as one single man.

If you press Enter you will hear an odd sound — this is the sound produced by the **Laser** command. The eight sprites will be blanked out and sprite two will be defined as a rough football. Sprite one is defined as a man. The man runs up to the football and kicks it.

```

10 REM LISTING THREE
11 REM
20 PMODE3:PCLS:SCREEN1,0
30 COLOR2
40 A$=INKEY$:IF A$="" THEN 40
50 IF A$>"0" AND A$<"5" THEN COLOR VAL(A$)
60 IF A$=CHR$(8) AND X>0 THEN X=X-1
70 IF A$=CHR$(9) AND X<7 THEN X=X+1
80 IF A$=CHR$(14) AND Y>0 THEN Y=Y-1
90 IF A$=CHR$(10) AND Y<7 THEN Y=Y+1
100 IF A$=CHR$(13) THEN 130
110 PSET(X,Y)
120 GOTO40
130 CLS:FOR A=1536 TO 1760STEP32:PRINTPEEK(A):NEXT A

```

To write your own programs that use sprites you must first understand what each new command does and the syntax for using it. You must also know how to define characters and sprites.

To be able to use the !Char command you must have eight pieces of data. These eight bytes make up the character. Take the top row. Look at the eight squares in the row. Add up the numbers above the filled in squares. eg., $4+8+16+32=50$ so the first piece of data is 60. The whole man would be:

To design multicolour characters type in Listing 3. Keys 1-4 change the colour and the arrow keys are used to draw your characters. When you are satisfied with your character press Enter. The program will print the eight pieces of data for you to use in a !Char statement.

There are 11 new commands for the handling of sprites:

To use the command you must give the sprite number and four character numbers that make up the sprite eg.

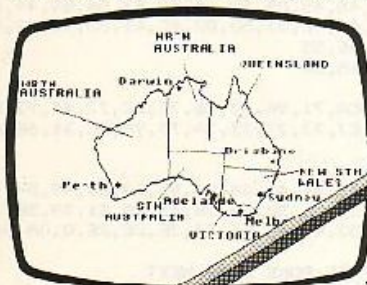
X= !SPRITE 1.65.66.67.68

(continued on page 149)

AUSTRALIA IN 6 MINUTES?

Geography teacher Bob Phillips' program on the school's BBC Micro needed a map of Australia divided into states, with the names of states and cities appearing when requested by the student. Using an RD Digital TRACER, Bob prepared this usually laborious task in just six minutes. "It's so simple," he said "... it's traced directly from an atlas, scaled up or down as needed, and so I have a very accurate presentation, with plenty of colour and

movement to maintain the kids' interest."



Supplier:
with full, easy to understand
instructions and advanced software.

The RD Digital TRACER

...SIMPLY CREATIVE

For
BBC Micro B
£60.83
plus 19.12 VAT
For ZX Spectrum
£48.26
plus 17.24 VAT
Prices exclude
P&P

The RD Digital TRACER is specially suited for educational use. From geography to biology, from chemistry to arts and crafts. Its features include:

- Immediate reproduction from original drawings (up to A3) to display file
- Adding geometrical shapes, text, colour and shading
- Automatic re-trace, or animation (on BBC)
- Save your drawings on cassette or print-out, or merge with your own programs
- Uses all the BBC's colour graphics modes, including Teletext
- No previous computer knowledge needed.

Available direct from Spectrum stores or Griffin & George

Please send _____ Tracer(s) for BBC Micro at **£69.95** each, total **£** _____
_____ Tracer(s) for ZX Spectrum at **£55.50** each, total **£** _____

Name _____

Address _____

Cheque, payable to RD Laboratories Ltd, for **£** _____ enclosed.

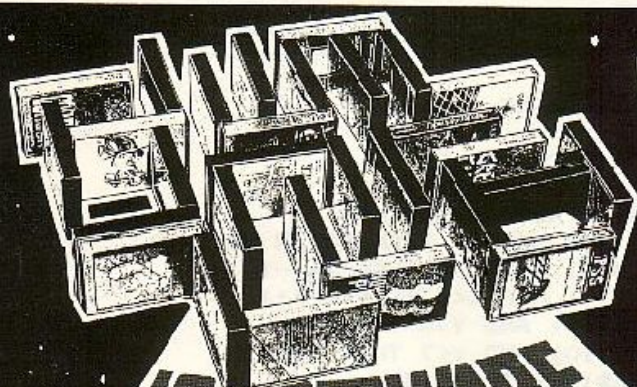
Send to: Dept YC4 RD Laboratories Ltd 20 Court Road Estate Cwmbran Gwent NP44 3AS. Allow 20 days for delivery.



For further details write (SAE please) or phone

RD Laboratories

20 Court Road Estate Cwmbran Gwent NP44 3AS
Tel 06333 74333 Telex 437240



IS SOFTWARE YOUR BASIC PROBLEM?

Software Index gives a description of each program listed and provides information on price, program operation, sound, memory required, colour, names and addresses of retailers and in many cases a screen photograph. The whole range of programs are covered in the Index. Games. Education. Utility. Business. Person Management.

Don't let software give you a hard time, get the user guide to microcomputer software.



Too many programs to choose from?
Too little background info and data?

SOFTWARE INDEX

Is your answer.

The most comprehensive magazine listing of Software programs for the eight leading Microcomputers.

- BBC ● COMMODORE 64 ● DRAGON ● VIC 20
- ORIC ● ATARI 400/800 ● SPECTRUM ● ZX81

IN YOUR NEWSAGENT'S NOW

OVER
2,500
PROGRAMS
LISTED

User Guide to Microcomputer Software
**SOFTWARE
INDEX**
1984 No.2 £1.50

(continued from page 147)

would define sprite 1 assuming that you have defined the letters of the alphabet. The character number may be 0-254.

!NUM — This command is used to control the number of sprites appearing on screen. You may have up to 29 sprites on screen at once.

To use the command you must add one to the number of sprites that you are going to use e.g., if you want two sprites then you must use

X = !NUM 3

!LOCATE — This command positions a sprite on the high resolution screen. You must use the sprite number, X co-ordinate (0-30), and the Y co-ordinate (0-22).

!MOTION — This command sets the direction in which a sprite is to move.

0 = STOP, 1 = UP, 2 = RIGHT,
3 = DOWN, 4 = LEFT.

To set the motion of sprite 1 use X = MOTION 1, direction.

!MOVE — This calls the machine code sprite move routine. It moves the sprites selected by !Num and that do not have a motion of 0.

When a sprite is about to move off the screen it stops automatically.

!PX — This returns the X co-ordinates of a chosen sprite e.g., if sprite 1 is at 10,10 then using:

X = !PX 1

will return the value 10 in the variable X.

!PY — This works in the same way as !PX but returns the Y co-ordinate instead.

!XDIST — This command returns the distance between the X co-ordinates of two sprites e.g.,

X = !XDIST 1,2

returns the difference between the X co-

ordinates of sprites 1 and 2.

!YDIST — This command works in the same way as !XDIST but returns the difference between the Y co-ordinates of two sprites.

!COINC — This command is used to detect collisions between two sprites.

If sprite 1 is at 10,10 and so is sprite 3 then if you use

X = !COINC 1

then X will equal 3 or if you use

X = !COINC 3

then X will equal 1. If sprite 3 was at 9,9 then

X = !COINC 1

would equal 0.

!BLSPR — This is useful for blanking out a certain sprite e.g., if sprite 1 has come to the edge of the screen and has stopped then use

X = !BLSPR 1

This will not blank out whatever is underneath sprite 1.

There are eight new commands that are not for controlling sprites.

!CHAR — This command is used to define characters. You may define characters 0-254. You must give the character number and then the eight pieces of data separated by commas e.g.,

X = !CHAR 32,0,0,0,0,0,0,0

will define character 32 as a space.

Listing 2 gives data for defining characters 32 to 128.

!FLASH a,b — This flashes the screen 'a' times with a delay of 'b' between flashes, ie.,

X = !FLASH 10,20000

!TRIG1 — This returns 0 if the fire button on the right joystick is pressed or 1 if not.

!TRIG2 — This works the same as !TRIG1 but for the left joystick.

!KEY This waits for you to press a key. The

ASCII value is returned ie., if you pressed A then 65 would be returned. If you press Break then 3 will be returned and the program will not Break.

!LASER — This produces a simple laser sound e.g.,

X = !LASER

!FREE — This replaces the Dragon's Mem function. Try

PRINT MEM

You should get the result 0. Now try

PRINT !FREE

this gives you the amount of memory left.

!CURSET x,y — sets the position for printing on the high resolution screen. x is the x co-ordinate which may be between 0-32 and y is the y co-ordinate between 0-23.

To print on the high resolution screen, make a string of the characters you wish to print and add a carriage return ie.,

AS\$ = "DRAGONS RULE OK" + CHR\$(13)

Make sure that near the beginning of the program you have a line stating:

DEFUSR 0 = &H7408

When you are ready to print, type

X = USR0(VARPTR(AS))

and the contents of AS should be printed on the high resolution screen.

Please note that whatever variables I have used can be changed to whatever you like.

When a command needs numbers after it you can use variables ie., instead of

X = !NUM 3

you could give variable A the value of 3 and have

X = !NUM A

If anyone does not feel up to typing in the programs they can obtain a cassette tape of the programs from me at 167 Ludlow Road, Itchen, Southampton SO2 1EL. The cassette costs £3.

Listing 4.

```

20 REM ***SPRITE DEMO***
30 PMODE4:PCLS:SCREEN1,1
40 Q=!NUM 3:REM USE 8 SPRITES
50 REM DEFINE THE 4 CHRS
60 Q=!CHAR128,7,13,13,15,12,7,1,127:REM TOP LEFT OF MAN
70 Q=!CHAR129,224,176,176,240,48,224,128,254:REM TOP RIGHT OF MAN
80 Q=!CHAR130,127,1,1,2,4,8,16,32:REM BOTTOM LEFT OF MAN
90 Q=!CHAR131,254,128,128,64,32,16,8,4:REM BOTTOM RIGHT OF MAN
100 REM DEFINE THE SPRITES
110 FOR A=1 TO 8
120 Q=!SPRITE A,128,129,130,131:NEXT
130 REM LOCATE SPRITES
140 FOR A=1 TO 8:READ X,Y:Q=!LOCATE A,X,Y:NEXT
150 DATA 0,8,0,15,0,23,0,4,20,11,20,18,20,26,20
160 REM GIVE THE SPRITES A DIRECTION
170 FOR A=1 TO 8:D1(A)=3:D2(A)=1:NEXT
180 FOR A=5 TO 8:D1(A)=1:D2(A)=3:NEXT
190 FOR A=1 TO 8:Q=!MOTION A,D1(A):NEXT
200 REM MOVE THOSE SPRITES
210 Q=!MOVE
220 P=PY5:REM P=Y COORDINATE OF SPRITE 5
230 IF P=0 THEN GOSUB270:REM IF SPRITE 5 IS AT TOP OF SCREEN THEN CHANGE DIRECTION OF ALL SPRITES SO THAT THEY BOUNCE
240 IF P=22 THEN 190:REM IF AT BOTTOM THEN CHANGE DIRECTION SO THAT THEY BOUNCE
250 A$=INKEY$:IF A$=CHR$(13) THEN 290
260 GOTO210:REM MOVE THOSE SPRITES AGAIN
270 FOR A=1 TO 8:Q=!MOTION A,D2(A):NEXT
280 RETURN
290 Q=!LASER:IF FLAG=1 THEN 720
300 REM FLASH THE SCREEN
310 Q=!FLASH10,20000
320 SCREEN1,1
330 REM BLANK OUT THE SPRITES
340 REM PCLS WILL DO THE SAME
350 FOR A=1 TO 8:Q=!BLSPR A:NEXT
360 Q=!NUM3:REM USE 2 SPRITES
370 Q=!LOCATE1,2,10
380 Q=!MOTION1,2:REM IT'S GOING RIGHT
390 REM DEFINE A ROUGH FOOTBALL
400 Q=!CHAR132,255,255,255,255,255,255,255,255,255
410 Q=!CHAR32,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
420 Q=!SPRITE3,32,32,132,32
430 Q=!LOCATE2,20,11
440 Q=!MOTION2,1
450 REM MOVE THAT FOOTBALLER
460 Q=!MOVE
470 Q=!MOTION2,0
480 FOR A=1 TO DL:NEXT
490 TEST=!XDIST1,2:IF TEST=2 THEN 510:REM HAS HE REACHED THE FOOTBALL
500 GOTO460
510 Q=!MOTION1,0:REM STOP FOOTBALLER
520 Q=!MOTION2,2:REM SET BALL IN MOTION
530 Q=!MOVE:REM MOVE THE BALL
540 TEST=!PX2:IF TEST=30 THEN GOTO 570
550 FOR A=1 TO DL:NEXT
560 GOTO530
570 CLS:PRINT"*****ACTION REPLAY*****"
580 FOR A=1 TO 1000:NEXT
590 IF DL=70 THEN 630
600 DL=70
610 SCREEN1,1:PCLS
620 GOTO330
630 DEF USR0=&H7408:REM ADDR OF PRINT ROUTINE
640 Q=!CURSET0,12:REM PRINT AT 0,12
650 CLS:PRINT"THE SPRITES DO NOT DESTROY ANY DEFINED CHARACTERS THAT THEY PASS OVER!":PRINT"PLEASE PRESS A KEY AND WATCH "
660 Q=!KEY
670 SCREEN1,1:PCLS
680 Z$=STRING$(32,132)+CHR$(13):Q=USR0(VARPTR(Z$)):REM PRINT Z$
690 RESTORE
700 FLAG=1
710 GOTO40
720 CLS:PRINT"THAT WAS THE END OF THE DEMO PROGRAM!"
:END

```


You've read the game... now play the book...

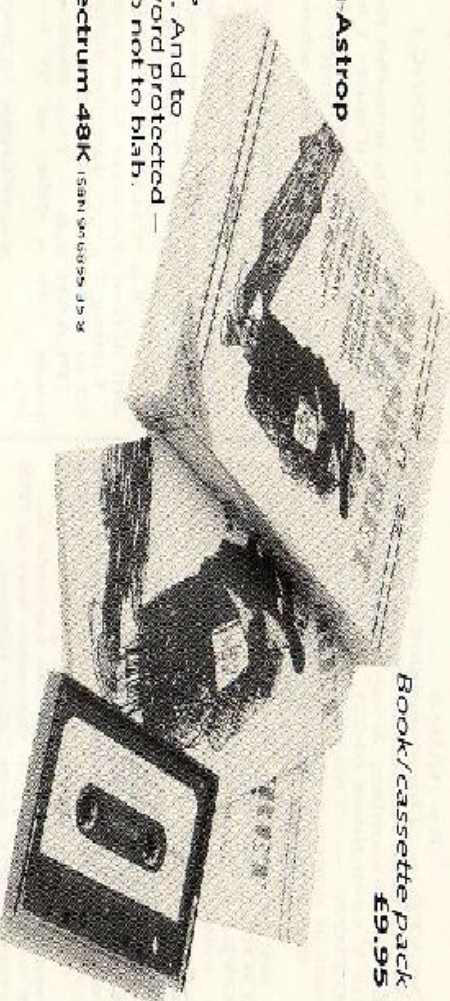
MY SECRET FILE

Program by Phil Nathans
Based on the best-selling Puffin book by John Astrop

A personal database for your darkest thoughts. Do you have secrets you wouldn't even confide to your closest friend? Let alone your family? Do you have secrets about your friends and family you wouldn't confide to anyone but yourself? At last, you're no longer alone. My Secret File turns your personal computer into a personal confidante. And to keep your confidences confidential, it's even password protected — because these days, you can't even trust your micro not to blab. Trust no one: file your friends before they file you.

Available for the: Commodore 64 ISBN 0469053077 Spectrum 48K ISBN 0469053538
BBC Micro B ISBN 0469053077

Book/cassette pack
£9.95



Book/cassette pack
£9.95

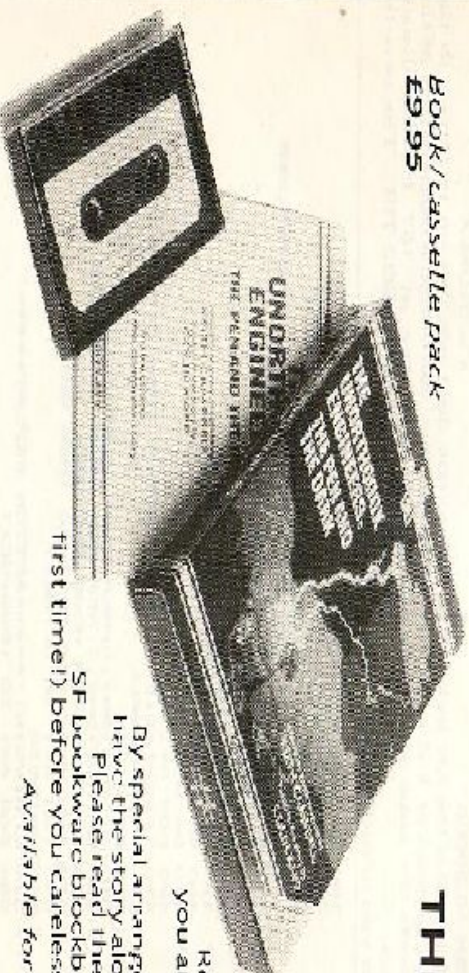
THE UNORTHODOX ENGINEERS: THE PEN AND THE DARK

Adventure game program by Keith Campbell
Based on the story by Colin Kapp

Colin Kapp created the classic SF stories about the Unorthodox Engineers — and now you can try to solve the mystery of the indestructible pillar of darkness and the riddle of contra-energy in this mind-bending text adventure game. Reading Colin's story in this pack should help you. But once you and your micro are locked into the problem, not even Colin could get you out.

By special arrangement with an unspecified alien culture, Mosaic will let you live the story along with the program — so at least you're in with a chance. Please read the story carefully because we'd like to release our Spring SF bookware blockbuster (Harry Harrison's Stainless Steel Rat on micro for the first time!) before you carelessly unleash contraincrepacy across the universe. Thank you.

Available for the: Spectrum 48K ISBN 0469051538 BBC Micro B ISBN 0469052030



Published by Mosaic Publishing Ltd
Marketed by John Wiley & Sons Limited, Baffins Lane, Chichester, Sussex PO19 1UD

Please send orders to: John Wiley & Sons, Dept. PM, Baffins Lane, Chichester, Sussex PO19 1UD

Please send: ☐ copies of Unorthodox Engineers | ☐ Spectrum 48K ☐ BBC 'B' ☐ Commodore 64 ☐ BBC 'B' ☐ Spectrum 48K

To: Name and address

or please charge to Credit Card No

Payment enclosed (£9.95 each including postage)

American Express/Diners/Barclaycard/Access: Expiry date



TOOLKIT

TOOLKIT PROGRAMS have been published before, mostly concerned only with graphics and/or sound. This is all very well but first you need to have written a Basic program to use them and because of the nature of Basic the result is very often a mess, tailends of unwanted programs and line numbers going up in random steps.

This program is designed to aid the program writer by providing a number of useful, user friendly routines to take a lot of the work out of program writing and developing. The first and most important of these is the renumber routine. Renumber routines have been published before but these were all very limited as all they could do was renumber the line numbers, not the Goto, Gosub etc. This renumber routine is different, it will renumber the program using a specified start and step value and after renumbering the line numbers it will renumber all the Goto's, Gosubs, Run, Lists, LLists, and restores. The only disadvantages, and these are very small, are:

- The routine will not renumber lines as: SAVE "filename" LINE number

John Charlesworth takes the hassle out of program writing.

■ The routine will not renumber lines of the form Goto calculation. For example: GOTO 1000+(100 AND x=3)+1200 AND x=7)

■ The routine will not renumber Gotos etc. which refer to non-existent lines.

In the event of the first or third occurring the computer will ignore it but in the event of the second the computer will print the message

Can't renumber line nnnn
nnnn being the offending line and the routine will return having done nothing.

The second routine provided by this toolkit is a Rem kill routine. During program development Rem statements are very useful but when the program is finished they no longer serve any purpose and simply slow down loading and saving so what this program does is search through the program for Rem statements and when it finds one it deletes it.

The third routine is a block delete. This program will remove all the lines between two specified lines and is useful for example to
(continued on page 153)

Listing 1.

```
10 DEF FN x(a#)=16*(CODE a#-48
- (39 AND a#(1))>"9"))+(CODE a#(2)
-48-(39 AND a#(2))>"9"))
20 CLEAR 31270: PRINT "Poking
in progress": LET x=31276
30 FOR a=0 TO 20: READ a#: LET
t=0: LET t1=VAL a#( TO 4): LET
a#=#a#(5 TO )
40 FOR b=0 TO 63: LET v=FN x:a
#(b*2+1 TO b*2+2)): POKE #,v: LE
T t=t+v: LET x=x+1: NEXT b
50 IF t<>t1 THEN PRINT "Error
in line ":100+a*10: STOP
60 NEXT a: PRINT "Finished": S
TOP
100 DATA "7503cd367acd967ccddc7
cc92a535ced5b4b5ca7ed5219c82be5d
de123232323237efe0e2006232323232
3237efe0d281bfef12824fee52820fee
c281cfe02818fe"
110 DATA "7046f02814fef72810231
8d5ed5b4b5c1b1ba7ed521939c1c9237
efe0d28edf3a28befe0e20072323232
32318eb+e303806fe3a300218e1dde5c
d4h0dcdcd1f21c3"
120 DATA "64437afe0c2804d7231
8f7dde1dd4601dd4e02cd1t1ac1c9160
00043616e27742072656a75Adh7A577?
06c696e65200d3eff18023e2fa73ced5
230fb19c9e53e0a"
130 DATA "7388a711e803ed5219301
33da7116400ed521930093ca71e0aed5
230013de1c9e5e5eb131afe0e20fa7bc
6053001145fe1d5eba7ed527dd1e1c9e
511e803a7ed5219"
140 DATA "44933013116400a7ed521
9300f1e0aa7ed5219300f1814cddf7a0
203116400cddf7a02c31e0acddf7a020
37dc63002033e0e02039702030203e17
d02037c02039702"
150 DATA "8676c9fd2a535cd2bfe
5c1fd5e03fd560413131313fd:9fde5d
1a7ed521930e8c5fde1c916005ffe0a3
8011Scddf7dfc6604fd6e0319fd7404f
d7503fde5e1d5dd"
160 DATA "8158e5d1a7ed52:93004d
1dd19c9d1c9e5cd0a7b472a005bcde97
```

```
ae1e3082B1b9025f5-b2a615ca7ed524
44d626bed44853001246fedb0f1cd8f7
b2a005bc103cd24"
170 DATA "73557bc9e5cd0a7b472a0
05bcd97ae1e5b828e79023f5eb2a615
ca7ed5244d19545d833001145fedb81
8ebc5237efe0d2810fe3a200cfe0e280
afe303804fe3a3e"
180 DATA "6781eae1c92323235e235
6dd6a01dd6e02a7ed521920ecce1c5cd6
d7b3a025bf0e02005cdaba7b1803cdee7
be123c92a535e232323237efe0d2825f
e0e2004232313ef"
190 DATA "7534fee12814fee52810f
eec280cfe0d2308fef02804fef720dac
d167c18d5ed5b4b5c1b1ba7ed521939c
6c9f3fda5dd2a535cd2b3e0032025b2
1000022005bcd5E"
200 DATA "73807c2a005bdd7401dd7
502dd5e03cd5504dd19110400dd192a0
05b3222005bdd5e1ed5b4b5c1ba7ed5
21938d2fde1fbc9f3fde52a4b5c2b2cc
d6d7bfe5dded1dd"
210 DATA "68864e02dd46012a0353e
d5b055b77190bb520fb820f8444de34
3005b3e0132025bcd587c2a005bdd740
1dd7502ed4b055ba7ed4222005bdd5e
12bcd6d7bfde5dd"
220 DATA "7635e12a035bed5b0553a
7ed52ed5b055ba7ed521920cbfde1fbc
92a4b5ced5b535c131313a7ed5219d8d
u2a535cd2bde5e123232323237efe0
e20032318f3feea"
230 DATA "70582B.4fe0d20efe5dde
1ed5b4b5c1b1ba7ed521930dccc9cde3d
11313131313a7ed52:928350100002b5
45d03131afe0d20f9ebe5d5210000a7e
d42ebdd604dd6e"
240 DATA "806703:9dd7503dd7404c
ddf7dd1a7ed5244de1ed5b0dde5e1189
8d3e5e1dd5604dd5e031911040019dde
5d1e5d5eba7ed52eb18d52a4b5c19224
b5c2a595c192259"
250 DATA "69015c2a615e1927A15rr
9dd2a535cdde5e1ed5b4b5c1b1ba7ed5
2d0dc2b2a035bdd5e02d15601eba7ed5
219eb301ccd5e03dd5604dd19110400d
```

```
d19ed5b4b5c1b1b"
260 DATA "7322dda5e1a7ed5238d4c
9dd22035b2a055bdd5e02dd5601eba7e
d5219eb30:ddd5e03dd5604dd1911040
0dd19ed5b4b5c1b1bde5e1a7ed5238d
4180+200ddd5e03"
270 DATA "7586dd5604dd19110400d
d19dd22055b2a615ced5b055ba7ed524
44debed5b035bedb02a035bed5b055ba
7ed52ebcd7fcd9cd5b0dcdcd1f3e16d
757d797d72a595c"
280 DATA "7700ed5b4b5c1313a7ed5
2d824b5c463e1fa0c640477ee6e0fe6
0200878d7110600191853fea0200c78d
7237efe038f9d68018e9fee0200d78f
57ef3d7f1d71113"
290 DATA "598600191832fe8020107
8d73e28d73e29d7235e235e2319181ef
e40200d78d73e24d7235e235a1923180
d78d73e24d73e28d73e29d718ebdd5b5
95c3e06d71ba7ed"
300 DATA "3596521938893e0dd73e4
dd73e65d73e6dd73e3cd72a595ced5b4
b5ca7ed5244dc9000000000000000000
00000000000000000000000000000000
0000000000000000"
9994 CLS : PRINT "1) Renumber""
2) Remkill""3) Delete""4) Vari
able list": INPUT fff: LET zzz=(
31276 AND fff=1)+(32069 AND fff=
2)+(32245 AND fff=3)+(32412 AND
fff=4): IF NOT zzz THEN GO TO 99
94
9995 LET ttt=1: LET fff=1: IF zz
z=31276 THEN INPUT "Start ":fff.
"Step ":ttt
9996 IF zzz=32245 THEN INPUT "Fr
om ":fff,"To ":LLL.
9997 IF fff>9999 OR fff<1 OR ttt
>9999 OR ttt<1 OR (fff>ttt AND z
zz=32245) THEN GO TO 7994
9998 POKE 23300,INT (fff/256): P
OKE 23299,fff-256*PEEK 23300: P
OKE 23302,INT (ttt/256): POKE 233
01,ttt-256*PEEK 23302: IF zzz=32
412 THEN PRINT USE zzz: STOP
9999 RANDOMIZE USR zzz
```


Just the thing for these long winter nights

DRAGON 32

FAMILY PROGRAMS

Eight games, quizzes, utilities and educational programs

£6.95

FUN AND GAMES

A compendium of ten games for young and old

£6.95

LIVE AND LEARN

Six educational programs for the older child and adult

£6.95

CITY DEFENCE

Missile command arcade game (uses joystick)

£5.75

EMPIRE

Exciting game of strategy for all ages

£6.95

PUZZLER

Jigsaw puzzles generator. Four pictures and many levels

£6.95

PETTIGREWS DIARY

Epic 20K adventure for the whole family

£6.95

FUN TO LEARN

Education for 6-12 year olds. Menu driven

£6.95

QUIZ PACK

500-word vocabulary quiz and crossword puzzles

£3.95

INFANT PACK

Preschool education. Counting and alphabet

£3.95

JUNIOR PACK

Learn your tables and word recognition the fun way

£3.95

MONSTER MATHS (New)

Education for 8-11 year olds

£6.95

HOOKED! (New)

Entertaining graphical fishing game for 1 or 2 players

£5.75

BBC 'B'

FUN TO LEARN

Education for 6-12 year olds

£6.95

MONSTER MATHS

Education for 8-11 year olds. Menu driven

£6.95

SCIENCE 4 (New)

Physics education for 11-16 year olds

£6.95

EMPIRE (New)

Exciting game of strategy for all ages

£6.95

SPECTRUM 48K

JERICHO ROAD (New)

Full featured educational adventure set in biblical times

£5.75

LYNN

GRID ATTACK

Survive the war! Arcade action with machine gun

£1.95



SHARDS SOFTWARE
The family favourites

Available from Boots and all good stockists, or by sending cheque/P.O. to 189 Eton Road, Ilford, Essex IG1 2UQ.

Listing 2.

```

10 DEF FN x(a#)=16*(CODE a#-48
-139 AND a#(1)>"9")+ (CODE a#(2)
-48-(39 AND a#(2)>"9"))
20 CLEAR 64040: PRINT "Poking
in process": LET x=64048
30 FOR a=0 TO 20: READ a#: LET
t=0: LET t1=VAL a#( TO 4): LET
a#=a#(5 TO )
40 FOR b=0 TO 63: LET y=FN x(a
#b*2+1 TO b*2+2)): LET t=t+y: P
OKE x,y: LET x=x+1: NEXT b
50 IF t=t1 THEN NEXT a: PRINT
"Finished": STOP
60 PRINT "Error in line ":100+
a*10: STOP
100 DATA "7901cd3afacd9afccde0f
cc92a535ced5b4b5ca7ed5219c82be5d
de123232323237efe0e20062323232
3237efe0d281bfef12824f2e52820f2e
c281cfeed2818fe"
110 DATA "7050f02814faf72810231
8c5ed5b4b5c1b1ba7ed521938c1c9237
efe0d28ed-e3a28bef0e20072323232
32318ebfe30380afe3a300218e1dde5c
d6b0cdcd1f21c7"
120 DATA "657:fa7efe0d2804d7231
8f7dded1dd4601dd4e02cd1b1ac1c9160
0c043a1a67742072656e756c62a5722
06c696e65200d3eff18023e2fa73ced5
230fb17c9e53e0a"
130 DATA "7388a711e803er5219301
33da7116400ed521930093da71e0aed5
230013de1c9e5e5eb131afe0e20-a7bc
6c53001145fe1d5eba7ed527cd1e1c9e
511e803a7ed5219"
140 DATA "48893013116400a7ed521
9300f1e0aa7ed5219300f1814cde3fa0
203116400cde3fa02031e0acce3-a020
37dc63002033e0e02039702030203e17
dc2037c02039702"
150 DATA "8828c9fd2a535cfd2bfde
5c1fd5e03fd560413131313fd19-de5d
1a7ed521930e8c5fdde1c9160c5ffe0a3
80115cde3fd4d6604fdde031b+d7404f
d7503fd5e1d5dd"
160 DATA "8558e5d1a7ed52193004d
1dd19c79d1c9e5c00efb472a005bcded+
ae1e5b8281b9023f5eb2a615ca7ed524
44d626bed44853001246fedb0f1cd93f
b2a0030c103cd28"
170 DATA "7747fbc9e5cd0efb472a0
05bcdedfae1e5b828a75023f5eb2a615
ca7ed52444d19545d833001145fedb81
8cbe5237efe0d2810fe3a280cfe0e280
afe303804fe3a38"
180 DATA "7177eae1c92323235e235
6dd6e01dd6e02a7ed521920ecele5cd7

```



```

1fb3a025bfe002005cdbebf1b03cdf2f
ba123c92a535c232323237efe0c2825f
e0e2004232318ef"
19C DATA "7770fee12814fee52810f
eac280cfeed2808fef02804fef720dac
d1afc18d5ed5b4b5c1b1ba7ed521938c
6c9f3fde5dd2a535cdd2b3e0032025b2
100c022005bcd5c"
20C DATA "8140fc2a005bdd7401dd7
502dd5e03dd5604dd19110400dd192a0
05b2322005bde5e1ed5b4b5c1ba7ed5
21938d2fdel1fbc9f3fde52a4b5c2b2bc
d71fbfde5dde1dd"
21C DATA "71504e02dd46012a035be
dcb0c5b07/190bb720fb5820f8444ded4
3005b3e0132025bcd5cfc2a005bdd740
1dd7502ed4b055ba7ed4222005bde5e
12bcd71fbfde5dd"
22C DATA "7633e12a035bed5b055ba
7ed52ed5b005ba7ed521920cbfde1fbc
72a4b5cde5b535c131313a7ed521908d
d2a535cdd2bde5e123232323237efe0
e20032318f3feea"
23C DATA "70582014fec0d20efe5dde
1ed5b4b5c1b1ba7ed521938dccc9dde5d

```

```

11313131313a7ed521928350100002b5
45d031313afe0d20f9eue5d3210000a7e
d42ebdd6604dd6e"
240 DATA "8199c319dd7503dd7404c
de3fde1a7ed52444de:edb0dde5c1189
8dde5e1dd5604dd5e031911040019dde
5d1e5c5eba7ed52eb18d52a4b5c19224
b5c2a595-192259"
250 DATA "69015c2a615c1922615cc
9dd2a535cddde5e1ed5b4b5c1b1a7ed5
2d0dd2b2a035bdd5e02dd5601eba7ed5
219eb301cdd5e03dd5604dd19110400d
d19ed5b4b5c1b1b"
260 DATA "7322dde5e1a7ed5238d4c
9dd22c35b2a055bdd5e02dd5601eba7e
d5219eb301dd5e03dd5604cd1911040
0dd19ed5b4b5c1b1bde5e1a7ed5238d
4180f200dd5e03"
270 DATA "77:8dd5604dd19110400d
d19dd22055b2a015ced5b055ba7ed524
44debed5b035bedb02a035bed5b055ba
7ed52ebcde3fde9cd6b0d:dcdd1f3e16d
797d797d72a595c"
280 DATA "7700ed5b4b5c1313a7ed5
2d82a4b5c463e1fa0c640477eebe0cfe6
020087bd7110600191853fea0200c78d
7237efe0c38f9d68018e7fee0200d78f
53ef3d7f1d711:3"
290 DATA "598600191832fe802c107
8d73e28d73e29d7235e235623191e1ef
e40200d78d73e24d7235e23561923180
d78d73e24d73e28d73e29d718ebcd5b5
95c3e06d71ba7ed"
300 DATA "547952193893e0dd73e4
cd73e65d73e6dd73e3dd72a595ced5b4
b5ca7ed52444dc9877761b03130c3e0
03c42427e424200007c427c42427c000
03c4240423c00"
9994 GOSUB 1: PRINT "1) Renumber"
2) Rekill" "3) Delete" "4) Var:
able list": INPUT fff: LET zzz=:
64048 AND fff=1)+(64841 AND fff=
2)+(65017 AND fff=3)+(65184 AND
fff=4): IF NOT zzz THEN GOTO 99
94
9995 LET ttt=:00: LET fff=ttt: I
F zzz=64048 THEN INPUT "Start ":
fff:"Step ":ttt
9996 IF zzz=65017 THEN INPUT "Fr
om ":fff:"To ":ttt
9997 IF fff>9999 OR fff<1 OR ttt
/9999 OR ttt<1 OR fff>ttt AND z
zz=65017 THEN GOTO 9994
9998 POKE 23300,INT (fff/256): P
OKE 23299,fff-256*PEEK 23300: PU
KE 23302,INT (ttt/256): POKE 233
01,ttt-256*PEEK 23302: IF zzz=65
184 THEN PRINT "USR zzz: STOP
9999 RANDOMIZE USR zzz

```

(continued from page 151)

remove all unused sections of programs.

The final routine is a variable list. This routine when called will list all the variables used by the program so far and how much total memory is being used.

The routines together take up about 1300 bytes. To enter them, type in listing 1 — for the 16K version — or listing 2 — for the 48K version. When run these programs Poke in the machine code from hex data statements, above Ramtop. Run the program and if the program reports finding a data error, correct the offending line and Return until the program prints "finished".

The routines should now be in place and error free — a checksum checks each line — and so the data is no longer needed and so should be deleted. However the toolkit can help you here. Run line 9994 and type 3 in response to the menu to select the block delete. The computer will then ask for the first and last lines to be deleted so type 1 then 1000.

The routines should now be saved using
SAVE "TOOLKIT":SAVE "BYTES"

Listing 3.

```

1 RUN 3
3 FOR a=3 TO 4: NEXT a: DIM a
#(3,2): DIM x(7)
10 PRINT "hello": REM title
17 LET x#="string variable"
20 GO SUB 100: RESTORE 10: LLI
ST 17: LIST 100
30 GO TO z*100
100 LET z=1: RETURN
110 REM the end

```

CODE 31276, 1300

for a 16K Spectrum or

SAVE "TOOLKIT":SAVE "BYTES"

CODE 64048, 1330

for a 48K Spectrum. To load the program in future type

LOAD"":CLEAR 31270:LOAD "" CODE

for the 16K Spectrum or

LOAD"":CLEAR 64040:LOAD "" CODE

for the 48K Spectrum.

If you now type in listing 3 — do not delete lines 9994-9999 — you may test out the other routines.

Run the toolkit — Run 9994 — and the menu will be printed out. You may notice from the listing that there are a

couple of unnecessary Rem statements so why not delete them. In response to the menu type 2 to get the Rem delete. If you now list the program you will see the Rem statements have disappeared. Renumber the program.

Type Goto 9994 and in response to the menu type 1 to get the renumber routine and then in response to the prompts type the lowest line number you want, 10 is normal, and to the second prompt type the step between successive lines, again 10 is normal. Immediately the message

Car't renumber line 30

will appear. If you list the program you can see the problem — line 30 has a Goto calculation. Delete line 30 — you could always replace it later — and again type Goto 9994 and type in the responses as before. You may get an error message when renumbering is complete. It should be ignored.

To test the final routine type Goto 70 and in response to the menu type 4. The variables used should be listed on the screen and the total memory printed at the bottom.

Blast off to ADVENTURE



Create and solve ADVENTURE programs on your Spectrum, Commodore 64, Dragon, Oric or BBC Micro.

CREATING ADVENTURES ON YOUR ZX SPECTRUM —

Peter Shaw and James Mortlema. Create and solve Adventure programs on the Spectrum with this exciting new book which includes five complete major programs, plus chapter after chapter of hints and tips to help you write your own programs. Chapter

headings include Creating Locations; Picking Things Up; Monsters; Adding Graphics; and Adding to the Vocabulary. Just £4.95 and you're up and away.

CREATING ADVENTURE PROGRAMS ON YOUR COMPUTER — Andrew Nelson. If your computer uses a version of Microsoft BASIC, then this book is for you. It contains three complete Adventure programs, along with extensive documentation to help you create and solve Adventures. Suitable for use with the Commodore 64, Dragon, Oric, BBC Micro, Sirius, IEM PC and

Apple, you'll find this book an easy-to-understand primer on Adventure creation. The full-length programs include WEREWOLVES AND WANDERER and THE AFTERMATH OF THE ASIMOVIAN DISASTER. This book is just £4.95



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

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

- ☐ Creating ADVENTURES on your ZX Spectrum
Shaw/Mortlema — 4.95
- ☐ Creating ADVENTURE programs on your Computer
Andrew Nelson — £4.95

Name:

Address:

**INTERFACE
PUBLICATIONS**



Computer and book trade supplied by The Computer Bookshop,
30 Lincoln Road, Olton, Birmingham B27 6PA (021 737 7544, telex 334361).

Write your own machine code adventures

Without any knowledge of machine code whatsoever



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

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

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

FOR THE 48K SPECTRUM AT £14.95

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

SAE for full details of our range.

Dealer enquires welcome.

GILSOFT

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

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



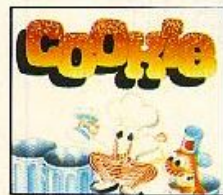
ULTIMATE



THE NOT·SO·SOFTWARE

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

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



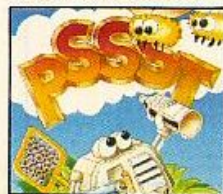
Cookie 10/48K ZX Spectrum



Tranz Am 16/48K ZX Spectrum



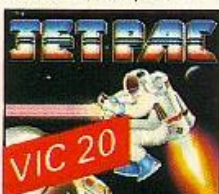
Atic Atac 48K ZX Spectrum



Pssst 16/48K Spectrum



Lunar Jetman 48K ZX Spectrum



Jetpac 16/48K ZX Spectrum
or 8K Expanded VIC 20

ONLY £5.50 EACH

(All games joystick or
keyboard control)

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

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

☐ Cookie ☐ Lunar Jetman ☐ Pssst ☐ Tranz Am
☐ Jetpac ☐ Jetpac - Expanded VIC 20 ☐ Atic Atac

I enclose cheque/PO for £ _____ Name _____

Address _____

Code _____

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



Ultimate Play The Game is a trade name of Ashby Computers and Graphics Ltd., The Green, Ashby de la Zouch, Leicestershire, Tel (0530) 411485. Dealer enquiries welcome.

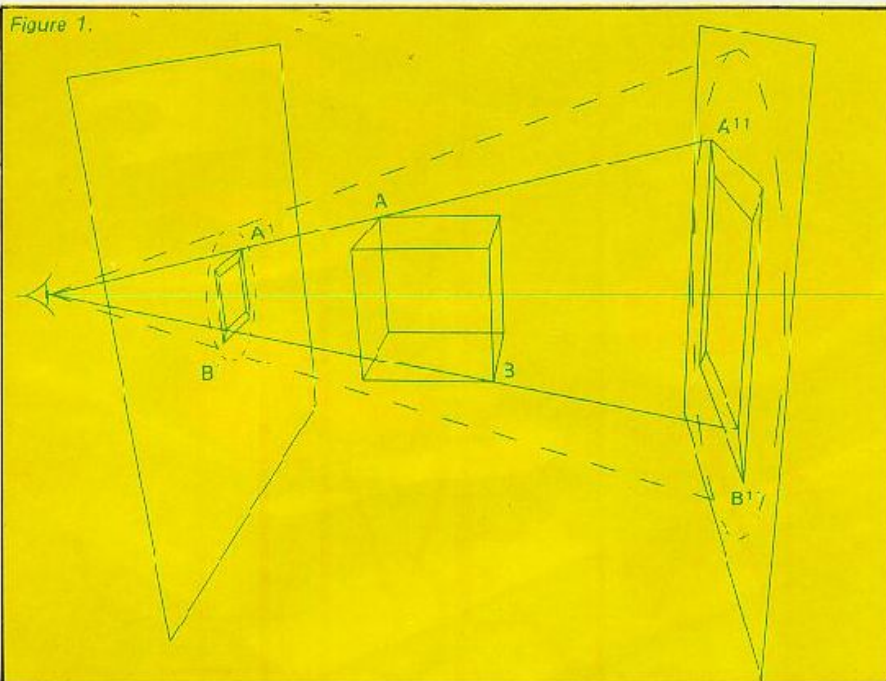
PERSPECTIVE AND PROJECTIONS

IN A PREVIOUS ARTICLE in the February edition of *Your Computer* I gave a method for drawing pictures of three dimensional wire-objects on the screen of a BBC micro. I looked at the simplest type of projection which maps a 3-D scene onto a 2-D screen. This orthographic projection has the property that parallel lines in 3-D space are projected into parallel lines on the screen. Although very useful, such views do look odd! Our brains are used to the perspective phenomenon of 3-D space, and so they attempt to interpret orthographic pictures as if they are perspective views and so they look distorted.

So it is essential to produce a projection which displays perspective phenomena i.e. parallel lines should meet on the horizon: an object should appear smaller as it moves away from the observer. The drawing board methods devised by artists over the centuries are of no value to us. Three dimensional co-ordinate geometry, however, furnishes us with a relatively straightforward technique.

A perspective view

To produce a perspective view we introduce a very simple definition what we mean by vision. We imagine every visible point in space sending out a ray which enters the eye. Naturally the eye cannot see all of space, it is limited to a cone of rays which fall on the retina, the so-called cone of vision, which is outlined by the dashed lines of figure 1. The axis of this cone is called the straight-ahead ray. We imagine that the eye at the origin and the straight ahead ray identified with the positive z-axis of our co-ordinate system.



We imagine the screen — which we call the perspective plane — perpendicular to the axis of the cone of vision at a distance from the eye. In order to form the perspective projection we mark the points of intersection of each ray with this plane. Since there are an infinity of such rays this appears to be an impossible task. Actually the problem is not that great because we need only consider the rays which emanate from the important points in the scene e.g. the vertices at the ends of line

segments. The final view is formed by drawing lines between the projected points on the screen in exactly the same way as the equivalent vertices are related in 3-D space.

Figure 1 shows a cube observed by an eye and projected onto two planes: and the whole scene is also drawn in perspective. Two example rays are shown: the first from the eye to A, one of the near corners of the cube relative to the eye, and the second to B one of the far corners of the cube. The perspective

Listing 1.

```

1000 REM MAIN PROGRAM
110 INPUT "Which MODE?MODE : MODE MODE
120 INPUT "HORIZ",HORIZ : VERT=3-HORIZ/4
130 PROCstart(1,0)
140 PROCsetorigin HORIZ/2,VERT/2
150 PROCscene
160 END
500 REM genroc : rotate scene about a general axis
510 DEF PROCgenroc(PX,PY,PZ,Q,DY,DZ,SINHA)
520 LOCAL ALPHA,BETA
530 PROCload(PX,PY,PZ,Q,DY,DZ,SINHA)
540 ALPHA=FNangle(QX,QY)
550 PROCrot(3,ALPHA,0) : PROCmult3
560 BETA=FNangle(QZ,SOR(QX+QY*QY))
570 PROCrot(3,-BETA,2) : PROCmult3
580 PROCrot(3,0,BETA,3) : PROCmult3
590 PROCrot(3,BETA,2) : PROCmult3
600 PROCrot(3,ALPHA,3) : PROCmult3
610 PROCtrans(PX,PY,PZ) : PROCmult3
620 ENDPROC
630 REM look3 : maintain vertical
640 DEF PROClook3
650 LOCAL FX,FY,FZ,THETA
660 COS,S : INPUT "EX,EY,EZ","E",EY,EZ
670 INPUT "DX,DY,DZ","D",DY,DZ
680 PROCtrans(-DX,-DY,-DZ) : PROCmult3
690 EX=EX-DX : FY=FY-DY : FZ=FZ-DZ
700 THETA=FNangle(FX,FY)
710 PROCrot(3,-THETA,3) : PROCmult3
720 DIST=SQR(EX*EX+FY*FY)
730 THETA=FNangle(DIST,FZ)
740 PROCrot(3,PI-THETA,2) : PROCmult3
750 DIST=SQR(DIST*DIST+FZ*FZ)
760 THETA=FNangle(DIST,FZ)
770 PROCrot(3,THETA,3) : PROCmult3
780 PROCtrans(0,0,DIST) : PROCmult3
790 ENDPROC
800 REM rot3
810 DEF PROCrot3(THETA,AXIS)
820 LOCAL AX1,AX2,CT,ST
830 AX1=AXIS MOD 3)+1
840 AX2=(AX1+MOD 3)+1
850 CT=COS(THETA) : ST=SIN(THETA)
860 AX1=AX1+ST : AX2=AX2-CT : A(AX1,AX2)=CT
870 AX1=AX1-CT : AX2=AX1+ST : A(AX1,AX2)=ST
880 AX1=AX1+CT : AX2=AX1-CT : A(AX1,AX2)=CT
890 AX1=AX1-CT : AX2=AX1+CT : A(AX1,AX2)=ST
900 AX1=AX1+CT : AX2=AX1-CT : A(AX1,AX2)=CT
910 AX1=AX1-CT : AX2=AX1+CT : A(AX1,AX2)=ST
920 AX1=AX1+CT : AX2=AX1-CT : A(AX1,AX2)=CT
930 AX1=AX1-CT : AX2=AX1+CT : A(AX1,AX2)=ST
940 AX1=AX1+CT : AX2=AX1-CT : A(AX1,AX2)=CT
950 AX1=AX1-CT : AX2=AX1+CT : A(AX1,AX2)=ST
960 AX1=AX1+CT : AX2=AX1-CT : A(AX1,AX2)=CT
970 AX1=AX1-CT : AX2=AX1+CT : A(AX1,AX2)=ST
980 AX1=AX1+CT : AX2=AX1-CT : A(AX1,AX2)=CT
990 AX1=AX1-CT : AX2=AX1+CT : A(AX1,AX2)=ST
1000 ENDPROC
1010 DEF FNangle(AX,AY)
1020 IF ABS(AX)>.00001 THEN B660
1030 IF ABS(AY)>.00001 THEN B660
1040 IF AY<0 THEN B660
1050 PI/2
1060 IF AKO THEN -ATN(AY/AX)+PI ELSE -ATN(AY/AX)
1000 REM trans
1010 DEF PROCtrans(TX,TY,TZ)
1020 AX1(1,1)=1 : A(1,2)=0 : A(1,3)=0 : A(1,4)=T
1030 AX1(2,1)=0 : A(2,2)=1 : A(2,3)=0 : A(2,4)=TY
1040 AX1(3,1)=0 : A(3,2)=0 : A(3,3)=1 : A(3,4)=TZ
1050 AX1(4,1)=0 : A(4,2)=0 : A(4,3)=0 : A(4,4)=1
1060 ENDPROC
1070 REM mult3
1080 DEF PROCmult3
1090 LOCAL I,J,K
1100 FOR I=1 TO 4
1110 FOR J=1 TO 4
1120 LOCAL IX,JX,AX,AY
1130 FOR K=1 TO 4
1140 FOR IX=1 TO 4
1150 AY=0
1160 FOR JX=1 TO 4
1170 AY=AY+A(IX,JX)*A(JX,K)
1180 NEXT JX
1190 NEXT K
1200 NEXT J
1210 NEXT I
1220 FOR IX=1 TO 4
1230 FOR JX=1 TO 4
1240 AY=0
1250 FOR K=1 TO 4
1260 AY=AY+A(IX,JX)*A(JX,K)
1270 NEXT K
1280 NEXT JX
1290 NEXT IX
1300 FOR IX=1 TO 4
1310 FOR JX=1 TO 4
1320 AY=0
1330 FOR K=1 TO 4
1340 AY=AY+A(IX,JX)*A(JX,K)
1350 NEXT K
1360 NEXT JX
1370 NEXT IX
1380 FOR IX=1 TO 4
1390 FOR JX=1 TO 4
1400 AY=0
1410 FOR K=1 TO 4
1420 AY=AY+A(IX,JX)*A(JX,K)
1430 NEXT K
1440 NEXT JX
1450 NEXT IX
1460 FOR IX=1 TO 4
1470 FOR JX=1 TO 4
1480 AY=0
1490 FOR K=1 TO 4
1500 AY=AY+A(IX,JX)*A(JX,K)
1510 NEXT K
1520 NEXT JX
1530 NEXT IX
1540 FOR IX=1 TO 4
1550 FOR JX=1 TO 4
1560 AY=0
1570 FOR K=1 TO 4
1580 AY=AY+A(IX,JX)*A(JX,K)
1590 NEXT K
1600 NEXT JX
1610 NEXT IX
1620 FOR IX=1 TO 4
1630 FOR JX=1 TO 4
1640 AY=0
1650 FOR K=1 TO 4
1660 AY=AY+A(IX,JX)*A(JX,K)
1670 NEXT K
1680 NEXT JX
1690 NEXT IX
1700 FOR IX=1 TO 4
1710 FOR JX=1 TO 4
1720 AY=0
1730 FOR K=1 TO 4
1740 AY=AY+A(IX,JX)*A(JX,K)
1750 NEXT K
1760 NEXT JX
1770 NEXT IX
1780 FOR IX=1 TO 4
1790 FOR JX=1 TO 4
1800 AY=0
1810 FOR K=1 TO 4
1820 AY=AY+A(IX,JX)*A(JX,K)
1830 NEXT K
1840 NEXT JX
1850 NEXT IX
1860 FOR IX=1 TO 4
1870 FOR JX=1 TO 4
1880 AY=0
1890 FOR K=1 TO 4
1900 AY=AY+A(IX,JX)*A(JX,K)
1910 NEXT K
1920 NEXT JX
1930 NEXT IX
1940 FOR IX=1 TO 4
1950 FOR JX=1 TO 4
1960 AY=0
1970 FOR K=1 TO 4
1980 AY=AY+A(IX,JX)*A(JX,K)
1990 NEXT K
2000 NEXT JX
2010 NEXT IX
2020 FOR IX=1 TO 4
2030 FOR JX=1 TO 4
2040 AY=0
2050 FOR K=1 TO 4
2060 AY=AY+A(IX,JX)*A(JX,K)
2070 NEXT K
2080 NEXT JX
2090 NEXT IX
2100 FOR IX=1 TO 4
2110 FOR JX=1 TO 4
2120 AY=0
2130 FOR K=1 TO 4
2140 AY=AY+A(IX,JX)*A(JX,K)
2150 NEXT K
2160 NEXT JX
2170 NEXT IX
2180 FOR IX=1 TO 4
2190 FOR JX=1 TO 4
2200 AY=0
2210 FOR K=1 TO 4
2220 AY=AY+A(IX,JX)*A(JX,K)
2230 NEXT K
2240 NEXT JX
2250 NEXT IX
2260 FOR IX=1 TO 4
2270 FOR JX=1 TO 4
2280 AY=0
2290 FOR K=1 TO 4
2300 AY=AY+A(IX,JX)*A(JX,K)
2310 NEXT K
2320 NEXT JX
2330 NEXT IX
2340 FOR IX=1 TO 4
2350 FOR JX=1 TO 4
2360 AY=0
2370 FOR K=1 TO 4
2380 AY=AY+A(IX,JX)*A(JX,K)
2390 NEXT K
2400 NEXT JX
2410 NEXT IX
2420 FOR IX=1 TO 4
2430 FOR JX=1 TO 4
2440 AY=0
2450 FOR K=1 TO 4
2460 AY=AY+A(IX,JX)*A(JX,K)
2470 NEXT K
2480 NEXT JX
2490 NEXT IX
2500 FOR IX=1 TO 4
2510 FOR JX=1 TO 4
2520 AY=0
2530 FOR K=1 TO 4
2540 AY=AY+A(IX,JX)*A(JX,K)
2550 NEXT K
2560 NEXT JX
2570 NEXT IX
2580 FOR IX=1 TO 4
2590 FOR JX=1 TO 4
2600 AY=0
2610 FOR K=1 TO 4
2620 AY=AY+A(IX,JX)*A(JX,K)
2630 NEXT K
2640 NEXT JX
2650 NEXT IX
2660 FOR IX=1 TO 4
2670 FOR JX=1 TO 4
2680 AY=0
2690 FOR K=1 TO 4
2700 AY=AY+A(IX,JX)*A(JX,K)
2710 NEXT K
2720 NEXT JX
2730 NEXT IX
2740 FOR IX=1 TO 4
2750 FOR JX=1 TO 4
2760 AY=0
2770 FOR K=1 TO 4
2780 AY=AY+A(IX,JX)*A(JX,K)
2790 NEXT K
2800 NEXT JX
2810 NEXT IX
2820 FOR IX=1 TO 4
2830 FOR JX=1 TO 4
2840 AY=0
2850 FOR K=1 TO 4
2860 AY=AY+A(IX,JX)*A(JX,K)
2870 NEXT K
2880 NEXT JX
2890 NEXT IX
2900 FOR IX=1 TO 4
2910 FOR JX=1 TO 4
2920 AY=0
2930 FOR K=1 TO 4
2940 AY=AY+A(IX,JX)*A(JX,K)
2950 NEXT K
2960 NEXT JX
2970 NEXT IX
2980 FOR IX=1 TO 4
2990 FOR JX=1 TO 4
3000 AY=0
3010 FOR K=1 TO 4
3020 AY=AY+A(IX,JX)*A(JX,K)
3030 NEXT K
3040 NEXT JX
3050 NEXT IX
3060 FOR IX=1 TO 4
3070 FOR JX=1 TO 4
3080 AY=0
3090 FOR K=1 TO 4
3100 AY=AY+A(IX,JX)*A(JX,K)
3110 NEXT K
3120 NEXT JX
3130 NEXT IX
3140 FOR IX=1 TO 4
3150 FOR JX=1 TO 4
3160 AY=0
3170 FOR K=1 TO 4
3180 AY=AY+A(IX,JX)*A(JX,K)
3190 NEXT K
3200 NEXT JX
3210 NEXT IX
3220 FOR IX=1 TO 4
3230 FOR JX=1 TO 4
3240 AY=0
3250 FOR K=1 TO 4
3260 AY=AY+A(IX,JX)*A(JX,K)
3270 NEXT K
3280 NEXT JX
3290 NEXT IX
3300 FOR IX=1 TO 4
3310 FOR JX=1 TO 4
3320 AY=0
3330 FOR K=1 TO 4
3340 AY=AY+A(IX,JX)*A(JX,K)
3350 NEXT K
3360 NEXT JX
3370 NEXT IX
3380 FOR IX=1 TO 4
3390 FOR JX=1 TO 4
3400 AY=0
3410 FOR K=1 TO 4
3420 AY=AY+A(IX,JX)*A(JX,K)
3430 NEXT K
3440 NEXT JX
3450 NEXT IX
3460 FOR IX=1 TO 4
3470 FOR JX=1 TO 4
3480 AY=0
3490 FOR K=1 TO 4
3500 AY=AY+A(IX,JX)*A(JX,K)
3510 NEXT K
3520 NEXT JX
3530 NEXT IX
3540 FOR IX=1 TO 4
3550 FOR JX=1 TO 4
3560 AY=0
3570 FOR K=1 TO 4
3580 AY=AY+A(IX,JX)*A(JX,K)
3590 NEXT K
3600 NEXT JX
3610 NEXT IX
3620 FOR IX=1 TO 4
3630 FOR JX=1 TO 4
3640 AY=0
3650 FOR K=1 TO 4
3660 AY=AY+A(IX,JX)*A(JX,K)
3670 NEXT K
3680 NEXT JX
3690 NEXT IX
3700 FOR IX=1 TO 4
3710 FOR JX=1 TO 4
3720 AY=0
3730 FOR K=1 TO 4
3740 AY=AY+A(IX,JX)*A(JX,K)
3750 NEXT K
3760 NEXT JX
3770 NEXT IX
3780 FOR IX=1 TO 4
3790 FOR JX=1 TO 4
3800 AY=0
3810 FOR K=1 TO 4
3820 AY=AY+A(IX,JX)*A(JX,K)
3830 NEXT K
3840 NEXT JX
3850 NEXT IX
3860 FOR IX=1 TO 4
3870 FOR JX=1 TO 4
3880 AY=0
3890 FOR K=1 TO 4
3900 AY=AY+A(IX,JX)*A(JX,K)
3910 NEXT K
3920 NEXT JX
3930 NEXT IX
3940 FOR IX=1 TO 4
3950 FOR JX=1 TO 4
3960 AY=0
3970 FOR K=1 TO 4
3980 AY=AY+A(IX,JX)*A(JX,K)
3990 NEXT K
4000 NEXT JX
4010 NEXT IX
4020 FOR IX=1 TO 4
4030 FOR JX=1 TO 4
4040 AY=0
4050 FOR K=1 TO 4
4060 AY=AY+A(IX,JX)*A(JX,K)
4070 NEXT K
4080 NEXT JX
4090 NEXT IX
4100 FOR IX=1 TO 4
4110 FOR JX=1 TO 4
4120 AY=0
4130 FOR K=1 TO 4
4140 AY=AY+A(IX,JX)*A(JX,K)
4150 NEXT K
4160 NEXT JX
4170 NEXT IX
4180 FOR IX=1 TO 4
4190 FOR JX=1 TO 4
4200 AY=0
4210 FOR K=1 TO 4
4220 AY=AY+A(IX,JX)*A(JX,K)
4230 NEXT K
4240 NEXT JX
4250 NEXT IX
4260 FOR IX=1 TO 4
4270 FOR JX=1 TO 4
4280 AY=0
4290 FOR K=1 TO 4
4300 AY=AY+A(IX,JX)*A(JX,K)
4310 NEXT K
4320 NEXT JX
4330 NEXT IX
4340 FOR IX=1 TO 4
4350 FOR JX=1 TO 4
4360 AY=0
4370 FOR K=1 TO 4
4380 AY=AY+A(IX,JX)*A(JX,K)
4390 NEXT K
4400 NEXT JX
4410 NEXT IX
4420 FOR IX=1 TO 4
4430 FOR JX=1 TO 4
4440 AY=0
4450 FOR K=1 TO 4
4460 AY=AY+A(IX,JX)*A(JX,K)
4470 NEXT K
4480 NEXT JX
4490 NEXT IX
4500 FOR IX=1 TO 4
4510 FOR JX=1 TO 4
4520 AY=0
4530 FOR K=1 TO 4
4540 AY=AY+A(IX,JX)*A(JX,K)
4550 NEXT K
4560 NEXT JX
4570 NEXT IX
4580 FOR IX=1 TO 4
4590 FOR JX=1 TO 4
4600 AY=0
4610 FOR K=1 TO 4
4620 AY=AY+A(IX,JX)*A(JX,K)
4630 NEXT K
4640 NEXT JX
4650 NEXT IX
4660 FOR IX=1 TO 4
4670 FOR JX=1 TO 4
4680 AY=0
4690 FOR K=1 TO 4
4700 AY=AY+A(IX,JX)*A(JX,K)
4710 NEXT K
4720 NEXT JX
4730 NEXT IX
4740 FOR IX=1 TO 4
4750 FOR JX=1 TO 4
4760 AY=0
4770 FOR K=1 TO 4
4780 AY=AY+A(IX,JX)*A(JX,K)
4790 NEXT K
4800 NEXT JX
4810 NEXT IX
4820 FOR IX=1 TO 4
4830 FOR JX=1 TO 4
4840 AY=0
4850 FOR K=1 TO 4
4860 AY=AY+A(IX,JX)*A(JX,K)
4870 NEXT K
4880 NEXT JX
4890 NEXT IX
4900 FOR IX=1 TO 4
4910 FOR JX=1 TO 4
4920 AY=0
4930 FOR K=1 TO 4
4940 AY=AY+A(IX,JX)*A(JX,K)
4950 NEXT K
4960 NEXT JX
4970 NEXT IX
4980 FOR IX=1 TO 4
4990 FOR JX=1 TO 4
5000 AY=0
5010 FOR K=1 TO 4
5020 AY=AY+A(IX,JX)*A(JX,K)
5030 NEXT K
5040 NEXT JX
5050 NEXT IX
5060 FOR IX=1 TO 4
5070 FOR JX=1 TO 4
5080 AY=0
5090 FOR K=1 TO 4
5100 AY=AY+A(IX,JX)*A(JX,K)
5110 NEXT K
5120 NEXT JX
5130 NEXT IX
5140 FOR IX=1 TO 4
5150 FOR JX=1 TO 4
5160 AY=0
5170 FOR K=1 TO 4
5180 AY=AY+A(IX,JX)*A(JX,K)
5190 NEXT K
5200 NEXT JX
5210 NEXT IX
5220 FOR IX=1 TO 4
5230 FOR JX=1 TO 4
5240 AY=0
5250 FOR K=1 TO 4
5260 AY=AY+A(IX,JX)*A(JX,K)
5270 NEXT K
5280 NEXT JX
5290 NEXT IX
5300 FOR IX=1 TO 4
5310 FOR JX=1 TO 4
5320 AY=0
5330 FOR K=1 TO 4
5340 AY=AY+A(IX,JX)*A(JX,K)
5350 NEXT K
5360 NEXT JX
5370 NEXT IX
5380 FOR IX=1 TO 4
5390 FOR JX=1 TO 4
5400 AY=0
5410 FOR K=1 TO 4
5420 AY=AY+A(IX,JX)*A(JX,K)
5430 NEXT K
5440 NEXT JX
5450 NEXT IX
5460 FOR IX=1 TO 4
5470 FOR JX=1 TO 4
5480 AY=0
5490 FOR K=1 TO 4
5500 AY=AY+A(IX,JX)*A(JX,K)
5510 NEXT K
5520 NEXT JX
5530 NEXT IX
5540 FOR IX=1 TO 4
5550 FOR JX=1 TO 4
5560 AY=0
5570 FOR K=1 TO 4
5580 AY=AY+A(IX,JX)*A(JX,K)
5590 NEXT K
5600 NEXT JX
5610 NEXT IX
5620 FOR IX=1 TO 4
5630 FOR JX=1 TO 4
5640 AY=0
5650 FOR K=1 TO 4
5660 AY=AY+A(IX,JX)*A(JX,K)
5670 NEXT K
5680 NEXT JX
5690 NEXT IX
5700 FOR IX=1 TO 4
5710 FOR JX=1 TO 4
5720 AY=0
5730 FOR K=1 TO 4
5740 AY=AY+A(IX,JX)*A(JX,K)
5750 NEXT K
5760 NEXT JX
5770 NEXT IX
5780 FOR IX=1 TO 4
5790 FOR JX=1 TO 4
5800 AY=0
5810 FOR K=1 TO 4
5820 AY=AY+A(IX,JX)*A(JX,K)
5830 NEXT K
5840 NEXT JX
5850 NEXT IX
5860 FOR IX=1 TO 4
5870 FOR JX=1 TO 4
5880 AY=0
5890 FOR K=1 TO 4
5900 AY=AY+A(IX,JX)*A(JX,K)
5910 NEXT K
5920 NEXT JX
5930 NEXT IX
5940 FOR IX=1 TO 4
5950 FOR JX=1 TO 4
5960 AY=0
5970 FOR K=1 TO 4
5980 AY=AY+A(IX,JX)*A(JX,K)
5990 NEXT K
6000 NEXT JX
6010 NEXT IX
6020 FOR IX=1 TO 4
6030 FOR JX=1 TO 4
6040 AY=0
6050 FOR K=1 TO 4
6060 AY=AY+A(IX,JX)*A(JX,K)
6070 NEXT K
6080 NEXT JX
6090 NEXT IX
6100 FOR IX=1 TO 4
6110 FOR JX=1 TO 4
6120 AY=0
6130 FOR K=1 TO 4
6140 AY=AY+A(IX,JX)*A(JX,K)
6150 NEXT K
6160 NEXT JX
6170 NEXT IX
6180 FOR IX=1 TO 4
6190 FOR JX=1 TO 4
6200 AY=0
6210 FOR K=1 TO 4
6220 AY=AY+A(IX,JX)*A(JX,K)
6230 NEXT K
6240 NEXT JX
6250 NEXT IX
6260 FOR IX=1 TO 4
6270 FOR JX=1 TO 4
6280 AY=0
6290 FOR K=1 TO 4
6300 AY=AY+A(IX,JX)*A(JX,K)
6310 NEXT K
6320 NEXT JX
6330 NEXT IX
6340 FOR IX=1 TO 4
6350 FOR JX=1 TO 4
6360 AY=0
6370 FOR K=1 TO 4
6380 AY=AY+A(IX,JX)*A(JX,K)
6390 NEXT K
6400 NEXT JX
6410 NEXT IX
6420 FOR IX=1 TO 4
6430 FOR JX=1 TO 4
6440 AY=0
6450 FOR K=1 TO 4
6460 AY=AY+A(IX,JX)*A(JX,K)
6470 NEXT K
6480 NEXT JX
6490 NEXT IX
6500 FOR IX=1 TO 4
6510 FOR JX=1 TO 4
6520 AY=0
6530 FOR K=1 TO 4
6540 AY=AY+A(IX,JX)*A(JX,K)
6550 NEXT K
6560 NEXT JX
6570 NEXT IX
6580 FOR IX=1 TO 4
6590 FOR JX=1 TO 4
6600 AY=0
6610 FOR K=1 TO 4
6620 AY=AY+A(IX,JX)*A(JX,K)
6630 NEXT K
6640 NEXT JX
6650 NEXT IX
6660 FOR IX=1 TO 4
6670 FOR JX=1 TO 4
6680 AY=0
6690 FOR K=1 TO 4
6700 AY=AY+A(IX,JX)*A(JX,K)
6710 NEXT K
6720 NEXT JX
6730 NEXT IX
6740 FOR IX=1 TO 4
6750 FOR JX=1 TO 4
6760 AY=0
6770 FOR K=1 TO 4
6780 AY=AY+A(IX,JX)*A(JX,K)
6790 NEXT K
6800 NEXT JX
6810 NEXT IX
6820 FOR IX=1 TO 4
6830 FOR JX=1 TO 4
6840 AY=0
6850 FOR K=1 TO 4
6860 AY=AY+A(IX,JX)*A(JX,K)
6870 NEXT K
6880 NEXT JX
6890 NEXT IX
6900 FOR IX=1 TO 4
6910 FOR JX=1 TO 4
6920 AY=0
6930 FOR K=1 TO 4
6940 AY=AY+A(IX,JX)*A(JX,K)
6950 NEXT K
6960 NEXT JX
6970 NEXT IX
6980 FOR IX=1 TO 4
6990 FOR JX=1 TO 4
7000 AY=0
7010 FOR K=1 TO 4
7020 AY=AY+A(IX,JX)*A(JX,K)
7030 NEXT K
7040 NEXT JX
7050 NEXT IX
7060 FOR IX=1 TO 4
7070 FOR JX=1 TO 4
7080 AY=0
7090 FOR K=1 TO 4
7100 AY=AY+A(IX,JX)*A(JX,K)
7110 NEXT K
7120 NEXT JX
7130 NEXT IX
7140 FOR IX=1 TO 4
7150 FOR JX=1 TO 4
7160 AY=0
7170 FOR K=1 TO 4
7180 AY=AY+A(IX,JX)*A(JX,K)
7190 NEXT K
7200 NEXT JX
7210 NEXT IX
7220 FOR IX=1 TO 4
7230 FOR JX=1 TO 4
7240 AY=0
7250 FOR K=1 TO 4
7260 AY=AY+A(IX,JX)*A(JX,K)
7270 NEXT K
7280 NEXT JX
7290 NEXT IX
7300 FOR IX=1 TO 4
7310 FOR JX=1 TO 4
7320 AY=0
7330 FOR K=1 TO 4
7340 AY=AY+A(IX,JX)*A(JX,K)
7350 NEXT K
7360 NEXT JX
7370 NEXT IX
7380 FOR IX=1 TO 4
7390 FOR JX=1 TO 4
7400 AY=0
7410 FOR K=1 TO 4
7420 AY=AY+A(IX,JX)*A(JX,K)
7430 NEXT K
7440 NEXT JX
7450 NEXT IX
7460 FOR IX=1 TO 4
7470 FOR JX=1 TO 4
7480 AY=0
7490 FOR K=1 TO 4
7500 AY=AY+A(IX,JX)*A(JX,K)
7510 NEXT K
7520 NEXT JX
7530 NEXT IX
7540 FOR IX=1 TO 4
7550 FOR JX=1 TO 4
7560 AY=0
7570 FOR K=1 TO 4
7580 AY=AY+A(IX,JX)*A(JX,K)
7590 NEXT K
7600 NEXT JX
7610 NEXT IX
7620 FOR IX=1 TO 4
7630 FOR JX=1 TO 4
7640 AY=0
7650 FOR K=1 TO 4
7660 AY=AY+A(IX,JX)*A(JX,K)
7670 NEXT K
7680 NEXT JX
7690 NEXT IX
7700 FOR IX=1 TO 4
7710 FOR JX=1 TO 4
7720 AY=0
7730 FOR K=1 TO 4
7740 AY=AY+A(IX,JX)*A(JX,K)
7750 NEXT K
7760 NEXT JX
7770 NEXT IX
7780 FOR IX=1 TO 4
7790 FOR JX=1 TO 4
7800 AY=0
7810 FOR K=1 TO 4
7820 AY=AY+A(IX,JX)*A(JX,K)
7830 NEXT K
7840 NEXT JX
7850 NEXT IX
7860 FOR IX=1 TO 4
7870 FOR JX=1 TO 4
7880 AY=0
7890 FOR K=1 TO 4
7900 AY=AY+A(IX,JX)*A(JX,K)
7910 NEXT K
7920 NEXT JX
7930 NEXT IX
7940 FOR IX=1 TO 4
7950 FOR JX=1 TO 4
7960 AY=0
7970 FOR K=1 TO 4
7980 AY=AY+A(IX,JX)*A(JX,K)
7990 NEXT K
8000 NEXT JX
8010 NEXT IX
8020 FOR IX=1 TO 4
8030 FOR JX=1 TO 4
8040 AY=0
8050 FOR K=1 TO 4
8060 AY=AY+A(IX,JX)*A(JX,K)
8070 NEXT K
8080 NEXT JX
8090 NEXT IX
8100 FOR IX=1 TO 4
8110 FOR JX=1 TO 4
8120 AY=0
8130 FOR K=1 TO 4
8140 AY=AY+A(IX,JX)*A(JX,K)
8150 NEXT K
8160 NEXT JX
8170 NEXT IX
8180 FOR IX=1 TO 4
8190 FOR JX=1 TO 4
8200 AY=0
8210 FOR K=1 TO 4
8220 AY=AY+A(IX,JX)*A(JX,K)
8230 NEXT K
8240 NEXT JX
8250 NEXT IX
8260 FOR IX=1 TO 4
8270 FOR JX=1 TO 4
8280 AY=0
8290 FOR K=1 TO 4
8300 AY=AY+A(IX,JX)*A(JX,K)
8310 NEXT K
8320 NEXT JX
8330 NEXT IX
8340 FOR IX=1 TO 4
8350 FOR JX=1 TO 4
8360 AY=0
8370 FOR K=1 TO 4
8380 AY=AY+A(IX,JX)*A(JX,K)
8390 NEXT K
8400 NEXT JX
8410 NEXT IX
8420 FOR IX=1 TO 4
8430 FOR JX=1 TO 4
8440 AY=0
8450 FOR K=1 TO 4
8460 AY=AY+A(IX,JX)*A(JX,K)
8470 NEXT K
8480 NEXT JX
8490 NEXT IX
8500 FOR IX=1 TO 4
8510 FOR JX=1 TO 4
8520 AY=0
8530 FOR K=1 TO 4
8540 AY=AY+A(IX,JX)*A(JX,K)
8550 NEXT K
8560 NEXT JX
8570 NEXT IX
8580 FOR IX=1 TO 4
8590 FOR JX=1 TO 4
8600 AY=0
8610 FOR K=1 TO 4
8620 AY=AY+A(IX,JX)*A(JX,K)
8630 NEXT K
8640 NEXT JX
8650 NEXT IX
8660 FOR IX=1 TO 4
8670 FOR JX=1 TO 4
8680 AY=0
8690 FOR K=1 TO 4
8700 AY=AY+A(IX,JX)*A(JX,K)
8710 NEXT K
8720 NEXT JX
8730 NEXT IX
8740 FOR IX=1 TO 4
8750 FOR JX=1 TO 4
8760 AY=0
8770 FOR K=1 TO 4
8780 AY=AY+A(IX,JX)*A(JX,K)
8790 NEXT K
8800 NEXT JX
8810 NEXT IX
8820 FOR IX=1 TO 4
8830 FOR JX=1 TO 4
8840 AY=0
8850 FOR K=1 TO 4
8860 AY=AY+A(IX,JX)*A(JX,K)
8870 NEXT K
8880 NEXT JX
8890 NEXT IX
8900 FOR IX=1 TO 4
8910 FOR JX=1 TO 4
8920 AY=0
8930 FOR K=1 TO 4
8940 AY=AY+A(IX,JX)*A(JX,K)
8950 NEXT K
8960 NEXT JX
8970 NEXT IX
8980 FOR IX=1 TO 4
8990 FOR JX=1 TO 4
9000 AY=0
9010 FOR K=1 TO 4
9020 AY=AY+A(IX,JX)*A(JX,K)
9030 NEXT K
9040 NEXT JX
9050 NEXT IX
9060 FOR IX=1 TO 4
9070 FOR JX=1 TO 4
9080 AY=0
9090 FOR K=1 TO 4
9100 AY=AY+A(IX,JX)*A(JX,K)
9110 NEXT K
9120 NEXT JX
9130 NEXT IX
9140 FOR IX=1 TO 4
9150 FOR JX=1 TO 4
9160 AY=0
9170 FOR K=1 TO 4
9180 AY=AY+A(IX,JX)*A(JX,K)
9190 NEXT K
9200 NEXT JX
9210 NEXT IX
9220 FOR IX=1 TO 4
9230 FOR JX=1 TO 4
9240 AY=0
9250 FOR K=1 TO 4
9260 AY=AY+A(IX,JX)*A(JX,K)
9270 NEXT K
9280 NEXT JX
9290 NEXT IX
9300 FOR IX=1 TO 4
9310 FOR JX=1 TO 4
9320 AY=0
9330 FOR K=1 TO 4
9340 AY=AY+A(IX,JX)*A(JX,K)
9350 NEXT K
9360 NEXT JX
9370 NEXT IX
9380 FOR IX=1 TO 4
9390 FOR JX=1 TO 4
9400 AY=0
9410 FOR K=1 TO 4
9420 AY=AY+A(IX,JX)*A(JX,K)
9430 NEXT K
9440 NEXT JX
9450 NEXT IX
9460 FOR IX=1 TO 4
9470 FOR JX=1 TO 4
9480 AY=0
9490 FOR K=1 TO 4
9500 AY=AY+A(IX,JX)*A(JX,K)
9510 NEXT K
9520 NEXT JX
9530 NEXT IX
9540 FOR IX=1 TO 4
9550 FOR JX=1 TO 4
9560 AY=0
9570 FOR K=1 TO 4
9580 AY=AY+A(IX,JX)*A(JX,K)
9590 NEXT K
9600 NEXT JX
9610 NEXT IX
9620 FOR IX=1 TO 4
9630 FOR JX=1 TO 4
9640 AY=0
9650 FOR K=1 TO 4
9660 AY=AY+A(IX,JX)*A(JX,K)
9670 NEXT K
9680 NEXT JX
9690 NEXT IX
9700 FOR IX=1 TO 4
9710 FOR JX=1 TO 4
9720 AY=0
9730 FOR K=1 TO 4
9740 AY=AY+A(IX,JX)*A(JX,K)
9750 NEXT K
9760 NEXT JX
9770 NEXT IX
9780 FOR IX=1 TO 4
9790 FOR JX=1 TO 4
9800 AY=0
9810 FOR K=1 TO 4
9820 AY=AY+A(IX,JX)*A(JX,K)
9830 NEXT K
9840 NEXT JX
9850 NEXT IX
9860 FOR IX=1 TO 4
9870 FOR JX=1 TO 4
9880 AY=0
9890 FOR K=1 TO 4
9900 AY=AY+A(IX,JX)*A(JX,K)
9910 NEXT K
9920 NEXT JX
9930 NEXT IX
9940 FOR IX=1 TO 4
9950 FOR JX=1 TO 4
9960 AY=0
9970 FOR K=1 TO 4
9980 AY=AY+A(IX,JX)*A(JX,K)
9990 NEXT K
10000 NEXT JX
10001 NEXT IX

```


STEREOSCOPIC

I O Angell considers ways of producing perspective projections on screen.

Listing 2.

```
6000REM scene3 / consisting of a cube
6010DEF PROCscene3
6020DIM X(8),Y(8),Z(8),XD(8),YD(8)
6030DIM LIN(2,12),A(4,4),B(4,4),R(4,4)
6040NOV=0 : NDL=0 : PPD=3*VERT
6049REM place CUBE in SETUP position
6050PROCidR3 : PROCObject
6059REM find OBSERVED position.
6060PROCidR3 : PROClook3
6069REM draw the scene
6070PROCdrawit
6079REM repeat
6080GOTO 6060
6090ENDPROC
6500REM object / add to data base
6510DEF PROCObject
6519REM data for a CUBE
6520LOCAL IX,KX,YY,ZZ,L1,L2
6530DATA 1,2, 2,3, 3,4, 4,1, 5,6, 6,7, 7,8, 8,5, 1,5,
2,5, 3,7, 4,8
6540DATA 1,1,1, 1,1,-1, 1,-1,-1, 1,-1,1, -1,1,1, -1,1,
-1,-1,-1,-1,-1,1
6550RESTORE
6559REM store line information.
6560FOR IX=1 TO 12
6570READ L1,L2 : NDL=NDL+1
6580LIN(1,NDL)=L1+NOV : LIN(2,NDL)=L2+NOV
6590NEXT IX
6599REM store vertex information put in position by m
atrix R.
6600FOR IX=1 TO 8
6610READ XX,YY,ZZ : NOV=NOV+1
6620X(NOV)=R(1,1)*XX+R(1,2)*YY+R(1,3)*ZZ+R(1,4)
6630Y(NOV)=R(2,1)*XX+R(2,2)*YY+R(2,3)*ZZ+R(2,4)
6640Z(NOV)=R(3,1)*XX+R(3,2)*YY+R(3,3)*ZZ+R(3,4)
6650NEXT IX
6660ENDPROC
7000REM drawit
7010DEF PROCdrawit
7020LOCAL IX,L1,L2 : CLG
7030FOR IX=1 TO NOV
7039REM put vertices in OBSERVED position, then make
PERSPECTIVE transformation
```

```
7040ZZ=R(3,1)*X(IX)+R(3,2)*Y(IX)+R(3,3)*Z(IX)+R(3,4)
7050PMULT=PPD/ZZ
7060XD(IX)=(R(1,1)*X(IX)+R(1,2)*Y(IX)-R(1,3)*Z(IX)+R(
1,4))*PMULT
7070YD(IX)=(R(2,1)*X(IX)+R(2,2)*Y(IX)-R(2,3)*Z(IX)+R(
2,4))*PMULT
7080NEXT IX
7089REM draw lines of scene
7090FOR IX=1 TO NDL
7100L1=LIN(1,IX) : L2=LIN(2,IX)
7110PROCmoveto(XD(L1),YD(L1))
7120PROClineto(XD(L2),YD(L2))
7130NEXT IX
7140ENDPROC
```

Listing 3.

```
6000REM scene3 / consisting of 2 similar objects
6010DEF PROCscene3
6020DIM X(16),Y(16),Z(16),XD(16),YD(16)
6030DIM LIN(2,24),A(4,4),B(4,4),R(4,4)
6040NOV=0 : NDL=0 : PPD=3*VERT
6049REM place first object in SETUP position
6050PROCidR3 : PROCObject
6059REM place second object in a peculiar position
6060PROCidR3
6070PROCrot3(P1/5,1) : PROCmult3
6080PROCrot3(P1/5,2) : PROCmult3
6090PROCtran3(3,2,2) : PROCmult3
6100PHUObject
6109REM specify general rotation
6110PROCidR3 : CLS
6120INPUT " (PX,PY,PZ) ",PX,PY,PZ
6130INPUT " (QX,QY,QZ) ",QX,QY,QZ
6140INPUT " GAMMA ",GAMMA
6150PROCgenrot(PX,PY,PZ,QX,QY,QZ,GAMMA)
6159REM OBSERVED position
6160PROClook3
6169REM draw the scene
6170PROCdrawit
6179REM draw another picture
6180GOTO 6110
6190ENDPROC
```

projections of these points onto the near plane are A^1 and B^1 , and onto the far plane A^{11} and B^{11} . Note that the projections will have the same shape and orientation, but they will be of different sizes.

We let the perspective plane be a distance d from the eye — variable PPD in later programs. Consider a point $P=(x,y,z)$ in space which sends a ray into the eye. We must calculate the point where this line cuts the view plane — the $z=d$ plane — suppose it is

the point $P^1=(x^1,y^1,d)$. Let us first consider the value of y^1 by referring to figure 2. By similar triangles we see that $y^1/d=y/z$, that is $y^1=y.d/z$. Similarly $x^1=x.d/z$. Hence $P^1=(x.d/z,y.d/z,d)$, and we have the x - and y -coordinates of the projection on the screen.

Many of the routines needed to draw a perspective view of an object are the same as those required for the orthographic projection. We lump them all together in the library of routines given in listing 1. It

contains the routines Start, Setorigin, Moveto, Lineto and Real-to-pixel functions necessary for manipulating the screen of pixels as though it is a window on real 2-D space.

It also contains routines Angle, Rot3, Tran3, Mult3 and ldr3 for manipulating the matrices that represent transformations of 3-D space as well as Genrot which creates a matrix that represents the rotational transformation of space about a general axis, and Look3 which enables the observer to look from any point (EX,EY,EZ) in space toward any other (DX,DY,DZ) .

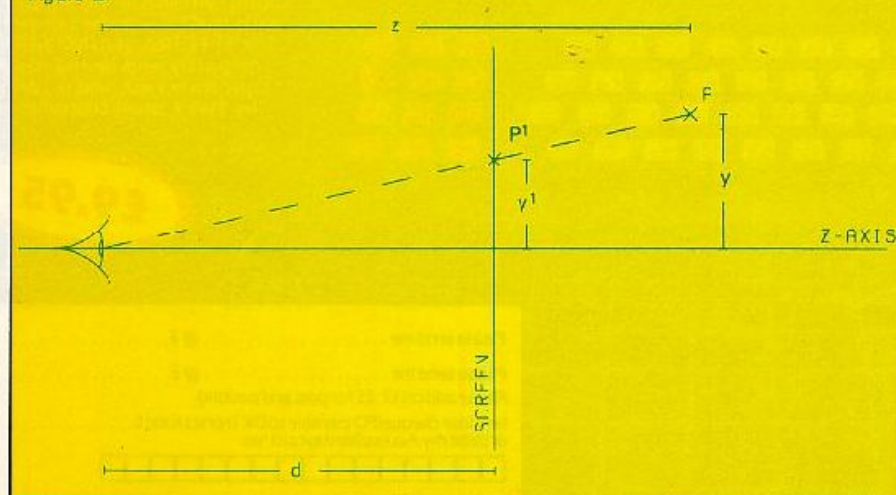
Use of matrices

If you want to understand them fully you must refer back to my previous article or read *Advanced Graphics with the BBC Model B Microcomputer* by I. O. Angell and E. J. Jones — ISBN 0 333 35052 9.

In order to draw a perspective view we must now create a Scene3 routine which calls other routines to calculate a vertex/line data base describing objects in the scene — the setup positions — uses matrices to move each individual object into its actual position in space, and then again to move space into the observed position where the eye is at the origin looking along the positive z -axis, ready for the perspective projection achieved in the

(continued on page 159)

Figure 2.



for Sinclair Spectrum with these features to give you endless hours of enjoyment.

1. Super positive response fire button.
2. Firm suction cups for stable one hand operation.
3. Snug fit hand moulded grip.
4. Additional fire button.
5. Extra long 4 ft lead.

The interface supplied with the Quick Shot TM has a two joysticks facility.

The first port simulates 6789 & 0 keys. The second port simulates in (31) command. It will run any Software.

1. Using keys 6, 7, 8, 9 and 0.
2. Having redefinable key function.
3. Using In [31] i.e. Kempston.
4. Any Software you write yourself.

Light pen

The LIGHT PEN enables you to produce high resolution drawings on your own TV screen simply by plugging into the ear socket of your Spectrum. The controlling software supplied with the light pen has 16 pre-defined instructions. You can change colour (Border, Paper, Ink), draw circles, arcs, boxes, lines and insert text onto the screen at any chosen place, you can also draw freehand. There is a feature to retain the screens and animate. On the 48K Spectrum you can retain 5 screens. You can also use the machine code on its own in your own programs, for selecting out of a menu etc. The LIGHT PEN is supplied with a control interface, to adjust the sensitivity/pen alignment.

£19.95

£22.95

£45.00

Our cased keyboard has 52 keys, 12 of which form a numeric pad. The 12 keys comprise 1-9 numeric plus full stop and shift keys, all in red, to distinguish from the main keyboard keys which are in grey, the keys contrast with the black case to form a very attractive unit. The case has been designed to take a ZX81 or Spectrum computer. 16K, 32K or 64K can also be fitted to the motherboard inside the case (81 model only). The case is also large enough for other add-ons like the power supply to be fitted, giving a very smart self-contained unit with which other add-ons e.g. printer etc. can still be used. Our ZX Professional keyboard offers more keys and features than any other model in its price range making it the best value keyboard available.

**Keyboard now
microdrive compatible**

Spectra-Sound

The so-called speaker in your Spectrum is really on a 'buzzer'. With the DK Tronics "SPECTRA SOUND" you can generate fully amplified sound through the speaker on your TV set. SPECTRA SOUND is a very simple but highly effective add-on. This means that you no longer have a faint beep but a highly amplified sound, which can be adjusted with the TV volume control. The SPECTRA SOUND fits compactly and neatly inside the Spectrum case and is connected by three small crocodile clips.

£9.95

dk'tronics

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

Please send me @ £

Please send me @ E

Please add on £1.25 for post and packing.

I enclose cheque/PO payable to DK Tronics total £.....
or debit my Access/Barclaycard No.

[illegible]

Signature

Name

Address _____

Send to: DK Tronics Ltd., Unit 6, Shire Hill Ind. Est., Saffron
Walden, Essex CB11 3AC. Tel: (0799) 26350 (24 hrs) 5 lines

Listing 4

```

6000REM scene3 / a jet
6010DEF PROCscene3
6020DIM X(74),Y(74),Z(74),XD(74),YD(74)
6030DIM LIN(2,92),A(4,4),B(4,4),R(4,4)
6039REM place JET in SETUP position
6040PROCjet
6049REMEORspecify general rotation
6050PMULIDRS : CLB
6060INPUT "(PX,PY,PZ) " ,PX,PY,PZ
6070INPUT "(QX,QY,QZ) " ,QX,QY,QZ
6080INPUT "GAMMA " ,GAMMA
6090PROCgenrot (PX,PY,PZ,QX,QY,QZ,GAMMA)
6099REM OBSERVED position
6100PROClook3
6107REM draw the scene
6110PROCdrawit
6117REM repeat
6120GOTO 6050
6130ENDPROC
6500REM jet
6510DEF PROCjet
6520LOCAL I%
6530DATA 0,0,80, 0,0,64, 0,8,32, 4,8,32, 8,4,32,
8,0,32, 4,-4,32, 0,8,-32, 4,8,-32, 8,4,-32,
4,-4,-32, 0,-4,-32, 8,0,-24, 4,8,-32, 8,2,-32,
0,8,0, 2,8,-32, 0,32,-32, 28,-4,-24, 30,-2,-24, 3
2, 2, 24, 34, 4, 24
6540DATA 32,-6,-24, 30,-6,-24, 28,-4,8, 30,-2,8,
32,-2,8, 34,-4,8, 32,-6,8, 30,-6,8, 31,0,-24, 31,
-2,-24, 31,-2,-12, 31,0,-12, 0,6,40, 3,6,40
6550DATA 1,2, 2,3, 2,4, 2,5, 2,6, 2,7, 3,4, 4,
9, 5,10, 6,11, 7,12, 8,9, 9,10, 10,11, 11,12,
12,13, 14,15, 15,10, 15,16, 14,16, 17,18, 17,19,
18,19
6560DATA 20,21, 21,22, 22,23, 23,24, 24,25, 25,2
0, 26,27, 27,28, 28,29, 29,30, 30,31, 31,26, 20
,26, 21,27, 22,28, 23,29, 24,30, 25,31, 32,33,
33,34, 34,35, 35,32, 36,37
6570RESTORE 6530 : NOV=74 : NOL=92
6579REM SETUP vertices and lines for first side ( X>=
0 )
6580FOR I%=1 TO 37 : READ X(I%),Y(I%),Z(I%) : NEXT I%
6590FOR I%=1 TO 46 : READ LIN(1,I%),LIN(2,I%) : NEXT I%
6599REM SETUP vertices and lines for second side ( X<
=0 )
6600RESTORE 6530
6610FOR I%=38 TO 74
6620READ X(I%),Y(I%),Z(I%) : X(I%)=-X(I%)
6630NEXT I%
6640FOR I%=47 TO 92
6650READ L1,L2
6660LIN(1,I%)=37+L1 : LIN(2,I%)=37+L2
6670NEXT I%
6680ENDPROC
7000REM drawit
7010DEF PROCdrawit
7020LOCAL I%,L1,L2 : CLB
7029REM put in OBSERVED position
7030FOR I%=1 TO NOV
7040ZZ=R(3,1)*X(I%)+R(3,2)*Y(I%)+R(3,3)*Z(I%)+R(3,4)
7050PMULT=PPD/ZZ
7060XD(I%)=(R(1,1)*X(I%)+R(1,2)*Y(I%)+R(1,3)*Z(I%)+R(
1,4))*PMULT
7070YD(I%)=(R(2,1)*X(I%)+R(2,2)*Y(I%)+R(2,3)*Z(I%)+R(
2,4))*PMULT
7080NEXT I%
7089REM draw lines of object
7090FOR I%=1 TO NOL
7100L1=LIN(1,I%) : L2=LIN(2,I%)
7110PROCmoveto (XD(L1),YD(L1))
7120PROCclineto (XD(L2),YD(L2))
7130NEXT I%
7140ENDPROC

```

(continued from page 157)

Drawit routine.

The data base will contain information on NOV vertices — their X,Y and Z values and their projected values XD and YD — and NOL lines. The I'th line joins vertices and indices LIN(1,I) and LIN(2,I).

The only difference between the program which draws a perspective view and that of the orthographic view is in the calculation of the co-ordinates of the projected image on the screen. Unlike the orthographic, in the perspective projection the co-ordinates on the screen cannot be identified with the x- and y-values of the point in observed position. We need to store the perspective transformation of the vertices in the arrays XD and YD so as not to corrupt the data base for future projections. The I'th vertex (X(I),Y(I),Z(I)) in observed position is projected to (XD(I),YD(I)). The values in arrays XD and YD are given by

$XD(I) = X(I) * PPD / Z(I)$ and
 $YD(I) = Y(I) * PPD / Z(I)$

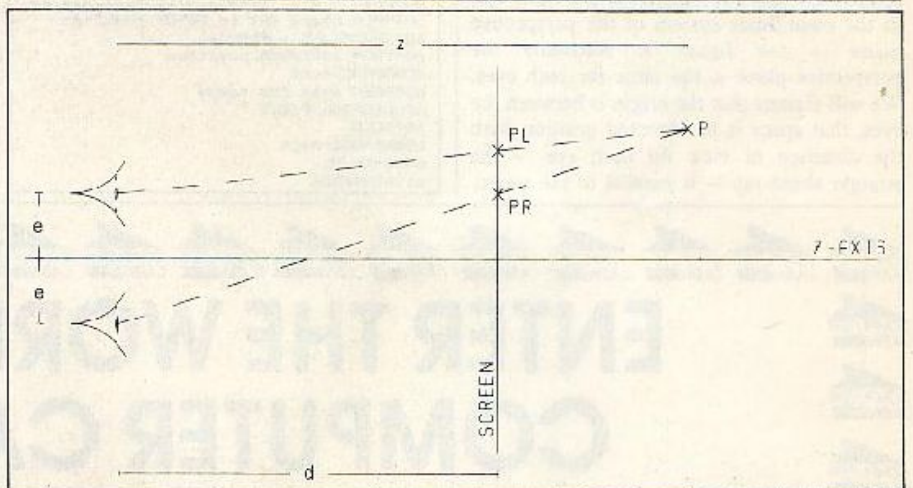
for $I = 1, 2 \dots NOV$

The value of PPD is set to $3 * VERT$ in Scene3.

We still need to explain our value for PPD. You can see from figure 1 that different values of PPD produce pictures of different sizes — which one do we choose? Is there a correct value. If we consider the practical situation, we note that the observer is sitting in front of a television and the perspective plane is identified with the plane of the T.V. screen. Normally the observer is sitting at a distance which is about three times the height of the screen from the terminal.

In the scale of our mapping from the real-world to the graphics area of pixels, this is a distance $3 * VERT$. If we choose PPD greater than this value it is as though we are creating a close up, and if PPD is less than $3 * VERT$ we get the smaller image of a long shot.

If you merge listing 2 with listing 1 you get



program 1 which, when run in Mode 4, draws a perspective view of a cube. Try $HORIZ = 1$, $(EX,EY,EZ) = (10,0,0)$ and $(DX,DY,DZ) = (0,0,0)$. Here we are viewing the wire cube from the front but note that, unlike the orthographic projection, the back face of the cube is smaller in projection than the front face and that lines parallel on the 3-D cube need no longer be parallel in projection: in fact they meet at a vanishing point.

Now choose $(EX,EY,EZ) = (20,0,0)$ i.e., the observer is still looking at the cube from the same direction, but from further away: see how the projection is the same shape and orientation as previously but it has diminished in size, as you would expect with perspective! If you now return program 1 with the same values of (EX,EY,EZ) and (DX,DY,DZ) but with $HORIZ = 100$ you will see that a change in the size of $HORIZ$ makes no difference to the perspective projection! So you can keep a value of $HORIZ = 1$ for all perspective projections.

Now run the program with $(EX,EY,EZ) = (0,0,0)$. It will fail. The eye of the observer lies in one edge of the cube, and the perspective

transformation leads to a division by zero. Theoretically, objects may be positioned throughout space, even behind the eye, however to avoid problems we only consider points with positive z-co-ordinates in the observer position.

Now run program 1 with general values of (EX,EY,EZ) and (DX,DY,DZ) e.g., $(10,20,30)$ to $(0,0,0)$: $(5,10,15)$ to $(0,0,0)$: $(5,10,15)$ to $(1,1,1)$ etc.

Listing 3 should be merged with listing 1 and the Object and Drawit routines of listing 2, to form program 2 which runs in Mode 4. It gives a general perspective view of a scene consisting of two cubes that can be rotated by an angle Gamma about an axis of rotation which joins point (PX,PY,PZ) to (QX,QY,QZ) .

Program 3 is formed by merging listing 4 with listing 1 and the Drawit routine of listing 2. When run in mode 4 it draws a perspective view of a jet. Try $HORIZ = 1$, $(PX,YP,PZ) = (1,1,1)$, $(QX,QY,QZ) = (0,0,0)$, $GAMMA = 1$ with $(EX,EY,EZ) = (200,300,400)$ and $(DX,DY,DZ) = (0,0,0)$. Then try $(EX,EY,EZ) = (300,400,500)$ etc.

(continued on next page)

(continued from previous page)

Perspective views are all very well but we have two eyes. Each eye should have its own perspective view, which will differ slightly from that of the other eye. This is the means by which we appreciate the three-dimensional quality of our world.

This leads to a problem; we cannot simply draw two such projections because the left eye will not only see the view created for it, but also that made for the right eye, and vice versa. To stop this confusion we must ensure that each eye sees its own view, but only its view. This is achieved by using a pair of stereoscopic spectacles: a pair of transparent plastic sheets, one red — left eye — and one blue — right eye. In this way the left eye cannot see red lines because they appear the same colour as the white background.

Similarly for the right eye which cannot see blue lines, but red lines look black. So the computer must make two line drawings of a scene: one in blue for the left eye, and one in red for the right eye; hence we have to run using Mode 1 logically. Anding the colours — GCOL 2 — onto a white background.

So we wish to devise a method of producing the stereoscopic projection of a general point $P=(x,y,z)$, that is two points $PL=(x_1,y_1)$ for the left eye and $PR=(x_2,y_2)$ for the right eye, in the co-ordinate system of the perspective plane — see figure 3. Naturally the perspective plane is the same for both eyes. We will assume that the origin is between the eyes, that space is in observed position with the direction of view for each eye — the straight ahead ray — is parallel to the z-axis.

Listing 5.

```
7000REM drawit
7010DEF PROCdrawit
7020LOCAL IZ,JZ,L1,L2 : CLG
7030VPU19,2,6,0,0,0
7040ED=VERT*0.2 : GCOL 2,2
7049PROCdraw figure twice :- first the view from th
e left eye then the view from the right eye
7050FOR JZ=1 TO 2
7060FOR IZ=1 TO MOV
7070REM put vertices in OBSERVED position, then make
PERSPECTIVE transformation
7070Z=IZ*(12+R(12,2))+Y(IZ+R(12,3))+Z(IZ+R(12,4))
7080MULT=PPD/IZ
7090X(IZ)=R(1,1)+X(IZ)+R(1,2)+Y(IZ)+R(1,3)+Z(IZ)+R(1,4)
7100Y(IZ)=R(2,1)+X(IZ)+R(2,2)+Y(IZ)+R(2,3)+Z(IZ)+R(2,4)
7110NEXT IZ
7110REM draw lines of scene
7120FOR IZ=1 TO NOL
7130L1=LIN(1,IX) : L2=LIN(2,IX)
7140PROCdrawto(XD(L1),YD(L1))
7150PROCdrawto(XD(L2),YD(L2))
7160NEXT IZ
7170REM view eye
7170EE=ED : GCOL 2,1
7180NEXT JZ
7190ENDPROC
```

The eyes have co-ordinates $(-e,0,0)$, left, and $(e,0,0)$, right: in the program that follows, e is given by variable ED, which is normally about $0.2*VERT$. Again the perspective view plane is a distance d — variable PPD — from the origin. In order to find PL we move space by $(e,0,0)$ so that P becomes $(x+e,y,z)$ and the perspective transform of this point for the left eye $s((x+e).d/z,y.d/z)$, which when we return space to its original position becomes

Listing 6.

```
6000REM scene3 / a jet
6010DEF PROCscene3
6020DIM X(74),Y(74),Z(74),XD(74),YD(74)
6030DIM LIN(2,92),A(4,4),B(4,4),F(4,4)
6039REM place JET in SE*UP position
6040PROCdrawit : PROCjet
6049REM OBSERVED position
6050PROClook3
6059REM draw the scene
6060SPPOOL PICCY
6070CLG
6080PROCdrawit
6090SPPOOL
6100ENDPROC
```

$((x+e).d/z - e.y.d/z)$. Similarly, the right eye transformation produces $PR=((x-e).d/z + e.y.d/z)$.

Listing 5 is a Drawit routine which, when used as a replacement in our first two programs, draws a stereoscopic view of the cube — program 1 — or pairs of cubes — program 2.

For the best stereoscopic views it is best to make the perspective plane cut on the object being viewed i.e., if $(DX,DY,DZ)=(0,0,0)$ then make $\sqrt{(EX^2+EY^2+EZ^2)}=PPD$ ($=3*VERT$). Therefore in the case of stereoscopic views we cannot keep HORIZ — and VERT — fixed, since for the best projections HORIZ and VERT depends on (EX,EY,EZ) . For program 4, formed in the above-mentioned way from program 1, try HORIZ=10, $(EX,EY,EZ)=(8,12,16)$ and $(DX,DY,DZ)=(0,0,0)$.

If you replace the Scene3 of program 3 — the jet — with listing 6, and also use Drawit — listing 5 — you get program 5 for drawing a stereoscopic picture of the jet. There is not enough memory to run the program in mode 1, so instead we run in mode 1, and the program *Spools the picture onto file Piccy in backing store. Then if you clear the old program and *Exec Piccy onto a white mode 1 screen you will get your stereoscopic picture. A good result is achieved with HORIZ=230, $(EX,EY,EZ)=(250,300,350)$ and $(DX,DY,DZ)=(0,0,0)$. Type NEW
MODE 1 : VDU 23 1,0,0;C;0;
GCOL 0,135 : CLG
*EXEC PICCY



ENTER THE WORLD OF COMPUTER CABIN

OFFICIAL ACORN DEALER
& BBC INFORMATION CENTRE
FOR STAFFORDSHIRE
SEND 50p FOR FULL CATALOGUE.

24 THE PARADE, SILVERDALE,
NEWCASTLE-UNDER-LYME
STAFFS. ST5 6LQ
TEL. 0782 636911

BAZ'S BARGAIN BASEMENT

SPECTRUM RADIO/AMPS

Doubles as a 3 Band Radio (with C.B.) and Boosts your Beep

Only £6.95 + £1.00 p - p

BBC SPARES

Computer cables and leads for various computers.
Send S.A.E. for full list.

CABSOFT TIME WARP

For the 48K Spectrum and the Commodore 64

Only £6.95 inc p - p

Cheque payable to "Cabsoft"
Memotech version available soon!

JAYTRONICS

SPECTEL

Enables your 48k Spectrum to store 500 names and telephone numbers for instant recall.

Software only £9.95

HARDWARE

Only £29.95

Enables you to Auto-dial and re-dial (simple connection requires Telecom approval).

Cheques payable to "Jaytronics"





LOOKING FOR A HOME COMPUTER? ALL ROADS LEAD TO MICRO POWER

MEMOTECH MTX500

An excellent choice for both the beginner and the Spectrum owner wishing to upgrade.

Features 32K, Z80A processor, SN76489A sound chip (the same as in the BBC Micro), 256 x 192 graphics resolution, 16 colours, 32 sprites (easily programmed moveable objects to make games writing easier), two Atari-type joystick ports, composite video socket, number pad. Sophisticated utilities to aid programming include built-in Assembler/Disassembler and monitor.

Complete with 5 cassettes including Draughts, Toado and a Head Cleaner.

SPECIAL PRICE
£275
£249

MEMOTECH MTX512

This computer has the same specification as the MTX500, but has 64K RAM (Random Access Memory).

SPECIAL PRICE
£315
£284

COMMODORE 64 £199.95

Features: 64K, Microsoft BASIC, 16 colours, 8 multi-coloured sprites, sound synthesiser (producing the best sound on any micro), 320 x 200 graphics resolution, four function keys, two Atari-type joystick ports, cartridge slot, parallel printer interface.

COMMODORE Cassette Recorder only £39.95 (Only available with computer).

CASSETTE RECORDERS

(All have an index counter and come complete with cassette lead.)

Acorn Recorder	£33.90
Datex/Lloytron Recorder	£29.90
Ferguson Recorder	£38.95

MAIL ORDER ADDRESS:
MICRO POWER LTD.
8/8a REGENT STREET
CHAPEL ALLERTON
LEEDS LS7 4PE
Tel: (0532) 683186 or 696343

SHOWROOM ADDRESS:
NORTHWOOD HOUSE
NORTH STREET
LEEDS LS7 2AA
Tel: (0532) 458800

HIRE PURCHASE FACILITIES
AVAILABLE. PLEASE CONTACT
US FOR FURTHER DETAILS.

BBC MODEL B £399

Made by Acorn and used extensively in schools and colleges.

SPECIAL OFFER:
FOUR FREE Program Power
tapes (worth up to £39.80)

Features: 32K, BBC BASIC (the fastest on any home computer), 8 display modes, 16 colours, 640 x 256 high resolution graphics, 3 voice sound plus noise channel, RS423 and Centronics printer interfaces, joystick port, built-in Assembler, 10 user definable function keys.

Complete with a 16 program cassette and 512 page User Guide.

ORIC 1 £129.95

Features:
48K,
Extended
Microsoft

FREE Oric Software Pack (consists of
Flight Simulator, Multigames, Home
Finance, and Teach Yourself BASIC).

BASIC, 8 colours, 240 x 200 graphics resolution, 3 voice sound plus noise channel.

ACORN ELECTRON £199

(Subject to
availability)

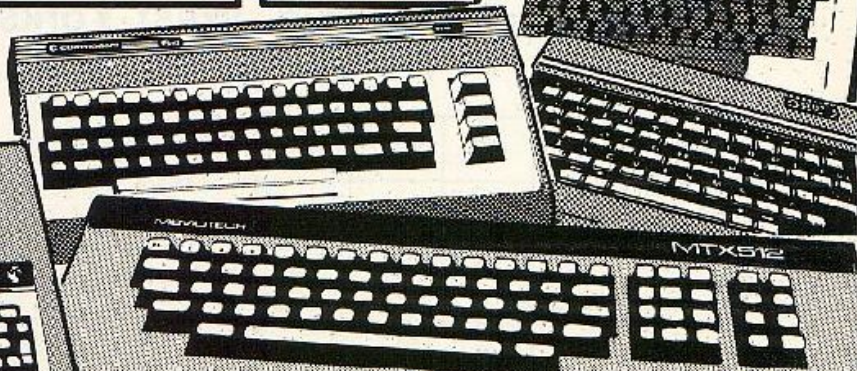
The scaled down version of the BBC Micro.

Features: BBC BASIC, 32K, 7 display modes (including 80 column text mode and 640 x 256 graphics resolution), 16 colours, 9 octave sound plus noise channel, built-in Assembler.

Complete with an Introductory Cassette containing 16 programs, a User Guide, and a book: "Start Programming on the Electron".

We also stock a
wide range of
printers, joysticks, disk drives,
monitors, light pens,
books, software and
much more! Please send for
our complete list.

CARRIAGE FREE
FOR BBC AND
MEMOTECH.
ALL OTHER
COMPUTERS £5



NEW
available ex-stock
NOW!

NOW YOUR Micro can talk back with *Speakeasy*

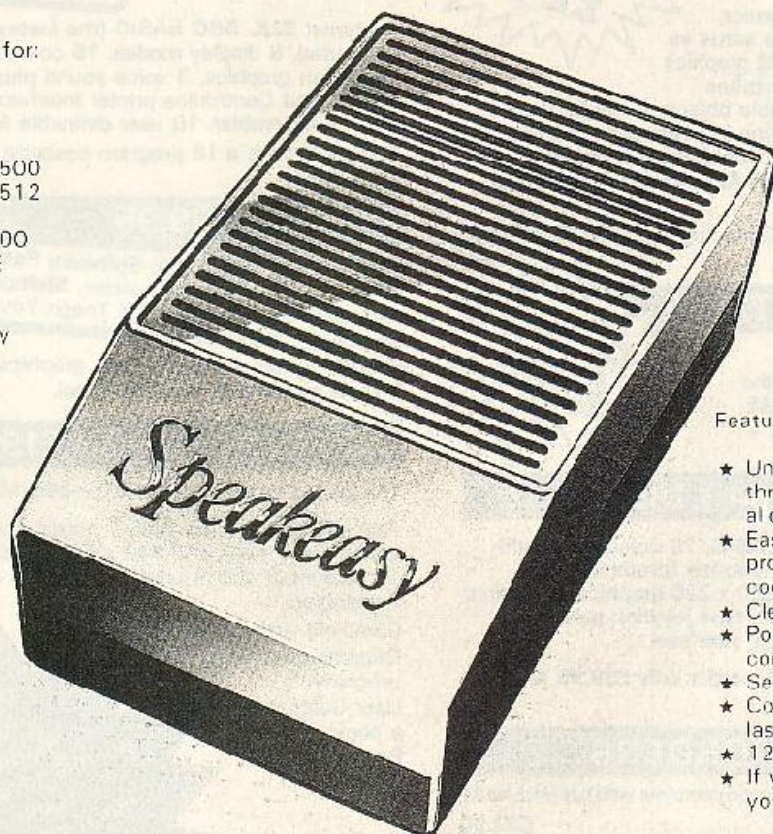
NEW
available ex-stock
NOW!

for only £29.95 inc VAT and P&P

Available NOW for:

BBC
CBM 64
VIC-20
MEMOTECH 500
MEMOTECH 512
ORIC-1
SHARP MZ-700
COLOUR GENIE
ATMOS

Available shortly
for most other
popular micros



Features include:

- ★ Unlimited vocabulary through the use of al ophones
- ★ Easy to use in your Basic programs (and in machine code programs!)
- ★ Clear, audible speech
- ★ Powered from your own computer
- ★ Self-contained speaker
- ★ Compact, sturdy, built to last
- ★ 12 month guarantee
- ★ If you change your micro you just change the lead!

Available from your local Spectrum (UK) Dealer or direct from:

JAMAR LTD

17 Station Road, Mirfield, West Yorkshire WF14 8LN

Tel: 0924 495923

Please rush me:

ITEM	QTY	PRICE	TOTAL
Speakeasy(s)		£29.95	
Connecting lead (* State which micro)		£4.50	
Total Payable			

Name Mr/Mrs/Ms.

Address

Can you meet Laserwarp's infinite Challenge?

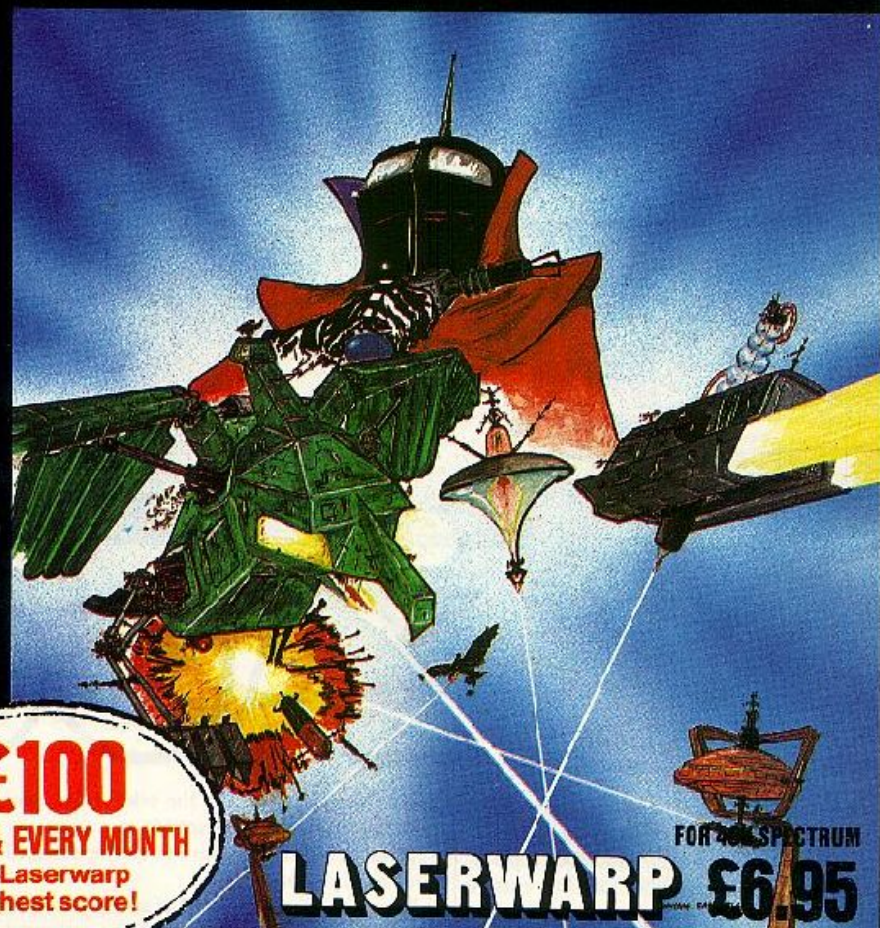
Be a real game lord – imagine the quest for the ultimate high score!

At last – a real challenge for the arcade ace: Laserwarp, the most exciting arcade-style game around, in full, high-res graphics. It's got everything – fight your way through the ramships, space mines, homing droids, hyperspace chickens, interstellar pogos, and more, till you challenge the Master. Can you beat him? Can anybody beat him? Comes complete with Hall of Fame, coded verifiable high score – send yours in and see if you can win the £100 Mikro-Gen are offering every month (full details in instructions)

High scorers names will be published in a Hall of Fame in the computer press – and they will be invited to join in a Battle of the Champions.

NB – if you have the earlier version of Laserwarp, Mikro-Gen will replace it with the new version – FREE!

£100
EACH & EVERY MONTH
for Laserwarp
highest score!



LASERWARP £6.95

AND NOW

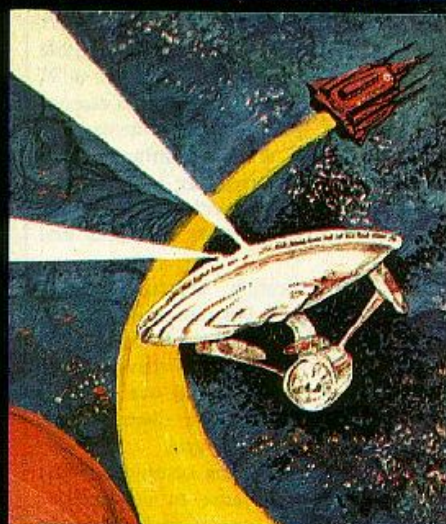
*** Star Trek**

You won't find a more exciting version of this superb tactical role-play game – save the star systems from the Klingon attack. Runs in real time – so you have to make the right decisions fast. Comes complete with Captain's Log & Operating Manual

*** FOR 48K SPECTRUM**

£7.95

Just part of Mikro-Gen's great range – look out for Paradroids, Mad Martha II, Cruise Attack, Land of Sagan, Galakzions, Defender and many others. Available from WH Smith, Co-op, Boots, Menzies & other leading retailers, or direct from Mikro-Gen (Please make cheque/PO payable to Mikro-Gen & add 40p post & packing)



**PHONE YOUR
VISA/ACCESS
NUMBER**

MIKRO-GEN

44 The Broadway, Bracknell, Berks RG12 1AG Tel: 0344 427317

John Ransley
completes his
mini-series on
adventure
program
writing.



ZAGORSK

If you read last month's article and entered the sample program, you will now have spent nearly a month traipsing around the crypts of Zagorsk Monastery looking for that elusive ikon. I promise that it gets more interesting from now on in.

Our sample adventure is based on a grid six squares by six, giving a total 36 possible locations, numbered 1 to 36 — not zero to 35 as shown in last month's feature, for reasons I'll explain later. Each square has the name of the location found at that position, with a notional one-way or two-way arrow or no arrow at all linking it with any adjoining box(es) to indicate possible entrances and exits.

The sample location descriptions and movement data given last month is reflected in lines 7010 to 8415 of the full listing. The eagle-eyed will notice that I have altered slightly legal moves into and out of some locations to make it a little easier for the novice to move around the grid.

You may now enter the complete listing (which should make sense to any micro's dialect of Basic) from start to finish and start playing. But if you want to understand the mechanics of the program, you may prefer to tackle the listing in little chunks or modules, which I'll describe and explain how to test as you go along.

Begin by entering lines 1170, 1180, 1400 to 1450 inclusive and 7010 to 8415 inclusive. As a short cut, you can spare yourself some typing by using just token descriptions — for example, Tsars' Tomb, St Petre — instead of

those I've suggested. On the other hand, you may like to start improving on my efforts by expanding on the descriptions to the limits of your imagination.

When you have finished entering all those lines, check your descriptions for awkward line breaks, spelling mistakes and general screen presentation. To do so, simply type Run X, where X is the description's line number, and hit Return. Give special care to entering lines 1400 and 1450. Each of them offers a signpost to one horizontal row of six locations. Here is how they work:

Your current position or CP is set at location 23 — line 1170 — at the start of every new game. That value is then tested by lines 1400 to 1420 in this way. As it is not any of the locations numbered 1 to 18, you drop through lines 1400 to 1420 and come to rest at 1430; CP is less than 25 but not less than 19. Most micros' Basic need a minimum value of 1 for On Goto commands, which is why I dropped the zero when re-numbering the grid.

The program branches

In this particular case, the On Goto routine expects a value from 1 to 6, so 18 is deducted from CP to provide a number in that range. Line 1430 ends its work by counting five places along the queue of description line numbers to arrive at 8170 — and it is to that line number which the program now branches.

You can check that all 36 locations are properly signalled in that way by changing CP

to values from 1 to 36 in turn. Do not worry about the error message you will get when running a test on location 33.

Now we can fill some of those 36 locations with objects — a few of which you will need to overcome challenges and find the ikon. Line 1016 reserves space for three arrays each containing 12 elements — we want to site 12 objects. The numeric array PL% will hold the numbers of the squares where the objects will always be found when a new game begins — their (P)rimarily (L)ocations. The first string array, SN\$, stores the objects' short names. The second string array, LN\$, holds their long names.

On the first pass through the loop in 1022 and 1024, X fills those three arrays with the three data items in line 1030 in turn. The loop repeats the process 12 times. After entering lines 1022 to 1140, test the procedure by typing in direct mode:

```
PRINT PL%(1):PRINT SN$(1):PRINT LN$(1)
```

This should generate the screen display:

```
2
ROSARY
A BROKEN ROSARY IS HERE
```

You can run through the remaining 11 values of X to check that each three-piece suite of arrays is properly stuffed. We can now say goodbye to the first section by adding line 1150, which awards a token value of 1 to each of the five variables representing hazards you will encounter in the game. A value of 1 indicates they are active challenges; a value of 0 neutralises.

Lines 1620 to 1640 provide the means of

2250 to 2270. Otherwise, line 2110 gives the go-ahead and one of the four possibilities in 2150 to 2180 will act on your choice, calculating your (N)ew (P)osition and looping back to 1200 to update your revised CP.

But say you do not enter N, S, E or W? The instruction I will call your inventory, to show what objects if any you are currently carrying. The H is for help; using it may give you a clue. Press Q if you get thoroughly fed up and want to quit the game.

When you reach a challenge location, you can only survive, escape, find the ikon or whatever by having with you the right object and using the correct command. Lines 2400 to 2435 specify what those commands must be

Qualifier controls use

The CP qualifier in each line controls their use in the right location but in challenge and any other locations, you may want to try commands of your own. Central to an adventure is the player's freedom to acquire, and perhaps later jettison, the objects he finds along the way. The commands allowing this usually take the form of a two-word sentence comprising one verb and one noun. For example:

TAKE ROPE
GET CANDLES
DROP ROSARY
LEAVE SCROLL

Lines 2460 to 2840 walk through each such command, searching for the space which separates the two. If one cannot be found — suggesting that one word, not two, has been entered — control passes to line 2490. Otherwise, lines 2530 to 2570 get to work on

splitting the two-word command into a verb string and noun string, naming the word to the left of the space VES and that to the right NOS.

Lines 2600 to 2630 then check VES for verbs recognised. You can have any number you like up to your micro's maximum line length, and even then you can always spill over into additional lines. For example, you could add STEAL, GRAB or PICK; DUMP, ABANDON or LOSE; and SLAY, CONQUER or SHOOT as additions to lines 2600, 2610 and 2620 respectively. Line 2650 takes care of any verb outside the VES dictionary.

When you Take or Get any object — or dispose of it — you'll want the Inventory to reflect that fact. The routine contained within lines 2670 to 2720 does that for you. Likewise, any call for help will pass control to lines 2750 to 2800, to display any clue available in respect of your current location.

The Get and Drop functions are probably the most important in any adventure program and although you are welcome to adopt unquestioningly the routines in lines 2830 to 2890 and 3020 to 3070 respectively, you will find that they repay a little study.

Line 2830 sets up a (G)et loop which will check out the 12 possible objects; line 2840 actually makes the comparison between the object(s) found at your current position and the object you want to take. If there is a match then that location is given a negative value (-1) only in respect of the object you now carry. It is safe to use -1 because it is a distinctive value — often used, for example, to signal the end of a Data queue — which

(continued on next page)

generating a new line of screen text whenever you enter a location that holds an object. It scans each of the 12 grid positions stored in the array PL% for a match with your current position.

Thus if your CP is 2 — the Chapel of the Tsars — on the very first pass through the loop, PL% will equal 2. This condition triggers screen display of the matching LN\$0. In short, it will now read:

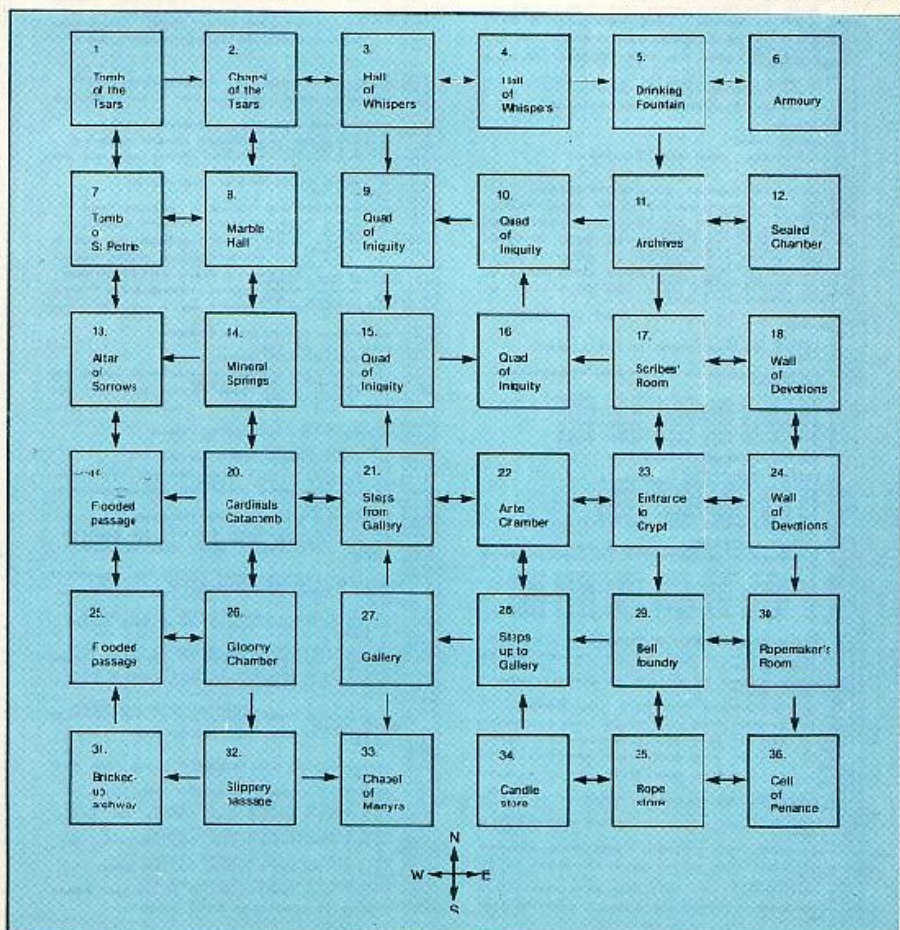
YOU ENTER THE CHAPEL OF THE TSARS.
A BROKEN ROSARY S HERE.

Apart from those 12 objects, this adventure also presents five challenges — one of them, the flood water, is found in two adjoining locations. These are the poisoned water at the drinking fountain, a Nazi in the marble hall, the coin lock protecting the ikon in the sealed chamber, the flood water, and darkness in a gloomy chamber. To conquer each challenge, you will need to be carrying a particular object when you encounter it.

We have already given each challenge variable a value of 1 in line 1016. That being so, lines 1680 to 1730 check your current location and the status of any challenge that exists there. Remember that challenges remain in the same location throughout the game — at least until you conquer them — whereas any object can be taken from location to location — and left at one different from that at which it was found.

If a challenge does exist, control passes to line 8440 to 8480 depending on the peril: we will deal with that module later. If no challenge exists, you can move to another location, and lines 1760 to 1810 calculate and display your options. Line 1840 adds some screen space — CHR\$(13) is a carriage return — before 1850 invites your response.

The main input routine starts here. You must use the letter N, S, E or W and Return to move. If you try this play with an active challenge present, lines 2010 to 2060 speed you off to the wrist-slapping routine in lines



Variables.			
PL	Primary location.	S	South.
SN\$	Short name string.	E	East.
LN\$	Long name string.	W	West.
PW	Poisoned water.	IS	Instructions input string.
NZ	Nazi.	I	Inventory.
CL	Coin lock.	H	Help.
FW	Floodwater.	Q	Quit.
DK	Darkness.	SP	Space between noun and verb.
CP	Current position.	VE\$	Verb string.
N	North.	NO\$	Noun string.

(continued from previous page)

cannot be confused with any other variable.

If the location is one where a -1 flag already exists in respect of the object you wish to take, then it means you carry it already, and line 2860 announces the fact. Or if you try to Get an object that is not at that location anyway, line 2870 does its bits. Otherwise, 2890 will confirm your selection. Enter I and Return now and you will see that your inventory has been appropriately updated.

Lines 3020 to 3075 perform the same function in reverse in response to Drop or Leave, testing in line 3050 for a value other than -1.

You will remember that your success in

```

0000 REM*****THE ST PETERSBURG HIGH *****
0001
0002 REM*****
0003 REM*****WRITTEN FOR YOUR COMPUTER*****
0004
0005 REM*****COPYRIGHT 1984 JOHN BRIGLEY***
0006
0007
0008 REM*****SET UP OBJECT ARRAYS*****
0009
0010
0011
0012
0013
0014
0015
0016
0017
0018 REM*****ALL OBJECT ARRAYS*****
0019
0020
0021
0022 FOR X=1 TO 12:READ PLOC(X),CHECK(X):LINK
0023
0024 NEXT
0025
0026 REM*****DATA FOR OBJECT ARRAYS*****
0027
0028 DATA 2,ROSBY,IF A BROKEN ROBBY IS HE
0029
0030 DATA 6,OPF,IF YOU FIND A BRITISH OFFIC
0031
0032 DATA 1,SCROLL,AN ILLUMINATED SCROLL
0033
0034 DATA 3,DRAGER,IF A RAZI DRAGER IS AT
0035
0036 DATA 7,PRAYER BOOK,IF YOU NOTICE AN
0037
0038 DATA 8,CLINKS,A FEW CLINKS ARE SCAT
0039
0040 DATA 25,TOOLS,IF YOU DISCOVER AN OLD TO
0041
0042 DATA 22,TOOLS,SOME OLD TOOLS ARE MI
0043
0044 DATA 31,CLOAK LABEL,IF YOU SPOT A BUTC
0045
0046 DATA 15,CHARLES,A FEW UNUSED CHARLE
0047
0048 DATA 4,ROPE,IF YOU NOTICE SOME OLD LE
0049
0050
0051
0052
0053
0054
0055
0056
0057
0058
0059
0060
0061
0062
0063
0064
0065
0066
0067
0068
0069
0070
0071
0072
0073
0074
0075
0076
0077
0078
0079
0080
0081
0082
0083
0084
0085
0086
0087
0088
0089
0090
0091
0092
0093
0094
0095
0096
0097
0098
0099
0100
0101
0102
0103
0104
0105
0106
0107
0108
0109
0110
0111
0112
0113
0114
0115
0116
0117
0118
0119
0120
0121
0122
0123
0124
0125
0126
0127
0128
0129
0130
0131
0132
0133
0134
0135
0136
0137
0138
0139
0140
0141
0142
0143
0144
0145
0146
0147
0148
0149
0150
0151
0152
0153
0154
0155
0156
0157
0158
0159
0160
0161
0162
0163
0164
0165
0166
0167
0168
0169
0170
0171
0172
0173
0174
0175
0176
0177
0178
0179
0180
0181
0182
0183
0184
0185
0186
0187
0188
0189
0190
0191
0192
0193
0194
0195
0196
0197
0198
0199
0200
0201
0202
0203
0204
0205
0206
0207
0208
0209
0210
0211
0212
0213
0214
0215
0216
0217
0218
0219
0220
0221
0222
0223
0224
0225
0226
0227
0228
0229
0230
0231
0232
0233
0234
0235
0236
0237
0238
0239
0240
0241
0242
0243
0244
0245
0246
0247
0248
0249
0250
0251
0252
0253
0254
0255
0256
0257
0258
0259
0260
0261
0262
0263
0264
0265
0266
0267
0268
0269
0270
0271
0272
0273
0274
0275
0276
0277
0278
0279
0280
0281
0282
0283
0284
0285
0286
0287
0288
0289
0290
0291
0292
0293
0294
0295
0296
0297
0298
0299
0300
0301
0302
0303
0304
0305
0306
0307
0308
0309
0310
0311
0312
0313
0314
0315
0316
0317
0318
0319
0320
0321
0322
0323
0324
0325
0326
0327
0328
0329
0330
0331
0332
0333
0334
0335
0336
0337
0338
0339
0340
0341
0342
0343
0344
0345
0346
0347
0348
0349
0350
0351
0352
0353
0354
0355
0356
0357
0358
0359
0360
0361
0362
0363
0364
0365
0366
0367
0368
0369
0370
0371
0372
0373
0374
0375
0376
0377
0378
0379
0380
0381
0382
0383
0384
0385
0386
0387
0388
0389
0390
0391
0392
0393
0394
0395
0396
0397
0398
0399
0400
0401
0402
0403
0404
0405
0406
0407
0408
0409
0410
0411
0412
0413
0414
0415
0416
0417
0418
0419
0420
0421
0422
0423
0424
0425
0426
0427
0428
0429
0430
0431
0432
0433
0434
0435
0436
0437
0438
0439
0440
0441
0442
0443
0444
0445
0446
0447
0448
0449
0450
0451
0452
0453
0454
0455
0456
0457
0458
0459
0460
0461
0462
0463
0464
0465
0466
0467
0468
0469
0470
0471
0472
0473
0474
0475
0476
0477
0478
0479
0480
0481
0482
0483
0484
0485
0486
0487
0488
0489
0490
0491
0492
0493
0494
0495
0496
0497
0498
0499
0500
0501
0502
0503
0504
0505
0506
0507
0508
0509
0510
0511
0512
0513
0514
0515
0516
0517
0518
0519
0520
0521
0522
0523
0524
0525
0526
0527
0528
0529
0530
0531
0532
0533
0534
0535
0536
0537
0538
0539
0540
0541
0542
0543
0544
0545
0546
0547
0548
0549
0550
0551
0552
0553
0554
0555
0556
0557
0558
0559
0560
0561
0562
0563
0564
0565
0566
0567
0568
0569
0570
0571
0572
0573
0574
0575
0576
0577
0578
0579
0580
0581
0582
0583
0584
0585
0586
0587
0588
0589
0590
0591
0592
0593
0594
0595
0596
0597
0598
0599
0600
0601
0602
0603
0604
0605
0606
0607
0608
0609
0610
0611
0612
0613
0614
0615
0616
0617
0618
0619
0620
0621
0622
0623
0624
0625
0626
0627
0628
0629
0630
0631
0632
0633
0634
0635
0636
0637
0638
0639
0640
0641
0642
0643
0644
0645
0646
0647
0648
0649
0650
0651
0652
0653
0654
0655
0656
0657
0658
0659
0660
0661
0662
0663
0664
0665
0666
0667
0668
0669
0670
0671
0672
0673
0674
0675
0676
0677
0678
0679
0680
0681
0682
0683
0684
0685
0686
0687
0688
0689
0690
0691
0692
0693
0694
0695
0696
0697
0698
0699
0700
0701
0702
0703
0704
0705
0706
0707
0708
0709
0710
0711
0712
0713
0714
0715
0716
0717
0718
0719
0720
0721
0722
0723
0724
0725
0726
0727
0728
0729
0730
0731
0732
0733
0734
0735
0736
0737
0738
0739
0740
0741
0742
0743
0744
0745
0746
0747
0748
0749
0750
0751
0752
0753
0754
0755
0756
0757
0758
0759
0760
0761
0762
0763
0764
0765
0766
0767
0768
0769
0770

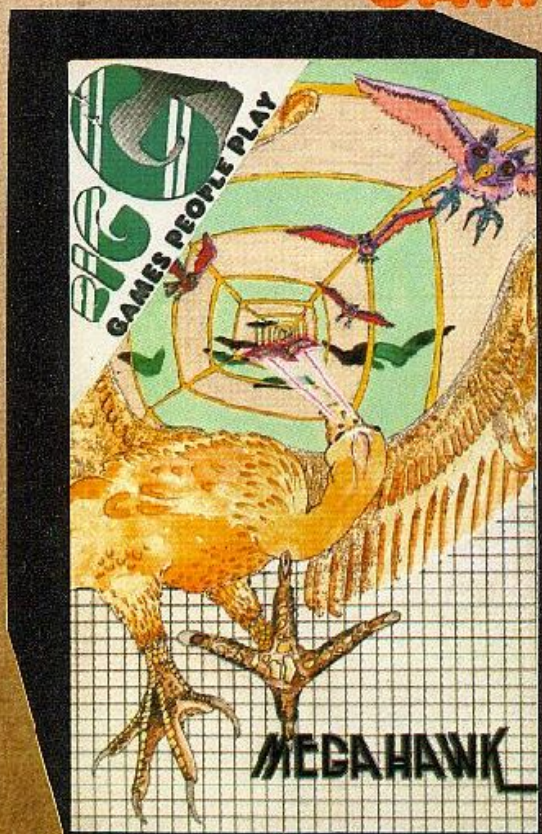
```

[illegible]

for the
COMMODORE 64

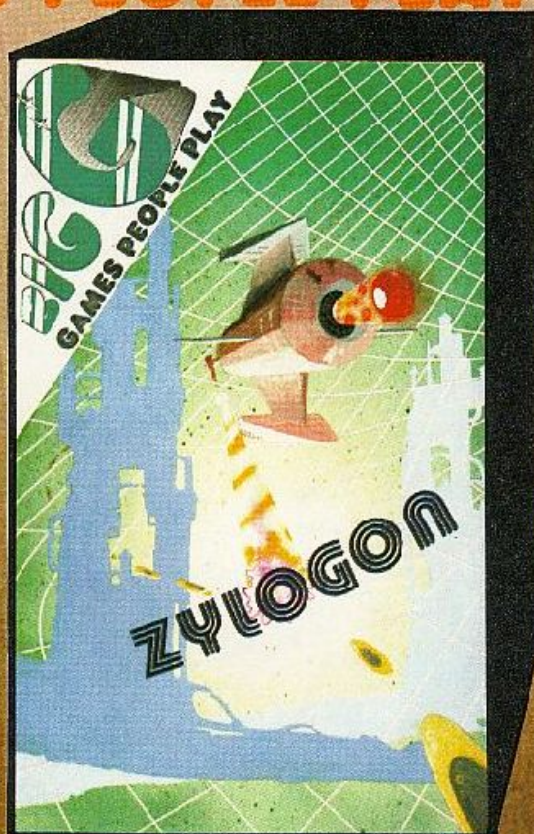
BIG G

GAMES PEOPLE PLAY



MEGAHAWK

Fly the sensational MEGAHAWK through the Abyss of Time as fearful bats and ice age predators seek your destruction. Be amazed as the 4th dimension unfolds itself with awesome reality. Stretch your skill to the limit as you leave the time corridor into a new universe.



ZYLOGON

Seek out and destroy the Android Space Platform that threatens Mankind. Break down the defense of the ZYLOGONS whose huge fortresses guard wave after wave of relentless attackers. Fast and furious Full colour Isometric Projection
Machine Code: Val Franco

£6.95 inc. postage
each

DEALER ENQUIRIES WELCOME

Post this coupon to : **BIG G**

Birchall Moss Hall, Hatherton, Nantwich, Cheshire,
tel. 0270 811948 telex. 367311 CW5 7PJ

Please Rush me :-

- ☐ **MEGAHAWK** £6.95 inc VAT
☐ **ZYLOGON** £6.95 inc VAT

I enclose cheque/postal order payable to 'BIG G'
for £ - - -

Name - - - - -

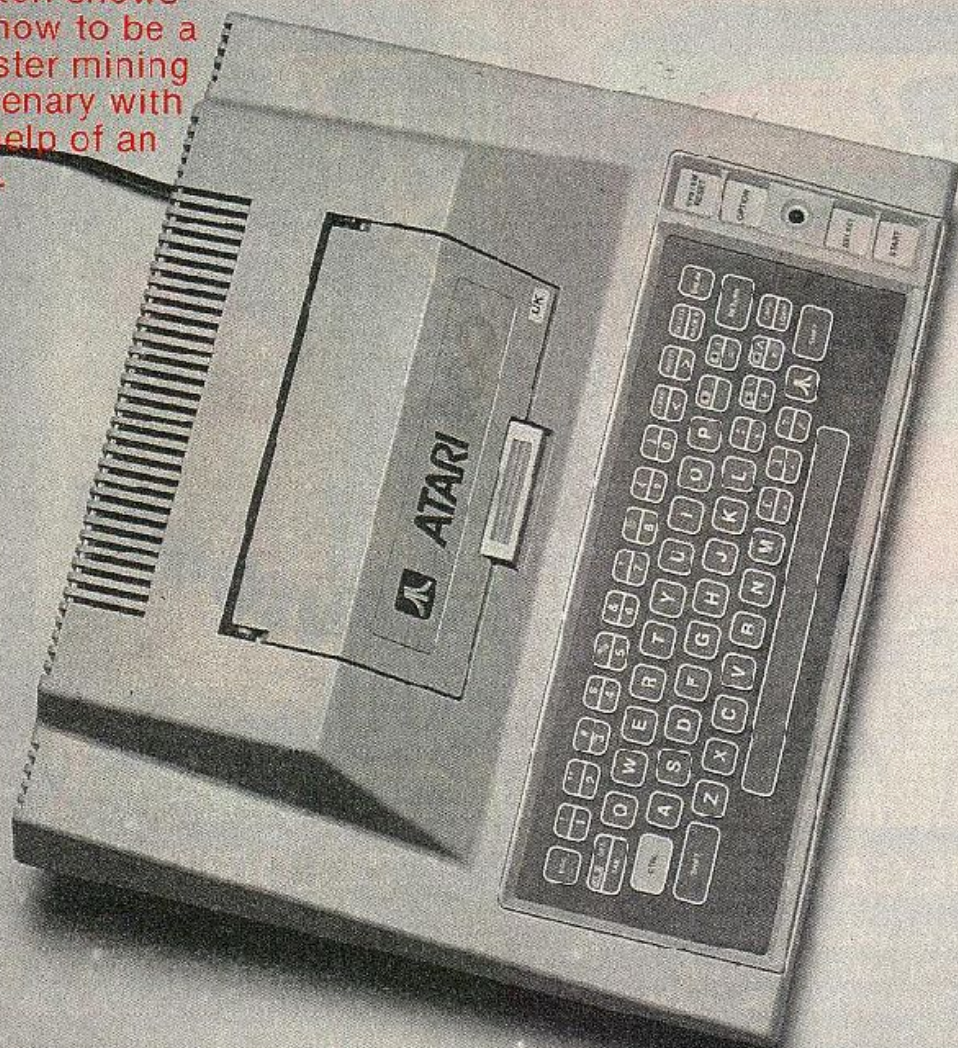
Address - - - - -

- - - - -

- - - - - Post Code - - - - -

MONSTER M

Frederick Shotton shows you how to be a monster mining mercenary with the help of an Atari.



```
0 POKE 555,0:GOSUB 3000
1 REM ...FREDERICK SHOTTON
2 REM ...
3 REM ...19 MELDELAH
4 REM ...1980 LERVAH
5 REM ...1980 LERVAH
6 REM ...1980 LERVAH
7 REM ...1980 LERVAH
8 SOUND 0,255,10,8
9 SOUND 1,254,10,8
10 GRAPHICS 1:12
11 POKE 712,0:POKE 708,52
12 POSITION 3,3:7 #6:"MONSTER MINER:1P
13 POSITION 2,4:7 #6:"
14 POSITION 1,5:7 #6:"FRED SHOTTON"
15 REM CHANGE CHARACTER SET
16 GOSUB 20000
17 POSITION 1,5:7 #6:"
18
19 POSITION 1,1:7 #6:" X=1:Y=7 #6:7 #6
20 " Z=50:17 #6:7 #6:" C=750:17 #6:7 #6
21 " #6:" \=-1 LIFE"
22 " 7 #6:7 #6:" 1 -50 OXYGEN"
23 REM LOAD PLAYER MISSILE SUBROUTINE
24 GOSUB 25000:FOR I=C TO 3: SOUND 1,0
25 ,0:NEXT I:POKE 7,2,160:POKE 7,1,255:
26 REM
27 REM MOST VARIABLES USED IN PROGRAM
28 SC=0:LC=3
29 X=88:Y=78:X1=103:Y1=159:X2=167:Y
28:63:13=176:Y3=150:E=14:W=110:116=0:500
29 NO 0,0,0,0:GOSUB 1,0,0,0
```

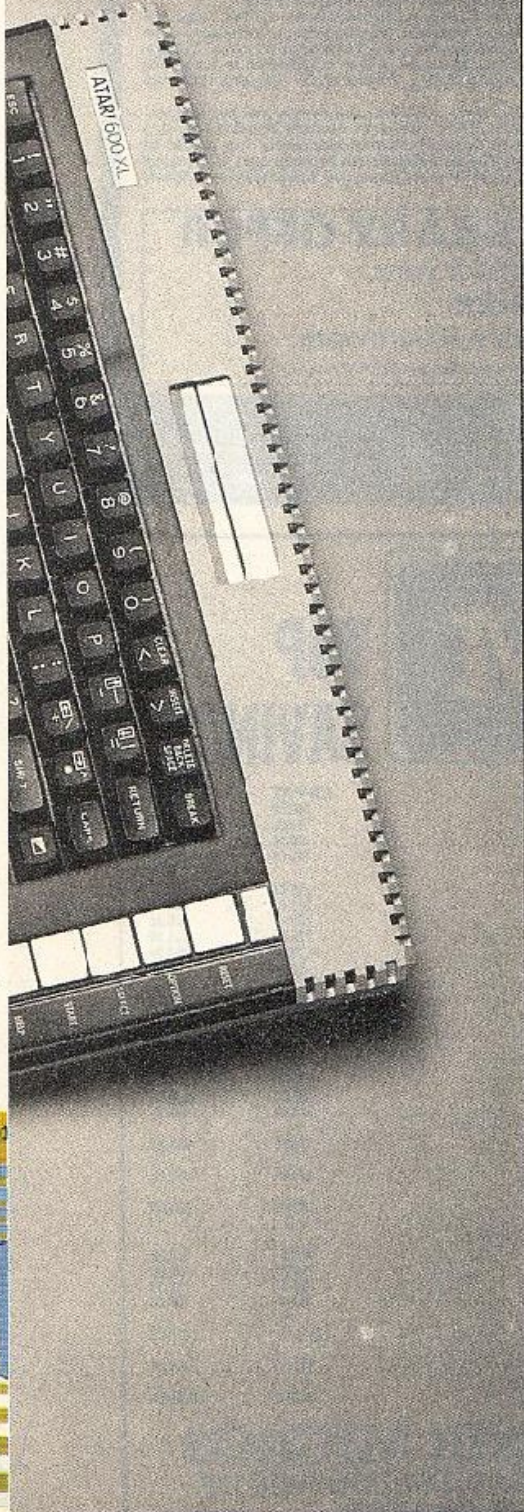
```
106 A=USR(256)
107 IX=9:YY=1:EA=0:VC=8:V2=11:V3=10:V
108 V0=11:V2=V2+1:V3=V3+1:AL0=0:AL1=0:AL2
109 AL3=0:DX=200:POKE 712,214
110 FOR I=0 TO 3:POKE 53256+I,9:NEXT I
111 REM SET UP SCREEN
112 POKE 708,226:COLOR ASC(CHAR*(15)):F
113 OR I=0 TO 19:FOR V2=2 TO 19:POKE 7,1,V2
114 (Y:NEXT I:POKE 708,32
115 COLOR 0:PLOT 8,10:DRAWTO 10,10:PLO
116 T 5,5:DRAWTO 5,7:PLOT 6,14:DRAWTO 6,14
117 PLOT 14,4:DRAWTO 14,4:PLOT 16,14:DRAW
118 TO 16,14
119 REM
120 REM SET MONSTER POSITIONS
121 REM
122 REM
123 REM
124 POKE 710,255
125 REM
126 POKE 77,0
127 POKE PLX,(0):POKE PLY,(0):POKE PLX+1
128 ,X1:POKE PLY+1,Y1:POKE PLX+2,X2:POKE P
129 LY+2,Y2:POKE PLX+3,X3:POKE PLY+3,Y3
130 COLOR ASC(CHAR*(11))+123:PLOT 7,10
131 GOTO 1000
132 REM
133 REM MOVE MINER
134 REM
135 VE=1:GOSUB 4000:VE=0:COLOR ASC(CHA
136 R*(1))+123:PLOT XX,YY:RETURN
137 VE=1:GOSUB 4000:VE=0:COLOR ASC(CHA
138 R*(2))+123:PLOT XX,YY:RETURN
139 VE=1:GOSUB 4000:VE=0:COLOR ASC(CHA
```

```
R*(3))+123:PLOT XX,YY:RETURN
330 VE=1:GOSUB 4400:VE=0:COLOR ASC(CHA
R*(4))+123:PLOT XX,YY:RETURN
400 FOR I=1 TO 255: SOUND 0,1,2,15:POKE
E 710,I:NEXT I
410 L=L-1:IF L<0 THEN 450
411 SOUND 0,0,0,0
420 COLOR 0:PLOT XX,YY:XX=9:YY=10:RETU
RN
449 REM .....GAME OVER.....
450 POSITION 0,19:7 #6:"GAME OVER:1SC=
0:LC=3: SOUND 0,0,0,0
460 IF STICK(0)=1 THEN 480
470 GOTO 104
499 REM NO MORE OXYGEN
500 L=L-1:POSITION 0,23:7 #6:"NO OXYGE
N:" *POKE 710,0:FOR I=1 TO 500:NEXT
I
505 FOR I=1 TO 200: SOUND 0,1,2,15:NEXT
I
510 COLOR 0:PLOT XX,YY:GOTO 145
511 REM MAIN LOOP
1000 ST=STICK(0)
1010 SOUND 0,100,12,6
1100 IF ST=14 AND YY=1 THEN COLOR 0:PLO
T XX,YY:YY=YY+1:GOSUB 330
1200 IF ST=13 AND YY=19 THEN COLOR 0:P
LOT XX,YY:YY=YY+1:GOSUB 330
1300 IF ST=7 AND XX=19 THEN COLOR 0:PLO
```

```
T XX,YY:XX=XX+1:GOSUB 310
1400 IF ST=11 AND XX=0 THEN COLOR 0:PLO
T XX,YY:XX=XX+1:GOSUB 300
1999 REM DISPLAY INFORMATION
2000 POSITION 0,20:7 #6:"SCORE="SC:"
" "POSITION 9,22:7 #6:"LIVES="LC:"
"
2010 POSITION 0,25:7 #6:"OXYGEN="OX:"
"
2050 SOUND 0,200,12,6
2070 IF OX<0 THEN GOSUB 500
2090 IF L<0 THEN 450
2100 IF STICK(0)=0 THEN 400
2105 REM SHOOT...
2110 IF STICK(0)>14 OR YY<2 THEN 3200
2110 COLOR ASC(CHAR*(12))+123:PLOT XX,
YY+1:PLOT XX,YY+2:GOSUB 3500
2111 FOR I=1 TO 100: SOUND 0,1,6,5:NEXT
I
2115 FOR I=1 TO 100:NEXT I:COLOR 0:PLO
T XX,YY+1:PLOT XX,YY+2:GOTO 3998
2200 IF STICK(0)<312 OR YY>17 THEN 330
0
2310 COLOR ASC(CHAR*(12))+123:PLOT XX,
YY+1:PLOT XX,YY+2:GOSUB 3500
2311 FOR I=1 TO 100: SOUND 0,1,6,5:NEXT
I
2315 FOR I=1 TO 100:NEXT I:COLOR 0:PLO
T XX,YY+1:PLOT XX,YY+2:GOTO 3998
```

(listing continued on opposite page)

MINER



ONCE AGAIN YOU have been hired to kill off monsters in the deep caverns of Mars. National Martian Mining Industries has hired you in the hope of killing these monsters once and for all. No one has ever come back from there. Luckily, a new weapon that is able to destroy these monsters has just been invented. One problem remains though — only small amounts of oxygen can be carried at one time so you will have to collect the old oxygen tanks left behind by other adventurers.

You must however, be quick for they disappear after a while. From time to time, a strawberry or cherry will appear. If you decide to collect them you will get bonus points. If you wait too long though, they will go bad and will be no longer edible.

If you are not a very experienced programmer, you might want to skip this section and copy the program. Monster Miner uses two interrupts; the first one, a Vertical Blank Interrupt, moves the player missile-objects. If you want more information on that interrupt, refer to articles on the subject in past issues of *Your Computer* or buy one of the numerous books on sale describing this.

The other interrupt plays a background tune while you are playing the game. The

operating system of your computer supports five of these general purpose software timers. I used the first one. This timer counts backwards from a non-zero value to zero.

Upon reaching zero, the operating system does an indirect JSR through a RAM vector.

To use this timer, you must Poke the low byte of the machine language subroutine of yours in the memory location \$225 and the high byte in memory location \$227. You must then Poke the amount of 1/60ths of a second you want your computer to wait before it executes your subroutine in location \$218. In your subroutine, you must include another Poke with the amount of 1/60ths of a second or the subroutine will not execute a second time.

The game also redefines the character set. That's why it takes so long for the program to start.

By the way, this program requires at least 24K to run. If you have not got time to copy in the program or you are not very good at typing, you can always send a blank cassette, £3 and a self addressed envelope to the following address: Frederick Shotton, 19 Weidelaan, 1980 Tervuren, Belgium.

(listing continued from opposite page)

```

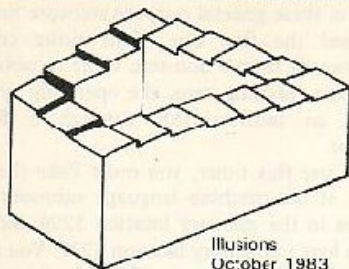
3300 IF STICK(0)<7 OR XX<17 THEN 3400
3310 COLOR ASC(CHAR$(0)+128:PLOT XX+
1,Y:COLOR ASC(CHAR$(1)+128:PLOT XX+
2,Y:GOSUB 3900
3311 FOR I=1 TO 100: SOUND 0,I,5,15:NEXT
I: SOUND 0,0,0,0
3315 FOR I=1 TO 100:NEXT I: COLOR 0:PLOT
1,XY:Y=PLT XX+2,Y:GOTO 3900
3400 IF STICK(0)<11 OR XX<2 THEN 4000
3410 COLOR ASC(CHAR$(0)+128:PLOT XX+
2,Y:COLOR ASC(CHAR$(1)+128:PLOT XX+
1,Y:GOTO 3900
3411 FOR I=1 TO 100: SOUND 0,I,5,15:NEXT
I: SOUND 0,0,0,0
3415 FOR I=1 TO 100:NEXT I: COLOR 0:PLOT
1,XY:Y=PLT XX+2,Y:GOTO 3900
3900 OR-XX-10
3905 IF PEEK(53253)=4 OR PEEK(53252)=5
THEN SC=SC+400:PKE 53254,1:FOR I=1 T
O 100:NEXT I:PKE 53256,0:AL=1:RETURN
3910 IF PEEK(53253)=4 OR PEEK(53252)=5
THEN SC=SC+400:PKE 53257,1:FOR I=1 T
O 100:NEXT I:PKE 53257,0:AL=1:RETURN
3920 IF PEEK(53254)=4 OR PEEK(53254)=5
THEN SC=SC+400:PKE 53258,1:FOR I=1 T
O 100:NEXT I:PKE 53258,0:AL=2:RETURN
3930 IF PEEK(53255)=4 OR PEEK(53255)=5
THEN SC=SC+400:PKE 53259,1:FOR I=1 T
O 100:NEXT I:PKE 53259,0:AL=3:RETURN
3940 RETURN
4000 PKE 53276,0:LOCATE X,Y,Y,M
4010 IF W=ASC(CHAR$(13)) THEN SC=SC+5
0:GOSUB 11000
4020 IF W=ASC(CHAR$(14)) THEN SC=SC+7
50:GOSUB 11000
4030 IF W=ASC(CHAR$(15)) THEN SC=SC+11
4040 IF W=ASC(CHAR$(16)) THEN SC=SC+15
0:SC=SC+100:GOSUB 11000
4045 IF W=ASC(CHAR$(15)) THEN GOSUB 4
00
4050 FOR I=0 TO 3
4060 IF PEEK(53252)=4 OR PEEK(53252)=
5 THEN GOSUB 400
4070 NEXT I
4999 IF Y=1 THEN OX=X-2:RETURN
5000 EA=EA+1:IF EA=243 THEN 107
5010 OX=X-1:IF CX=0 THEN 500
6000 IF CX<180 AND OX<150 THEN 6100
6005 IF CX<50 AND OX<30 THEN W=1:GOTO
6100
6010 IF CX<150 AND OX<120 THEN 6200
6020 IF CX<80 OR OX<50 THEN 6300
6030 GOTO 7000
6100 COLOR ASC(CHAR$(16)):IF E=1 THEN
Z=INT(RND(0)*18)+1:C=INT(RND(0)*16)+3:
PLOT Z,C:G=0
6110 IF CX<51 OR OX<31 THEN COLOR 0
:PLOT Z,C
6120 GOTO 7000
4200 RR=1:IF RND(0)>0.5 THEN RR=15
6205 COLOR ASC(CHAR$(RR)):IF W=1 THEN
Z1=INT(RND(0)*18)+1:C1=INT(RND(0)*16)+3
:PLOT Z1,C1:G=0
6210 IF CX<51 THEN COLOR ASC(CHAR$(1
5)):PLOT Z1,C1
6220 GOTO 7000
6300 COLOR ASC(CHAR$(14)):IF Q=1 THEN
Z2=INT(RND(0)*18)+1:C2=INT(RND(0)*16)+3
:PLOT Z2,C2:Q=0
6310 IF CX<51 THEN COLOR ASC(CHAR$(15
)):PLOT Z2,C2
6320 GOTO 7000
7000 REM

```

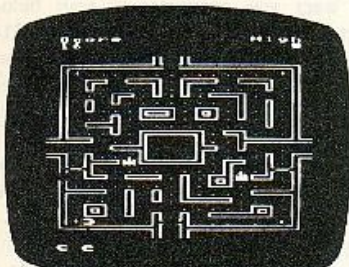
```

PEEK(CHAR$(1))+NEXT I:PKE 754,CHSET:25
4:RETURN
20049 REM DATA FOR SHAPES
20050 DATA 24,24,88,252,88,24,36,36,24,
24,24,63,26,24,36,36,16,56,19,124,124
19,0,0,0,0,200,62,62,200,28,8
20060 DATA 255,255,255,255,255,255,255
141,137,162,127,43,64
20070 DATA 0,10,67,119,249,110,10,49,
98,140,242,216,78,51,0,32,60,145,34,18
10,10,4
20080 DATA 0,8,140,148,83,61,34,0,14,1
2,2,25,107,128,96,16,34,24,126,219,247
94,52,24
20090 DATA 14,21,100,116,116,110,14,4,
40,50,101,186,111,221,18,44,153,126,1
02,219,215,102,126,153
20100 REM ... IN GRAPHICS SUBROUTINE
20000 RESTORE 20000:FOR I=1536 TO 1706
READ A:PKE I,A:NEXT I:FOR I=1774 T
O 1787:PKE I,A:NEXT I
20010 PH=PKE(106)-16:PMBASE=256+PH:FO
R I=PMBASE+1023 TO PMBASE+2047:PKE I,
0:NEXT I
25200 FOR I=PMBASE+1025 TO PMBASE+1632
READ A:PKE I,A:NEXT I
25300 FOR I=PMBASE+1281 TO PMBASE+1288
READ A:PKE I,A:NEXT I
25400 FOR I=PMBASE+1537 TO PMBASE+1544
READ A:PKE I,A:NEXT I
25500 FOR I=PMBASE+1795 TO PMBASE+1800
READ A:PKE I,A:NEXT I
25600 PKE 704,198:PKE 705,201:PKE 70
6,70:PKE 707,228
25670 PKE 33246:PKE 1780:PKE 1794:PKE
559,521:PKE 623,1:PKE 1788,PH+1:PKE
53277,3:PKE 54279,PH
25675 FOR I=0 TO 3:PKE PLE+1,B:NEXT I
25680 DATA 167,3,139,244,6,240,39,50,2
21,240,6,240,83,141,254,6,106,141
26010 DATA 235,6,142,233,6,24,159,0,10
9,253,6,24,105,252,6,133,24,133
26020 DATA 204,189,240,6,133,205,175,2
54,6,133,205,189,216,6,170,232,46,255
26030 DATA 6,144,15,168,17,203,145,20
5,169,0,145,203,135,202,206,244,76,87
26040 DATA 6,160,0,177,203,145,205,167
0,145,203,202,202,208,244,174,253,6
26050 DATA 173,254,6,157,240,6,189,236
6,240,48,133,203,24,138,141,253,6
26060 DATA 105,235,6,133,204,24,173,25
3,6,109,252,6,133,206,89,240,6,133
26070 DATA 205,189,248,6,170,160,0,177
203,145,205,200,232,208,248,174,253,6
26080 DATA 165,0,137,236,6,202,48,3,76
2,6,76,98,226,0,0,104,169
26090 DATA 7,162,6,160,0,32,92,228,96
26100 DATA 153,126,90,126,102,189,145,
165,129,126,90,102,126,165,24,102
26110 DATA 255,90,102,0,34,60,66,195,
24,102,36,189,126,24,36,102
30000 RESTORE 30000:FOR I=256 TO 256+1
8:READ A:PKE I,A:NEXT I:RETURN
30001 DATA 104,169,11,141,28,2,169,1,1
41,39,2,174,55,1,139,50,1,141,6,210
30002 DATA 24,105,2,141,4,210,159,154,
141,7,210,141,5,210,238
30003 DATA 55,1,174,55,1,224,65,208,5,
169,0,141,50,1,169,10,141,24,2,70
30004 DATA 0,193,128,144,128,162,128,1
62,128,193,182,162,128,144,162,182,182
193,128,44,128,152,128,182
30005 DATA 128,193,102,142,120,142,102
193,193,253,217,253,217,243,195,243,1
93,217,182,217,182,193,217,243,243
30006 DATA 253,217,253,217,243,193,243
193,217,182,193,243,253,2,2,253,253

```

Illusions
October 1983



Munchman October 1983



3D Surfaces October 1983



BBC MICRO

REGISTERED REFERRAL CENTRE FOR THE BBC PROJECT

BEEBUG FOR THE BBC MICRO

BRITAIN'S LARGEST SINGLE-MICRO USER GROUP

MEMBERSHIP NOW EXCEEDS 20,000

20,000 members can't be wrong — BEEBUG provides the best support for the BBC Micro. BEEBUG Magazine — now 64 pages including new product guide supplement — devoted exclusively to the BBC Micro. Programs — Hints & Tips — Major Articles — News — Reviews — Commentary. PLUS members discount scheme with National Retailers. PLUS members Software Library. 10 magazines a Year. First issue April 1982. Reprints of all issues available to members.

December issue: Program Features: Killer Dice game, Galactic Invasion, a fast moving space invasion game, LINK, a very useful disc utility for program development, ASTAAD, a really excellent program for Computer Aided Design, the Percussion Machine, moving Chequer Board display, Screen Freezer, a routine to freeze your favourite game in mid-play and a musical rendering of the Twelve Days of Christmas to add a seasonal flavour. Plus articles on the Teletext Mode (part 3) and Fitting an External Speaker, Plus Disc Drive Reviews, Book Reviews, Hints and Tips.

Jan/Feb issue: Program Features: Block Blitz, an excellent arcade style game, A Disassembler for the BBC micro, the Ray Box game to test your powers of deduction, Large Digital Displays in Mode 7, Dancing Lines, an interesting visual demonstration of random numbers. Plus articles on Machine Code Graphics, the first of an introductory series, Teletext Mode (Part 4) with a set of useful procedures, Protecting your own programs, and an introduction to forth. Plus reviews of Double Density Disk Controllers, Graphics Tablets, new Software, Product news, Post bag, Hints and Tips.

March issue: Program features: Crazy Football 0 game, the Menhole game, requiring quick thought and fast reaction, Extending ASTAAD, our popular Computer Aided Design Program, The Stonemason, Multiple Disc Catalogues, a program version of Bach's Cantata No.147, a program for Printing Your Own Function Key Labels. Plus articles on Acorns' Latest Developments, Testing Out Your Micro (Sideways ROMs), Machine Code Graphics (part 2), Compact Function Key Definitions. Plus Reviews of FORTH for the BBC micro, Memory Expansion Board Review, Software Reviews, Hints and Tips.

SPECIAL ANNIVERSARY OFFER

Join by April 15th for your

£1 VOUCHER

Exchangable for software & hardware.

The voucher will be mailed to all members with the May issue of BEEBUG magazine

Send £1.00 & SAE for Sample

Membership UK £5.40 for six months, £9.90 for one year

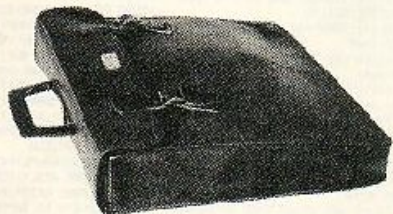
Overseas one year only: Europe £16.00, Middle East £19.00, Americas & Africa £21.00, Other Countries £23.00

Make cheque to BEEBUG Dept 4, PO Box 109, High Wycombe, Bucks

For editorial material to: The Editor, BEEBUG, PO BOX 50, St Albans, Herts AL1 2AR

JENART COMPUTER CARRYING AND STORAGE CASES

(Suppliers to Industry, Commerce and Schools)



ELECTRON (Illustrated)

£10.95

The case is specifically designed also to carry the transformer, all leads, the boxed welcome tape and has a special inside pocket which hold the two instruction manuals.

DRAGON Holds transformer and leads

£12.95

BBC Holds all leads

£13.95

These superb British made cases are manufactured from heavy duty, brown antique finish, water-proof vinyl, to protect your computer the cases are lined with a coloured nylon foam backed material and the edges are bound to give added strength. They are machine sewn through-out with rot-proof terylene thread.

All prices are inclusive (UK only) send cheques P/O to

JENART TRADING

19 Spire Lake, Bishops Nympton,
South Molton, Devon. EX36 4NY.

Tel: Bishops Nympton 693.

Allow 21 days for delivery.

Please note if not satisfied we shall of course refund your money in full, providing you return the case undamaged within 14 days



TOP SAVINGS

PRINTERS

BROTHER HR 15
TRACTOR
SHEETFEEDER
KEYBOARD

EX VAT

349.00
68.00
195.00
142.00

INC VAT

401.36
78.20
224.25
163.30

EPSON RX80T
EPSON RX80F/T
EPSON FX80P/T
EPSON MX100FT
EPSON FX 00F/T
FX80 TRACTOR

213.00

242.00

329.00

378.00

430.00

30.00

247.25

278.30

378.35

431.25

494.50

34.50

JUKI 6.00

345.00

396.75

MANNSMANN TALLY MT 80

199.00

228.85

OKI MICROLINE 802P
OKI MICROLINE 882
OKI MICROLINE 832
OKI MICROLINE 92P

180.00

289.00

435.00

395.00

207.00

332.35

500.25

454.25

SEIKOSHA CP100A

175.00

201.25

SHINWA CP80

175.00

201.25

S'AR GEMINI 10X

199.00

228.85

COMPUTERS

COMMODORE 64
COMMODORE 641 DISK
COMMODORE 64N CASSETTE
INTERFACE 64-PAREL

166.50

165.20

36.50

69.50

179.99

139.66

11.59

38.43

APRICOT 2'D+MON

1575.00

1811.25

SANYO MBC555

298.00

918.85

EPSON QX10

1600.00

1840.00

MAYFAIR MICROS

362 YORK ROAD, LONDON SW18 1SP

01-870 3255

RESPONSE FRAME

Do you have a problem? Your manual is incomprehensible or you just cannot get the hang of that programming trick you tried — whatever it is, Tim Hartnell will do his best to answer your queries. Please include only one question per letter and mark them "Response Frame".

SIDEWAYS SCROLL

I own a BBC Micro, Model B. I have noticed an effect in many arcade games, on the Beeb and on other machines, that I would like to copy. That is, the sideways scrolling of the screen. I have read routines in a couple of places that I am totally unable to understand. I do not want a complicated machine-code solution to my problem and wonder if there is some way it could be done in Basic.

Walter Barnard,
London, W12.

ACCORDING TO Ross Symons — author of *Beginner's Guide to Assembly Language on the BBC Micro* — the simplest way of getting a sideways scroll on the BBC is to include the following in a program:

```
7850 = 1
```

You will see now that Control K moves the screen right, and Control J moves it left. You can get the screen to scroll right by Tabbing to the bottom of the screen, and Tabbing at the top to get it to scroll left. That is, if you include

```
PRINT TAB(0,0);CHR$(11)
```

in your program, the screen will scroll every time it hits that line. Similarly,

```
PRINT TAB(0,24)
```

will cause it to scroll the other way.

GETTING OUT

I have a lot of trouble with Insert mode when editing programs on the Vic-20. Is there a way of disabling this mode?

Paul Gordon,
Hobury,
Southampton.

SIMPLY EXECUTE Poke 216,0 in the direct mode, and Insert mode will be disabled.

WHO'S FAULT

I have recently bought a 48K Spectrum and have found that the numbers produced by the In statements used to read the keyboard differ from those in programs in magazines. For example, when no key has been pressed, the number produced is 191 instead of 255. Is this a fault?

C Smith,
Salisbury,
Wiltshire.

NO, THIS IS NOT a fault. There have been three issues of Spectrums. Issues one and two used different In to those on issue three generally.

With most Basic programs this does not cause an insurmountable problem. You need to do two things to modify old Spectrum programs to run on your machine. The first thing is simply to read the instructions for

the program, and determine which key press achieves which aim — such as pressing the F key to fire, or whatever. Then, you need to write a short routine which will return to you the In values when various keys are pressed. Next, press the keys you need from the original program — such as F — and substitute the figure you get from your routine for all occurrences of the original figure in the listing you are entering. You should find then that you have no further problems.

ALTERNATIVE MID\$

I have written two data-file type programs for my ZX Spectrum for home use. However, my programs lack a fast and efficient string search routine. Could you suggest a simple routine for the Spectrum to search a long string for a short string as in the BBC's:

```
100 FOR J = 1 TO LEN (LONG$)
  - LEN (SHORT$) + 1
110 IF SHORT$ = MID$(LONG$,J,
  LEN(SHORT$)) THEN 200
120 NEXT J
```

I have tried to adapt this very simple yet fast routine, but cannot find an alternative to Mid\$ which the Spectrum does not have.

Keneth Watson,
Gateshead,
Tyne and Wear

THE ROUTINE you have given for the BBC commits an unpardonable sin, jumping out of an incomplete loop. Run this on the computer for very long, and the BBC Micro would crash with an out of memory error. Although the ZX machines allow you to jump out of loops with impunity, it is extremely bad programming practice, as very few other computers are as tolerant.

Putting that aside, it is unfortunate that the Instr\$ command, which searches through one string for the occurrence of another, and returns a number which is the starting position of the second string — or zero if it is not found — is not available on the Spectrum. This would solve your problem very quickly.

All the standard string-handling commands — Left\$, Mid\$, Right\$ — can be emulated in ZX Basic. The following program, although not brilliantly efficient, should do the job for you.

```
10 A = LEN (LONG$):B = LEN
  (SHORT$)
20 J = 1
30 IF LONG$(J TO B - 1) = SHORT$
  THEN 60
40 IF J < A THEN J = J + 1:GOTO 30
50 PRINT "NOT FOUND":GOTO 70
60 PRINT "STRING FOUND,
  STARTING AT ELEMENT";J
```

Note how lines 20 and 40 do not

create a loop which will be prematurely exited.

LETTER PRINT

I have a Vic-20 computer and I have made a program to write a letter. Could you please tell me how I could print that letter out on a printer? The address is in Print statements and the letter is written as inputs i.e., A\$, B\$, etc.

A R Lilly,
Bishop Auckland,
County Durham.

IT IS UNFORTUNATE that the Commodore computers do not allow the simple access to printer afforded by many other machines. To dump a screen, for example, is a quite tortuous process, and even listing a program requires three steps.

To solve your particular problem, you need to include #4. After the word Print and before the material you want to Print as follows:

```
PRINT #4, "YOUR ADDRESS" or
PRINT #4, A$
```

To turn the printer on, enter Open 4, then press Return, followed by CMD4 and again press Return. Then run your program, making sure you include a Close 4 at the very end.

MICRODRIVE COPY

Could you answer a question that I am sure is uppermost in the minds of all Spectrum owners interested in the Microdrive. Is it possible to copy one's own cassette-based commercial software onto the Microdrive to enable faster loading?

Ken Watson,
Gateshead,
Tyne and Wear.

COPYING ONTO the Microdrives presents the same obstacles as copying a commercial "save-blocked" cassette onto cassette. If you can save a program onto cassette, you can save it onto Microdrive. If the program has been saved so that it cannot be resaved onto another cassette, without the use of the one of the "lock breaker" programs, then you will not be able to save it onto Microdrive.

ACOUSTIC MODEMS

I am interested in purchasing a computer for 'over-the-telephone' line networking. At the moment, I own a Spectrum, but am interested in the Vic-20 or the Commodore 64. Could you please tell me if there is a Modem available for either of these — preferably an acoustic Modem? I have seen one Modem which plugs directly into the telephone socket. Does this mean that the computer can be programmed to dial a telephone number?

Ian Curneck,
Inkberrow,
Worcestershire.

FIRST, LET ME say that as far as I have been able to ascertain, it is illegal to plug Modems directly into the telephone lines in the UK, which is

why so many acoustic Modems are available for various machines. It is quite feasible for a computer — using an acoustic Modem — to dial a number for you, so a plug-in Modem would, of course, be able to do the same thing.

Acoustic Modems have been produced for both the machines you ask about, although it may not be too easy to get hold of them. I have looked through the latest issues of *Commodore Horizons* and *Commodore User* and did not see a single advertisement for Modems for either machines.

However, before you rush out and buy the computer of your choice, you had better determine who or what it is you will be communicating, via the telephone and computer, with. Are you intending to talk to friends, access Preset or whatever? It would make sense to make your decision of which micro-computer to buy for this purpose on the machines which your associates — if it is them you wish to talk with — already have.

JUPITER DAWN

Now that Jupiter Cantab have gone out of business, does that mean that I, and thousands of other Jupiter Ace owners, are going to be left out in the cold? I had not had my Ace long when I heard about the company folding. I think this is most unfortunate as I was just at the point of expanding my machine. Is there anyone still out there who is supporting this great little computer?

Neville Wright,
Londor E17.

THERE HAS BEEN no indication from manufacturers supporting the Jupiter Ace that they will withdraw that support, simply because the computer is no longer available. The Pace 16K RAM unit is one of several expansion units available for the Ace, and sells for £20. It can be further expanded, for £14.50, to bring the Ace's full memory to 32K.

COMPUTER CAMP

In a recent issue of *Your Computer* I mentioned a few computer camps in response to a query from Malcolm Parks of Amersham. Following the publication of that letter, I heard from Cyril Tyson, director of Camp Aldenham, which is a "non-residential adventure and computer camp for boys and girls from five to 13 years", near Letchmore Heath, about 20 miles from central London.

The computer camp is designed for children between nine and 13 years old and consists of one session of two hours each day. If you want to know more, write to the camp for a brochure at Camp Aldenham, Aldenham School, Elstree, Herts, WD6 3AJ.

METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

A fast and original game for the unexpanded VIC. Challenging and colourful, with good sonics and a unique game action and design, this promises to be the most exciting new 3.5K VIC game since the introduction of GRIDRUNNER nearly a year ago. £5.50

LASER ZONE

Experience Laser Zone — an utterly NEW, totally ORIGINAL masterpiece of Video games design. Learn to control two spaceships at once. Feel the EXHILARATION as, after long hours of practice, you control the two ships so that they function as a smooth, co-operative team! Feel the raw POWER as you lunge for the electric button and BLAST your enemies into expanding clouds of SPACE JUNK! Feel the humiliation as a carelessly aimed BLAST slams into the side of your last remaining ship! 8K expansion required. Available for Commodore 64 £7.50 and VIC-20 £6.



MATRIX

Jeff Minter has taken Gridrunner — the game that topped Bestselling charts in USA and UK — and created an awesome sequel. Graphically superb, it features multiple screens, new aliens and attack waves, mystery bonuses, renegade humanoids, defector fields, diagonal tracking, countdown/panic phase and much, much more. Packed into 20 mind-zapping zones and accompanied by incredible sonics. 8K expansion required. Available for Commodore 64 £7.50 and VIC-20 £6.

HOVER BOVVER

A totally original arcade game for C64 featuring outstanding graphics and a sound track created by a professional Piano Wizard. Gordon Bennett has

borrowed his neighbour's Air Mo lawnmower. Mow your way through as many of the 16 lawns as you can before the pursuing neighbour retrieves his mower. Set your dog onto the neighbour to help you out of tight spots and don't annoy the gardener. Try not to plough through the neat flower beds or overheat your mower. £7.50



ATTACK of the MUTANT CAMELS

Planet earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 80 foot high, neutronium shielded, laser-spitting death camels!! Can you fly your tiny, manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the humans stronghold! You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features superb scrolling, scanner 1/2 player actions and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome m/c action! Available for Commodore 64 £7.50.



REVENGE OF THE MUTANT CAMELS

At last the long awaited sequel to Attack of the Mutant Camels is available. You are controlling a ninety foot high, neutronium shielded, laser spitting death camel, leading a rebellion against your evil Zzyzgian overlords. The game features beautiful smooth scrolling graphics and no less than 42 different attack waves, more than any game in video history. The challenge of play will last for months as you battle to see what's on the next wave.

GRIDRUNNER

Finally true arcade quality on the unexpanded VIC! Shoot down the segmented DFOIDS invading the grid. Beware of the pods and zappers! The awesome speed sound and graphics gives you the best blast available for unexpanded VIC. Available for VIC-20 £5.00, Commodore 64 £5.00, Atari 400/800 £7.50.



Llamasoft

AWESOME GAMES SOFTWARE

49 MOUNT PLEASANT,
TADLEY, HANTS. RG26 6BN.
TELEPHONE: TADLEY (07356) 4478

All orders add
50p postage and packing

LLAMA-SOFT GAMES NOW IN BOOTLS,
-LASKYS AND MANY OTHER RETAILERS.

SOFTWARE FILE

Software File gives you the opportunity to have your programs, ideas and discoveries published. We will accept contributions for any home computer provided they are submitted to *Your Computer* exclusively. Please double-check your programs and specify the memory they require before sending them, preferably on cassette. We pay between £6 and £36 for contributions published.

Program 1.

[illegible]

Program 2.

```

1 REM PROGRAM 2
2 REM by U.Nalla
4 LET m$=2: LET lives$=4: LET
5 C=0: LET k$=-1: BORDER 5: PAPER
6 INK 1: CLS: POKE 32455,201
7 POKE 32456,201: POKE 32457,201
8 GO 5010
9 LET dx=3: LET dy=15: LET m$
10 LET my=1: LET sx=1: LET kx=3:
11 LET ay=15: LET x=19: LET y=16:
12 LET m$="A": LET o$="A"
13 PRINT "FOR K=1 TO 50 WHEN lives$
14 PRINT 1: INK 0: PAPER 7:
15 PRINT : NEXT K
16 FOR k=2 TO 16 STEP 2: FOR j
17 TO INT (RAND*5)+1: PRINT AT
18 (RAND*5)+2: BRIGHT 1: PAPER
19 7:
20 NEXT j
21 PRINT AT 5,0: BRIGHT 1: PA
22 ER 0: INK 7:
23 PRINT AT 30,0: PAPER 5: INK
24 3: BRIGHT 1: FLASH 1:
25 PRINT AT 1,1: INVERSE 1: PA
26 PER 7:
27 INK 6: PAPER 1: FLASH 0: P
28 PAPER 1: INK 1:
29 FOR i=1 TO INT (RAND*5)+1
30 STEP 2: PRINT AT i,INT (RAND*5)
31 +1: INK 1: PAPER 5: FLASH 1: "A"
32 : NEXT i
33 FOR v=1 TO 5 STEP 0
34 10 STEP 0.015: LET ix=k: LET
35 ly=y: PRINT AT x,y, INK 5: PAPE
36 R 6,m$
37 105 IF INKEY$(<"a" AND INKEY$(>
38 "o" AND INKEY$(<"p" THEN LET 3$=

```

Jump Bug

Umer Nalla,
Belton.

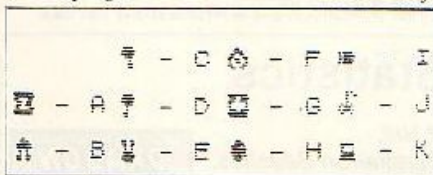
CALLED JUMP BUG and for a 16K or 48K ZX Spectrum, this game involves getting a bug to the top of the screen, by jumping through gaps in the platforms. On the first sheet it is fairly easy but, on following sheets, hazards are introduced, such as a cannon-ball, a missile and a heat-seeking mutant alien. The platforms also get to move faster as the skill increases. When you lose a life, you will be informed of the cause.

Type in program 1 and check it twice. Then Run it and Save it to tape. Type New to clear the computer, *not* USR 0, as this will clear the machine code as well. Now type in program 2 Save this by typing:

GOTO 999

and Verify it. Now Run it. If the program crashes, reload both programs and check the first for mistakes in data and correct mistakes. If none exists then check all the Poke and USR address in program 2. Correct any mistakes.

The program should now run successfully.



```

000000 "": GO TO 130
000001 107 LET ax:=INKEY$
000002 118 IF ax="" THEN IF SCREEN$ =
X-1,y)=1 THEN LEI x=X-2: LEI y
$=m$: LET m$="": LET as$="": FOR
k=1 TO 8: BEP .05,k,F5: RESTORE
USR 32295: NEXT k: LET sc=sc+20
000003 130 TO 130
000004 131 IF ax="" THEN IF SCREEN$ =
X-1,y)=" THEN GO SUB B050: GO T
O B010
000005 120 IF as$="p" THEN LET m$="q"
000006 125 IF s$="o" THEN LET m$=
"t": WHEN$="x,y")="s" THEN S
O TO 5000
000007 132 LET y=y+(m$="(y)")-(m$="r")
000008 135 IF y>ly THEN LET m$="s"
000009 140 IF y<0 THEN LET y=1
000010 145 IF x>lx THEN LET x=30
000011 150 FOR k=0 TO sk-1: RESTORE USR
R 32295: NEXT k
000012 160 IF SCREEN$(x+1,y)="" THEN
GO SUB B050: GO TO B000
000013 162 IF ax="" THEN LET s$="p"
000014 165 IF ax="" THEN IF SCREEN$(x,y
)" THEN GO SUB B050: GO TO B01
0
000015 167 IF ATTR(x,y)=169 THEN BEP
S,30: BEP .05,20: LET sl=sl+1
000016 00
000017 170 PRINT AT lx,ly:" AT x,y,
INK 3: PAPER 6,m$:AT 0,2: INVERS
E 1 "SCORE":jsc:
000018 175 IF ak1 THEN NEXT U
000019 180 LET ox=ax: LET oy=ay: PRINT
AT ax+1,y+2:PAPER 5,"
000020 190 IF SCREEN$(ax+1,ay)," TH
EN LET ax=ax+2: BEP .05,50

```

```

195 LET ay=ay+5: IF ay>29 OR ay
12 THEN LET s=s+1: IF ax=19 THE
N 10 LET ax=3
200 PRINT AT ox,cy: " "; AT sx,ay
: INK 2: PAPER 6:
205 IF ax=x THEN IF ay=y OR ay+
1=y OR ay-1=y THEN GO SUB 8050:
GO TO 8020
208 IF s=2 THEN NEXT X
210 LET x:=mx: LET y:=ny: PRINT
AT ax,ay: INK 4: " "; IF ny=s+2
7 THEN LET mx=mx+2: LET ny=1: IF
mx>13 THEN LET mx=3
220 IF mx=x THEN IF ny=y THEN
IF ay=s+3 THEN GO SUB 8050: GO
TO 8020
230 LET m1=ny+s: PRINT AT x,y,
: AT mx,my: BEEP .0005,2
0: BEEP .0008,15
240 IF sx<3 THEN NEXT X
250 LET bx=bx+1: LET cy=by: FRIN
AT bx,by: " ": LET a=INT (RD+10
):+1: LET bx=bx+s: LET cy=cy+s
4 AND a<41-(cy+AND a<61: IF bx
19 THEN LET bx=3
260 PRINT AT cx,cy: " "; AT bx,cy
: BEEP .0005,35
265 IF bx=xx AND by=y THEN GO SU
B 8050: GO TO 8020
270 NEXT X
280 GO TO 99
290 LET sc=6+200: FOR k=1 TO 1
5000 NEXT sc: BORDER 7: PAPER 7: I
NK 3: CLS: BEEP .1,10: BEEP .1,
20: BEEP .5,15: PRINT AT 2,10: F
LASH 1: BRIGHT 1: "WELL DONE!"; P
AUSE 50: PRINT PAPER 7: INK 3: T
8: GO OUT: BEEP .5,5: PRINT "NOU
": BEEP .5,4: PRINT "IT IS
.5,2: PRINT AT 6,11: BRIGHT 1:
HARDER BEEP .5,1: BEEP .5,10
5010 PAUSE 50: LET sk=k+1: IF s
5015 PRINT AT 9,5: BRIGHT 1: INK
3: PAPER 7: "HOW HIGH CAN YOU TR
Y?": AT 0,7: INK 0: PAPER 5: FLR5
H 1: JUMP BUG
5020 FOR q=0 TO 3: BEEP .5,q: P
RINT AT 18-(q+2),15: INK q:CHR$
(55+q): " "; (q-1)>50: "H": NE
XT q
5030 PAUSE 30
5060 IF sk=1 THEN POKE 32425,0
5065 IF sk=2 THEN POKE 32450,0
5070 IF sk=3 THEN POKE 32469,0
5075 IF k=2 THEN LET ms=ms+1:
IF ms>5 THEN LET ms=5
5080 IF sk=3 THEN LET sk=3
5090 PAUSE 50: FOR k=0 TO 10: BE
EP .005,55: PRINT AT 21,k: "B
LASH 1: BRIGHT 1: PAPER 7: INK 0
3: GO TO 801: NEXT k
5100 BEEP .05,40: BEEP .05,59: B
EEP .05,30: BEEP .05,59: IF INKE
Y<") THEN GO TO 5100
5110 BORDER 6: PAPER 6: INK 1: C
LS: CLS
5120 LET lives=lives-1: IF lives
<1 THEN GO TO 6100
5130 PAUSE 50: PRINT AT 21,2: "Pr
ess any key to continue": PAUSE
5: CLS: GO TO 6
5180 INPUT "Press ENTER to play
": LINE a$: RUN
7999 STOP
8000 PAUSE 10: PRINT AT 19,y: "
AT 19,y: FLASH 1: BRIGHT 1:
BRIGHT 1: "Well through
a hole"
8110 PRINT AT 19,y: "AT 19,y:
FLASH 1: BRIGHT 1: "BRIGHT 0
AT 21,2: "banged your head": GO
TO 6000
8020 PRINT AT 21,2: FLASH 1: BRI
GHT 1: "Shot!": GO TO 6000
8030 PRINT AT 21,2: FLASH 1: BRI
GHT 1: "bowed!": GO TO 6000
8040 PRINT AT 21,2: FLASH 1: BRI
GHT 1: "dashed!": GO TO 6000
8050 FOR k=1 TO 100: NEXT k: FOR
k=50 TO 10 STEP -2: BEEP .001,k
: NEXT k: FOR k=1 TO 2: FOR j=1
TO 10 STEP 2: PRINT AT j,y: "A
T j,y: " ": BEEP .01,j+3: NEXT
j: NEXT k
8060 FOR k=4 TO 1 STEP -1: PRINT
AT 19,y: BRIGHT 1: FLASH 1:CHR$
(144+k): PAPER 13: BEEP .5,k: N
EXT k
8070 RETURN
9000 STOP
9090 STORE 9991: FOR k=USR "A
" TO USR "K":7: READ a: POKE k,a:
NEXT k
9991 DATA 255,255,195,102,102,19
5,255,255,24,60,126,126,36,36,10
2,126,126,126,126,190,36,12,12,60
,126,126,60,16,16,48,36
9992 DATA 102,102,36,36,60,126,3
26,60,24,60,102,195,153,153,153,
102,255,231,231,129,129,231,255,
255
9993 DATA 24,60,122,126,126,122,
60,24,0,0,185,150,255,192,168,0,
20,19,16,16,34,186,166,6
9994 DATA 0,0,126,66,66,126,126,
255
9997 RETURN
9998 SAVE "JUMP" LINE 9999: STOP
9999 GO SUB 9990: RUN

```

Buzz

Tony Davies,
West Briogford,
Nottinghamshire



THIS IS A FAMILY game, notable for its cartoon-quality graphics, which show to advantage the ease with which the Draw and Paint commands of the Dragon can be used to produce such effects. It also has fast-moving

(continued on next page)

```

5 CLEAR5000:CLS
6 PRINT@200,"COPYRIGHT":PRINT@264,"R.A.DAVIS":PRINT@32
E,"1983"
10 PMODE3,1:PCLS
11 M1$="L402AL8G6L4F+GG+AG+A"
12 M2$="BL8AAL4G+ABO+CO-BO+C"
13 M3$="O3DCO-BO+CO-BAG+A"
14 M4$="GBA+BAGF+G"
15 M5$="O3L2DL4O-G6O+L2DL4CL2C"
16 M6$="T4;XM1$;XM2$;XM3$;XM4$;XM1$;XM2$;XM3$;XM5$;"
17 GOSUB2000

```

(listing continued on next page)

(listing continued on next page)

The dream makers



CRL brings a whole new world of excitement right into your living room!

Games that test your skills to the ultimate – whether it's zapping down invaders or playing a whole game of cricket.

Only CRL offers such a wide choice of computer programs for the world's most popular micros.

...catch one today at Menzies Boots, W. H. Smiths, Spectrum Group and all good computer shops or send direct to CRL.

Never has so much excitement been contained in a cassette!

CRL

CRL House, 9 Kings Yard,
Carpenters Road, LONDON E15 2HD.
Tel: 01-533 2918

SOFTWARE FILE

(continued from page 175)

```

90 NEXT X
100 GOTO 140
110 LET A$=PEEK A
115 LET A=A+1
120 IF A=10744 THEN LET A=10750
125 IF B=26 THEN RETURN
130 LET A$=A$+CHR$ B
135 GOTO 110
140 SLOW
145 PRINT AT 13,3;"HOW MANY PLF
YERS?"
150 INPUT I
155 LET I=INT I
160 IF I<1 OR I>4 THEN GOTO 150
165 PRINT AT 15,3;"HOW MANY TUR
N5?"
170 INPUT J
175 LET J=INT J
180 IF J<1 THEN GOTO 170
185 DIM U(1,20)
190 FOR X=1 TO I
195 LET U(X,30)=100
200 LET U(X,1)=300000
205 LET U(X,2)=INT (RND*18)+1
210 LET U(X,3)=H(U(X,2))
215 NEXT X
220 DIM B(3,I+3)
225 FOR X=1 TO I+3
230 LET B(X,1)=INT (RND*18)+1
235 LET B(X,2)=INT (RND*18)+1
240 IF Y=E THEN GOTO 230
245 LET F=INT (RND*900)+100
250 LET B(1,X)=Y
255 LET B(2,X)=E
260 LET B(3,X)=F
265 NEXT X
270 LET NO=I
275 GOSUB 1130
280 PRINT
285 FOR Z=1 TO J
290 PRINT "TIME ELAPSED ";Z-1
295 PRINT "TIME LEFT ";J-Z+1
300 FOR Y=1 TO NO
305 PRINT "PRESS A KEY"
310 IF INKEY$="" THEN GOTO 310
315 IF U(Y,3)=0 THEN GOTO 780
320 CLS
325 PRINT "PLAYER ";Y
330 PRINT AT 3,0;"MONEY £";U(Y,1)
335 PRINT AT 5,0;"YOU HAVE A SH
IP ";
340 IF U(Y,2)=0 THEN PRINT "AT
SEA"
345 IF U(Y,2)<>0 THEN PRINT "IN
THE PORT OF ";P$(U(Y,2))
350 IF U(Y,6)+U(Y,7)+U(Y,8)=0 T
HEN PRINT "VOL HAVE NO GOODS ABO
ARD"
355 IF U(Y,6)+U(Y,7)+U(Y,8)=0 T
HEN GOTO 385
360 PRINT AT 8,0;"ON BOARD YOU
HAVE:"
365 PRINT "GOODS","UNITS"
370 FOR X=6 TO 8
375 IF U(Y,X)<>0 THEN PRINT G$(U(Y,X)),U(Y,X+3)
380 NEXT X
385 IF U(Y,2)=0 THEN GOTO 420
390 PRINT AT 10,0;"DO YOU WISH
TO STAY IN PORT?"
395 INPUT I$
400 IF I$(1 TO 1)="Y" THEN GOTO
405
405 IF I$(1 TO 1)<>"N" THEN GOT
O 395
410 LET U(Y,1)=U(Y,1)-200
415 LET U(Y,2)=0
420 LET E=INT (RND*18)+1
425 PRINT "YOU HAVE £";U(Y,1)
430 PRINT "PRESS N/L"
435 INPUT I$
440 LET PE=PEEK 16396+255+PEEK
16397
445 GOSUB 1910
450 FOR F=1 TO E
455 LET G=PEEK (U(Y,3)+PE)
460 POKE (U(Y,3)+PE),G
465 LET H$=INKEY$
470 IF H$="I" THEN GOTO 465
475 POKE U(Y,3)+PE,G
480 IF H$<>"D" THEN GOTO 575
485 CLS
490 FOR X=1 TO 20
495 PRINT X,P$(X)
500 NEXT X
505 SLOW
510 PRINT "ENTER NO."
515 INPUT I
520 LET I=INT I
530 IF I<0 OR I>20 THEN GOTO 52
0
535 GOSUB 1910
540 LET PE=PEEK (M:I)+PE
545 FOR X=1 TO 10
550 POKE M(I)+PE,53
555 POKE M(I)+PE,H
560 NEXT X
565 NEXT I
570 GOTO 785
575 IF H$<>"D" THEN GOTO 520
580 FOR X=1 TO 10
585 IF U(Y,3)=M(X) THEN GOTO 60
0
590 NEXT X
595 NEXT I
600 GOTO 785
605 LET U(Y,1)=U(Y,1)-200+INT
(RND*100)
610 LET U(Y,2)=X
615 GOTO 795
620 IF H$<>"C" THEN GOTO 550
625 IF U(Y,3)=M(19)-33 THEN LET
U(Y,3)=M(19)
630 IF U(Y,3)=M(19)+33 THEN LET
U(Y,3)=M(19)
635 LET U(Y,3)=U(Y,3)-(U(Y,3)=M
(20)+1)+(U(Y,3)=M(20))
640 LET U(Y,1)=U(Y,1)-400
645 GOTO 780
650 IF H$="N" AND U(Y,3)=M(19)+
33 THEN GOTO 760
655 IF H$="S" AND U(Y,3)=M(19)-
33 THEN GOTO 760
660 IF H$="E" AND U(Y,3)=M(20)
THEN GOTO 760
665 IF H$="U" AND U(Y,3)=M(20)+
1 THEN GOTO 760
670 LET DE=U(Y,3)-(H$="U")+H$-
"E"-33*(H$="N")+33*(H$="S")
675 IF DE/33=INT (DE/33) THEN
LET DE=DE-(H$="E")
1205 GOTO 500
680 IF DE/725 THEN LET DE=DE-72
5
685 IF DE/1 THEN THEN LET DE=DE+725
690 LET AD=PEEK (DE+PE)
695 LET AV=G
700 IF AD=128 THEN GOTO 745
705 LET ZX=DE
710 LET DE=AD
715 LET ZX=X
720 IF H$="N" AND (DE=131 OR DE
=130 OR DE=129 OR AV=7 OR AV=132
OR AV=3) THEN GOTO 745
725 IF H$="S" AND (AV=131 OR AV
=130 OR AV=129 OR DE=7 OR DE=132
OR DE=3) THEN GOTO 745
730 IF H$="E" AND (AV=133 OR AV
=132 OR AV=129 OR DE=130 OR DE=7
OR DE=5) THEN GOTO 745
735 IF H$="U" AND (DE=133 OR DE
=130 OR DE=129 OR AV=30 OR AV=7
OR AV=5) THEN GOTO 745
740 GOTO 765
745 NEXT F
750 GOTO 785
755 LET U(Y,3)=AD
760 NEXT F
765 CLS
770 PRINT "THAT WAS THE LAST OF
YOUR MOVES AND YOU ARE NOT IN P
ORT YET"
775 GOTO 1500
780 NEXT Y
785 NEXT Z
790 GOTO 1755
795 CLS
800 PRINT "PRESS A KEY"
805 IF INKEY$="" THEN GOTO 805
810 CLS
815 PRINT "THIS IS THE PORT OF
";P$(U(Y,2))
820 PRINT "GOODS AVAILABLE ";G$
(U(Y,2))
825 PRINT "AT A COST OF £";C(U(Y,2))
830 PRINT AT 4,0;"YOU CAN DO TH
E FOLLOWING"
835 PRINT AT 6,0;"1 BUY GOODS";
AT 8,0;"2 SELL GOODS";AT 10,0;"3
DISPLAY CONTENTS OF SHIP";AT 12
,0;"4 PORT INFORMATION"
840 PRINT AT 14,0;"5 LIST CURRE
NT CONTRACTS";AT 15,0;"6 REPAIRS
";AT 18,0;"7 END"
845 LET LOSS=(100-RND*10)/100
850 PRINT AT 21,0;"ENTER CHOICE"
855 INPUT I
860 LET I=INT I
865 CLS
870 IF I<1 OR I>7 THEN GOTO 855
875 IF I=1 THEN GOTO 915
880 IF I=2 THEN GOTO 1210
885 IF I=3 THEN GOTO 1075
890 IF I=4 THEN GOTO 1175
895 IF I=5 THEN GOTO 1120
900 IF I=6 THEN GOTO 1030
905 IF I=7 THEN GOTO 775
910 GOTO 800
915 REM BUY
920 LET AM=0
925 FOR X=6 TO 8
930 IF U(Y,X)<0 AND U(Y,X)+U(Y,1)
THEN GOTO 940
935 LET AM=AM+500-U(Y,X+3)
940 NEXT X
945 IF AM=0 THEN PRINT "YOU HAV
E NO ROOM ON YOUR SHIP"
950 IF AM=0 THEN GOTO 980
955 PRINT "THERE IS ROOM FOR ";
AM," UNITS"
960 PRINT "YOU HAVE £";U(Y,1)
965 PRINT "HOW MANY UNITS DO YO
U WISH TO BUY AT £";C(U(Y,2))
970 INPUT I
975 LET I=INT I
980 LET LC=INT (I*(12+RND)+5)
985 IF I<0 OR I>AM THEN GOTO 97
0
990 IF I<C(U(Y,2))+U(Y,1) THEN
GOTO 1005
995 PRINT "YOU CANNOT AFFORD TH
AT MUCH"
1000 GOTO 970
1005 LET U(Y,1)=U(Y,1)-(I*C(U(Y,2)))
1010 FOR X=6 TO 8
1015 IF U(Y,X)+500-U(Y,X+3)<0 AND U(Y,X)
<0 AND U(Y,X)+U(Y,2)) THEN GO
TO 1030
1020 IF I>(500-U(Y,X+3)) THEN GO
TO 1040
1025 LET U(Y,X+3)=U(Y,X+3)+I
1030 LET U(Y,X)=U(Y,2)
1035 GOTO 1060
1040 LET I=I-(500-U(Y,X+3))
1045 LET U(Y,X+3)=500
1050 LET U(Y,X)=U(Y,2)
1055 NEXT X
1060 NEXT I
1065 PRINT "LOADING FEES £";LC
1070 LET U(Y,1)=U(Y,1)-LC
1075 GOTO 800
1080 IF U(Y,6)+U(Y,7)+U(Y,8)<>0
THEN GOTO 1090
1090 PRINT "THERE ARE NO GOODS O
N BOARD"
1095 GOTO 800
1100 PRINT "CONTENTS OF YOUR SHI
P"
1105 PRINT "HOLD GOODS","AMOUNT"
1110 FOR X=6 TO 8
1115 IF U(Y,X)=0 THEN GOTO 1120
1120 PRINT
1125 PRINT X-5,TAB 5;G$(U(Y,X)),
U(Y,X+3)
1130 NEXT X
1135 CLS
1140 PRINT "LIST OF CONTRACTS"
1145 PRINT "PORT";TAB 15;"IMPORT
";TAB 25;"AMOUNT"
1150 PRINT
1155 FOR X=1 TO NO+3
1160 PRINT P$(B(1,X));TAB 15;G$(B(2,X));TAB 25;G$(B(3,X))
1165 IF I=5 THEN GOTO 800
1170 RETURN
1175 CLS
1180 PRINT "PORT"
1185 PRINT "----"
1190 FOR F=1 TO 18
1195 PRINT P$(F);TAB 14;G$(F);TO
B 25;C(F)
1200 NEXT F
1205 GOTO 800
1210 IF U(Y,6)+U(Y,7)+U(Y,8)<>0
THEN GOTO 1225
1215 PRINT "YOU HAVE NO CARGO *FO
R SALE"
1220 GOTO 800
1225 PRINT "HOLD GOODS","AMOUNT"
1230 FOR X=6 TO 8
1235 IF U(Y,X)=0 THEN GOTO 1250
1240 PRINT
1245 PRINT X-5,TAB 5;G$(U(Y,X)),
U(Y,X+3)
1250 NEXT X
1255 PRINT "ENTER HOLD NUMBER"
1260 INPUT I
1265 LET I=INT I
1270 IF I<1 OR I>3 THEN GOTO 126
0
1275 LET I=I+5
1280 IF U(Y,I)=0 THEN GOTO 1200
1285 PRINT "DO YOU WANT TO SELL
CONTRACT"
1290 INPUT I$
1295 IF I$(1 TO 1)="Y" THEN GOTO
1300
1300 PRINT "ENTER QUANTITY"
1305 INPUT Q
1310 LET Q=INT Q
1315 IF Q<0 OR Q>U(Y,I+3) THEN G
OTO 1325
1320 IF I$(1 TO 1)="Y" THEN GOTO
1430
1325 LET CO=INT (Q*C(U(Y,I))+LDS
5)
1330 PRINT "YOU GET ";CO
1335 LET U(Y,I)=U(Y,I)-CO
1340 LET U(Y,I+3)=U(Y,I+3)+CO
1345 IF U(Y,I+3)=0 THEN LET U(Y,
I)=0
1350 PRINT "LOADING FEES ";Q*5)
1355 LET U(Y,I)=U(Y,I)-(Q*5)
1360 GOTO 800
1365 CLS
1370 PRINT "NO. PORT";TAB 18;"IM
PORT";TAB 25;"AMOUNT"
1375 FOR X=1 TO NO+3
1380 PRINT X,TAB 3;P$(B(1,X));TA
B 18;G$(B(2,X));TAB 25;G$(B(3,X))
1385 NEXT X
1390 PRINT "ENTER CONTRACT NO."
1395 INPUT Q
1400 LET Q=INT Q
1405 IF Q<1 OR Q>NO+3 THEN GOTO
1395
1410 IF B(1,Q)<>U(Y,Q) OR B(2,Q)
<>U(Y,Q) THEN GOTO 1420
1415 GOTO 1300
1420 PRINT "THE CONTRACT IS INVA
LID"
1425 GOTO 1285
1430 IF B(3,Q)=0 THEN PRINT "THA
T CONTRACT IS NOT REQUIRED"
1435 IF B(3,Q)<>0 THEN GOTO 1305
1440 LET U(Y,I+3)=U(Y,I+3)-Q
1445 LET CO=Q*C(U(Y,I))+LDS(1+LDS
5)
1450 LET CO=INT CO
1455 LET CO=CO-Q*5)
1460 IF U(Y,I+3)=0 THEN LET U(Y,
I)=0
1465 PRINT "AFTER UNLOADING FEES
YOU HAVE ";U(Y,I)+CO
1470 LET U(Y,I)=U(Y,I)+CO
1475 LET B(3,Q)=B(3,Q)-Q
1480 IF B(3,Q)=0 THEN GOTO 800
1485 LET I=0
1490 GOSUB 1550
1500 GOTO 800
1505 IF RND>.7 THEN GOSUB 1520
1510 IF RND>.95 THEN GOSUB 1545
1515 IF RND>.99 THEN GOSUB 1575
1520 FOR X=1 TO INT (RND*3+1)
1525 LET INT (RND*18+1)
1530 LET C(O)=INT (C(O)+1*(90+(RN
D*20))/100)
1535 NEXT X
1540 RETURN
1545 LET O=INT (RND*(ND+3)+1)
1550 LET B(1,O)=INT (RND*18)+1
1555 LET B(2,O)=INT (RND*18)+1
1560 IF B(1,O)=B(2,O) THEN GOTO
1550
1565 LET B(3,O)=INT (RND*900)+10
0
1570 RETURN
1575 IF U(Y,2)<>0 THEN RETURN
1580 PRINT "YOU ARE IN A STORM"
1585 IF U(Y,9)+U(Y,10)+U(Y,11)>1
00 THEN GOTO 1545
1590 PRINT "STRENGTH OF SHIP ";U(Y,30)
1595 IF U(Y,30)<25 THEN PRINT "Y
OU COULD SINK"
1600 PRINT "DAMAGE SUSTAINED ";
1605 LET DAM=INT (RND*25)
1610 PAUSE 100
1615 PRINT DAM
1620 LET U(Y,30)=U(Y,30)-DAM
1625 IF U(Y,30)<0 THEN RETURN
1630 PRINT "YOUR SHIP HAS SUNK Y
OU ARE OUT OF THE GAME"
1635 LET U(Y,3)=0
1640 RETURN
1645 PRINT "IF YOU DUMP ALL YOUR
CARGO YOU WILL BE ABLE TO REDE
THE STORM AND YOUR SHIP WILL N
OT BE DAMAGED"
1650 PRINT "DO YOU WISH TO TAKE
THIS OPTION?"
1655 INPUT I$
1660 IF I$(1 TO 1)="Y" THEN GOTO
1665
1665 IF I$(1 TO 1)<>"Y" THEN GOT
O 1655
1670 FOR F=6 TO 11
1675 LET U(Y,F)=0
1680 NEXT F
1685 RETURN
1690 IF U(Y,30)=100 THEN PRINT "
YOU DO NOT NEED REPAIRS"
1695 IF U(Y,30)<100 THEN GOTO 80
0
1700 PRINT "YOU REQUIRE ";100-U(Y,30); " REPAIRS","COST OF REPAIR
S £";100
1705 PRINT "ENTER REPAIRS"
1710 INPUT I
1715 LET I=INT I
1720 IF I<0 OR I>(100-U(Y,30)) T
HEN GOTO 1710
1725 IF U(Y,1)<100 THEN PRINT
"YOU CANNOT AFFORD THE REPAIRS"
1730 IF U(Y,1)<I+100 THEN GOTO 1
710
1735 LET U(Y,1)=U(Y,1)-100-I
1740 LET U(Y,30)=U(Y,30)+I
1745 PRINT "REPAIRS REQUIRED=";100-U(Y,30)

```

(continued on page 183)

• Europe's
No 1 group of
retail outlets

• Check our
multi-national
network for
your nearest
dealer

• Backed by
an after-sales
service second
to none

• Up to £1,000
instant credit
Write for
details

The Apple IIe Business Package



— save over £1,200 with the **BIG** 

The heart of the system is the Apple IIe Microcomputer, it's the latest version of the famous Apple II personal computer. It incorporates the latest in LSI technology and other state-of-the-art advances. Its unique modular design incorporates 8 slots which allow user expansion capabilities no other personal computer can match. This package includes Disk Drive with Controller plus a second Disk Drive, a suite of Business Software which includes Sales Ledger, Sales Invoicing, and Purchase Ledger by Peachtree Software International, TV Modulator, £25 Apple Software Rebate Voucher, Certificates, Micronet/Prestel Discount Software Certificates and a Catalogue of Hardware and Software.

Normal recommended retail price £2668

BIG  PRICE, Just £1449

Micro Management Head Office:
16 Princes Street, Ipswich, Suffolk. Tel: 0473 219461

BBC Hardware



A full colour 32K ROM computer with text and graphics modes up to 640 x 256 graphics and 80 column text screen, extended Microsoft basic, built in assembler 1 MHz and tube interface, sideways ROM, RS 423, A/D converter.

BBC Model B £399

Electron

Son of BBC at selected Big  dealers now!



Manufactured by the same company as the BBC, who have used their experience and knowledge to great effect to produce another winning computer. Many BBC programs are compatible with the Electron.

Electron £199

Memotech MTX Series



This new and very versatile computer is aimed at the lower end of the business market and the home computer enthusiast. Highly expandable disk drives which will be available early spring. The Memotech is able to take on many peripherals. Separate numeric key pad and functions key pad enabling fast data entry input. CPM compatible. **The Memotech comes in two different versions:**

MTX500 32K of user RAM — £275

MTX512 64K of user RAM — £315

Atari 600XL



A fully expandable home computer. Ideal for the first time user. With cassette recorders, disk drives, printer, joysticks and other add-on peripherals. 2000 software titles readily available. All peripherals for the Atari 600XL are completely compatible with the Atari 400 and 800 machines already on the market.

16K £159.99

64K £249.99

Commodore 64



Colour, sophisticated ROM/ RAM user, full business applications, disk drives available, sound, UHF/ composite video, proven basic language, exceptional value, high resolution graphics, many "add-ons" available.

£229

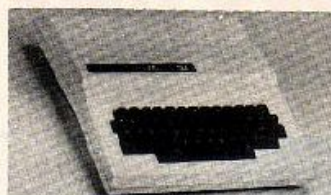
Sinclair ZX Spectrum



16K and 48K basic, colour and text and graphics. Vast range of software, including educational. Many add-ons now available.

16K £99.95 48K £129.95

DRAGON 32



32K RAM, colour, extended basic, sound 5 octaves 255 tones, vast software range, typewriter keyboard, standard cassette drive, high resolution graphics 256 x 192, text 16 + 32.

DRAGON 32 £174.99

DRAGON 64 £225.00

CONCHESS



This remarkable chess game comes in 3 different finishes. Warning... try it once and you're sure to buy it.

Models available:

ESCORTER £179.99

AMBASSADOR £229.99

MONARCH £279.99

MASTER CLASS VIDEO



Finding it hard to come to terms with user manuals. Master Class videos will take you step by step and make first time computing much more enjoyable. Hire or buy for a very low cost.

TORCH Z80 DISK PACK 800K.



Dual disk drive complete with Z80 second processor and CPM to run on the BBC. Gives BBC 64K of usable RAM. Ideal for a small business machine with CPM giving access to a huge range of software currently available on CPM machines.

£839.50

PRINTERS



SEIKOSHA GF100	£215.00
SEIKOSHA GF250	£276.00
EPSON MX10J	£488.75
EPSON RX-80PRINTER	£339.25
EPSON FX-80 PRINTER 160cps	£454.25
SMITH CORDONA D/WHEEL	£511.75
TEC STARWRITER (40cps)	£1265.00
TEC STARWRITER RIBBON	£7.47
MCP40 (Colour Printer)	£171.35
JUKI £100 (Daisywheel)	£458.85
SEIKOSHA GP-700A (Colour Printer)	£488.75
COSMOS JP80	£288.85

DISK DRIVES



DISK DRIVE 100K SINGLE	£201.25
DISK DRIVE 200K SINGLE	£241.50
DISK DRIVE 400K SINGLE	£395.75
DISK DRIVE 800K DUAL	£711.85
1 DRIVE CABLE FOR ABOVE	£12.65
2 DRIVE CABLE FOR ABOVE	£17.25
TORCH Z80 DISK PACK	£839.50

MONITERS



RGB COLOUR MONITOR STD/RES	£247.25
RGB COLOUR MONITOR H/RES	£632.50
PLINTH FOR RGB MONITOR	£8.63
RGB CABLE	£5.75
12" GREEN MONITOR	£99.00
12" AMBER MONITOR	£120.75
FIDELITY MTV 1400 Monitor/T.V.	£247.25

The Big International Dealer Network

Allingham

Pharmacy Computer Systems
Copeland
37 Stamford New Road
Allingham
Crestre
061 928 0087

Ballymoney

Everyman Computers
80 Charlotte Street
Ballymoney
Co. Antrim
N. Ireland
02656 62116/62658

Birmingham

The Micro Centre
1756 Pershore Road
Cottonridge
Birmingham
021 456 4564

Bishops Cleeve

Computus (East Anglia)
3 Church Street
Bishops Cleeve
Herts
0279 506802

Braintree

Braintree Computer Centre
Massey Road
Braintree
Essex
0376 24922

Bridgend

Automation Services
42 Dunraven Place
Bridgend
Mid Glam
0656 3550

Brighton

Game
24 Gloucester Road
Brighton
Sussex
0273 698424

Bristol

Brensil Computers Ltd
24 Park Road
Bristol
0272 294188

Brixham

Computer Systems (Torbay)
Pump Street
Brixham
Devon
08045 5565

Bromley

Data Store
6 Charterton Road
Bromley
Kent
01-460 8991

Bury

Entertainment in Leisure
88 The Rock
Bury
061 797 3463

Cambridge

GCC Cambridge Ltd
66 High Street
Sawston
Cambridge
0223 835330

Cardiff

Stevens Computer Centre
Castle Arcade
Cardiff
0222 41905

Chelmsford

Essex Computer Centre
216 Moulsham Street
Chelmsford
Essex
0245 358702

Chester-Le-Street

Knowledge Computer Centre
15 Northburns
Chester-Le-Street
Co. Durham
0335 881014

Dartford

Anirog Computers
29 West Hill
Dartford, Kent
0322 92513

Derby

First Byte Computers
10 Castlefields
London Road
Derby
0332 365280

Dover

Dover International
Computer Centre
18-19 The Charlton Arcade
High Street
Dover, Kent
0304 212433

Evesham

Evesham Micro Centre
Crown Courtyard 1
Bridges Street
Evesham, Worcs
0386 49641

Hanley

Town Computer Store
30 Town Road
Hanley, Stoke On Trent
0732 287543

Haverford West

Computer Centre
18 Riverside Market
Haverford West
Dyfed
0437 2776/28228

Heckmondwike

Thoughts and Crosses
37 Market Street
Heckmondwike
West Yorkshire
0924 402 337

Hemel Hempstead

Faxminster Ltd
25 Market Square
Hemel Hempstead
Herts
0442 55044

High Wycombe

South Bucks Computer Centre
de Hui, Lonsley & Pearce
423 Oxford Road
High Wycombe, Bucks
0494 442311

Homechurch

Complete Computer Systems
112a North Street
Homechurch, Essex
04024 46741

Horsham

Micro Store
13b West Street
Horsham, W. Sussex
0403 52297

Horsham

Orchard Business Systems Ltd
34 East Street
Horsham, W. Sussex
0403 66461

Ipswich

Brainwave
24 Crown Street
Ipswich, Suffolk
Ipswich 50965

Lancashire

Blackpool Computer Stores
179 Church Street
Blackpool
Lancashire
0253 27094

Lewick

Tomorrow's World
20 Commercial Road
Lewick
Shetland Isles
0595 2145

London

Computers of
Wigmore Street
87 Wigmore Street
London
01 486 3373

Motms

1446 Chalk Place
Earls Court
London
01 373 5000/6607

Maldenhead

Chiswick Organs
45 Nicholson's Walk
Maldenhead
0628 31765

Marlow

Clybentch
71/2 Flan Place
Marlow
Bucks
06284 75244

Newton-Le-Willows

Source Computers
4 Cross Lane
Newton-Le-Willows
Merseyside
092 524394

Norfolk

Abacus
12a Pottersgate
Norwich
Norfolk
0603 614441

Peterlee

General Northern Computing
8 Whitworth Road
South West End Estate
Peterlee
Durham
0783 850314

Preston

Farml Computing
67 Friar Gate
Preston
Lancs
0772 551952

Reading

The Berkshire Camera Centre
154 Friar Street
Reading
Berkshire
0734 529346

Rye

Tallgate Video
Tallgate Garage
New Winchelsea Road
Rye
E. Sussex
Rye 223106

Scunthorpe

Ashby Computer Centre
166 Ashby High Street
Scunthorpe
S. Humberside
0724 871756

Southend

Isuary Software
261 Victoria Avenue
Southend
Essex
0702 43508

St. Austell

Computavision
4 Market Street
St. Austell
0726 5207

Stirling

Micro Store
38 The Arcade
King Street
Stirling
Central Region
0766 64571

Stoneleigh

Diamond Duel Records
75 The Broadway
Stoneleigh
Surrey
01 393 4944

Stroud

The Model Shop
22 High Street
Stroud
Glos
04536 5020

Subiton

Computasolve Ltd
8 Central Parade
St. Marks Hill
Subiton
Surrey
01 390 5135

Swanland

Beverley Computer Centre
5 Mereway
Swanland
N. Humberside
0482 86101

Taunton

Snewave Computer Services
Corporation Street
Taunton
Devon
0823 57526

Turo

Turo Micro Ltd
Unit 4 Fridge House
New Bridge Street
Turo
Cornwall
0872 40043

Uxbridge

J.K.L. Computers
7 Windsor Street
Uxbridge
Middlesex
0895 51815

Welling

North Kent Computer Centre
52-54 Bellgrove Road
Welling
Kent
01 301 2677

Wolverhampton

Wolverhampton Computer Centre
17-19 Lichfield Street
Wolverhampton
0902 29907

For your nearest European Dealer
telephone Belgium or Holland

Belgium

Micro Management
Belgium
Baldastraat 75
2018 Antwerp
Belgium
03 238 9284

Holland

Micro Management
Netherlands
Raad Huissraat 98 2406
Ah Alphen-aan-den-rijn
01720 - 72380

CHECK WITH YOUR LOCAL DEALER FOR SPECIAL BARGAINS AND NEW PRODUCT RELEASES

(All products normally in stock, but to prevent a wasted journey phone your local dealer first before calling. All prices inclusive of VAT)

NOGUL

THE HOTWARE PEOPLE

FIRE ANT

Written by Mike Wacker



As the last remaining soldier of an army of ants crushed by a group of scorpions, your sole purpose in life is to rescue the Queen Ant taken hostage only moments ago. Fast action machine code game that calls for a winning combination of sharp wits plus extra fast reflexes.

Available on CBM64

Address: P.O. Box 4BT, 35-37 Wardour Street, London W1A 4BT
Telephone: 01-437 3156-7

(continued from page 177)

```

1750 GOTO 200
1755 PRINT "END OF GAME"
1760 FOR X=1 TO NO
1765 IF U(X,3) > 0 THEN LET U(X,1)
1770 IF U(X,1) < 150000
1775 IF U(X,3) > 0 THEN GOTO 1765
1780 IF U(X,1) < 0 THEN GOTO 1750
1785 LET U(X,1) = U(X,1) + C(U(X,1),F)
1790 NEXT X
1795 NEXT F
1800 CLS
1805 PRINT "RESULT AFTER ";J;" G
1810 FOR X=1 TO NO
1815 PRINT "PLAYER ";X
1820 PRINT "TOTAL=";U(X,13)
1830 PRINT
1835 NEXT X
1840 PRINT AT 15,0:"DO YOU WISH
AN EXTENSION OF THIS GAME?"
1845 INPUT J$
1850 IF J$ (1 TO 1) = "N" THEN GOTO
1855
1855 IF J$ (1 TO 1) < "Y" THEN GOT
O 1845
1860 PRINT "HOW MANY EXTRA GOES?"
1865 INPUT J
1870 CLS

```

```

1875 GOTO 285
1880 PRINT AT 21,0:"DO YOU WANT
ANOTHER GAME? (Y/N)"
1885 LET I$=INKEY$
1890 IF I$="Y" THEN CLS
1895 IF I$="Y" THEN RUN
1900 GOTO 1885
1910 REM MAP
1915 CLS
1920 PRINT "
1925 PRINT "
1930 PRINT "
1935 PRINT "
1940 RETURN

```



Caterpillar

Richard Arundale,
Leeds,
West Yorkshire.



CATERPILLAR is based on the popular arcade game Centipede. The caterpillar moves horizontally but drops down a line and changes direction whenever it reaches the edge of the screen or hits a mushroom. Your task is to kill off the caterpillar before it reaches the bottom of the screen and kills you.

The mushrooms can be destroyed by shooting them three times. Their colour changes according to the number of hits sustained — no hits — red, one hit — green, two hits — blue. However, spiders often spin

down from their webs above the mushroom patch to drop more mushrooms. The spiders can be shot for bonus points, but do not get in their way — they are lethal.

A snail also joins in the fun, poisoning any mushrooms in its way. Both the snail and the poisoned mushrooms can be shot for bonus points, but if the caterpillar comes into contact with a poisoned mushroom it will die.

If you manage to shoot all the segments of the caterpillar then you move on to the next mushroom patch, which contains more mushrooms and all the usual creepy-crawlies and, of course, another caterpillar. You have three bugs with which to fight off the caterpillars.

When asked if you want instructions, type Y or N. However, the instructions are more of an introduction to the inhabitants of the

mushroom patch than an explanation of the game.

The program allows the use of both keyboard and joysticks. Although you are not asked if you want to use joysticks, a check is made, so you can use either, and you can in fact change in the middle of a game. For those without joysticks, the Advail commands in Procmove and Procfire can be omitted. A word of warning for those with joysticks: make sure that the lever is centred when using the keyboard, otherwise the program will be responding to the joystick as well as the keyboard. The keyboard controls are Z to go left, X to go right, and Shift to fire.

The program itself is well-structured using procedures and the minimum number of Goto statements. The following is a list of procedures used and their main purpose.

PRCCmove: moves the bug.
PRCCfire: fires arrows and checks if they hit anything.
PRCCcaterpillar: moves caterpillar.
PRCCdown: moves caterpillar down a line.
PRCCpest: checks what pest needs moving — snail or spider.
PRCCsnail: moves snail and poisons any mushrooms it passes over.
PRCCspider: moves spider and drops mushrooms.
PRCCscreen: sets up screen display.
PRCCclear: resets variables after clearing a screen.
PRCCdead: checks if last score is a highscore, displays high-score table.
PRCCinstructions: displays characters, instructions, and controls.
PRCCinit: sets up variables and defines envelopes.
PRCCchars: sets up user-defined characters.

```

10 MODE2:PROCin:t:PROCchars
20 REPEAT:PRCCinstructions
30 REPEAT:PRCCscreen
40 REPEAT:PRCCmove:PROCfire:PROCcaterpillar:PRCCpest
t:UNTIL C% OR D%
50 IF C% THEN PROCclear ELSE IF D% THEN PROCdead
60 UNTIL L%<C:PROChiscores:UNTIL FALSE
70 END
80 DEFPROCmove
90 IF (INKEY=-98) OR ADVAL(1) DIV 64>900 AND A%>63
AND POINT(A%-32,16)=0 THEN MOVE A%,32:PRINT bug$:A%=A
%-64:MOVE A%,32:PRINT bug$:ENDPROC
100 IF (INKEY=-67) OR ADVAL(1) DIV 64<200 AND A%<12
16 AND POINT(A%+96,16)=0 THEN MOVE A%,32:PRINT bug$:A%
=A%+64:MOVE A%,32:PRINT bug$:ENDPROC ELSE ENDPROC
110 DEFPROCfire
120 IF (INKEY=-1) OR ADVAL(0) AND 1)=1 AND NOT F%
THEN F%=TRUE:BX%=A%:BY%=32:GCOL3,14:MOVE BX%,BY%:VDU 2
28:SOUND 0,-10,6,1:J%=0:REPEAT:J%=J%+1:GOTO 140 ELSE IF
NOT F% THEN ENDPROC
130 J%=0:REPEAT:J%=J%+1:GCOL3,14:MOVE BX%,BY%:VDU228
:BY%=BY%+32:MOVE BX%,BY%:VDU228
140 IF BY%>895 THEN MOVE BX%,BY%:VDU228:F%=FALSE:UNT
IL F%=FALSE:ENDPROC
150 IF POINT(BX%+32,BY%+16)=1 THEN MOVE BX%,BY%:VDU2
28:MOVE BX%,BY%+32:PRINT RM$:MOVE BX%,BY%+32:PRINT BM$
:SOUND 0,-15,6,2:F%=FALSE:SC%=SC%+20:VDU4:PRINT TAB(6,
2):SC%:VDU5:UNTIL F%=FALSE:ENDPROC
160 IF POINT(BX%+32,BY%+16)=2 THEN MOVE BX%,BY%:VDU2
28:MOVE BX%,BY%+32:PRINT BM$:MOVE BX%,BY%+32:PRINT BM$
:SOUND 0,-15,6,2:F%=FALSE:SC%=SC%+30:VDU4:PRINT TAB(6,
2):SC%:VDU5:UNTIL F%=FALSE:ENDPROC
170 IF POINT(BX%+32,BY%+16)=4 THEN MOVE BX%,BY%:VDU2
28:MOVE BX%,BY%+32:PRINT BM$:SOUND 0,-15,6,2:F%=FALSE:
SC%=SC%+40:VDU4:PRINT TAB(6,2):SC%:VDU5:UNTIL F%=FALSE
:ENDPROC
180 IF POINT(BX%+32,BY%+16)=10 THEN SOUND 2,2,140,1:
MOVE BX%,BY%:VDU228:MOVE BX%,BY%+32:PRINT spider$:F%=F
ALSE:P%=0:SC%=SC%+200:VDU4:PRINT TAB(6,2):SC%:VDU5:UNT
IL F%=FALSE:ENDPROC
190 IF POINT(BX%+32,BY%+16)=11 THEN MOVE BX%,BY%:VDU

```

```

228:MOVE BX%,BY%+32:PRINT PM$:SOUND 0,-15,6,2:F%=FALSE
:SC%=SC%+100:VDU4:PRINT TAB(6,2):SC%:VDU5:UNTIL F%=FAL
SE:ENDPROC
200 IF POINT(BX%+32,BY%+24)=14 THEN SOUND 1,2,150,1:
MOVE BX%,BY%:VDU228:MOVE BX%,BY%+32:PRINT snail$:P%=FA
LSE:F%=FALSE:SC%=SC%+500:VDU4:PRINT TAB(6,2):SC%:VDU5:
UNTIL F%=FALSE:ENDPROC
210 IF POINT(BX%+32,BY%+16)<5 THEN UNTIL J%=3:ENDPR
OC ELSE MOVE BX%,BY%:VDU228:K%=0:REPEAT:K%=K%+1:UNTIL
(SX%(K%)=BX% AND SY%(K%)=BY%+32)
220 SOUND 1,2,100,1:MOVE SX%(S%),SY%(S%):PRINT C$:MO
VE SX%(S%),SY%(S%):PRINT RM$:SX%(S%)=0:SY%(S%)=0:SC%=SC
%-1:F%=FALSE:SC%=SC%+50:VDU4:PRINT TAB(6,2):SC%:VDU5:IF
S%=0 THEN C%=TRUE:UNTIL F%=FALSE:ENDPROC ELSE UNTIL F
%=FALSE:ENDPROC
230 DEFPROCcaterpillar
240 MOVE SX%(S%),SY%(S%):PRINT C$:IF SY%(1)<32 THEN
D%=TRUE:ENDPROC
250 IF S%>1 THEN FOR K%=S% TO 2 STEP -1:SY%(K%)=SX%(
K%-1):SY%(K%)=SY%(K%-1):NEXT
260 SX%(1)=SX%(1)+SD%:IF POINT(SX%(1)+32,SY%(1)-16)=
-1 THEN PROCdown
270 IF POINT(SX%(1)+32,SY%(1)-16)=1 OR POINT(SX%(1)+
32,SY%(1)-16)=2 OR POINT(SX%(1)+32,SY%(1)-16)=4 THEN P
ROCDOWN
280 IF POINT(SX%(1)+32,SY%(1)-16)<>11 THEN 290 ELSE
MOVE SX%(S%),SY%(S%):PRINT C$:SX%(S%)=0:SY%(S%)=0:SC%=S
%-1:SY%(1)=SX%(1)-SD%:MOVE EX%(1),SY%(1):PRINT C$:IF S
%=1 THEN C%=TRUE:ENDPROC ELSE ENDPROC
290 IF POINT(SX%(1)+32,SY%(1)-16)=3 THEN MOVE EX%(1)
,SY%(1):PRINT C$:D%=TRUE:ENDPROC
300 MOVE SX%(1),SY%(1):PRINT C$:ENDPROC
310 DEFPROCdown
320 SY%(1)=SY%(1)-32:SY%(1)=SY%(1)-SD%:SD%=-SD%
330 IF POINT(SX%(1)+32,SY%(1)-16)=1 OR POINT(SX%(1)+
32,SY%(1)-16)=2 OR POINT(SX%(1)+32,SY%(1)-16)=4 THEN S
X%(1)=SX%(1)+SD%:GOTO 330
340 ENDPROC
350 DEFPROCpest
360 IF P%=0 AND RND(100)=1 THEN P%=1:PX%=0:PY%=RND(6

```

(continued on next page)

(continued from previous page)

```

) *64+192: SOUND 1,1,100,9: MOVE P%:PY%:PRINT snail$
370 IF P%-0 AND RND(50)-1 THEN P%-2: SOUND 2,4,175,1:
AX%=(RND(20)-1)*64:AY%=92E:MOVE AX%,AY%:PRINT spider$
380 IF P%=1 THEN PROCsnail:ENDPROC ELSE IF P%=2 THEN
PROCspider:ENDPROC ELSE ENDPROC
390 DEFPROCsnail
400 MOVE P%:PY%:PRINT snail$
410 P%=(P%+64):IF POINT(P%+32,PY%-16)=1 THEN MOVE P
X%,PY%:PRINT RM$:MOVE P%:PY%:PRINT PM$:GOTO 410
420 IF POINT(P%+32,PY%-16)=2 THEN MOVE P%:PY%:PRIN
T 3M$:MOVE P%:PY%:PRINT FM$:GOTO 410
430 IF POINT(P%+32,PY%-16)=4 THEN MOVE P%:PY%:PRIN
T 3M$:MOVE P%:PY%:PRINT FM$:GOTO 410
440 IF POINT(P%+32,PY%-16)=11 THEN MOVE P%:PY%:PRI
NT PM$
450 IF POINT(P%+32,PY%-16)=-1 OR POINT(P%+32,PY%-1
6)=5 THEN P%=FALSE:ENDPROC
460 MOVE P%:PY%:PRINT snail$:ENDPROC
470 DEFPROCspider
480 MOVE AX%,AY%:PRINT spider$
490 AY%=AY%-32:IF POINT(AX%+32,AY%-16)=1 OR POINT(AX
%+32,AY%-16)=2 OR POINT(AX%+32,AY%-16)=4 OR POINT(AX%+
32,AY%-16)=11 THEN 490
500 IF POINT(AX%+32,AY%-16)=14 THEN SOUND 2,2,140,1:
GCOL3,14:MOVE BX%,BY%:VDU22B:FX=FALSE:PX=0:SC=SC+200
:VDU4:PRINT TAB(6,2):SC:VDU5:ENDPROC
510 IF POINT(AX%+32,AY%-16)=-1 THEN SOUND 2,0,0,0:P%
=0:ENDPROC
520 IF POINT(AX%+32,AY%-16)=0 AND RND(5)=1 THEN MOVE
AX%,AY%:PRINT RM$:GOTO 490
530 IF POINT(AX%+32,AY%-16)=3 THEN DX=TRUE:ENDPROC
540 MOVE AX%,AY%:PRINT spider$:ENDPROC
550 DEFPROCscreen
560 MOVE 0,1023:PRINT C$:C$:C$:MOVE 1088,1023:PRINT
C$:C$:C$:GCOL0,2:MOVE 310,1017:PRINT "CATERPILLAR":GCOL
0,3:MOVE 300,1023:PRINT "CATERPILLAR"
570 VDU4:PRINT TAB(0,2):"SCORE ":SC:TA(12,2):"LIVE
S ":LX:TAB(0,3):"HIGH ":HX(1):TAB(12,3):"SHEET ":sheet
%:VDU5
580 FOR K%=1 TO 35+sheet%:NX=(RND(20)-1)*64:N%=(27-R
ND(25))*32:MOVE NX,NX:PRINT RM$:NEXT
590 MOVE AX,32:PRINT bug$:FOR K%=1 TO 12:MOVE SX(K%
),SY(K%):PRINT C$:NEXT
600 ENDPROC
610 DEFPROCclear
620 SOUND 2,3,120,1:sheet%=sheet%+1:FX=FALSE:CX=FA
LSE:FX=FALSE:P%=0:RESTORE 870:FOR K%=1 TO 12:READ SX(K%
),SY(K%):NEXT:SX=12:SD%=64
630 CLS:ENDPROC
640 DEFPROCdead
650 SOUND 2,4,100,1:TIME=0:REPEAT UNTIL TIME>250:SOU
ND 2,0,0,0
660 DX=FALSE:RESTORE 870:FOR K%=1 TO 12:READ SX(K%
),SY(K%):NEXT:SY=12:SD%=64:LX=LX-1:FX=FALSE:P%=0
670 CLS:ENDPROC
680 DEFPROCchiscore$
690 VDU4:IF SC%<=HX(5) THEN 710 ELSE PRINT TAB(5,3):
"A HI-SCORE":KX=0:REPEAT KX=KX+1:UNTIL SC%>HX(KX):*FX1
5,1
700 J%=5:REPEAT 4%(J%)=HX(C%-1):H$(J%)=H$(J%-1):J%=J
%-1:UNTIL J%=KX:H$(KX)=SC%:INPUT TAB(0,10)"Name ",H$(K
%):H$(K%)=LEFT$(H$(K%),8)
710 CLS:VDU5:GCOL0,2:MOVE 320,928:PRINT "HI-SCORES":G
COL0,3:MOVE 312,932:PRINT "HI-SCORES":VDU4:FOR K%=1 TO
5:PRINT TAB(0,K%+4):KX:SPC(2):HX(K%):SPC(3):H$(K%):N
EX

```

```

720 PRINT TAB(2,20):"PRESS SPACE BAR":REPEAT UNTIL 0
ET=32:CLS:VDU5:SC%=0:LX=3:AX=576:sheet%=:ENDPROC
730 DEFPROCinstructions
740 VDU5:GCOL0,2:MOVE 266,515:PRINT "INSTRUCTIONS?":G
COL0,3:MOVE 255,519:PRINT "INSTRUCTIONS?":REPEAT:G%<GET
%:UNTIL G%="Y" OR G%="N":CLS:IF G%="N" THEN ENDPROC
750 GCOL0,2:MOVE 310,966:PRINT "CATERPILLAR":GCOL0,3:
MOVE 300,991:PRINT "CATERPILLAR":MOVE 100,900:PRINT bug
$:MOVE 400,900:PRINT "BUG":MOVE 100,800:PRINT C$:C$:C$:
C$:MOVE 400,800:PRINT "CATERPILLAR"
760 MOVE 100,700:PRINT snail$:MOVE 400,700:PRINT "SNA
IL":MOVE 100,600:PRINT spider$:MOVE 400,600:PRINT "SPID
ER":MOVE 100,500:PRINT RM$:GM$:BM$:PM$:MOVE 400,500:PR
INT "MUSHROOMS"
770 MOVE 100,200:PRINT "PRESS SPACE BAR":REPEAT UNTIL
3ET=32:CLS:GCOL0,2:MOVE 266,754:PRINT "CATERPILLAR":G
COL0,3:MOVE 256,759:PRINT "CATERPILLAR":VDU4
780 PRINT TAB(1,6):"Kill off the""caterpillar befo
re""it kills you."" Beware the spider""as it cr
aws down""the screen dropping""mushrooms, and th
e""snail which poisons""the mushrooms."
790 PRINT ""PRESS SPACE BAR":REPEAT UNTIL GET=32:CL
S:VDU5:GCOL0,2:MOVE 266,754:PRINT "CATERPILLAR":GCOL0,3
:MOVE 256,759:PRINT "CATERPILLAR":VDU4
800 PRINT TAB(5,5):"CONTROLS":TAB(2,10):"Z L
EFT":TAB(2,12):"X RIGHT":TAB(2,14):"SHIFT
FIRE":TAB(3,20):"or joysticks""PRESS SPACE BAR":RE
PEAT UNTIL GET=32:CLS:VDU5:ENDPROC
810 DEFPROCinit
820 DIM SX(12),SY(12):RESTORE 870:FOR K%=1 TO 12:R
EAD SX(K%),SY(K%):NEXT
830 DIM HX(5),H$(5):FOR K%=1 TO 5:H$(K%)=0:000:H$(K%)
="B B C":NEXT
840 AX=576:FX=FALSE:sheet%=1:SC=12:DX=FALSE:SD%=64:C
X=FALSE:SCX=0:LX=3:FX=0
850 ENVELOPE 1,1,5,-5,50,25,25,126,0,0,-5,126,0:ENVELOPE 2,133,8,4,8,3,1,126,0,0,-10,126,0:ENVELOPE 3,2,8,-1,-1,8,200,200,126,-1,-1,126,10:ENVELOPE 4,8,10,6,-1,0,0,255,109,-1,0,-1,126,126
860 ENDPROC
870 DATA 704,864,640,864,576,864,512,864,448,864,384
,864,320,864,256,864,192,864,128,864,64,864,0,864
880 DEFPROCchars
890 VDU23,224,0,24,52,60,110,122,0,0,0,23,225,0,0,8,
0,16,4,24,24
900 RM$=CHR$(8+CHR$(3-CHR$(1+CHR$(224+CHR$(8+CHR$(18+CHR$(
3+CHR$(7+CHR$(225:GM$=CHR$(13+CHR$(3+CHR$(2+CHR$(224+CHR$(8+CHR$(
18+CHR$(3+CHR$(7+CHR$(225:PM$=CHR$(13+CHR$(3+CHR$(11+CHR$(224+CHR$(8+CHR$(
18+CHR$(3+CHR$(7+CHR$(225:BM$=CHR$(13+CHR$(3+CHR$(11+CHR$(224+CHR$(8+CHR$(
18+CHR$(3+CHR$(7+CHR$(225:VDU23,226,24,60,126,255,24,0,0,23,227,24,36,
66,165,129,195,66,66
930 bug$=CHR$(18+CHR$(3+CHR$(3+CHR$(226+CHR$(8+CHR$(18+CHR$(
3+CHR$(2+CHR$(227
940 VDU23,228,0,16,56,16,16,16,16,0
950 VDU23,229,0,0,24,255,255,24,66,66,23,230,0,24,10
2,0,0,102,90,66
960 C$=CHR$(18+CHR$(3+CHR$(5+CHR$(229+CHR$(8+CHR$(18+CHR$(3
+CHR$(6+CHR$(230
970 VDU23,231,0,0,0,0,1,127,254,0,23,232,0,56,124,12
4,56,0,0,0
980 snail$=CHR$(18+CHR$(3+CHR$(9+CHR$(231+CHR$(8+CHR$(18+CHR$(
3+CHR$(14+CHR$(232
990 VDU 23,233,0,130,124,214,254,124,84,130,23,234,0
,130,0,40,0,16,84,130
1000 spider$=CHR$(18+CHR$(3+CHR$(10+CHR$(233+CHR$(8+CHR$(18
+CHR$(3+CHR$(12+CHR$(234
1010 ENDPROC

```

File saver

F D Roso.
Stoke Bishop,
Bristol

CBM-64

UNLIKE THE SPECTRUM with its Save Code

command, the CBM-64 lacks the facility for saving a portion of memory from Basic. This program provides such a utility. It allows you to save any stretch of memory, specifying the start address, the finish address, file-name, device number, and secondary address. The device number will usually be 1 for tape saving or 8 for disc saving.

Once you have typed the program in run it

and wait for it to Pake in a small machine-code routine. You will then be asked to specify addresses and device number. If you give 1 as your secondary address you can reload the file using Load; giving a secondary address of zero means that you will have to use the command Load "",1,1. To save a file whether it be data or a machine-code program simply enter SYS 49152.

```

1 INPT "FILENAME";F$
2 F$=LEFT$(F$,8)
3 FOR N=1 TO LEN(F$):POKE18+N,ASC(MID$(F$,N,1)):NEXT
4 INPT "START ADDRESS";SA
5 INPT "END ADDRESS";EA
6 INPT "DEVICE NO.":DN
7 INPT "SECONDARY ADDRESS";ES
8 II=49152
9 I=49152
10 READ A$
20 IF A$="-" THEN 200

```

```

30 AL$=LEFT$(A$,1):AR$=RIGHT$(A$,1)
40 IF ASC(AL$)<65 THEN D=VAL(AL$)*16:GOTO 60
50 I=(ASC(AL$)-55)*16
60 IF ASC(AR$)<65 THEN D=D+VAL(AR$):GOTO 80
70 I=D+ASC(AR$)-55
80 POKE I,D:I=I+1:GOTO 10
100 DATA A9,08,A2,08,A3,FF,20,BA,FF,A9,01,A2,34,A0,03,20,BD,FF,A9,FF,8E,FE
110 DATA A9,FF,85,FC,A2,03,A3,FF,A9,FF,20,D8,FF,60,-
200 POKE II+3,DN:POKEII+5,ES
210 POKE II+10,LEN(F$)
220 A=INT(SA/256):POKEII+19,SA-A*256:POKEII+23,A
230 A=INT(EA/256):POKEII+27,EA-A*256:POKEII+29,A

```


Tape back-up

J Press,
Biggleswade,
Bedfordshire.



THIS MACHINE-CODE routine resides in the printer buffer and will allow back-up copies to be made of almost any program on both 16K and 48K versions of the Spectrum. The routine is compatible with the ZX Interface 1 and is easy to use.

Type in the program as listed and then enter: Run. The program will POKe the machine code into place and will then save it to tape. If you have made a typing mistake, the message Sumcheck Error will be displayed, in which case you should check the Data statements for errors.

The cloning routine is loaded by entering:
LOAD "JPCLONE" CODE
Once the code has been loaded, either:
RANDOMISE USR 23293

You will be presented with a menu of the three options available to you.

The program to be backed-up must be copied block by block — Spectrum programs usually consist of two or three data blocks, one of which may be headerless. Press 1 for a normal block — with a header — or 2 if the block is headerless. Put the program to be copied into the cassette recorder and start it playing. If option 1 was selected, the name of the block will be displayed. Once the block has been loaded the normal Start tape and press any key message will be displayed, you should then put the back-up tape into the recorder, start it recording and press any key on the Spectrum. When the block has been saved the menu will be redisplayed so that you can copy another data block or press 3 to return to Basic.

```

5 LET a=0
6 RESTORE 50
10 FOR i=23296 TO 23296+238
20 READ c: POKE i,c: LET a=a+c
30 NEXT i
35 PRINT "a"
40 IF a<>22885 THEN PRINT "SUMCHECK ERROR": STOP
45 SAVE "JPCLONE" CODE 23296,239
50 DATA 52,2,205,1,22,6,22,205,68,14,17,184,91,1,55,0
70 DATA 205,60,32,33,0,91,229,62,247,219,254,79,230
90 DATA 1,40,12,121,230,2,40,66,121,230,4,32,237,225,201
110 DATA 52,49,205,166,91,175,55,221,33,239,91,17,17,0
120 DATA 205,2,8,58,239,91,17,192,9,205,10,12,1,10,0,17
150 DATA 240,91,205,60,32,55,62,255,237,91,250,91,221,42
160 DATA 10,92,205,2,8,42,101,92
170 DATA 22,33,239,91,195,112
180 DATA 7,62,50,205,166,91,55,62
190 DATA 255,221,42,101,92,17
200 DATA 255,239,205,66,5,221,229,225,237,91,101,92,175,237,82,
34
210 DATA 250,91,62,253,205,1,22,175,17,161,9,205,10,12,253,205
220 DATA 2,238,205,212,21,62,255,221,42,101,92,237,91,250,91,19
5
230 DATA 194,4,215,1,8,0,17,176,91,195,60,32
240 DATA 22,1,0,6,6,22,0,0,22,3,0,127,74,80,39,56,52,13,49,45
250 DATA 78,79,82,77,65,76,32,67,79,80,89,13,50,45,72,69,65,68,
69,82,76,69,83,83
260 DATA 32,67,79,80,89,13,51,45,69,78
270 DATA 58,13,79,80,84,73,79,78,63
    
```

3D graph program

Robert Driver,
Leeds.
West Yorkshire.

386

HERE IS A 3D-Graph program which will run on a 16K or 32K BBC Micro. It will plot any section of any function for Y in terms of X and Z as a wire-frame or surface diagram with or without axes — the axes option is only offered if the chosen values for X and Z include the origin.

In the menu, the last function for Y, values for X and Z etc. are shown and can be left unaltered simply by pressing Return, or changed by typing in the new value. All the expressions are entered as strings and then EVALed. This is especially useful for trigonometrical functions where the values for X and Z may need to be in terms of PI e.g., -2π .

The menu is virtually foolproof: it will not accept a highest value for X lower than the lowest value for X. However, make sure that your function for Y is in terms of X and Z, and that there is no possibility of division by zero. There is an error-handling routine, but it is rather annoying to come and see how your wonderful graph is coming along, only to find that there was something wrong with the function.

The graph is then scaled by Procscale which usually does its job, but for extra-special graphs some fiddling around may be called for: YTAIL is the height of the origin above the bottom of the screen, and YBIG is the number of graphics units per Y unit.

The graph is then plotted in mode 4 by Procplot. This procedure calls various other procedures according to whether a wire-frame or surface diagram is called for, and whether axes are wanted. Basically it calls Procline or Procax:line from within a loop, which in turn call Procfill or Procsquare from within a loop.

If required the graph can be dumped up to nine times on to a printer by Procdump. This was written for a Seikosha GP-250X but it should run on any Seikosha or Acorn graphics printer with perhaps a little modification. The VDUs at the beginning are to specify linefeed and graphics mode, and to print lots of spaces so that the graph is printed in the middle of the paper. Then the graph is plotted sideways. This is because a byte of screen memory represents a row of eight pixels, whereas a byte sent to the printer is printed as a column of eight dots.

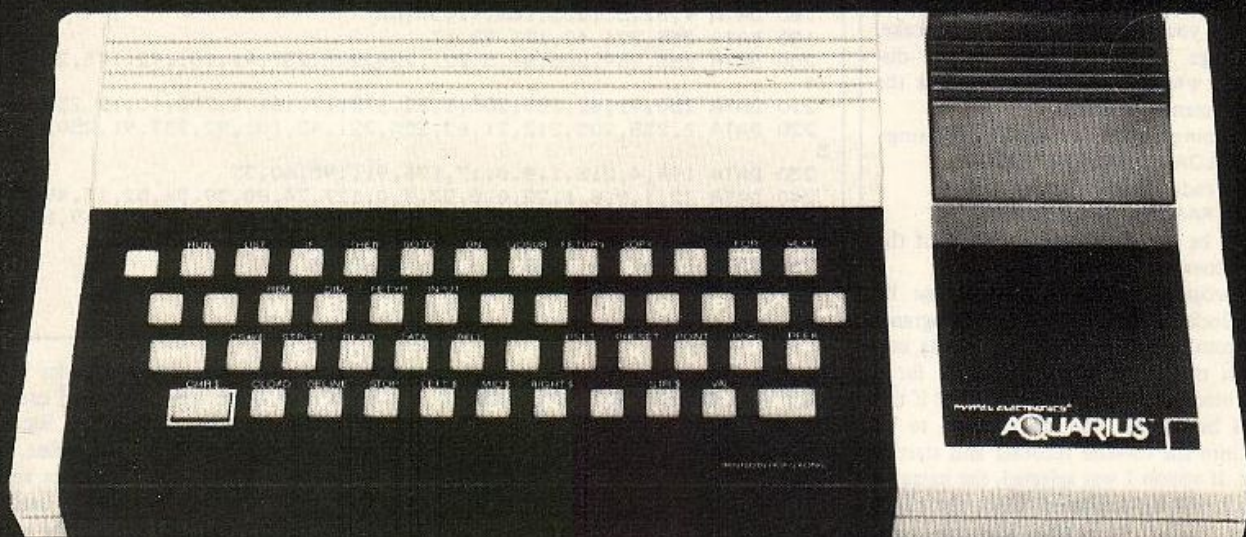
```

10REM *****
20REM * 3D-GRAPH *
30REM * WRITTEN BY *
40REM * ROBERT DRIVER *
50REM * COPYRIGHT 1984 *
60REM *
70REM *****
80
90
100
110ON ERROR GOTO 1360
120MODE7
130PROCINIT
140RESTART:REM MAIN
150MODE7
160PROCINPUT:REM PROGRAM
170PROCSCALE
180MODE4:REM CONTRL
190PROCPLT
200UNTIL FALSE:REM LOOP
210END
220
230
240DEF PROCINPUT
250VDU23,1,1010101
260PRINT"EXPRESSION FOR Y IN TERMS OF X AND Z:":PRN
270IN:IF A$="" THEN GOTO 290:Z=VAL(EVAL(A$)):IF A$=
280PRINT"LOWEST VALUE FOR X:":CHR$(36):INPUTA$:IF
290PRINT"LOWEST VALUE FOR X:":CHR$(36):INPUTA$:IF
300PRINT"LOWEST VALUE FOR X:":CHR$(36):INPUTA$:IF
310IF EVAL(LX$)>EVAL(HX$) THEN FOR J=1 TO 35-LEN(HX$)
320VDU127,NE(7):GOTO340
330PRINT"LOWEST VALUE FOR Z:":CHR$(36):INPUTA$:IF
340PRINT"LOWEST VALUE FOR Z:":CHR$(36):INPUTA$:IF
350PRINT"LOWEST VALUE FOR Z:":CHR$(36):INPUTA$:IF
360PRINT"NUMBER OF STEPS ALONG X-AXIS:":CHR$(36):IN
370PRINT"NUMBER OF STEPS ALONG Z-AXIS:":CHR$(36):IN
380PRINT"DO YOU WANT A WIRE FRAME OR SURFACE?":DIABR
390PRINT"0=0, 1=1, 2=2, 3=3, 4=4, 5=5, 6=6, 7=7, 8=8, 9=9, 10=10, 11=11, 12=12, 13=13, 14=14, 15=15, 16=16, 17=17, 18=18, 19=19, 20=20, 21=21, 22=22, 23=23, 24=24, 25=25, 26=26, 27=27, 28=28, 29=29, 30=30, 31=31, 32=32, 33=33, 34=34, 35=35, 36=36, 37=37, 38=38, 39=39, 40=40, 41=41, 42=42, 43=43, 44=44, 45=45, 46=46, 47=47, 48=48, 49=49, 50=50, 51=51, 52=52, 53=53, 54=54, 55=55, 56=56, 57=57, 58=58, 59=59, 60=60, 61=61, 62=62, 63=63, 64=64, 65=65, 66=66, 67=67, 68=68, 69=69, 70=70, 71=71, 72=72, 73=73, 74=74, 75=75, 76=76, 77=77, 78=78, 79=79, 80=80, 81=81, 82=82, 83=83, 84=84, 85=85, 86=86, 87=87, 88=88, 89=89, 90=90, 91=91, 92=92, 93=93, 94=94, 95=95, 96=96, 97=97, 98=98, 99=99, 100=100, 101=101, 102=102, 103=103, 104=104, 105=105, 106=106, 107=107, 108=108, 109=109, 110=110, 111=111, 112=112, 113=113, 114=114, 115=115, 116=116, 117=117, 118=118, 119=119, 120=120, 121=121, 122=122, 123=123, 124=124, 125=125, 126=126, 127=127, 128=128, 129=129, 130=130, 131=131, 132=132, 133=133, 134=134, 135=135, 136=136, 137=137, 138=138, 139=139, 140=140, 141=141, 142=142, 143=143, 144=144, 145=145, 146=146, 147=147, 148=148, 149=149, 150=150, 151=151, 152=152, 153=153, 154=154, 155=155, 156=156, 157=157, 158=158, 159=159, 160=160, 161=161, 162=162, 163=163, 164=164, 165=165, 166=166, 167=167, 168=168, 169=169, 170=170, 171=171, 172=172, 173=173, 174=174, 175=175, 176=176, 177=177, 178=178, 179=179, 180=180, 181=181, 182=182, 183=183, 184=184, 185=185, 186=186, 187=187, 188=188, 189=189, 190=190, 191=191, 192=192, 193=193, 194=194, 195=195, 196=196, 197=197, 198=198, 199=199, 200=200, 201=201, 202=202, 203=203, 204=204, 205=205, 206=206, 207=207, 208=208, 209=209, 210=210, 211=211, 212=212, 213=213, 214=214, 215=215, 216=216, 217=217, 218=218, 219=219, 220=220, 221=221, 222=222, 223=223, 224=224, 225=225, 226=226, 227=227, 228=228, 229=229, 230=230, 231=231, 232=232, 233=233, 234=234, 235=235, 236=236, 237=237, 238=238, 239=239, 240=240, 241=241, 242=242, 243=243, 244=244, 245=245, 246=246, 247=247, 248=248, 249=249, 250=250, 251=251, 252=252, 253=253, 254=254, 255=255, 256=256, 257=257, 258=258, 259=259, 260=260, 261=261, 262=262, 263=263, 264=264, 265=265, 266=266, 267=267, 268=268, 269=269, 270=270, 271=271, 272=272, 273=273, 274=274, 275=275, 276=276, 277=277, 278=278, 279=279, 280=280, 281=281, 282=282, 283=283, 284=284, 285=285, 286=286, 287=287, 288=288, 289=289, 290=290, 291=291, 292=292, 293=293, 294=294, 295=295, 296=296, 297=297, 298=298, 299=299, 300=300, 301=301, 302=302, 303=303, 304=304, 305=305, 306=306, 307=307, 308=308, 309=309, 310=310, 311=311, 312=312, 313=313, 314=314, 315=315, 316=316, 317=317, 318=318, 319=319, 320=320, 321=321, 322=322, 323=323, 324=324, 325=325, 326=326, 327=327, 328=328, 329=329, 330=330, 331=331, 332=332, 333=333, 334=334, 335=335, 336=336, 337=337, 338=338, 339=339, 340=340, 341=341, 342=342, 343=343, 344=344, 345=345, 346=346, 347=347, 348=348, 349=349, 350=350, 351=351, 352=352, 353=353, 354=354, 355=355, 356=356, 357=357, 358=358, 359=359, 360=360, 361=361, 362=362, 363=363, 364=364, 365=365, 366=366, 367=367, 368=368, 369=369, 370=370, 371=371, 372=372, 373=373, 374=374, 375=375, 376=376, 377=377, 378=378, 379=379, 380=380, 381=381, 382=382, 383=383, 384=384, 385=385, 386=386, 387=387, 388=388, 389=389, 390=390, 391=391, 392=392, 393=393, 394=394, 395=395, 396=396, 397=397, 398=398, 399=399, 400=400, 401=401, 402=402, 403=403, 404=404, 405=405, 406=406, 407=407, 408=408, 409=409, 410=410, 411=411, 412=412, 413=413, 414=414, 415=415, 416=416, 417=417, 418=418, 419=419, 420=420, 421=421, 422=422, 423=423, 424=424, 425=425, 426=426, 427=427, 428=428, 429=429, 430=430, 431=431, 432=432, 433=433, 434=434, 435=435, 436=436, 437=437, 438=438, 439=439, 440=440, 441=441, 442=442, 443=443, 444=444, 445=445, 446=446, 447=447, 448=448, 449=449, 450=450, 451=451, 452=452, 453=453, 454=454, 455=455, 456=456, 457=457, 458=458, 459=459, 460=460, 461=461, 462=462, 463=463, 464=464, 465=465, 466=466, 467=467, 468=468, 469=469, 470=470, 471=471, 472=472, 473=473, 474=474, 475=475, 476=476, 477=477, 478=478, 479=479, 480=480, 481=481, 482=482, 483=483, 484=484, 485=485, 486=486, 487=487, 488=488, 489=489, 490=490, 491=491, 492=492, 493=493, 494=494, 495=495, 496=496, 497=497, 498=498, 499=499, 500=500, 501=501, 502=502, 503=503, 504=504, 505=505, 506=506, 507=507, 508=508, 509=509, 510=510, 511=511, 512=512, 513=513, 514=514, 515=515, 516=516, 517=517, 518=518, 519=519, 520=520, 521=521, 522=522, 523=523, 524=524, 525=525, 526=526, 527=527, 528=528, 529=529, 530=530, 531=531, 532=532, 533=533, 534=534, 535=535, 536=536, 537=537, 538=538, 539=539, 540=540, 541=541, 542=542, 543=543, 544=544, 545=545, 546=546, 547=547, 548=548, 549=549, 550=550, 551=551, 552=552, 553=553, 554=554, 555=555, 556=556, 557=557, 558=558, 559=559, 560=560, 561=561, 562=562, 563=563, 564=564, 565=565, 566=566, 567=567, 568=568, 569=569, 570=570, 571=571, 572=572, 573=573, 574=574, 575=575, 576=576, 577=577, 578=578, 579=579, 580=580, 581=581, 582=582, 583=583, 584=584, 585=585, 586=586, 587=587, 588=588, 589=589, 590=590, 591=591, 592=592, 593=593, 594=594, 595=595, 596=596, 597=597, 598=598, 599=599, 600=600, 601=601, 602=602, 603=603, 604=604, 605=605, 606=606, 607=607, 608=608, 609=609, 610=610, 611=611, 612=612, 613=613, 614=614, 615=615, 616=616, 617=617, 618=618, 619=619, 620=620, 621=621, 622=622, 623=623, 624=624, 625=625, 626=626, 627=627, 628=628, 629=629, 630=630, 631=631, 632=632, 633=633, 634=634, 635=635, 636=636, 637=637, 638=638, 639=639, 640=640, 641=641, 642=642, 643=643, 644=644, 645=645, 646=646, 647=647, 648=648, 649=649, 650=650, 651=651, 652=652, 653=653, 654=654, 655=655, 656=656, 657=657, 658=658, 659=659, 660=660, 661=661, 662=662, 663=663, 664=664, 665=665, 666=666, 667=667, 668=668, 669=669, 670=670, 671=671, 672=672, 673=673, 674=674, 675=675, 676=676, 677=677, 678=678, 679=679, 680=680, 681=681, 682=682, 683=683, 684=684, 685=685, 686=686, 687=687, 688=688, 689=689, 690=690, 691=691, 692=692, 693=693, 694=694, 695=695, 696=696, 697=697, 698=698, 699=699, 700=700, 701=701, 702=702, 703=703, 704=704, 705=705, 706=706, 707=707, 708=708, 709=709, 710=710, 711=711, 712=712, 713=713, 714=714, 715=715, 716=716, 717=717, 718=718, 719=719, 720=720, 721=721, 722=722, 723=723, 724=724, 725=725, 726=726, 727=727, 728=728, 729=729, 730=730, 731=731, 732=732, 733=733, 734=734, 735=735, 736=736, 737=737, 738=738, 739=739, 740=740, 741=741, 742=742, 743=743, 744=744, 745=745, 746=746, 747=747, 748=748, 749=749, 750=750, 751=751, 752=752, 753=753, 754=754, 755=755, 756=756, 757=757, 758=758, 759=759, 760=760, 761=761, 762=762, 763=763, 764=764, 765=765, 766=766, 767=767, 768=768, 769=769, 770=770, 771=771, 772=772, 773=773, 774=774, 775=775, 776=776, 777=777, 778=778, 779=779, 780=780, 781=781, 782=782, 783=783, 784=784, 785=785, 786=786, 787=787, 788=788, 789=789, 790=790, 791=791, 792=792, 793=793, 794=794, 795=795, 796=796, 797=797, 798=798, 799=799, 800=800, 801=801, 802=802, 803=803, 804=804, 805=805, 806=806, 807=807, 808=808, 809=809, 810=810, 811=811, 812=812, 813=813, 814=814, 815=815, 816=816, 817=817, 818=818, 819=819, 820=820, 821=821, 822=822, 823=823, 824=824, 825=825, 826=826, 827=827, 828=828, 829=829, 830=830, 831=831, 832=832, 833=833, 834=834, 835=835, 836=836, 837=837, 838=838, 839=839, 840=840, 841=841, 842=842, 843=843, 844=844, 845=845, 846=846, 847=847, 848=848, 849=849, 850=850, 851=851, 852=852, 853=853, 854=854, 855=855, 856=856, 857=857, 858=858, 859=859, 860=860, 861=861, 862=862, 863=863, 864=864, 865=865, 866=866, 867=867, 868=868, 869=869, 870=870, 871=871, 872=872, 873=873, 874=874, 875=875, 876=876, 877=877, 878=878, 879=879, 880=880, 881=881, 882=882, 883=883, 884=884, 885=885, 886=886, 887=887, 888=888, 889=889, 890=890, 891=891, 892=892, 893=893, 894=894, 895=895, 896=896, 897=897, 898=898, 899=899, 900=900, 901=901, 902=902, 903=903, 904=904, 905=905, 906=906, 907=907, 908=908, 909=909, 910=910, 911=911, 912=912, 913=913, 914=914, 915=915, 916=916, 917=917, 918=918, 919=919, 920=920, 921=921, 922=922, 923=923, 924=924, 925=925, 926=926, 927=927, 928=928, 929=929, 930=930, 931=931, 932=932, 933=933, 934=934, 935=935, 936=936, 937=937, 938=938, 939=939, 940=940, 941=941, 942=942, 943=943, 944=944, 945=945, 946=946, 947=947, 948=948, 949=949, 950=950, 951=951, 952=952, 953=953, 954=954, 955=955, 956=956, 957=957, 958=958, 959=959, 960=960, 961=961, 962=962, 963=963, 964=964, 965=965, 966=966, 967=967, 968=968, 969=969, 970=970, 971=971, 972=972, 973=973, 974=974, 975=975, 976=976, 977=977, 978=978, 979=979, 980=980, 981=981, 982=982, 983=983, 984=984, 985=985, 986=986, 987=987, 988=988, 989=989, 990=990, 991=991, 992=992, 993=993, 994=994, 995=995, 996=996, 997=997, 998=998, 999=999, 1000=1000, 1001=1001, 1002=1002, 1003=1003, 1004=1004, 1005=1005, 1006=1006, 1007=1007, 1008=1008, 1009=1009, 1010=1010, 1011=1011, 1012=1012, 1013=1013, 1014=1014, 1015=1015, 1016=1016, 1017=1017, 1018=1018, 1019=1019, 1020=1020, 1021=1021, 1022=1022, 1023=1023, 1024=1024, 1025=1025, 1026=1026, 1027=1027, 1028=1028, 1029=1029, 1030=1030, 1031=1031, 1032=1032, 1033=1033, 1034=1034, 1035=1035, 1036=1036, 1037=1037, 1038=1038, 1039=1039, 1040=1040, 1041=1041, 1042=1042, 1043=1043, 1044=1044, 1045=1045, 1046=1046, 1047=1047, 1048=1048, 1049=1049, 1050=1050, 1051=1051, 
```


AQUARIUSTM

HOME COMPUTER SYSTEM

More software—more hardware!



The best value full colour computer on the market — at under £60.

Welcome to the wonderful world of Aquarius — Proof that computers can stretch your mind, without stretching your pocket!

Aquarius owners have so much to look forward to with a wide range of new products about to be introduced for the best value, most reliable home computer in the world.

What other computer includes a Z80

micro processor? Faster than any other machine in the Aquarius price range, plus 49 moving keys, 16 colour display, built-in Microsoft BASIC and the manual that Which Micro called "An example to the rest of the computer world" — all for £60.

Peripherals available now include — the data recorder for perfect information storage, a mini-expander for super game playing and a thermal dot matrix printer for

taking hard copies from on-screen information.

Additions to the Aquarius range in the next few months will include a 32K RAM pack for writing more complex programmes and a four-colour printer/plotter for exciting graphic reproduction. And, of course, week by week the Aquarius business, education and games software library grows larger and larger.

Look out too for the Aquarius Magazine — your chance to contribute tips, programs and articles to your very own computer magazine.



Huge range of cassettes and cartridges with more becoming available each month.

Manufactured and sold by Radofin Electronics (UK) Ltd.,
Hyde House, London NWS 6LG.
Telephone: 01-205 0044 Telex: 923624 FIPLCG
Trade enquiries welcome.

Available through many leading retailers — including
Harrods — Menzies — Carrefour — Asda.

SOFTWARE FILE

(continued from page 185)

```

B70:
B80:
B90DEF PROCBSQUARE(X,Z)
9000DEFNFX(X,Z),FNY(X,Z):DRAW FNX(X,Z-2STEP),FNY(X,Z-2STEP):MOVENFX(X,Z),FNY(X,Z):DRAWNFX(X,Z-2STEP),FNY(X,Z-2STEP)
910ENPROC
920:
930:
940DEF PROCFILL(X,Z)
950MOVENFX(X,Z),FNY(X,Z):MOVENFX(X-2STEP,Z),FNY(X-2STEP,Z):GOTO 970
960DEFNFX(X,Z-2STEP),FNY(X,Z-2STEP):PLOTES,FNX(X,Z),FNY(X,Z):GOTO 970
970DEFNFX(X,Z-2STEP),FNY(X,Z-2STEP)
980MOVENFX(X,Z),FNY(X,Z):DRAWNFX(X-2STEP,Z),FNY(X-2STEP,Z)
990:
990:
1000DEF PROC LINE(Z)
1010FOR X=XSTART TO XSTOP-2STEP STEP 2STEP
1020IF F4="E" THEN PROC FILL(X,Z) ELSE PROCBSQUARE(X,Z)
1030NEXT X:DRAWNFX(XSTOP,Z-2STEP) FNY(XSTOP,Z-2STEP)
1040ENPROC

```

URI after each section in the menu. The computer will then use the values which are flashing. If you want to use your own values, you simply type them in. 1250VUI:PRINT in the appropriate places. Your value will then override the flashing ones, so the next time the menu appears you can decide for each one whether or not to change it or leave it as it is. 1260PRINT. The only problem with this program is that it takes rather a long time, especially if you use a large number of steps, which is necessary if you want a detailed graph.

```

1270DEFNFX(X,Z-2STEP):GOTO 970
1280DEFNFX(X,Z-2STEP):GOTO 970
1290DEFNFX(X,Z-2STEP):GOTO 970
1300DEFNFX(X,Z-2STEP):GOTO 970
1310DEFNFX(X,Z-2STEP):GOTO 970
1320DEFNFX(X,Z-2STEP):GOTO 970
1330DEFNFX(X,Z-2STEP):GOTO 970
1340DEFNFX(X,Z-2STEP):GOTO 970
1350DEFNFX(X,Z-2STEP):GOTO 970
1360DEFNFX(X,Z-2STEP):GOTO 970
1370DEFNFX(X,Z-2STEP):GOTO 970
1380DEFNFX(X,Z-2STEP):GOTO 970
1390DEFNFX(X,Z-2STEP):GOTO 970
1400DEFNFX(X,Z-2STEP):GOTO 970

```

Vic-20 auto line numbering.

```

10 DATA 169,40,133,0,133,2,133,3
20 DATA 133,4,169,49,133,1,120,169
30 DATA LB,141,20,3,169,HB,141,21
40 DATA 3,88
50 DATA 96,165,211,201,1,208,6,169
60 DATA 32,197,197,240,3,76,191,234
70 DATA 169,0,133,211,169,48,162,4
80 DATA 213,0,208,5,202,224,255,208
90 DATA 247,232,134,198,160,0,136,181
100 DATA 0,153,119,2,200,202,224,255
110 DATA 208,245,230,198,169,32,153,119
120 DATA 2,162,1,246,0,169,58,213
130 DATA 0,208,9,169,48,149,0,232
140 DATA 224,5,208,239,76,191,234
150 Z=0
151 T=PEEK(55)+256*PEEK(56)
152 T=T-105:LB=(T/256-INT(T/256))*256:HB=INT(T/256)
153 POKE55,LB:POKE56,HB
154 LB=LB+27:IF LB>255 THEN LB=LB-256:HB=HB-1
160 FOR X=T TO T+104
170 READ Y$
172 IF Y$="HB" THEN Z=Z+HB:POKE X,HB:NEXT
174 IF Y$="LB" THEN Z=Z+LB:POKE X,HB:NEXT
176 Y=VAL(Y$):Z=Z+Y:POKE X,Y
180 NEXT X
190 IF Z>13063+LB+HB THEN PRINT "ERROR IN DATA - PLEASE RE-ENTER":END
200 PRINT "SYS(0) TO START"
210 PRINT "SYS(1) TO STOP/RESTORE TO END"
220 PRINT "SYS(2) TO RESUME"
230 SYS(T)
240 NEW

```

CBM-64 auto line numbering.

```

10 DATA 169,48,133,2,133,4,133,5
20 DATA 133,6,169,49,133,3,120,169
30 DATA 27,141,20,3,159,192,141,21
40 DATA 3,88
50 DATA 96,165,211,201,1,208,6,169
60 DATA 60,197,197,240,3,76,49,234
70 DATA 169,0,133,211,169,48,162,4
80 DATA 213,2,208,5,232,224,255,208
90 DATA 247,232,134,198,160,0,136,181
100 DATA 2,153,119,2,200,202,224,255
110 DATA 208,245,230,198,169,32,153,119
120 DATA 2,162,1,246,0,169,58,213
130 DATA 0,208,9,169,48,149,0,232
140 DATA 224,5,208,239,76,49,234
150 Z=0
160 FOR X=49152 TO 49256
170 READ Y:Z=Z+Y:POKE X,Y
180 NEXT X
190 IF Z>13045 THEN PRINT "ERROR IN DATA - PLEASE RE-ENTER":END
200 REM ** SYS (49152) TO START **
210 REM ** SYS (49256) OR RUN-STOP/RESTORE TO END
220 REM ** SYS (49166) TO RESUME **
230 SYS (49152)
240 NEW

```

Auto Number

Clifford Miller,
Orlando,
Florida,
U.S.A.

VIC-20

CBM-64

I FOUND GERALD DALY'S program in the November, 1983 issue of *Your Computer* for automatic line numbering on the Vic-20 very useful. However, I was unhappy to find that the program was designed for an unexpanded Vic. If it were to be run on a Vic-20 with memory expansion, all of the extra RAM would be lost.

I have modified Mr Daly's program to be used on a Vic-20 with any amount of memory expansion. The routine is stored at the top of RAM and the additional memory is preserved. The program runs exactly like Mr. Daly's except that the SYS commands to be used for the amount of RAM present are printed on the screen. Also since the start of Basic varies as the Vic-20 is expanded, it may be necessary to SYS to a location other than 4096 when interrupting the routine so that the system will not crash.

This same program will also run on the Commodore 64 with minor modifications. To enable automatic line numbering on the 64, type SYS(49152). It can be disabled by a SYS(2048) or by hitting Run-Stop/Restore. Resume with a SYS(49166).

To use either of these versions of Auto Number, load the program, type Run, and hit Return. To call a new line number, hit the space bar while the cursor is in the first column of a line, just as you would in the original program.

Function Keys

Robert Young,
Chichester,
Sussex.

SPECTRUM

THE SPECTRUM DOES NOT have a function key facility, and so I have written a machine-code program which allows any number of keys to be programmed very easily. This includes all the legends on the keys, the graphic symbols and the user-defined graphics, so that, for instance, the Print token can be programmed separately to the P and Tab. Of course, you will only wish to define keys you are unlikely to use for their normal

(continued on next page)

SOFTWARE FILE

(continued from previous page)
purpose.

The definitions of keys should be put in separate Rem statements at the very beginning of the program. You should follow the line number and Rem by the symbol you wish to program, a colon, and then the definition. The definition can be any combination of characters, graphics and legends. If you want it to execute automatically then end it with the hash — # — character. If a syntax error is found when the line is executed, the line will be displayed at the bottom of the screen with a question mark as normal. Note that a key whose definition is just a hash, will act as an enter key.

The colon that must be put between the key to be defined and the definition not only conveniently separates the two but also puts the computer into K mode. If, however, you wish to start the definition with a letter of the alphabet which cannot be accessed in this mode, it is necessary to type any token or symbol that puts the computer into L mode, such as a keyword, then to type the character you want and finally to go back and delete whatever you used.

Rather than search through the whole program for key definitions, the program stops looking as soon as it finds the first proper program line. Therefore all the definitions must be put before the main program. This can be quite useful if you want a key which has been programmed to revert to its normal purpose temporarily.

Rather than deleting the definition all you

need to do is change its line number so that it is, for instance, at the end of the program. Then at a later date you can change it back again. Lastly if a key is defined twice, it is the definition nearest the beginning of the program that will be taken. Note that a programmed key will repeat if held down.

The machine code is included in the data statements of the Basic program. The ninth figure of each statement is, however, the sum of the first eight and this is used by the program to check for errors in the data. Enter the Basic program, save it just to be on the safe side, and then run it. If an error is found the program will display the message Error In Line, followed by the line in which the error occurred. Note that the Basic program automatically alters the machine code if you have a 48K Spectrum, so that it is located at the top of memory — the actual data given is for the 16K model.

The program will then display Prepare To Save and the normal message will appear at the bottom of the screen. You may then save the machine code. After this it will print Prepare To Verify. Rewind the tape to the point where you started saving the code and the program will verify it automatically. If this is completed successfully, the Basic program will New itself leaving the machine code located at address 32348 for 16K machines or 65129 for 48K. In future, to load the machine code, type

CLEAR 32347

for the 16K or

CLEAR 65126

for the 48K, followed by

LOAD "" CODE

The program must be turned on before it will work. This is done by:

"RANDOMIZE USR 32479" (16K)

or

"RANDOMIZE USR 65260" (48K)

To turn it off type:

"RANDOMIZE USR 32486" (16K)

or

"RANDOMIZE USR 65237" (48K)

Here are a few examples of key definitions

```
1 REM !! PAPER 7: INK 0: CLS: BORDER 7
#
2 REM !! PRINT 65536 - USR 7962#
3 REM NEW: INPUT A$: IF A$ = "Y" THEN
  NEW #
4 REM !!
```

Rem 1 will reset all the colours — white paper and border, black ink — at a press of symbol shift — 1. This is useful if you are developing a program using a strange combination of colours. Often, after stopping such a program, the listing is almost unreadable.

Rem 2 will print out how much free memory you have left on typing a full-stop.

Rem 3 is a safeguard against Newing a program accidentally. On pressing New, you must input a string. If you enter Y the program will New. Anything else will mean that key press is ignored. Enter the New after the Rem by typing a colon, followed by the New then deleting the colon.

Finally Rem 4 allows you to type in quantities of data far quicker. It makes the space key act as a comma, avoiding the need for using the shift key.

```
10 DATA 255,243,229,213,197,24
5,205,107,1694
11 DATA 126,241,193,209,225,25
1,201,253,1699
12 DATA 203,1,110,200,33,0,0,5
7,604
13 DATA 235,237,123,61,92,225,
1,127,1101
14 DATA 16,167,237,66,233,249,
192,42,1204
15 DATA 83,92,24,2,235,9,35,35
,515
16 DATA 78,35,70,35,84,93,126,
254,775
17 DATA 234,192,35,38,8,92,190
,32,841
18 DATA 235,35,126,254,53,32,2
29,35,1004
19 DATA 126,254,13,40,223,11,1
1,11,689
20 DATA 11,197,229,42,91,92,20
5,85,952
```

```
21 DATA 22,19,237,83,91,92,35,
235,814
22 DATA 225,193,237,176,235,43
,126,254,1489
23 DATA 35,40,8,205,29,17,253,
203,190
24 DATA 1,174,201,1,1,0,205,23
2,815
25 DATA 25,62,13,50,8,92,253,2
03,706
26 DATA 1,238,201,62,40,237,71
,23,1087
27 DATA 94,201,62,62,237,71,23
7,86,1050
28 DATA 201,0,0,0,0,0,0,201
100 LET A=32348: IF PEEK 23732+
256*PEEK 23733>32767 THEN LET A=
65129
105 PRINT "PLEASE WAIT"
110 RESTORE : FOR F=0 TO 18: LE
T T=0: FOR G=0 TO 7
120 READ D: POKE A+F*8+G,D: LET
```

```
t=t+d
130 NEXT G: READ D: IF D<>T THE
N PRINT "ERROR in line ";f+10:
STOP
140 NEXT F
150 IF A=65129 THEN POKE 65261,
9: POKE 65136,120: POKE 65137,25
4
160 PRINT "PREPARE TO SAVE 'Fu
nc keys'"
170 SAVE "Func keys"CODE A,150
180 PRINT "PREPARE TO VERIFY '
Func keys'"
190 VERIFY "Func keys"CODE A,15
0
200 PRINT "ON : ";a+131"OFF
: ";a+138
210 PRINT "Press any key to NE
w basic prog."
220 PAUSE 0
230 CLEAR A-1: NEW
```

Copy function

A Tugwell,
Walton-on-Thames,
Surrey.



USING THE COPY command on the ZX-81 is a simple and effective way of dumping the contents of the screen to the ZX Printer but it does have one drawback — it copies the whole of the screen even though the bottom half or more is blank.

The routine that I wrote to solve this problem is 51 bytes in length and, for a change, is slower than the equivalent Basic. It will also only work with a fully expanded

display file.

If listing 1 is entered and Run it will list itself on the printer and the string prompts will appear. If the hex digits in listing 2 are now entered followed by the letter S the program will Poke the routine into the Rem statement at line 1 and then jump to line 200. Listing 2 will be displayed on the screen and copied from there to the printer by the routine.

If you study lines 330 to 330 you will see that the routine will only copy down to the line where the last "printing" has occurred.

If everything has been entered correctly you should finish up with listings 1 and 2 exactly as shown although those with economy in mind should omit lines 10, 20 and 30.

Listing 1

```
1 REM 00000000000000000000000000000000
000000000000000000000000000000000000
000
10 LPRINT "LISTING 1"
20 LPRINT
30 LIST
40 LET X=16514
50 LET Q$=""
60 IF Q$="" THEN INPUT Q$
70 IF Q$="S" THEN GOTO 200
80 POKE X,16+CODE Q$+CODE Q$(2)
90 IF PEEK 16442=2 THEN SCROL
L
100 PRINT X: " ";Q$(1 TO 2)
110 LET Q$=Q$(3 TO )
120 LET X=X+1
130 GO TO 60
140 CLS
150 FOR N=16514 TO 16564 STEP 8
160 PRINT N: " "
170 FOR O=0 TO 7
180 LET Q=PEEK (N+O)
190 LET H=INT (Q/16)
200 LET L=Q-16*H
210 LET Q$=CHR$(H+28)+CHR$(L+
220 PRINT " ";Q$;
```

(continued on page 191)

Telephone 0924-402337

Vic 2C	£15
Pro Ace Commodore 64	£12
Vic 2C	£12
Cambridge IComplete	£33
Spectrum	£33
Clares Pairi Propertona	£16
BBC	£16

C15 Cassettes 10 for £4.50	
Wubesh Disks 5 1/4"	
S S S D 401	10 for £17
S S S D 401	10 for £20
S S S D 401	10 for £22
S S D 801	10 for £28

JOYSTICKS

7.97	7.15
7.90	7.15
7.85	7.15
7.80	7.15
7.75	13.00
7.70	13.15
6.95	5.35
6.90	5.35
6.85	5.35
6.80	5.35
6.75	7.5
6.70	7.5
6.65	7.5
6.60	7.5
6.55	7.5
6.50	8.85
6.45	8.85
6.40	8.85
6.35	8.85
6.30	8.85
6.25	13.00
6.20	13.15
6.15	7.5
6.10	7.5
6.05	7.5
6.00	7.5
5.95	7.5
5.90	7.5
5.85	7.5
5.80	7.5
5.75	7.5
5.70	7.5
5.65	7.5
5.60	7.5
5.55	7.5
5.50	7.5
5.45	7.5
5.40	7.5
5.35	7.5
5.30	7.5
5.25	7.5
5.20	7.5
5.15	7.5
5.10	7.5
5.05	7.5
5.00	7.5
4.95	7.5
4.90	7.5
4.85	7.5
4.80	7.5
4.75	7.5
4.70	7.5
4.65	7.5
4.60	7.5
4.55	7.5
4.50	7.5
4.45	7.5
4.40	7.5
4.35	7.5
4.30	7.5
4.25	7.5
4.20	7.5
4.15	7.5
4.10	7.5
4.05	7.5
4.00	7.5
3.95	7.5
3.90	7.5
3.85	7.5
3.80	7.5
3.75	7.5
3.70	7.5
3.65	7.5
3.60	7.5
3.55	7.5
3.50	7.5
3.45	7.5
3.40	7.5
3.35	7.5
3.30	7.5
3.25	7.5
3.20	7.5
3.15	7.5
3.10	7.5
3.05	7.5
3.00	7.5
2.95	7.5
2.90	7.5
2.85	7.5
2.80	7.5
2.75	7.5
2.70	7.5
2.65	7.5
2.60	7.5
2.55	7.5
2.50	7.5
2.45	7.5
2.40	7.5
2.35	7.5
2.30	7.5
2.25	7.5
2.20	7.5
2.15	7.5
2.10	7.5
2.05	7.5
2.00	7.5
1.95	7.5
1.90	7.5
1.85	7.5
1.80	7.5
1.75	7.5
1.70	7.5
1.65	7.5
1.60	7.5
1.55	7.5
1.50	7.5
1.45	7.5
1.40	7.5
1.35	7.5
1.30	7.5
1.25	7.5
1.20	7.5
1.15	7.5
1.10	7.5
1.05	7.5
1.00	7.5
0.95	7.5
0.90	7.5
0.85	7.5
0.80	7.5
0.75	7.5
0.70	7.5
0.65	7.5
0.60	7.5
0.55	7.5
0.50	7.5
0.45	7.5
0.40	7.5
0.35	7.5
0.30	7.5
0.25	7.5
0.20	7.5
0.15	7.5
0.10	7.5
0.05	7.5
0.00	7.5
-0.05	7.5
-0.10	7.5
-0.15	7.5
-0.20	7.5
-0.25	7.5
-0.30	7.5
-0.35	7.5
-0.40	7.5
-0.45	7.5
-0.50	7.5
-0.55	7.5
-0.60	7.5
-0.65	7.5
-0.70	7.5
-0.75	7.5
-0.80	7.5
-0.85	7.5
-0.90	7.5
-0.95	7.5
-1.00	7.5
-1.05	7.5
-1.10	7.5
-1.15	7.5
-1.20	7.5
-1.25	7.5
-1.30	7.5
-1.35	7.5
-1.40	7.5
-1.45	7.5
-1.50	7.5
-1.55	7.5
-1.60	7.5
-1.65	7.5
-1.70	7.5
-1.75	7.5
-1.80	7.5
-1.85	7.5
-1.90	7.5
-1.95	7.5

COMMODORE 64

YOUR COMPUTER, APRIL 1984 189

**is Britain's biggest selling
computer magazine —
subscribe
today!**

Take out a year's subscription to Your Computer today and enjoy the pleasure of receiving your favourite home magazine every month in the comfort of your home. **Simply fill in the form below and return to the address stated, today.**



(continued from page 198)

```

290 IF N+O=16564 THEN GOTO 330
300 NEXT O
310 PRINT
320 NEXT N
330 LPRINT
340 LPRINT "LISTING 2"
350 LPRINT
360 RAND USR 16514
370 LPRINT
380 LPRINT "PROGRAMME FINISHED"
390 STOP

```

Listing 2.

၁၂၃၄၅၆၇၈၉၁၀၁၁၂၁၃၁၄၁၅၁၆၁၇၁၈၁၉၂၀
၂၁၂၂၂၃၂၄၂၅၂၆၂၇၂၈၂၉၃၀၃၁၃၂၃၃၃၄
၃၅၃၆၃၇၃၈၃၉၄၀၄၁၄၂၄၃၄၄၄၅၄၆၄၇
၄၈၄၉၅၀၅၁၅၂၅၃၅၄၅၅၅၆၅၇၅၈၅၉၆၀
၆၁၆၂၆၃၆၄၆၅၆၆၆၇၆၈၆၉၇၀၇၁၇၂၇၃
၇၄၇၅၇၆၇၇၇၈၇၉၈၀၈၁၈၂၈၃၈၄၈၅၈၆၈၇
၈၈၈၉၉၀၉၁၉၂၉၃၉၄၉၅၉၆၉၇၉၈၉၉၁၀၀၁

W Lythgoe,
Shevington.
Wigan.



THIS PROGRAM TRANSFORMS drawings up to 50 by 50 pixels in size when they are expressed in PLOT and DRAW statements. Two examples are given and then you can Input your own drawing.

First draw the diagram on 50 by 50 graph

paper and write it out in Plot and Draw statements. Count the number of Draw statements and Enter this. Then Enter the co-ordinates as required.

To add your drawing to the data statements
change line 110 to:

For $m = 1$ TO 4

and add a new data line, following the Rem instructions in line 4990.

Further data lines can be added, increasing the final number in line 110 by 1 for each diagram.

```

10 REM transform
20 REM W. Lythgoe
110 FOR m=1 TO 3
120 IF m<>3 THEN GO SUB 500
130 IF m=3 THEN GO SUB 1000
135 DIM c(j+1): DIM d(j+1)
140 FOR n=1 TO 33
175 FOR i=1 TO j+1
180 LET c(i)=0: LET d(i)=0
185 NEXT i
187 INK RND*4
188 GO SUB 2000+10*n
190 FOR i=1 TO j+1
200 IF i=1 THEN PLOT a+x(i)*p,b
+y(i)*q
210 IF i>1 THEN DRAW c(i)+x(i)*
p,d(i)+y(i)*q
220 NEXT i
250 BEEP .5,n-12
255 CLS
260 NEXT n
270 NEXT m
280 STOP
500 READ j
510 DIM x(j+1)
520 DIM y(j+1)
530 FOR i=1 TO j+1
540 READ x(i): READ y(i)
550 NEXT i
560 RETURN

```

```

1000 INPUT "How many DRAWS?";j
1010 DIM x(j+1)
1020 DIM y(j+1)
1030 FOR i=1 TO j+1
1040 IF i=1 THEN INPUT "PLOT x c
o-ord?";x(i); INPUT "PLOT y co-
ord?";y(i)
1050 IF i>1 THEN INPUT "DRAW x c
o-ord?";x(i); INPUT "DRAW y co-
ord?";y(i)
1060 NEXT i
1070 RETURN
2010 PRINT "TRANSLATIONS": PAUSE
2001 LET a=0: LET b=0: LET p=1:
LET q=1:
2015 RETURN
2020 LET a=50: RETURN
2030 LET a=0: LET b=50: RETURN
2040 LET a=50: RETURN
2050 LET a=100: LET b=0: RETURN
2060 LET b=100: RETURN
2070 LET a=0: RETURN
2080 PRINT "REFLECTIONS": PAUSE
2001 LET b=0: RETURN
2090 LET a=100: LET p=-1: RETURN
2100 LET p=1: RETURN
2110 LET a=100: LET b=100: LET q
=-1: RETURN
2120 LET q=1: RETURN
2130 LET p=-1: RETURN
2140 LET a=0: LET p=1: RETURN

```

```

2150 LET q=-1: RETURN
2160 PRINT "ROTATIONS THROUGH 90
DEGREES": PAUSE 200: LET q=1: L
ET b=0: RETURN
2170 LET p=-1: LET q=1: GO SUB 3
000: LET a=a+50: RETURN
2180 LET q=-1: LET a=50: LET b=5
0: RETURN
2190 LET p=1: GO SUB 3000: LET b
=b+50: RETURN
2200 PRINT "ENLARGEMENTS": PAUSE
200: LET a=0: LET b=0: LET p=1:
LET q=1: RETURN
2210 LET p=2: RETURN
2220 LET p=3: RETURN
2230 LET p=1: LET q=2: RETURN
2240 LET q=3: RETURN
2250 LET p=2: LET q=2: RETURN
2260 LET p=3: LET q=3: RETURN
2270 PRINT "DISTORTIONS": PAUSE
200: LET a=0: LET b=0: LET p=1:
LET q=1: RETURN
2280 GO SUB 3100: RETURN
2290 LET q=2: GO SUB 3100: RETUR
N
2300 LET q=3: GO SUB 3100: RETUR
N
2310 LET p=2: GO SUB 3100: RETUR
N
2320 LET p=3: GO SUB 3100: RETUR
N
2330 LET p=1: LET q=1: RETURN
3000 FOR i=1 TO j+1
3005 LET a=p*(y(i)-x(i))
3010 LET c(i)=p*(y(i)-x(i))
3015 LET b=q*(x(i)-y(i))
3020 LET d(i)=c*(x(i)-y(i))
3030 NEXT i
3040 RETURN
3100 FOR i=1 TO j+1
3110 LET c(i)=p*.5*(y(i)-x(i))
3120 NEXT i
3130 RETURN
4990 REM First no. in each DATA
line is no. of DRAWS. 2nd and
3rd nos. are PLOT co-ords.
Subsequent nos. are DRAW co-ords
5000 DATA 3,0,0,50,0,0,50,-50,-5
0
5010 DATA 32,15,0,5,1,2,1,9,0,5,
2,4,4,0,6,-2,3,-3,0,2,-7,-5,-5,-
7,-2,5,4,1,5,-1,6,-3,5,-3,4,2,3,
0,5,-2,3,-2,10,-4,-10,-2,0,-3,10
,-3,-10,-2,-5,0,-4,2,-3,-4,-7,-1
,-9,1,-6,5,-3,6,-1

```

Mazen Kisawi,
North Ahmadi,
Kuwait.



THIS PROGRAM enables ZX-81 users to define their own characters, using a ZX Printer. Before entering the program type New and
POKE 16389,124

Now type in the program and run it.

In the top left-hand corner of the screen line 1 will be repainted, and the program then waits

for an input. The character will be defined on an eight-by-eight grid.

Whenever you want a dot on the first line, enter a full stop. Whenever you want a blank, input a space. This continues for eight lines, working horizontally.

After the character has been defined you can either move on to another character or type in Plot. After that there will be a short pause before the character is printed on the printer. To save any character use the string-saving method. A character is defined between BS (1) and BS (8).

```

1 IF PEEK 16388+256*PEEK 1638
9=31744 THEN GOTO 5
2 POKE 16384,21
5 FOR I=0 TO 112
6 POKE 31744+I,PEEK (2161+I)
7 NEXT I
8 POKE 31800,63
9 POKE 31857,201
12 DIM A$(32,9)

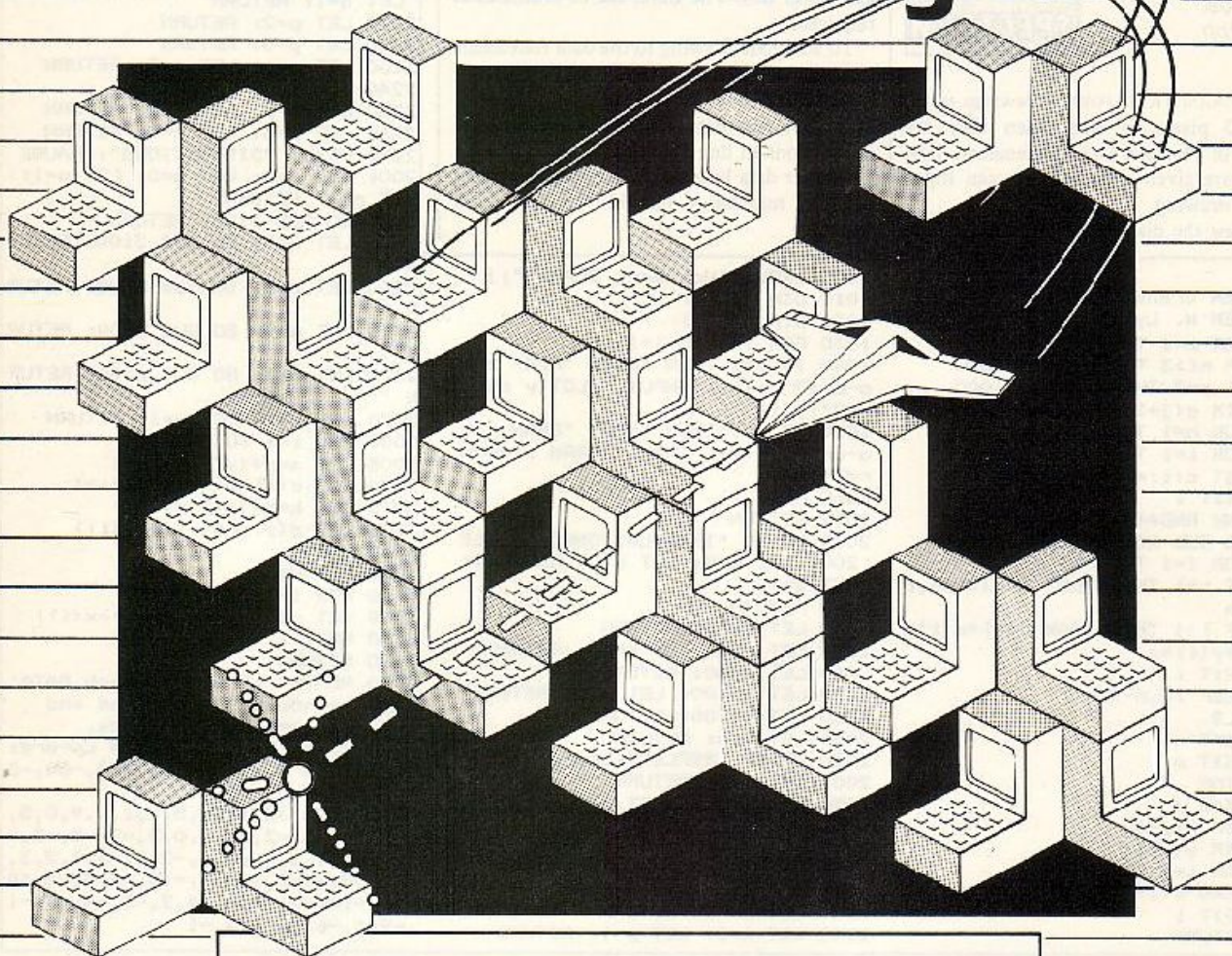
```

```

15 FOR N=1 TO 32
20 FOR A=1 TO 8
30 LET C=0
40 PRINT AT 0,0;"LINE ";A
41 INPUT B$
42 IF B$="PLOT" THEN GOTO 9998
43 IF LEN B$=3 THEN LET B$=B$+
"
44 IF B$(1 TO 4)="EXIT" THEN PO
KE 16384,13
50 IF B$(1)="," THEN LET C=C+2
*7
60 IF B$(2)="," THEN LET C=C+2
*6
70 IF B$(3)="," THEN LET C=C+2
*5
80 IF B$(4)="," THEN LET C=C+2
*4
90 IF B$(5)="," THEN LET C=C+2
*3
100 IF B$(6)="," THEN LET C=C+2
*2
110 IF B$(7)="," THEN LET C=C+2
120 IF B$(8)="," THEN LET C=C+1
130 LET A$=IN,A+1)=CHR$ C
135 PRINT AT 21,0;C
140 NEXT A
145 CLS
150 NEXT N
9990 FOR J=1 TO 32
9991 FOR K=1 TO 8
9992 POKE 32255+K+8*(J-1),CODE A
$(J,K+1)
9993 NEXT K
9994 NEXT J
9995 FOR H=0 TO 31
9996 POKE 16444+H,H
9997 NEXT H
9998 LET HPRINT=USR 31744
9999 POKE 16384,126

```


Explore the Microcomputer Age at the NEC Birmingham



May 4-7

Open 10 am-6 pm daily.
10 am-5 pm Monday.

Explore the excitement and fascination of new technology first hand and see how microcomputers can entertain as well as help in everyday life.

All types of microcomputers plus the necessary accessories and software will be on display with expert advice instantly available. Business visitors to the show will be able to see a wide range of products designed for commercial use on many stands at the show.

So make sure that you visit the Midland Computer Fair and see for yourself what the microcomputer age really means.

Entry for adults is only £2.50 while children under 16 and senior citizens is only £1.50.

For special party rates and further information contact:
The Exhibition Manager, The Midland Computer Fair, Reed Exhibitions,
Surrey House, 1 Throwley Way, Sutton, Surrey SM1 4QQ.

THE Midland
**Computer
Fair**

Sponsored by
**YOUR
COMPUTER**

**Practical
Computing**

UNLIKE MOST of our competitions, February's contained an extremely tough puzzle. It succeeded in weeding out all but a handful of entries — six to be precise.

The problem was that if you started out by assuming that all six black bricks may be salvaged you were bound to fail. There are 2,900,000 permutations of movement order and direction on this assumption; and none of them work.

In fact the maximum number of bricks you can set free is four. And the minimum number of bricks you can destroy on the way is 36, including two black bricks. The correct order of movement and direction is as follows:

1. Brick 6 to the south-east
2. Brick 4 to the north-west
3. Brick 3 to the north-east
4. Brick 2 to the north-west
5. Brick 1 to the south-east

It does not matter how the brick with five dots moves since brick 6 collides with it. Both are consequently destroyed.

Two of the six correct entries mentioned that they had used a computer to solve the puzzle. If the others did not rely on a program solution they must have been blessed with either luck or inspiration.

I. Llewellyn-Jones, 2A Elmbridge Road, Gloucester, GL2 0NZ pro-

grammed a Spectrum to crack the puzzle. It ran for 10 hours before coming up with the solution. He complains that this marathon created

all sorts of thermal stresses and strains to the machine and himself.

He should be mollified to learn that his tie-breaker wins him the prize of a Memotech

MTX 500. The opening sentence read "At work and

at play a Memotech would make my day". He completed it by adding "with memory galore, sixteen colours and more, what a splendid give away".

The other program solution came from Yugoslavia. Jovan Puzovic also used a Spectrum which again took 10 hours over it. His tie-breaker read simply, "joyful and gay".

Most contenders struck a similar poetic note. From D. Stanford came "with many problems soon made light by solving puzzles through the night"; A. Gran suggested "its styling is striking, its memory inviting, please I want one today"; and K. Cross offered "it's the best, it's clear every day of the year".

Others deserving of a mention were J. Middleton's "with features unique and design so sleek" and R. Pendall's "for accounting or counting, it's money well spent".

MEMOTECH

Competition RESULTS



THE FABULOUS CASSETTE



FROM **Cascade**

VALUE that's out of this world

50 GAMES ON ONE CASSETTE

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

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

EXPRESS DELIVERY-ORDER NOW

Name

Address

Post Code

Country

Dealers & Stockists enquiries welcome.

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

£ made payable to Cascade Games Ltd.

Please debit my ☐ No.

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



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

YC 4/84

Together the biggest marketplace in Britain

Manchester

NOV 22-24, 1984 BELLE VUE

Birmingham

MAY 4-7, 1984 N.E.C.

London

JUNE 14-17, 1984 EARLS COURT

Success breeds success and that's certainly true of The Computer Fair series of exhibitions.

By including the Computer Fair series in your marketing plan you can reach three large groups of customers from the consumer, business and trade markets with your products throughout the year, and time new launches to coincide with the shows, adding interest and stimulating demand.

The continuing growth of The Computer Fair series is evidence of their success. You can be part of that success if you take a stand at the shows. To find out how simply ring Chris O'Hea on 01-661 3125 or return the coupon below:

THE Computer Fair

*Personal computers
Home computing
Small business systems*

Please send further information on exhibiting at:

Northern Computer Fair - Manchester ☐

Midland Computer Fair - Birmingham ☐

Please tick as applicable

The Computer Fair - London ☐

Name _____

Position _____

Company _____

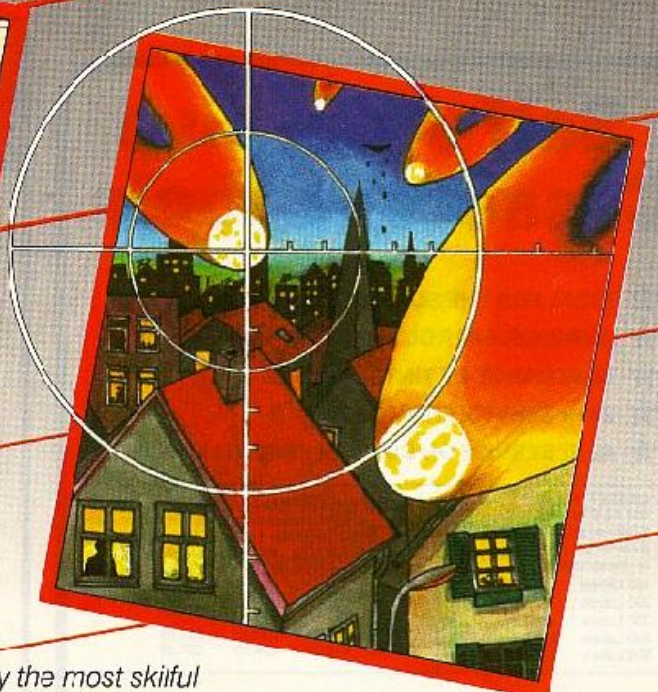
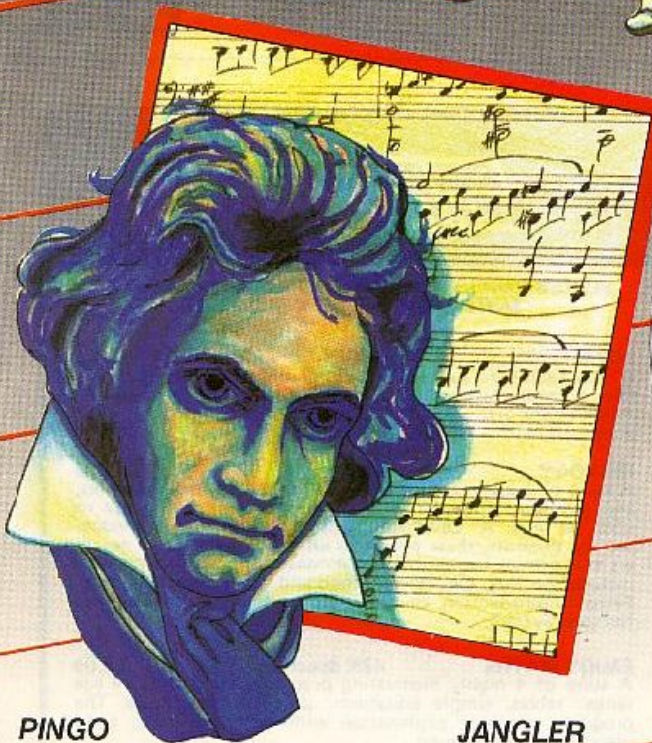
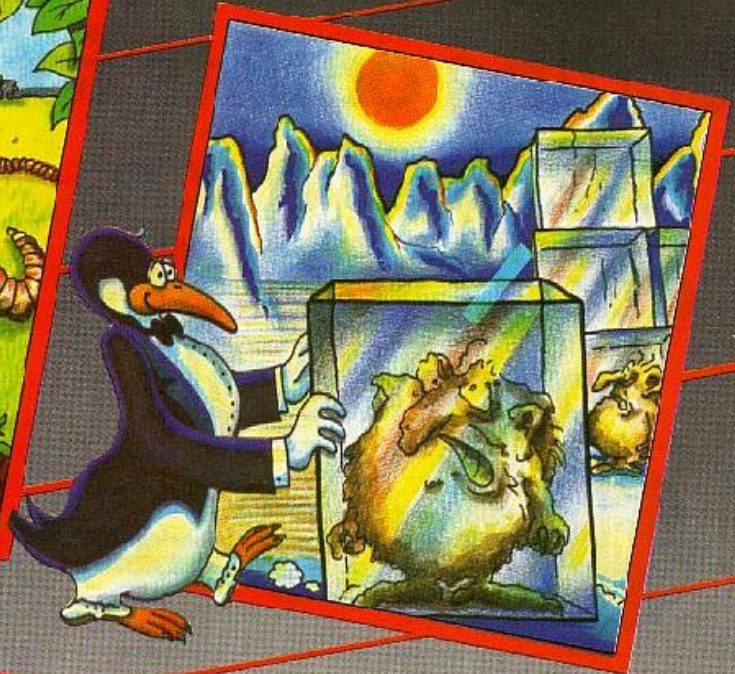
Address _____

Tel No. _____

Return to: The Exhibition Sales Manager,

The Computer Fair, Room L310 Quadrant House, The Quadrant, Sutton, Surrey, SM2 5AS

For The First Time Ever In England



PINGO

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

ZX Spectrum 48k

5.95

SPACE MISSILE COMMAND

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

ZX Spectrum 48k

5.95

JANGLER

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

ZX Spectrum 48k

5.95

MUSIC COMPOSER

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

- ★ fully editable
- ★ synthesizer coming shortly

ZX Spectrum 48k

6.95

Available from your software dealer

profsoft

Dealer enquiries contact telex
Germany 94966 profis d.

GCC are gaining respect as one of the country's leading outlets for the BBC micro and compatible peripherals



GCC (Cambridge) Limited
66 High Street, Sawston, Cambridge CB2 4BG
Telephone: Cambridge (0223) 835330
Telex: 81594 SAWCON

BBC MODEL '3'	£399.00
BBC DISC INTERFACE KIT	£ 78.77
A-B UPGRADE	£ 70.00
Z80 2nd PROCESSOR WITH SOFTWARE	£431.00
GCC ROMEX 13 (Rom expansion)	£ 45.94
GCC EPROM PROGRAMMER FOR BBC	PCA
BEEBASE (Data Base Rom)	£ 45.94
WORDWISE	£ 44.85
PASCAL ROM	£ 67.85
FORTH ROM	£ 39.93

TEAC Slim-line

Disc Drives	
GCC 55A 100K	£160.00
GCC 200K (ultra-sim)	£199.00
GCC 55F 400K	£246.00
GCC 55A2 200K (dual)	£325.00
GCC 55F2 800K (dual)	£505.00
GCC 55A2 + PSU 200K (40/80 Switchable)	£345.00
GCC 55F2 + PSU 800K (40/80 Switchable)	£575.00
Disc drive cables single	£ 12.00
Disc drive cables dual	£ 14.00

Printers

STAR 510 80 col	£251.85
STAR 515 132 col	£277.15
SHINWA CP80	£256.75
NEC PL 8032C	£256.75
Printer Cable for BBC	£ 9.57
JUKI 6100 (Daisy wheel)	£437.00
EPSON FX80	£407.00

Sinclair Computers

ZX Spectrum 16K	£ 99.95
ZX Spectrum 48K	£129.95
ZX Printer	£ 39.95

Other Products

TORCH Z80 Disc Pack	£839.50
APPLE EFROM BLOWER	£ 86.25
GRAPH PAD	£143.75
LIGHT PEN for BBC	POA

Various other software and add-ons for the BBC available from GCC - please phone for details.

STOCK SUBJECT TO PRIOR SALE
ALL PRICES INCLUDE VAT.

Trade and local authority enquiries welcome
Prices correct at time of going to press



Self Adhesive Cassette Labels

- ★ IDEAL FOR THE SOFTWARE COMPANY
- ★ AVAILABLE IN ROLL OR SHEET FORMAT
- ★ NEW RANGE OF TINTED LABELS
- ★ 24 Hr SERVICE FROM STOCK
- ★ 48 Hr SERVICE ON CUSTOM PRINTED LABELS

CASSETTE LABELS
ON A4 SIZE SHEETS
White only, suitable for
small offset printing
or photocopying

100 Labels	£3.50
200 Labels	£6.00
300 Labels	£8.25
400 Labels	£10.00
500 Labels	£12.00

CASSETTE LABELS ON ROLLS
Complete with tractor feed perforations to allow
use in most computer printers. Now available in
white or tinted blue, pink, green or yellow.
Minimum order 500 labels

	500 labels	1000 labels	2000 labels
WHITE	£14.88	£20.70	£31.05
TINTED	£16.90	£24.15	£37.55

All Prices include VAT and postage/ packing
Excellent discounts for large quantities
Please send stamp for printing price lists and sample labels.

Industrial
Process

UNIT A4
SMEED-DEAN CENTRE
EUROLINK INDUSTRIAL ESTATE
SITT NGBOURNE
KENT ME10 3RN
Sittingbourne (0755) 28425

Self Adhesive Computer Labels

Supertast

Silverlind

SILVERLIND LTD 156 Newton Road, Burton-on-Trent
Staffs. DE15 0TR. Tel (0283) 63987

TOWNTEST BBC/B £6.50
A very useful aid for teaching Geography in primary schools, this program tests pupils' knowledge of the locations of major towns and cities in England, Scotland and Wales. Well presented, with a high-resolution map.

BIOLOGY BBC/B £12.50
A suite of programs using text, animated diagrams, examples, and questions to assist in the understanding of Biology to CSE, 'O' and 'A' Level standards. Most suited to individual use by students, these programs also contain material teachers can extract for classroom demonstration. Topics covered include: the Eye, Ear, Heart, Blood and Circulation, Skeleton, Female reproduction, Genetics, Biochemistry and the Central Nervous System.

ENJOY MATHS 48K Spectrum £8.00
A suite of 4 highly motivating programs for the 8-14 age range: tables, simple equations, polygons and areas. The programs combine explanation with tests and make good use of colour and sound.

MASTER DIET PLANNER 48K Spectrum £11.95
The ultimate in diet programs, the MASTER DIET PLANNER contains details of calories, protein, vitamins and other nutrients for 631 foods! The MASTER DIET PLANNER will help you plan a well-balanced diet, including options to restrict fats, cholesterol and salt, or to increase fibre intake - at the same time offering maximum choice of foods. Instructions and Recipe Book included.

ALL PRICES INCLUDE POST & PACKING & VAT

We require good programs to increase our catalogue and pay high royalty rates for published material.

MCODER II

MCODER II - The ultimate interger basic compiler for the 48K Spectrum and 16K ZX81.

Many claims are made about most Basic compilers on the market, but always remember, in programming you don't get anything for nothing. The more features a compiler offers, the slower it will run.

In our opinion, if you are writing games, you don't need floating point routines, and you don't need string handling as it is in BASIC - just high speed integer manipulation to turbo-charge your software.

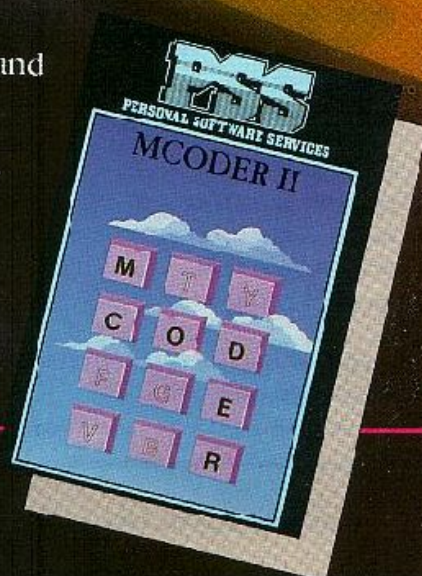
If you are in any doubt that MCODER II is the program you need to give your BASIC programs the instant speed of machine code, why not write or telephone (0203) 667556 for a list of features and a comparison chart showing the relative strengths and weaknesses of the major BASIC compilers currently available.

To give you every confidence in our product, we also offer a NO QUIBBLE GUARANTEE to all mail order customers. If you are not completely satisfied, simply return MCODER II within 7 days of receipt and we will refund your money - no questions asked.

SPECIAL OFFER Purchase MCODER II by mail order and we will knock £2.00 off the price. That means you can buy the Spectrum 48K version for just £7.95 and the ZX81 16K version for £6.95.

NO FRILLS - PURE SPEED

SEND CHEQUE OR P.O. TO P.S.S. 452 STONEY STANTON RD. COVENTRY CV6 5DG. FOR INSTANT CREDIT CARD SALES TEL (0203)667556



NEW RS 232 & PARALLEL PRINTER INTERFACE for ZX SPECTRUM

Connect to professional printers with this Centronics interface.

£39.95

cable £9.95
inc. VAT



ZX Lprint III interface enables your ZX Spectrum computer (16 or 48K) to print on almost any dot matrix or daisywheel printer with RS 232 or Centronics input. Just plug in ZX Lprint III and LPRINT and LIST commands will work. COPY works without any additional software on Seikosha 100 & 250, hi-res Epsoms, Star 510, 515, STX 80, Gemini & Delta, Walters WM80, Shinwa and CTI... Plus Seikosha GP 700 in full colour. COPY on other printers coming soon. And because NO additional software is needed all of your RAM is free to take Tasword 2 or Kemp Business Accounts, Viewfile etc.

**WORD PROCESSING
HIGH RESOLUTION SCREEN DUMPS
PRINTS SPECTRUM AND USER DEFINED GRAPHICS
JUST PLUG IN FOR LPRINT LIST and COPY
COMPATIBLE WITH MICRODRIVES AND
PRESTEL ADAPTOR**

**ORDER: To EURO ELECTRONICS, 26 Clarence Square,
Cheltenham, Glos. GL50 2JP Tel: (0242) 582009**

From: Name: _____
Address: _____

This order is for: _____ (Quantity)
ZX LPRINT III at £34.95 _____
Centronics Cable at £9.95 _____
RS 232 Cable at £9.95 _____
Tasword 2 at £13.90 _____

Cheques PO payable to EURO ELECTRONICS please.
Amount enclosed £ _____
Microdrive adaptor for ZX Lprint I and II £4.50 + 70p p&p

visit the

Prentice-Hall International

**Computer Bookware™
and Software displays**

to see an extensive range of
up-to-date titles at these shops.

LONDON AREA

London: Jarman Business Book Centre, Moorfields.
London: Dillons Q.M.C. Bookshop, Queen Mary College.
London: Dillons University Bookshop, Malet Street.
London: Imperial College Bookshop, Imperial College.
London: Modern Book Co. Ltd, Pried Street.
London: W. & G. Foyle Ltd, Charing Cross Road.
Croydon: Webster's Bookshop, Whitgift Centre.
Uxbridge: Brunel University Bookshop, Brunel University.
Watford: Watford Technical Books, St Albans Road.

EAST

Cambridge: W. Heffer Bookellers, St Tibbs Row.

MIDLANDS

Bedford: Pemberton Booksellers, Mill Street.
Birmingham: Hudsons Bookshop, New Street.
Birmingham: Midland Educational Co. Ltd, Corporation Street.
Cranfield: Cranfield Bookshop, College Road, Whitley End.
Covestry: Hudsons Bookshop, Earl Street.
Covestry: Hudsons Bookshop, Hertford Street.
Keele: Students Bookshop, University of Keele.
Leeds: Austicks Bookshop, Cookridge Street.
Leicester: Bowes & Bowes, Horsefair Street.
Leicester: Hudsons Bookshop Ltd, High Street.
Leicester: University Bookshop, University Road.
Loughborough: Hudsons Bookshop, Loughborough College.

Nottingham: Sissons Paperback Bookshop, Milton Street.
Nottingham: Dillons University Bookshop Ltd, University Park.
Sheffield: Bowes & Bowes, Chapel Walk.
Sheffield: W. Hartley Seed Ltd, West Street.
Wolverhampton: Hudsons Bookshop Ltd, Victoria Street.

NORTH

Chester: Bookland & Co., Church Street.
Liverpool: Bowes & Bowes, Lord Street.
Liverpool: Parry Books Ltd, Brownlow Hill.
Manchester: Haigh & Hochland Ltd, Oxford Road.

Manchester: Sherratt & Hughes, St Ann's Square.

Manchester: W. H. Willshaw Ltd, John Dalton Street.

Newcastle-upon-Tyne: Thorne Student Bookshop, Percy Street.

Stockport: Sherratt & Hughes, Princes Street.

SOUTH

Abingdon: Dene Bookshop, East St Helen Street.
Brighton: Garlands Bookshop, Trafalgar Street.
Brighton: Robinsons Bookshop, Bond Street.
Crawley: Hooks Bookshops Ltd, Haslett Avenue.
Guildford: University Bookshop, University of Surrey.
Guildford: Webster's Bookshop, Turgate Square.
Kingston-upon-Thames: Bates Bookshop, Eden Street.
Oxford: B. H. Blackwell Ltd, Broad Street.
Reading: William Smith Ltd, London Street.
Slough: Carter & Wheeler Ltd, High Street.
Southampton: Bowes & Bowes, Above Bar.
Southampton: Bowes & Bowes, University Bookshop.
Waterloo: Bay Tree Bookshop, London Road.
Wokingham: Bates Booksellers, Peach Street.

WEST

University of Bath: Bowes & Bowes, University Bookshop.
Bristol: George's Ltd, Park Street.
Exeter: George's Bookshop, Sidwell Street.
Exeter: University Bookshop, Stocker Road.
Plymouth: Bookseller, Drake Circus.
Plymouth: George's of Plymouth, Amadei Way.

WALES

Bangor: Bookland & Co., High Street.
Cardiff: H. J. Lear Ltd, Royal Arcade.

SCOTLAND

Aberdeen: James G. Bissett Ltd, Upperkirkgate.
Edinburgh: Bannister Bookellers, George IV Bridge.
Edinburgh: James Thin Ltd, South Bridge.
Edinburgh: Kimptons University Bookshop, Teviot Place.
Glasgow: John Smith & Son, St Vincent Street.



**publishers of computing books
for over 25 years**

for the latest information on all aspects of computing

visit displays of

Prentice-Hall International Computer Bookware and Software

at bookshops throughout the country in April.



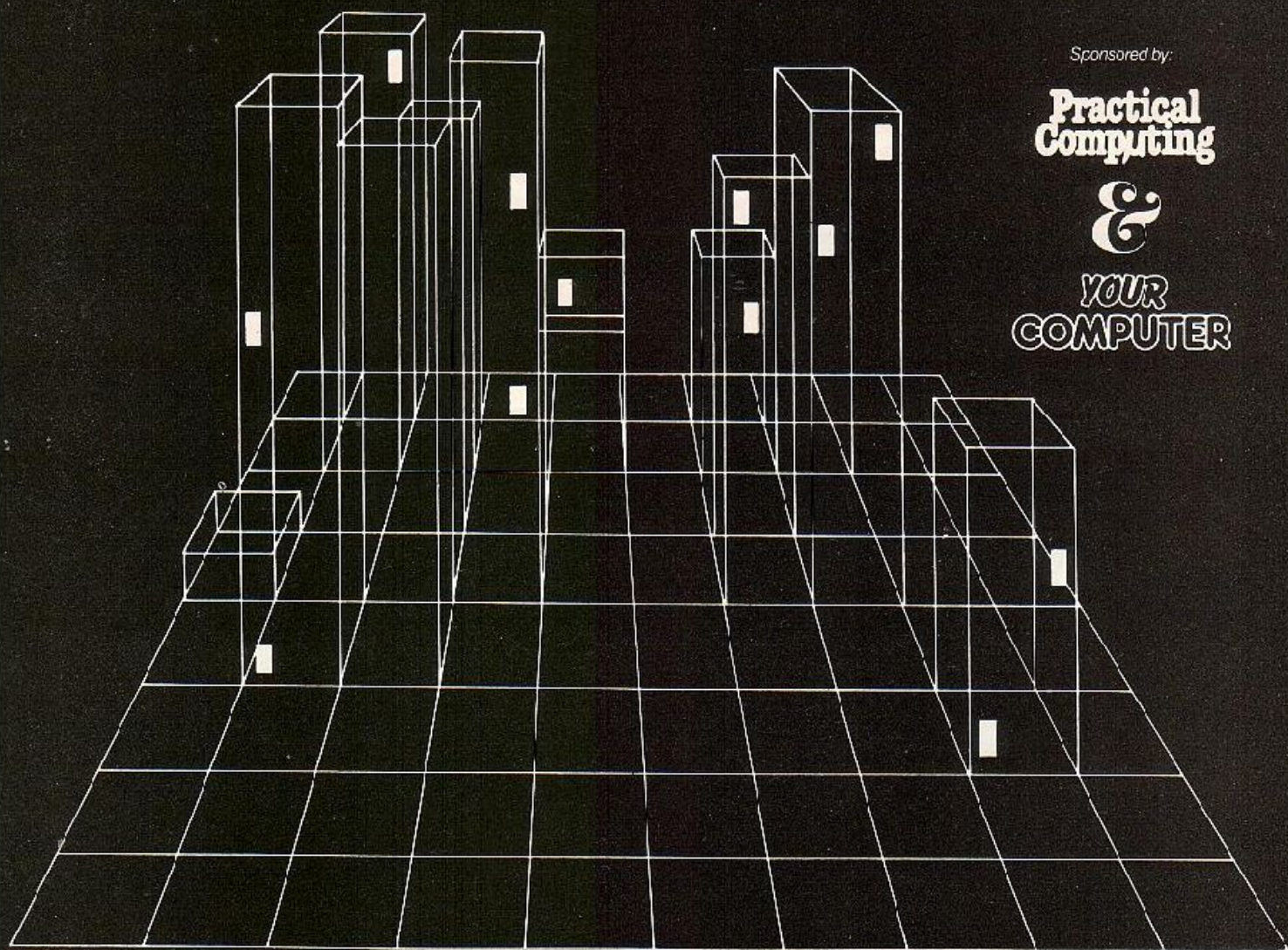
For information on over 400 up-to-date PC and microprocessors titles please write to Jean Walmsley at the address below for our latest catalogue and order form.



Prentice-Hall  International

66 Wood Lane End, Hemel Hempstead, Hertfordshire HP2 4RG, England
publishers of computing books for over 25 years

1984 On Course For Record Computer Sales



Sponsored by:

**Practical
Computing**
&
**YOUR
COMPUTER**

There can be few – if any – comparable exhibitions capable of generating such intense public interest as The Computer Fair series.

As expected, the 1983 Computer Fair, held at Earls Court, has consolidated its position as the major showcase for home and small business computers, to the extent that it became necessary for the original exhibition area to be doubled to a record 2,300 square metres. And all the signs are emerging to support our belief that 1984 will see further growth in an exhibition which provides an unrivalled opportunity for promoting personal computer systems of all kinds.

Sponsored by 'Practical Computing' and 'Your Computer' and organised by Reed Exhibitions, the 1984 London Computer Fair will again be backed by a massive publicity campaign using radio, television and press media. Advance stand reservations are understandably already well up on 1983. If you want to ensure that you do not miss out on a preferential site, you really must fill in the coupon below NOW, and return to the

Exhibitions Manager, The Computer Fair,
Reed Exhibitions, Surrey House, Throwley Way,
Sutton, Surrey. SM1 4QQ

THE
Computer
Fair *Personal computers*
Home computing
Small business systems
Earls Court, London. June 14–17 1984

I am interested in exhibiting at The Computer Fair, Earls Court, London. June 14–17 1984.

Please send full information to

Name _____

Position in Company _____

Company _____

Address _____

Telephone No. _____ Telex _____

INTERCEPTOR
MICRO'S

PRESENTS

CHINA MINER

WRITTEN BY
IAN GRAY

MUSIC BY
CHRIS COX

PRODUCED BY
RICHARD JONES

AN
ORIENTAL
EXPERIENCE
WITH
30 LEVELS!

ONLY
£7.00

SUITABLE FOR THE

commodore 64

INTERCEPTOR
MICRO'S

LINDON HOUSE, THE GREEN, TADLEY, HAMPSHIRE

TEL (07356) 71145

AVAILABLE NOW
FROM BOOKS, LASKY'S AND
ALL GOOD COMPUTER
RETAILERS

LOTHLORIEN



Mikro Moussa

GOES DE-BUGGING



ACTIONMASTER
ONE OF A SERIES OF
GREAT ARCADE GAMES

Any SPECTRUM £5.95 KEMPSTON Joy Stick Compatible.
Look out for COMMODORE '64!

Lothlorien 'ACTIONMASTER', 'WARMMASTER' and 'ADVENTUREMASTER' games are available from John Menzies, Lightning dealers and leading software outlets. For a complete list send for our free colour Catalogue.

M C Lothlorien, 56a Park Lane, Poynton, Cheshire SK12 1AE. Telephone 0625 876642



software | Spectrum Programs

SUPERCHESS 3.0

ABSOLUTELY GUARANTEED ABLE TO BEAT ALL OTHER SPECTRUM CHESS PROGRAMS

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

At the tournament level Superchess 3.0 has a look-ahead of five to seven ply (moves) in the middle game, and ten to twelve ply in the end game. This gives Superchess 3.0 a substantial advantage against other chess programs and promises the experienced player an interesting and challenging game of chess.

Unlike other chess programs, Superchess 3.0 is not just a brute-force calculator, but employs artificial intelligence techniques to allow deeper searching along the main lines of play.

FEATURES:

- 10 levels—all play within tournament time limits.
- First level made especially easy for beginners.
- Easy to use—help menus provided.
- Recommended move option.
- Change sides and level during game.
- Self play mode.
- Set up/change position.
- Technical information—how the program 'thinks'.
- Programs internal score for position displayed.
- Number of evaluated positions displayed.
- Library of opening moves.
- Select your own colour scheme for graphic board display.
- Solve mating problems—up to mate in four.



48K SPECTRUM—Price £8.95

PINBALL WIZARD

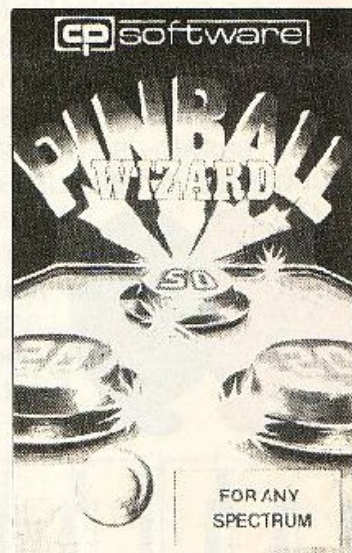
—For any Spectrum

Superb, colourful fast-action graphics and sound give this game the feel of a real arcade pin-table.

With realistic launch, flippers, bumpers, high-score, bonus scores and freeball features.

Be a Wizard!

FOR ANY SPECTRUM £5.95



BRIDGE PLAYER

PLAY AN ENTIRE GAME OF BRIDGE AGAINST YOUR SPECTRUM —WITHOUT GETTING IN THREE FRIENDS FOR THE PURPOSE

Dealing—the program shuffles, deals and sorts the cards to produce randomly dealt hands. An almost infinite number of hands are therefore possible with all kinds of distributions.

Bidding—is in the familiar ACOL system, including Stayman and Blackwood conventions. You bid your hand while the Spectrum bids the other three hands.

Card Play—you play from your own and dummy's hands, which are displayed as they would be at the bridge table, with the program playing the other two hands.

Scoring—at the end of each hand the score is calculated, including honours, slam and rubber points. Both the old and new scores are displayed in the usual manner.

Replay—at the end of each hand, all four hands can be displayed and, if desired, the hand replayed.

48K SPECTRUM
BRIDGE PLAYER—£8.95

An ideal complement to the Bridge Player Program:

Bridge Tutor (Beginners)—£5.95
Bridge Tutor (Advanced)—£5.95

SPECIAL OFFER:

Bridge Player and both
Bridge Tutors—£18.95



SUPERCODE

—for 16K and 48K Spectrum

100+ ROUTINES

This is a superior machine code tool kit with one hundred machine code routines that are relocatable for use in your own BASIC and/or machine code programs, the combined user friendly BASIC program, 48k Spectrum only, gives easy access to all routines: • Index of routines. • Call up details of each routine including all information required to tailor the routine to your needs. • Demonstration of how the routine works under software control, the demonstration is repeatable. • Save and verify individual routines. • Comprehensive user guide.

- | | | |
|--------------------------|--------------------------|-----------------------------|
| 1. Block Memory Insert | 24. Sci-Fi Character Set | 47. Wait-Key |
| 2. Block Line Delete | 25. Memory Available | 48. Strings to Upper Case |
| 3. Ch-9 Swap | 26. Line Number | 49. Strings to Lower Case |
| 4. Ch-5 Scramble | 27. Uni-Note Sound-Gen | 50. Program to Upper Case |
| 5. Super-Remember | 28. Dual-Note Sound-Gen | 51. Program to Lower Case |
| 6. 2-Byte Converter | 29. Uni-BEEP Simulator | 52. Confuse |
| 7. Dec-Hex Converter | 30. Multi-BEEP Simulator | 53. Clarity |
| 8. Hex-Hex Converter | 31. Screen Fill | 54. Space Saver |
| 9. Remill Condenser | 32. Screen Store | 55. Screen Overprint |
| 10. On Error Goto | 33. Screen Exchange | 56. Screen Invert |
| 11. On Break Goto | 34. Protect Program | 57. Clear All |
| 12. Free-Scroller | 35. Block Copy | 58. Ink Change |
| 13. Non-Visible Lines | 36. Contract | 59. Paper Change |
| 14. Border Effects | 37. Expand | 60. Flash On |
| 15. Screen Search | 38. Expand Rem | 61. Flash Off |
| 16. Variables Search/Lis | 39. Append | 62. Bright On |
| 17. 24-Line Printing | 40. Count Program | 63. Bright Off |
| 18. Star Draw | 41. Tape Header Reader | 64. Screen Print |
| 19. Flash Switch | 42. Address | 65. Random Number Generator |
| 20. Bright Switch | 43. Checker Board | |
| 21. Paint Shape | 44. Remove Colours | |
| 22. Record Sound | 45. Display Memory | |
| 23. Replay Sound | 46. Hex Loader | |

Routines 66-90: Screen routines

SUPERCODE £9.95

Plus for 48K Spectrum unless otherwise stated:

PLUS for 48K Spectrum:

FLOATING POINT FORTH with EDITOR	£13.95	DRAUGHTS	£5.95
INTEGER FORTH	£9.95	BACKGAMMON	£5.95
SUPERCHESS II	£7.95	SNAIL LOGO (Turtle Graphics)	£9.95
SUPERCHESS I (16K ZX81)	£4.95		
16K SUPERCHESS (16K Spectrum)	£6.95	GOLFING WORLD	£5.95
REVERSI	£8.95		

Also available at Boots, W.H. Smith and all good computer shops.

DELIVERY: UK—prices include VAT and postage & packing. Send SAE for Catalogue.

EUROPE—add 30p per program

ALL OTHER PLACES—for airmail add £2 for the first program and 50p for each subsequent program. Surface delivery add 60p per program.



Send Cheque, Postal Order or Access No. to:
CP SOFTWARE, Dept W1A
17 Orchard Lane, Prestwood,
Bucks HP16 0NN



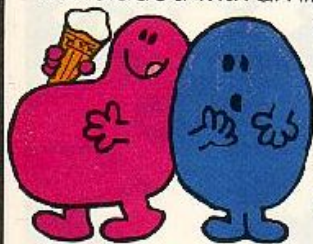
More than fun and games!

FIRST STEPS with the Mr. Men

by Primer Educational Software

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

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



QUICK THINKING!

by Widge Software

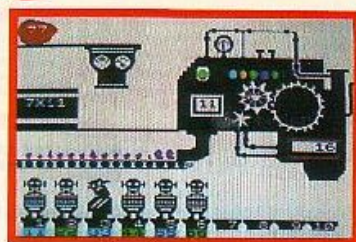
Two mind-stretching, space-age games to test mental arithmetic and nimble fingers.

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

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

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

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



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

CAESAR THE CAT

by Andromeda Software

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

A fast, colourful, all-action, arcade-style game with catchy music and a best-score record. Challenging for high-scoring arcade addicts as well as great fun to play for the novice. Available on cassette for the Commodore 64 **£8.95**.



**NOW ON
SPECTRUM 48K
£6.95**

Prices include VAT and post and packaging. MIRRORSOFT programs are available from selected branches of W.H. Smith and Sons, and other leading software stockists. Freephone enquiries welcome: phone 01-922 3580.

MIRRORSOFT

SOFTWARE FOR ALL THE FAMILY

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

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

	Price	Spectrum 48K (01)	BBC B (03)	Electron (04)	IBM 54 (05)
First Steps with the Mr. Men (MM01)	£8.95				
Quick Thinking (QT01)	£8.95				
Caesar the Cat (CC01)	£8.95				
Caesar the Cat (CC01)	£8.95				

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

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

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

Signature

Name

Address

Postcode

Offer applies to Great Britain and Eire only. Prices allow up to 28 days for delivery in the UK. MIRRORSOFT is a registered trade mark of Mirror Group Newspapers Ltd. Cl. Reg. No. 188660. Reg. Office: Falmouth Circus, London EC1.

Spectrum 48k

MAKE YOUR OWN TV FILMS!

WITH **LIVE ANIMATION**

& MUSIC

SAVE them...

& AMUSE FRIENDS AND FAMILY
WHEN YOU PLAY THEM BACK!



"Make us walk
& talk!"



ORDER: **£7**
MACRO
CONSTRUCTION
& ANIMATION CASSETTE MCA

- SPECIAL MACRO-PROGRAMMING TECHNIQUES ALLOW YOU TO:-
- CALL-UP ANY MEMBER OF CAST INCLUDING UFO, HELICOPTER AND A HOST OF 'PERSONNEL' IN A CHOICE OF NEARLY 30 'CALLS! MAKE EACH ANY COLOUR - LARGE ONES CAN BE IN TWO COLOURS!
- THEY WALK, RUN, CLIMB & FLY.
- BUILD HOUSES, CHURCHES ETC. IN A FLASH - & ERASE THEM UP TO 15 MINS. PER 'FILM', OR MORE IF YOU'RE A GOOD DIRECTOR
- MAKE CHARACTERS 'SPEAK' USING ANNOTATIONS AS IN STRIPS.
- FULL COMPUTER-PROMPTING TO SAVE YOU MAKING ERRORS.
- INSTANT PLAYBACK, EDITING AND DELETING AS YOU GO ALONG!
- MOST COMMANDS ARE A SINGLE KEY-STROKE, WITHOUT 'ENTER'.
- COMPOSE YOUR OWN TUNES USING THE SPECIAL THREE-OCTAVE CHROMATIC MUSIC COMPOSER, WHICH ALLOWS YOU TO LISTEN, CORRECT AND EDIT AT EACH NOTE ... IF YOU NEED TO!
- STORE UP TO NINE 95-NOTE TUNES TO 'CALL-UP' AT ANY TIME IN A STORY ... COMPUTER GIVES EACH A NUMBER IN MEMORY.
- CHANGE TUNES AT ANY TIME, EVEN WHILST MAKING A 'FILM'.
- YOU CAN EVEN ADD PERSPECTIVE TO BUILDINGS, ROADS ETC.
- NO SPECIAL SKILLS OR COMPUTER KNOWLEDGE NEEDED ... JUST IMAGINATION!

pinehurst data studios
60, PINEHURST PARK,
WEST MOORS, WIMBORNE,
DORSET. BA22 0BP
IMPORTANT: FOR 48K SPECTRUM ONLY

Educational Software **LCL**

MICRO MATHS



30 EASY TO USE PROGRAMS
FROM 10 TO 20 YEARS OLD

**BBC Micro
ZX Spectrum
unexpanded VIC
Electron
ZX81
Apple
PET
Commodore 64** **NEW**
All software for the
above computers.

MICRO MATHS 24 program revision or self-instruction course to O-level.
£24.50 (except ZX81 £12.00).

BRAINTEASERS (BBC, Electron, CBM 64) Book of programs to puzzle
and amuse people who want more than arcade games £5.95.

PICTURE PUZZLES (BBC & Electron only). Early learning fun
using educational tests. 3D graphics. £6.50

ANIMATED ARITHMETIC Teaches using moving colour pictures (not
words) Ages 3-8. £6.50 disc £7.50).

MASTER MATHS (Apple, Pet and CBM 64 only). 50 program O-Level
course or teacher's aid, amazing graphics.

"... the programming standard is high. The programs are robust ..."
TIMES EDUCATIONAL SUPPLEMENT

Immediate dispatch Micro Maths, and Master Maths. Phone or send
orders or requests for free catalogue (200 programs) to:

World leaders in Maths educational software
(distributors in 24 countries).

LCL

26 Avondale Ave.

Staines, Middx.

Tel: 0784 58771

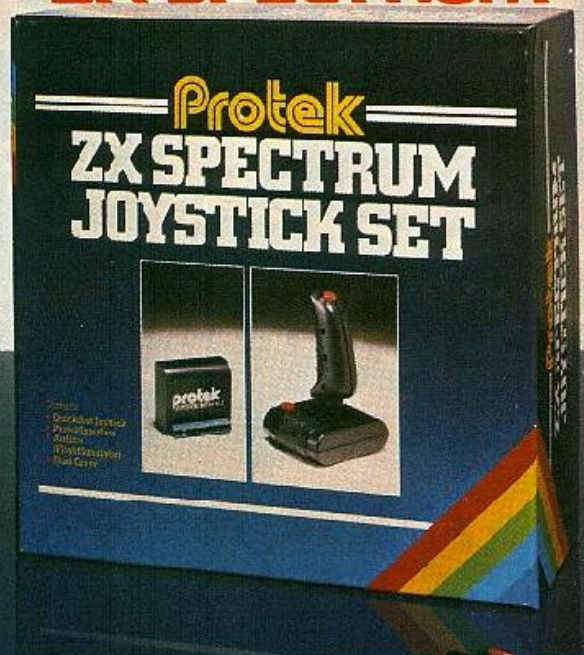
24 hrs. Orders



GENEROUS TRADE
DISCOUNTS.

AS SEEN
ON TV

ARCADE ACTION FOR THE ZX SPECTRUM



INCREASE YOUR COMPUTER FUN WITH A PROTEK JOYSTICK SET.

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

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

You can buy them separately or in a special presentation set which
comes complete with Airliner, a flight simulation programme.

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

Now available for the B.B.C. at only £19.95
(inclusive of joystick & interface only)



INCLUDES AIRLINER FLIGHT SIMULATION
PROGRAMME

COMPLETE SET
ONLY

£24.95

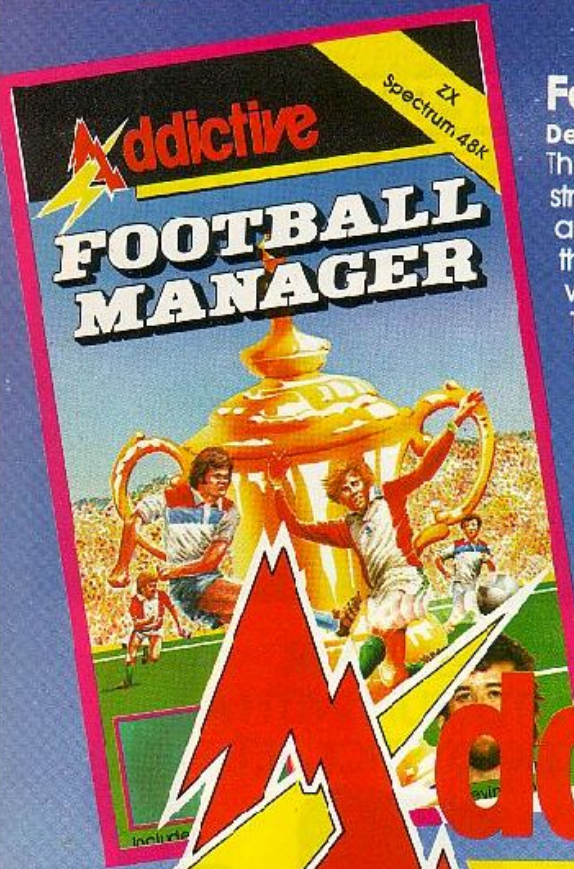


Protek

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

The No.1 Football Game

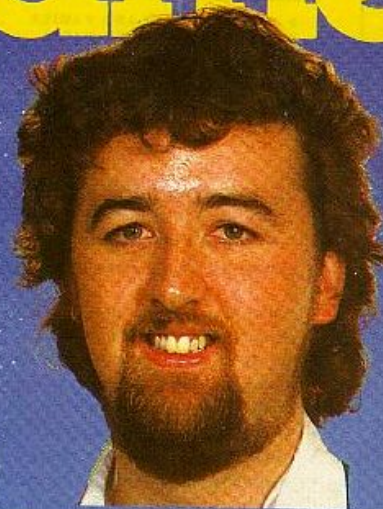
ZX81 16K.
ZX Spectrum 48K
88C and 88C versions coming soon!



Football Manager

Designed by Kevin Toms

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



Kevin Toms

Some of the features of the game:–

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

Addictive

*ZX81 Chart,
Home Computing Weekly 16.8.83

Comments about the game from press and our customers

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

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

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

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

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

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

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

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

Programmers

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



tion from the Spectrum version

available from computer software stockists nationwide, including **Plato** & **WHSMITH**

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

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

Overseas orders add £1.50

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

Addictive Games

Albert House, Albert Road, Bournemouth BH1 1EZ.

1 Spectrum version only

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

LORDS OF TIME

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

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

ADVENTURE REVIEWS

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

— *Soft, Sept 83*

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

— *PC, Dec 83*

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

— *Computer Choice, Dec 83*

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

— *Acorn User, Feb 84*

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

— *PCW, 18th Jan 84*

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

— *NILUG issue 1.3*

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

— *Educational Computing, Nov 83*

ADVENTURE REVIEWS

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

— *CBM 64 Users Club Newsletter*

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

— *Micro Adventurer, Dec 83*

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

— *Which Micro?, Feb 84*

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

— *PCW, 1st Feb 84*



MIDDLE EARTH ADVENTURES

1: COLOSSAL ADVENTURE

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

2: ADVENTURE QUEST

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

3: DUNGEON ADVENTURE

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

THE FIRST SILICON DREAM ADVENTURE

1: SNOWBALL

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

THE LORDS OF TIME SAGA

7: LORDS OF TIME

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

Price: £9.90 each (inclusive)

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

LEVEL 9 COMPUTING

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

ZX MIC

FOR A QUID (OR LESS) YOU CAN SPEND



ROFAIR

A WHOLE DAY ENJOYING YOURSELF!



ZX MICROFAIR has become a household word for anyone interested in discovering what's the latest gizmo for their SINCLAIR computer!

A good day out at a reasonable price and an enjoyable day spent amongst friends and fellow enthusiasts!

Let's face it, what other exhibition gives you so much for so little?

Where would you find under one roof all the

latest hardware, software, books, user groups, programming aids, peripherals and add-ons for your Sinclair Computer?

There's even a bring-and-buy sale, bars, buffets and a place to relax after a hard day's looking!

So book your place now by sending for an advance ticket at reduced cost.

But don't forget the date: ALLY PALLY 28th APRIL 1984.

See you there.

11TH ZX MICROFAIR. ALLY PALLY APRIL 28TH 1984.

Saturday 28th April 1984 10am – 6pm.

ALEXANDRA PAVILION, ALEXANDRA PARK, WOOD GREEN, LONDON N22.

SEND TODAY FOR REDUCED PRICE ADVANCE TICKETS!

Post to Mike Johnston, 71 Park Lane, Tottenham, London N17 0HG.

Please send me the following advance tickets for The ZX MICROFAIR on 28th April 1984:

.....Adult tickets @ £1.00 each

.....Childrer (under 14) tickets @ 50p each

PLEASE ENCLOSE A STAMPED ADDRESSED ENVELOPE AND MAKE CHEQUES/POSTAL ORDERS PAYABLE TO ZX MICROFAIR.

Name

Address

PRICES AT THE DOOR ON THE DAY: ADULTS £1.25, KIDS 60p



MANCHESTER HOME COMPUTER SHOW

5th - 7th April

AN EYE-OPENER FOR ALL THE FAMILY

Visit the show that brings you up-to-date with today's technology. Whether you run your business, domestic

accounts, learn or play with your computer; if you don't have one but want one; we have all the hardware, the software, the help and advice you could ever need.

If you live in the North West don't miss it!



NEW CENTURY HALL CORPORATION STREET MANCHESTER

Opening hours Thurs & Fri 10-6 Sat 10-4. Adults £2.00 Children under 16 £1.00

Computers for Export

Sinclair
Oric
Commodore
Atari
Texas
Epson
Coleco



BBC
Vectrex
Linx
Aquarius
New Brain
Acorn

Plus Printers, Disc Drives, Memory Expansion, Software

Quantity discounts available

No tax charge for equipment shipped abroad

Write for our price list or call our 24hr answer phone

01- 681 8785

**Galaset Ltd, 30 Bayford Road,
Littlehampton, West Sussex,
England. Telex. 8954018 Acurat G**

HIRE SPECTRUM SOFTWARE

FREE FIRST TAPE HIRE
26 PAGE CATALOGUE
NEWSLETTER

OVER **250** DIFFERENT
ZX SPECTRUM
PROGRAMMES
AND OVER 2000 TAPES IN STOCK

ANY TWO TAPES ONLY £2.20 (inc VAT & p&p)
FOR TWO WEEK'S HIRE

LIFE MEMBERSHIP ONLY £6.00

MANY POPULAR TAPES ALSO FOR SALE
AT DISCOUNT PRICES

JOIN NOW or send 30p stamps for catalogue



**NATIONAL
SOFTWARE
LIBRARY**

200 Mulgrave Road,
Chesham, Surrey, SM2 6JT

I enclose cheque for £6.00 for LIFE MEMBERSHIP and I understand that my first tape hire will be FREE. If, within 20 days, I'm not delighted with your service you'll refund my membership fee.

Name _____

Address _____

YC 4

Space Pilot

A 64K
BLOCK
BUSTER

COMMODORE
64

ANIROG

SPACE PILOT

ANIROG SOFTWARE LTD.,

Trade Enquiries:

29 WEST HILL DARTFORD KENT (0322) 92513/8

Mail Order:

8 HIGH STREET HORLEY SURREY

24 HOUR CREDIT CARD SALES HORLEY (02934) 6083

PAYMENT BY CHEQUE P.O. ACCESS/VISA

50p POST & PACKAGING

Fight your way to become The Master of the Skies travel through time to overcome the enemies of the past and future. Engage in dog fights with the squadrons of world war one to the fighters of the year 2084. Five Screens of Breathtaking Scenic Graphics.

J.S. £7.95

SCHOOLKIDS TRACE SATELLITE!

After the recent space shuttle flights the pupils of a Junior School were set the project - "Outer Space". In the computer room Jill, aged 9 and George, aged 10 were using an RD Digital TRACER on the BBC Micro to draw space monsters, following the simple commands for instant drawing and colour fill. They then added the animation routine, and imagine their excitement to see the monsters come to life and actually fly around the screen. Their teacher was impressed and could see a real life application. So he suggested that instead of monsters they draw a satellite in orbit. Using the special construction routines Jill and George did this in a matter of minutes.



The illustration shows each frame drawn, which when replayed makes a fully animated display.

Teacher later used their lively animated sequence to illustrate a lesson on the communication satellites orbiting earth, and the class were amazed that the sophisticated display was created by their pals - and not NASA.

For BBC Micro B £60.83 plus £9.12 VAT
For ZX Spectrum £48.25 plus £7.24 VAT
Prices include P&P

In the educational field the RD Digital TRACER is capable of very effective results in the most inexperienced hands, and yet it is an invaluable tool for the more advanced user.

Features of the TRACER include:-

- Immediate reproduction from original drawings, maps and books to display file (A4 on Spectrum, A3 on BBC).
- Sample and move text and user defined graphics before entering to display.
- Geometrical shapes quickly applied after sampling, then copied and moved to any position.
- Fast colour fill and shading of outlined areas.
- Instant colour change with all available colours, both PAPER and INK.
- Automatic re-trace and variable scaling (with animation on BBC).
- Save displays on cassette or printer or merge with your own programs.
- Uses all the BBC's graphics modes, including TELETEXT.
- Supplied ready to use with full easy to understand instructions and advanced software.

For further details of the RD Digital TRACER either telephone or write to Dept. YC4 at the address below (SAE please). For prompt delivery just send a cheque made payable to RD Laboratories Ltd, together with your name and address.

Also available from Spectrum Stores, and Griffin & George.

RD Laboratories
Microelectronics Application

20 Court Road Estate Cwmbran Gwent NP44 3AS
Cwmbran: (06333) 74333 Telex 437240

COMPUTER LINK

2 Row	10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	100p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

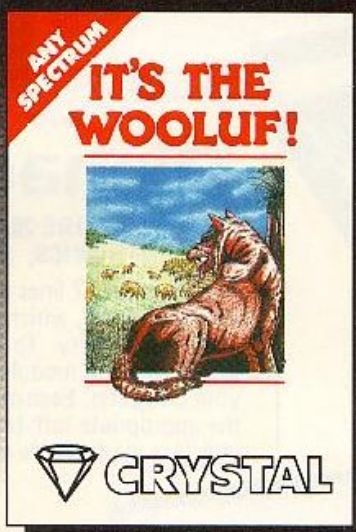
10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

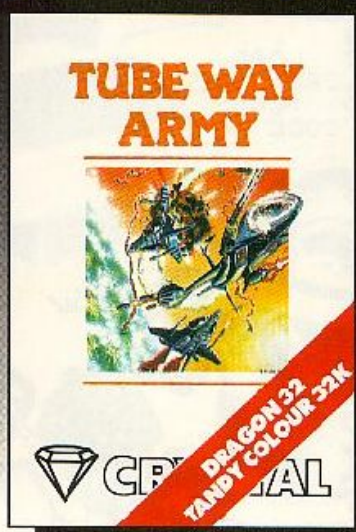
10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

10-way	14-way	16-way	20-way	24-way	28-way	32-way	40-way	50-way	60-way
10-way	80p	1.00	1.20	1.45	1.60	1.85	2.00	2.25	

TWO NEW RELEASES FROM CRYSTAL IT'S THE WOOLUF! TUBE WAY ARMY



Written by: Marin Buller



Written by: Rainbow Software

From the creators of 'Halls of the Things', 'Invasion of the Body Snatchas', and many other software classics come these exciting new games. Games to tax your judgement and puzzle and frustrate you for months on end.

Don't forget our other titles, which have attracted enthusiastic reviews like "Spectacular, one of the best games I've seen"... POPULAR COMPUTING WEEKLY and

"Excellent, dangerously addictive, could change the Spectrum games scene overnight"... SINCLAIR USER.

COMING
SOON
RETURN
OF THE
THINGS



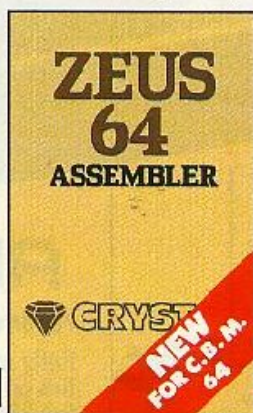
HALLS OF THE THINGS

Written by: Neil Mottershead,
Simon Brattel and
Martin Horsley



INVASION OF THE BODY SNATCHAS

Written by: Simon Brattel
and Neil Mottershead



Written by:
Graham Stafford



ROMMELS REVENGE

Written by: Martin Horsley



THE DUNGEON MASTER

Written by: Graham Stafford

All titles for
48K Spectrum
unless
otherwise
stated

Selected titles available from:-



spectrum

John Menzies

**HMV
WOOLWORTH**

other large department stores and all good major software retailers. Alternatively, send the coupon to:-



CRYSTAL

CRYSTAL COMPUTING, 2 ASHTON WAY,
EAST HERRINGTON, SUNDERLAND SR3 3RX.
TRADE ENQUIRIES WELCOME:- Tel: 061-205 6603.

CRYSTAL COMPUTING IS THE TRADING NAME OF CHANDREX LTD.
The name Crystal is used under license

PROGRAMMERS! WRITTEN ANY SOFTWARE THAT COMES UP TO OUR STANDARDS? IF SO SEND IT TO US FOR EVALUATION. WE OFFER GENEROUS ROYALTIES.

Please supply: **INVASION OF THE BODY SNATCHAS** ☐ £6.50
HALLS OF THE THINGS ☐ £7.50 **THE DUNGEON MASTER** ☐ £7.50
IT'S THE WOOLUF ☐ £6.50 **ROMMELS REVENGE** ☐ £6.50
TUBE WAY ARMY ☐ £7.50 **ZEUS 64** ☐ £9.95
CATALOGUE OF LATEST SOFTWARE ☐

NAME _____

ADDRESS _____

I enclose cheque/p.o. for
P & P included. Overseas orders, please add £1.50 per item.

YC4

PRINTERS

```

EP 1,5: PAPER
1: CL: PRINT
T 9,7: SSET IS
0: "PAGE UNIT"
LOAD "SCREEN# :
PRINT AT 13,0: LOAD
NT AT 13,0: LOAD ""CO
AT 13,0: LOAD "CODE
13,0: LOAD "CODE
404

```

£99.95
Add £2
p & p.

**For COMMODORE 20/64, ATARI (all models),
BBC CENTRONICS, DRAGON and RS232.**

A high-speed, 2 lines per second, 40 column thermal printer, which has full 320 x n dot graphic capability. To the printer, simply plug in the interface module which is applicable to your computer. Each module supplied includes the appropriate self-test programme. Other interface modules are available separately.

```

      .1 CLEAR 04000: BP
      .1.0: BEEP .1.0:
      .1.5: PAPER 0:
      .1.6: PRINT SRI
      .1.7: DESET IS LO
      .1.8: DESET IS LO

```

£59.95
Add £2
p & p.

For SINCLAIR SPECTRUM and ZX 81.

Fully interfaced to the Spectrum and ZX81, this printer operates at 2 lines per second, with full 256 x n dot graphic capability, 32 column line width. It uses the standard Sinclair print commands (COPY, LIST, LPRINT).

Available direct or from W H Smith, Laskeys,
Greens, John Menzies and Spectrum Group.

DEAN ELECTRONICS LIMITED

Glendale Park Fernbank Road Ascot Berkshire
Telephone 0344 885661 Telex 849242

Please send me printers at £61.95 for Spectrum or ZX 81 only.
Please send me printers at £104.95 for: ☐ Commodore 20/34, ☐ Atari,
☐ Dragon, ☐ BBC, ☐ Standard RS232, and boxes of paper at £12 per
box of 10 rolls. TOTAL £ Cheque/PO enclosed or debit my
Access/Barclay card account No.
Name & Address

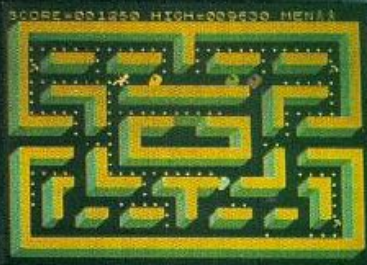
```

GO SUB 3500
3051 LET I=9: GO SUB 3500
3052 PRINT AT 10,17;"3"

```




LUNA CRABS
By M.J. ESTCOURT



HAUNTED HEDGES
By DEREK BREWSTER



DEATH CHASE
By M.J. ESTCOURT
Kempston Joystick Compatible



For any Spectrum

ALL TITLES £6.95 INC VAT.
SELECTED MICROMEGA PRODUCTS
THROUGH: BOOTS, GREENS, ASDA,
JOHN MENZIES, LASKYS, WIGFALLS,
RUMBELOWS, HMV, SELFREDGES,
WH SMITHS, SPECTRUM SHOPS
EVERYWHERE AND ALL OTHER GOOD
SOFTWARE STOCKISTS

Trade Enquires

PRISM 01 253 2277
WEBSTERS SOFTWARE 0486 84152
LIGHTNING RECORDS AND VIDEO 01 969 5255
MICRO DEALER UK - ST ALBANS 34351

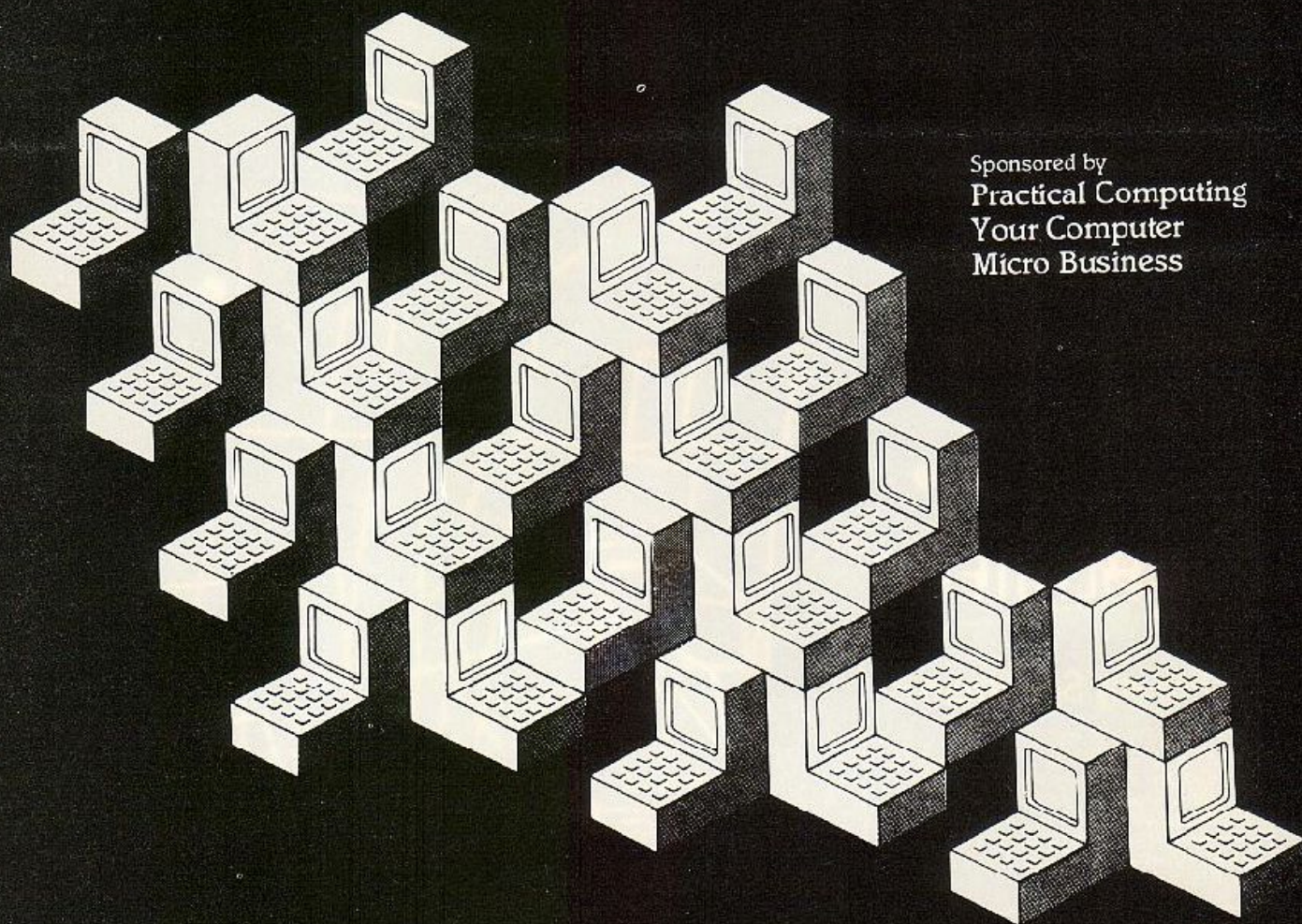


STARCLASH
By DEREK BREWSTER
Kempston Joystick Compatible

NEW SOFTWARE FOR A NEW DIMENSION

Micomega - Personal Computer Division - Quantec Systems and
Software Ltd 230 Lavender Hill London SW11 1LE

Success Breeds Success



Sponsored by
Practical Computing
Your Computer
Micro Business

National Exhibition Centre, Birmingham. May 4-7, 1984.

After one show the Midland Computer Fair has already established itself as an outright winner. Not only is it the leading exhibition in the Midlands for microcomputers and related products, but it stands in its own right as a major national event.

In recognition of this, and the need to accommodate thousands of expected visitors the venue for the 1984 Midland Computer Fair is to be Britain's premier showcase - the National Exhibition Centre, Birmingham. The NEC with its superb facilities for exhibitors and visitors alike will

be the fitting site for this major event which attracted over 17,000 people for the first show.

Whether you are interested in microcomputer enthusiasts or would prefer to take space in the Business Section to meet small business micro-users, the Midland Computer Fair is definitely for you.

So why not let a little of the Midland Computer Fair's success rub off on your company by reserving a stand at the next show.

The road to success starts by filling in the coupon below:

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

Return to the: Exhibition Manager, Reed Exhibitions,
Surrey House, 1 Throwley Way, Sutton, Surrey SM1 4QQ
Tel: 01 643 8040 Telex: 946564 BISPRS.G

Name

Position

Company

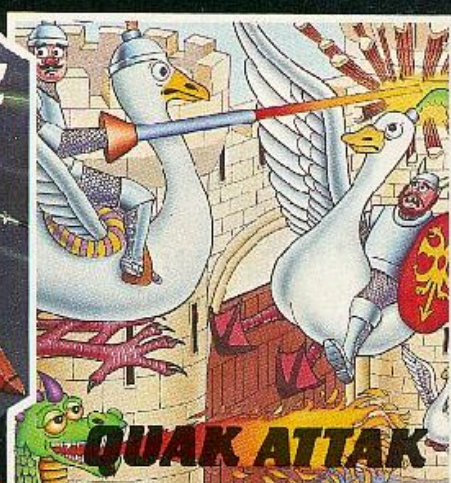
Address

3 NEW MASTERS' PIECES

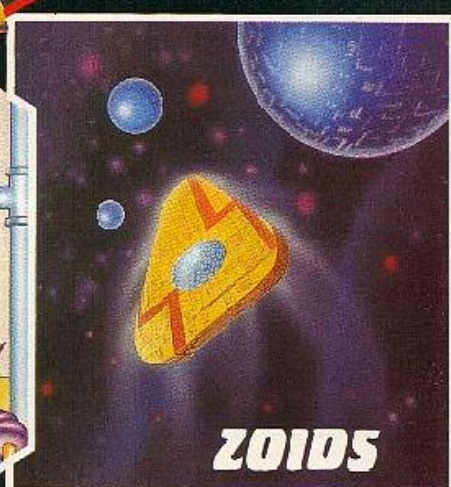
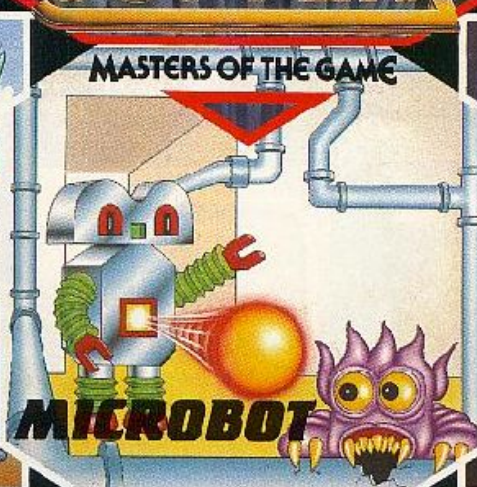
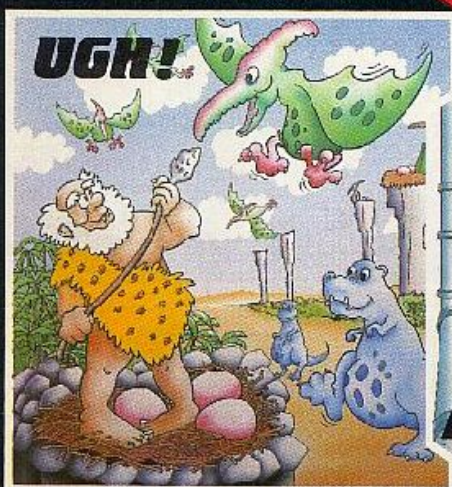
The masters proudly announce their latest three masterpieces. From the zany humour of our two CBM 64 games to the 'Arcade Simulation' excellence of our latest Spectrum launch, everyone will be a collector's item.

BUG SQUAD

Zany arcade action as you, the Puffing Spray Gun, take on the garden's bugs. But you have to contend with Mutant Lawnmowers, Manic Magnets, and even the occasional flypass of a bottle of Essence-of-Spinach! Fabulous fun for all ages, great graphics and a lovely sound track. For the CBM 64, only £7.95.



SOFTTEK



UGH!

Launched last autumn to rapturous applause and rated the best ever game for the Dragon 32, UGH! has already become a legend with massive demand for both the Dragon/Tandy Color version and our recently launched CBM 64 version. Soon on the 48K Spectrum, and many UGH! surprises in store! Dragon £6.95, CBM 64 £7.95.

MICROBOT

One of the few classics for a 48K Spectrum featuring high resolution, detailed and animated graphics of a

STARBLITZ

Here is the first ever truly 'Arcade Perfect' game for the ZX Spectrum. Barely launched and it has already become the shoot-em-up game that every Vid Kid is talking about. It's netted our greatest pre-launch orders ever. Cheap at only £6.95.

QUAK ATTAK

Yet more zany humour as you, the Feckless Hero, take on the Foes on their Flying Ducks. Fabulous action set against the background of a medieval castle, and some very fine graphics indeed! A sure-fire hit for the CBM 64, at only £7.95.

quality matched by few and bettered by none. Microbot has been an overnight success as one of the best and most original games for the Spectrum ever, only £5.95.

ZOIDS

Rated the best shoot-em-up game for the CBM 64 presently available. This best-selling all-action game features 'Arcade Quality' play, super smooth high resolution graphics, and all to the accompaniment of a Bach fugue! A fast mover, just £7.95.

All CBM 64 products soon available on disc - please contact us for details.

ALREADY CLIMBING THE CHARTS

Softtek's Software is available at most major outlets, including selected branches of the following: W.H.Smith, Boots, Dixons, Tandy Dealers, Lightning Dealers & Selfridges as well as through our nationwide dealer network. Mail Order Address: Softtek International Ltd., Softtek House, Tranquil Passage, London SE3 0BJ. Dealers' Contact: EMI Distribution or Caroline Shepherd on 01-318 5424. German Dealers' Contact: H. Hegemann 0211-376953, Mail Order: Buchhandlung Myer, 34/36 Markt, 4470 Meppen, Ems. **SOFTTEK INTERNATIONAL LTD.**, 12/13 Henrietta Street, Covent Garden, London WC2E 8LH. Telephone 01-240 1422. Softtek's Software is sold strictly according to our terms and conditions of trading - copies of which are available on request.

LVL COMPUTERTOWN

Whether its your first computer or whether you're already an enthusiast, LVL COMPUTERTOWN offers you the quality of service you expect from experts. If you invest money, you go to a bank or a broker - a specialist who can guide and advise you on the best return for your capital. At LVL COMPUTERTOWN we're specialists too. We're there to help guide you through the micro maze, keep you up to date on innovations, help you get the best value for money, whether your computer is for you, your children or your business. Your computer can change your life - make sure you change it for the better. Come and talk to the experts and move into micros with LVL COMPUTERTOWN

PRINTERS



Seikosha GPI00A	238.05
Silver Reed EX500	
Parallel	343.85
Silver Reed EX500	
Serial	378.35
Silver Reed EX550	
Parallel	534.75
Silver Reed EX550	
Serial	569.25
Epson RX80	320.85
Epson FX80	503.70
Epson RX80 (F/T)	366.85
Epson MX100 (B2 Col)	546.25
Epson FX100	654.35

COLOUR LIGHTPEN



The lightpen is compact, reliable and comes in a rugged metal case providing physical and electronic protection. Its sensitivity can be adjusted to match any make of TV screen, giving the highest levels of accuracy.

The lightpen package consists of the lightpen, an interface unit, introductory software on cassette and a user guide.

£45.95



MONITORS



SABA 14" COLOUR MONITOR/
COLOUR TV.

£274.45

MICROVITEC 14" Colour Monitor
£247.25

DECCACOLOUR

14" Colour Monitor
£247.25



SANYO

12" Green Screen
£102.35

BBC MICROCOMPUTER

MODEL A	£299
MODEL B	£399
MODEL B with ECONET	£446
MODEL B with DOS	£469
Model B with DOS & ECONET	£516



CASSETTE RECORDERS



£39.95

A REFLECTION OF SUPERIORITY

The Bell & Howell/LVL Computer Compatible Data Recorder

- Automatic Level Control
- Automatic Tape Stop
- Tape Counter
- Remote Motor Control

TRI-WRITER

- * IT'S A PORTABLE COMPUTER TERMINAL!
- * IT'S A LETTER QUALITY COMPUTER PRINTER
- * IT'S A FULL FEATURE ELECTRONIC TYPEWRITER

£734.85

SOFTWARE

DESIGNED FOR THE BBC MICROCOMPUTER

LANGUAGES	
LISP	£16.85
FORTH	£16.85
GAMES	
Monsters	£9.95
Snapper	£9.95
Planetoid	£9.95
Arcade Action	£11.90
Rocket Raid	£9.95
Meteors	£9.95
Arcadians	£9.95
Sliding-Block Puzzle	£9.95
Cube Master	£9.95
Starship Command	£9.95
Snooker	£9.95
Super Invaders	£9.95
Hopper	£9.95
Colditz	£9.95
Doctor Who	£10.00
White Knight II	£10.00
Missile Base	£9.95
Draughts & Reversi	£9.95

ADVENTURES	
Philosophers Quest	£9.95
Castle of Riddles	£9.95
Countdown to Doom	£9.95
Sphinx Adventure	£9.95

GENERAL	
Desk Diary	£9.95
Creative Graphics	£9.95
Graphs & Charts	£9.95
Tool Box	£21.00
Record Keeper	£13.80
Magic Garden	£9.95

EDUCATIONAL	
Map References	£7.50
Laser Maths	£7.50
Classmaster	£20.00
Algebraic Manipulation	£9.95
Word Sequencing	£11.90
Missing Signs	£11.90
Number Balance	£11.90
Word Hunt	£11.90
Density Circuit	£11.90
Chemical Analysis	£13.80
Chemical Structures	£13.80
Jars	£11.90
Vu-Type	£16.10

BOOKS

GENERAL

Programing for the BBC	£8.95
Advanced User Guide	£12.95

ACORN

Creative Graphics	£7.50
Graphs and Charts	£7.50
Forth Book	£7.50
Lisp Book	£7.50
View Guide	£2.50
Info View	£2.50
BCPL User Manual	£15.00

BBC

The Computer Book	£6.75
The Book of Listings	£3.75
30hr. Basic	£5.95
Beyond Basic	£7.25
The Friendly Computer	£4.50
Sound & Graphics	£7.95

ALL PRICES
INCLUDE
VAT.

The items featured represent a very small selection from our vast product range.

Further information of both product and services available can be obtained by telephoning or visiting your nearest LVL Computertown Dealer.

CHESHIRE

C-TECH SOFTWARE
184, Market St.
HYDE
Cheshire
061 366 8223
• **COMPUTER CITY**
78, Victoria Rd.
WIDNES
Cheshire
051 420 3333
• **OAKLEAF COMPUTERS**
100 Boughton
CHESTER
0244 310098

CUMBERIA

• **THE COMPUTER SHOP**
56/58 Lowthar St
CARLISLE
Cumbria
0228 27710

ESSEX

A.C.L.
1, Northall
GRAYS, ESSEX
0378 79834
BROADWAY MUSIC
AND VISION
Woodford Green
ESSEX
01 504 7500

GREATER MANCHESTER

• **LOMAX**
8, Exchange St.
St. Annes Square
MANCHESTER
061 832 4167

WORCS

SPURTREE COMPUTING LTD
Council Buildings,
Teme Street,
TENBURY WELLS,
Worcestershire
0584 811383/811304

MERSEYSIDE

• **THORNGUARD**
46, Penaby Rd.
HISWALL
The Wirral,
Merseyside
051 342 7516

NOTTS

• **BASIC BUS. SYS**
Trent Boulevard
WEST BRIDGFORD
Nottingham
0602 819713

S F ELECTRONICS

48, Linby Rd.

HUCKNALL

Notts.

0602 840377

LEASALINKVIEWDATA Ltd

230, Derby Rd.

STAPLEFORD

Notts.

0602 359484

OXFORD

ABSOLUTE SOUND

AND VIDEO (Oxford) Ltd

19, Old High St. Headington

OXFORD

0865 65961

AVON

K & K COMPUTERS

32, Alfrad Street

WESTON

SUPERMARE

Avon

0934 419324

COLSTON COMPUTER

CENTRE LTD.

The Colston Centre

11, Colston Ave.

BRISTOL

0272 276619

WARWICKSHIRE

CARVELL
9, Bank St
RUGBY
Warwickshire
0788 65278

WEST MIDLANDS

RICHARD MORRIS
523, Bearwood Rd.
Smethwick
WARLEY
021 429 1161
JBC MICRO SERVICES
200 Earlsdon Ave.
Nth. Earlsdon
COVENTRY
0203 73813

WILTSHIRE

WILTSHIRE MICRO
CENTRE
Unit 6,
Central Trading Estate,
Signal Way,
Old Town,
SWINDON
0793 612899

BUCKS

HI-VU ELECTRONICS
38, Church St. Wolverton
MILTON KEYNES
Bedford
0908 312808

SUSSEX

C J E MICROS
78, Brighton Rd.
WORTHING
West Sussex
0903 213900

ISLE OF WIGHT

EXCELL
4, Foreland Rd.
SEMBRIDGE
Isle of Wight
098 387 2578

YOUR
LOCAL



DEALER

HEREFORD

KEMPSON
40, St. Owen St.,
HEREFORD
0432 273480

KENT

KENT MICRO

37, Union St.

MAIDSTONE

Kent

0622 52734

GRAVENSEND

COMPUTERS

39, The Terrace.

GRAVENSEND

0474 50677

NORTHANTS

M A ELECTRICAL

7, High St

IRLINGBORO

N'tants

0933 650133

LEICESTER

PERCY LORD & SON

63, Blaby Rd.

WIGSTON

Leicester

0533 785033

LINCOLNSHIRE

• **OAKLEAF COMPUTERS**

121, Dudley Rd.

GRANTHAM

0476 70281

LONDON

CANNONBURY RADIO

185 Upper St

ISLINGTON N1

London

01 225 9392

PAUL ELECTRICAL

250/2 Grand Drive,

Raynes Park.

LONDON SW20

01 542 6546

WOODS RADIO

287, Laverder Hill.

Battersea.

LONDON

01 228 1788

SALOP

MEDICOTT BROS

53, Mardol

SHREWSBURY

Shropshire

0743 3060

SUFFOLK

S J EMERY & CO

10, Market Place

BUNGAY

Suffolk

0986 2141

IRELAND

EVERYMAN COMPUTER

SERVICES

BALLYMONEY

Co-Antrim

N Ireland

026 36 62658

NEWBURN

ELECTRONICS

BALLYCARRY

Co-Antrim

09603 76330

STAFFS

J W BACNAILL

18, Salter St.

STAFFORD

0785 3420

KIRKLANDS

City Rd., Fenion.

STOKE ON TRENT

0782 415787

COMPUTERAMA

59, Foregate St.

STAFFORD

0785 41899

SURREY

• **HASLEMERE COMPS**

25, Junction Place,

HASLEMERE

Surrey

0428 53850

P & H ELECTRONICS

3, The Parade,

Reading Road

YATELEY

Surrey.

0252 - 877 222

* Spectrum Members

LANCASHIRE

• P V MICROS

38A Water St

ACCRINGTON

Laics

0254 36521

Home & Business

Computers Ltd.

54, Yorkshire Street.

OLDHAM

061 633 1608

Home & Business

Computers (RCH) Ltd.

73, Yorkshire Street.

ROCHDALE

0706 344654

WALES

BUCON

18, Marael St.

SWANSEA

0792 467980

S.I.R.

91, Whichchurch Rd.

Cyscoed

CARDIFF

Wales

0222 621813

THE COMPUTER SHOP

41, The Hayes,

CARDIFF

Wales.

0222 26666

SCOTLAND

COMMSCOT

30 Gordon St

GLASGOW

041 226 4878

NORTH LAND

NEWTONS

Main St.

SEAHOUSES

0665 720307

"Leaves the Atari, Dra and Lynx



Choosing a home computer is a bit like playing a video game. The more you play, the better you get. So you'd expect people who spend their working life choosing computers to be pretty good at the game. Quick to shoot down a fault. Pleased when they find an improvement.

Recently Which Micro? and What Micro? tested the Spectravideo SV 318. Here's what they had to say.

"Every home computer coming on the market tends to be hailed as revolutionary. For once this really has to be true with the Spectravideo SV 318."

"The first cheap, high performance computer..."

"Double precision numbers... are ideal for companies with turnovers under £999,999,999,999.99."

Spectravideo SV 318: Memory – 32K ROM expandable to 96K, 32K RAM expandable to 144K; Keyboard – calculator type, 71 keys, 10 function keys, built in joystick/cursor control; Graphics – 16 colours, 256x192 high resolution graphics, 32 sprites; Sound – 3 channels, 8 octaves per channel; CP/M* compatibility – over 3000 existing software packages; Storage – cassette drive, 256K disc drive capacity; Suggested retail price – £186.

Spectravideo SV 328: Memory – 32K ROM expandable to 96K, 80K RAM expandable to 144K; Keyboard – full word processor type, 87 keys, 10 function keys, built in cursor control; Graphics – 16 colours, 256x192 high resolution graphics, 32 sprites; Sound – 3 channels, 8 octaves per channel; CP/M* compatibility – over 3000 existing software packages; Storage – cassette drive, 256K disc drive capacity; Suggested retail price – £262.

A full range of peripherals are also available.

** Which Micro Hardware Review – Spectravideo SV 318

* CP/M is a registered trademark of Digital Research Inc.

gon, Commodore 64 for dead."

Which Micro? Dec 83. **



"...a far better job with its keyboard than anybody else using soft keys."

"...most people will notice how easy it is to produce graphics with the Basic."

"This is a BBC class machine."

"As a computer for the enthusiast it is well nigh perfect."

"A good micro for tomorrow."

Obviously, they had more to say. And we think you should have a look at the reports for yourself to prove that we haven't exaggerated their independent opinions.

Fill in the coupon today and we'll mail you the reports as well as a full technical specification brochure in colour of this amazing new personal computer or see the Spectravideo for yourself at most leading computer stockists.

SPECTRAVIDEO™

SV-318 SV-328
PERSONAL COMPUTERS

Spectravideo Ltd, 165 Garth Road, Morden, Surrey SM4 4LM
Telephone: 01-330 0101. Telex: 28704 MMH VANG

To: Spectravideo Ltd, 165 Garth Road, Morden, Surrey SM4 4LM

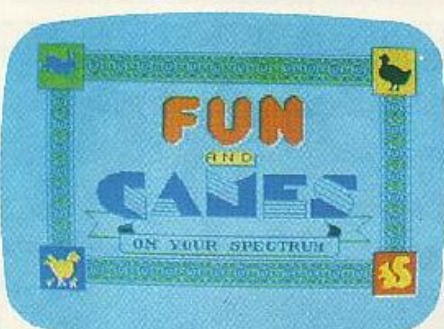
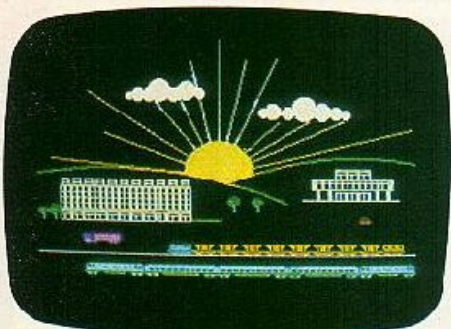
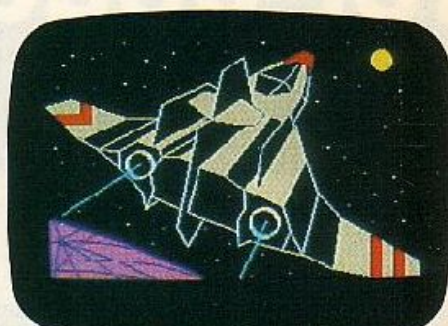
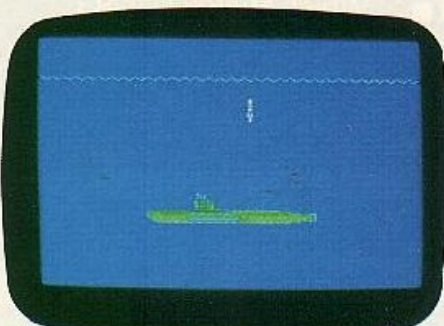
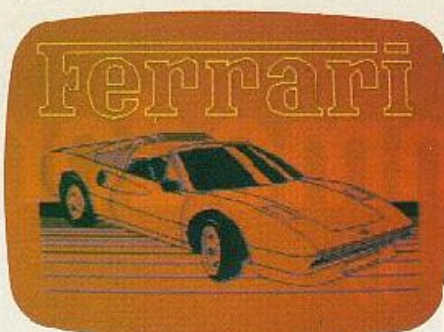
I am interested in Spectravideo computers and peripherals. Please send me the latest reports together with a full technical specification brochure.

Name: _____

Address: _____

Tel. No.: _____ STD Code: _____

YC4/84



The most imaginative graphics programming software for your Spectrum

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

Take a look at the screen prints shown above. They are the sort of thing you could produce on your SPECTRUM.

PAINTBOX gives you an entire suite of graphics programming aids in one integrated program. For instance:

UDG EDITOR

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

UDG DRAWING BOARD

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

SKETCHPAD

An experimentation "window" for developing the UDG set.

PRECISION PLOTTER

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

SCREEN PLANNER

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

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

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



01-6607231

24 HOUR CREDIT CARD ORDERING

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

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

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

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

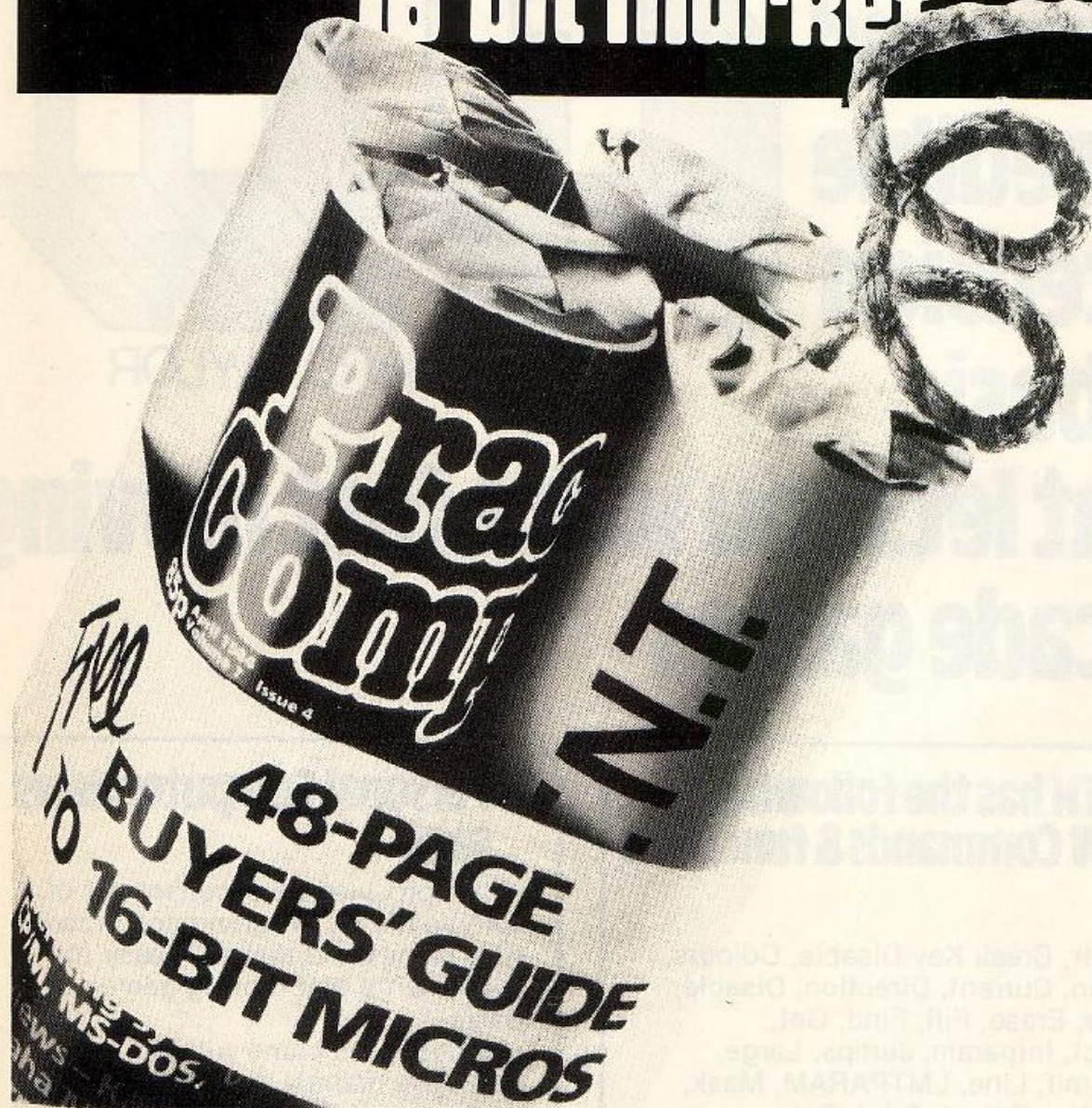
NAME _____

ADDRESS _____

DEALERS: Phone 01-433 6644 for enquiries

**Print 'n' plotter
Products**

This month's Practical Computing guides you through the exploding 16 bit market



With April's issue of Practical Computing we've got the most detailed guide yet to 16 bit micros. Our free 48 page supplement covers over 80 machines.

There's also a review of the Transportable Computer of the Year, the Kaypro. A special 15 page guide on operating systems. Advice on how computing can improve your health. And your last chance to win a Research Machines outfit worth over £2000.

And lots more.

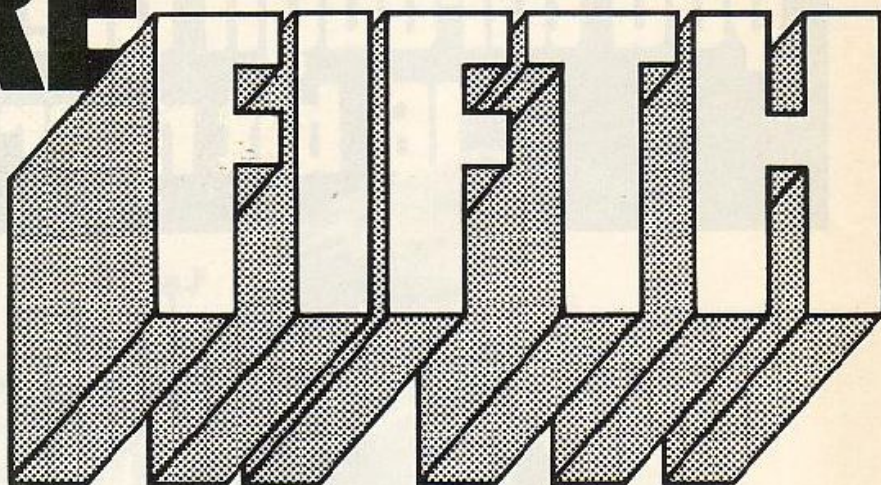
All in April's dynamite edition of Practical Computing, out now.

**Practical
Computing**
At work. At home

PUBLISHED BY
ELECTRICAL-ELECTRONIC PRESS

THE REVOLUTION IS HERE

**A new and
incredible
extension
to basic**



BY RICHARD TAYLOR

**that lets you write fast moving
Arcade games**

***FIFTH has the following NEW Commands & functions**

All, Attr, Break Key Disable, Colours, Column, Current, Direction, Disable, Enable, Erase, Fill, Find, Get, Interact, Intparam, Jumps, Large, Let, Limit, Line, LMTPARAM, Mask, More, No, Object, Print, Put, Replace, Remove, Screen, Sound, Speed, Status, Temps, Use, Vector, Velocity.

***Personal Computer News said:**

"Fifth provides an excellent set of commands for programming arcade type games and makes it easy for you to write fast moving games in Basic."

The packages come with an extensive manual, a demonstration program and the fifth interpreter. The commands are entered as words into your program and give you INTERRUPT, driven, fast, high resolution SPRITE graphics without losing the simplicity of Basic.

Buy FIFTH and get a City Bomber FREE!

Just TYPE in this program by Richard Taylor with your Fifth Interpreter.

```

2 REM * BY RICHARD TAYLOR *
3 REM * @ CRL September '83 *
4 REM *****
5
6 REM
7
8 REM
9
10 RANDOMIZE 1000
11 RANDOMIZE USA 51930
12 RANDOMIZE BORDER 5
13 OVER 0: INVERSE 0: FLASH 0
14 BRIGHT 0: INK 0: PAPER 7
15 CLS
16 GO SUB 9000
17 GU SUB 0000
18 LET H1=0: LET Z=1: LET Score
=0
19 CLS: PRINT " H1: "; H1; TAB
20: SCORE: "; Score
21 PLUT 0,163: DRAW 255,0
22 LET a=4000: REM LIMIT a
23 LET b=6000: REM INTERACT a
24 GO SUB 3000
25 LET x=0: LET y=50: REM MOVE
Plane,x,y
26 LET x=255: LET a=30: REM MO
VE Enemy,x,y
27 GO SUB 2000: GO TO 170
28 LET a=0: LET b=176
29 REM MOVE Plane,a,b:ENABLE P
lane
30 REM ALL Bomb:MOVE Bomb,a,b
31 REM ENABLE Bomb
32 REM MOVE Enemy,a,b:ENABLE E
nemy
33 CLS
34 FOR a=0 TO 7: REM FILL
35: BEEP .1,a*5: NEXT a
36 PAUSE .25: FOR a=50 TO 0 STE
P -1: BEEP .2,a*5: NEXT a
37 FOR c=0 TO 1000 STEP 20
38 LET a=10: LET b=30: LET d=50
39 REM SOUND a,b,c,d
40 NEXT c
41 LET a$="SCORE: "+STR$ Score
42 LET x=0: LET y=50: LET t=2:
LET w=3
43 REM TEMPS: LARGE
44 IF H1>Score THEN GO TO 1200
45 LET H1=Score: LET a$="A New
High Score"
46 LET x=60: LET y=100: LET t=
2: LET w=1: PRINT INK 1: REM LA
RGE
47 PRINT #0: FLASH 1: " A
New Level? (y/n) "
48 IF INKEY$="" THEN GO TO 12
49 IF INKEY$="y" OR INKEY$="n"
THEN GO TO 1500
50 IF INKEY$="y" AND INKEY$="n"
THEN GO TO 1220
51 INPUT "New Level? (Level
1-3) OR Level 15 OR Le
vel 16: INT Level THEN GO TO 1240
52 GO TO 90
53 INPUT INKEY$: PRINT #0: FLP
A New Game? (y/n)
54 IF INKEY$="" THEN GO TO 15
55 IF INKEY$="y" OR INKEY$="n"
THEN LET Score=0: LET Z=1: GO T
O 100
56 IF INKEY$="n" AND INKEY$="y"
THEN GO TO 1520
57 LET a$="OK": LET w=16: LET
t=22
58 CLS
59 LET x=0: LET y=0: REM TEMPS
: LARGE
60 LET a=21: LET b=31: REM SET
x,y,a,b,a$
61 FOR a=0 TO 21: LET b=a+.687
5
62 REM PUT a,b,a$
63 PAUSE 5: NEXT a
64 LET a=INT (RAND*0): PAPER 0:
BORDER a: CLS: BEEP 1,-10
65 GO TO 1610
66 LET a$=INKEY$: IF a$="" THE
N RETURN
67 IF a$="C" THEN LET y=y+1+(L
evel/2): LET Score=Score-2
68 IF a$="7" THEN LET y=y-1-(L
evel/2): LET Score=Score-10

```

```

2025 PRINT AT 0,26;Score: "
2026 IF y(20) THEN LET y=20
2027 IF y(163) THEN LET y=163
2028 REM MOVE Plane,COLUMN Plane
b,a
2029 IF a$="" THEN RETURN
2030 REM USE Bomb,z
2031 LET Z=Z+1: IF Z=4 THEN LET
Z=1
2032 REM LET a=LINE Plane:LET b=
COLUMN Plane:LET c=LINE Bomb
2033 IF c(176) THEN RETURN
2034 LET a=a+10: LET c=INT ((c+
4)/8)-32*(c/255): REM MOVE Bomb
b,a
2035 RETURN
2036 FOR a=2 TO 31: LET b=INT (R
AND*10)+1: IF RAND*.6 THEN GO TO 3
040
2037 LET d=INT (RAND*5): FOR c=21
TO 21-b STEP -1
2038 PRINT AT c,a: INK d: BRIGHT
RAND: BEEP .005,c+25: NEXT c
2039 PRINT AT c,a: INK d: "
2040 NEXT a: RETURN
2041 REM LTPARAM
2042 IF h$="plane" THEN GO TO 50
00
2043 IF h$="enemy" THEN GO TO 45
00
2044 LET a=176: REM LET p=CURREN
T h$:USE h$:MOVE h$:COLUMN h$:
:ENABLE h$:USE h$:p
2045 CONTINUE
2046 REM LET o=LINE enemy
2047 LET o=a+11+INT (RAND*6): IF
o>150 THEN LET o=150
2048 IF o<20 THEN LET o=20
2049 LET p=255: REM MOVE enemy,p
,o:ENABLE enemy
2050 CONTINUE
2051 REM LET y=LINE Plane
2052 LET o=0: LET y=y+1: IF y>=1
53 THEN GO TO 5500: IF y>=1
54 REM MOVE Plane,p,y:ENABLE P
lane
2055 LET Score=Score-1: PRINT AT
0,26;Score: ".005,60 CONTINUE
2056 LET a=176: LET b=0: REM MOU
VE Plane,a,b:ENABLE Plane
2057 REM MOVE Enemy,b,a:ENABLE E
nemy
2058 REM ALL Bomb:MOVE Bomb,b,a:
ENABLE Bomb
2059 FOR a=23681 TO 0: CLS
2060 LET a$="YOU HAVE LANDED"
2061 LET w=2: LET t=1: LET x=0:
LET y=0
2062 PRINT INK 2: REM LARGE
2063 LET Score=Score+200
2064 GO TO 1000
2065 REM INTPARAM
2066 IF h$="bomb" OR i$="boab" T
HEN GO TO 7000
2067 IF h$="plane" OR i$="p.3ne"
THEN POKE 23681,0: GO TO 1000
2068 LET p=255: LET o=50: REM MO
VE enemy,p,o:ENABLE enemy
2069 CONTINUE
2070 IF h$="enemy" OR i$="enemy"
THEN GO TO 7500
2071 IF i$="bomb" THEN LET h=i
2072 LET o=176: REM LET p=CURREN
T Bomb:USE Bomb,h:LET q=LINE Bom
b:LET r=COLUMN Bomb:MOVE Bomb,COL
LUM Bomb,o:ENABLE Bomb:USE Bomb
2073 LET q=INT (q/8): LET r=INT
(r/8): IF r>31 THEN LET r=31
2074 LET p=q+INT (RAND*5)+1: IF p
>21 THEN LET p=21
2075 FOR o=0 TO 18 STEP -1: PRIN
T AT o,r-1+(r=0) " : AT o,r " :
AT o,r+1 (r=31) " : BEEP .01,o+
30: NEXT o
2076 FOR o=q TO p: PRINT AT o,r-
1+(r=0) " : AT o,r " : AT o,r+1-
(r=31) " : BEEP .01,o+30: NEXT
o
2077 LET Score=Score+8-(Level/2)
: PRINT AT 0,26;Score: "
2078 CONTINUE
2079 LET o=50: REM MOVE Enemy,CO
LUM Enemy,o:ENABLE Enemy
2080 IF h$="bomb" THEN LET i=h
2081 REM LET p=CURRENT Bomb:USE
Bomb,i:MOVE Bomb,COLUMN Bomb,o:
ENABLE Bomb:USE Bomb,p
2082 CONTINUE
2083 LET a$="BOMBER": LET x=8
2084 LET y=0: LET t=2: LET w=5
2085 PRINT PAPER 5: BRIGHT 1:

```

```

3030 REM LARGE
3031 PLOT 0,160: DRAW 255,0
3032 LET a$=" A Game Using "
3033 LET x=0: LET y=25
3034 LET t=1: LET w=2
3035 REM TEMPS: LARGE
3036 PLOT 0,0: DRAW 255,0
3037 DRAW 0,175: DRAW -255,0
3038 DRAW 0,-175: LET t=3
3039 LET w=8: LET x=3
3040 LET y=35: LET a$="FIFTH"
3041 PRINT INK 2: REM LARGE
3042 LET t=2: LET w=1
3043 LET x=55: LET y=55
3044 LET a$="By RICHARD TAYLOR"
3045 PRINT INK 1: REM LARGE
3046 PRINT AT 12,6: "Key 6 to mov
e down"
3047 PRINT AT 14,5: "Key 7 to mov
e up"
3048 PRINT AT 15,8: "Key 0 to dro
p a bomb"
3049 PRINT AT 13,3: "You must c
hoose a path to": AT 19,3: "land on
"
3050 LET a=3: REM OBJECT Bomb,a
3051 LET a=1: REM OBJECT Plane,a
3052 REM OBJECT Enemy,a
3053 REM PRINT Bomb,a
3054 REM PRINT Plane,a:PRINT En
emy,a
3055 LET a=1: LET d=2: LET b=3:
LET c=0
3056 REM SPEED Bomb,b,c
3057 REM SPEED Plane,a,a
3058 REM SPEED Enemy,d,a
3059 PRINT INK 2: REM COLOUR 30
3060 PRINT INK 1: REM COLOUR 50
3061
3062 LET a=7: REM VECTOR Bomb,a
3063 LET a=4: REM VECTOR Plane,a
3064 LET a=12: REM VECTOR Enemy,
a
3065
3066 FOR c=3 TO 13 STEP 13
3067 FOR a=0 TO 500 STEP 10
3068 LET b=5: LET d=30
3069 REM SOUND b,c,d,a
3070 NEXT a: NEXT c
3071 PAUSE 100
3072 BEEP .2,12: BEEP .2,-10: B
EEP .3,8: BEEP .2,-10: DCF .2,
-10: BEEP .2,-10: BEEP .2,-8: B
EEP .2,-7: BEEP .2,-5: BEEP .2,-5
3073 BEEP .2,-5: BEEP .2,-7: BEEP .
2,-5
3074 PAUSE 50
3075 FOR a=0 TO 7: PAPER a
3076 INK 9: PRINT PAPER a-1+8*(a
=0): INK 0: REM REP-ACE
3077 LET b=40: LET c=5: LET d=a:
LET e=10
3078 REM SOUND b,c,d,e
3079 NEXT a: PAPER 7: INK 0
3080 LET a$=" Press any key to
continue"
3081 PRINT #0: AT 1,0: BRIGHT 1,a
$
3082 PAUSE 5: LET a$=a$(2 TO 1)+
$(1)
3083 IF INKEY$="" THEN GO TO 351
0
3084 CLS
3085 PRINT AT 17,0: FLASH 1: BRI
GHT 1: "SELECT LEVEL: "
3086 PRINT "0 - Easy"
3087 PRINT "1 - Medium"
3088 PRINT "2 - Hard"
3089 PRINT "3 - Very Hard"
3090 INPUT "Please Select: ";Leve
l
3091 IF Level<0 OR Level>3 OR L
evel<>INT Level THEN GO TO 8000
3092 REM ERASE Plane
3093 RETURN
3094 RESTORE
3095 FOR a=USA "a" TO USA "a"+47
3096 READ b: POKE a,b: NEXT a
3097 RETURN
3098 DATA 0,0,0,55,124,124,55
3099 DATA 255,153,153,255,255,15
3,153,255
3100 DATA 24,60,126,255,255,153,
153,255
3101 DATA a,152,145,159,223,153,
153,255
3102 DATA b,0,249,33,235,235,16,
0
3103 DATA 0,0,159,195,255,255,4,
0
3104 SAVE "Bomber" LINE 9990: SA
VE "Data" CODE 1000,1338
9990 CLEAR 61029: LOAD ""CODE
9999 RUN

```

Just an example of the power of FIFTH CRL. CRL House, 9 Kings Yard, Carpenters Rd, London E15 2HD

Only £9.95

CRL

Available from Boots, Menzies, selected branches of HMV, Selfridges and all good computer shops, or from CRL, CRL House, 9 Kings Yard, Carpenters Rd, London E15 2HD. Dealers enquires welcome.

ORIC Software

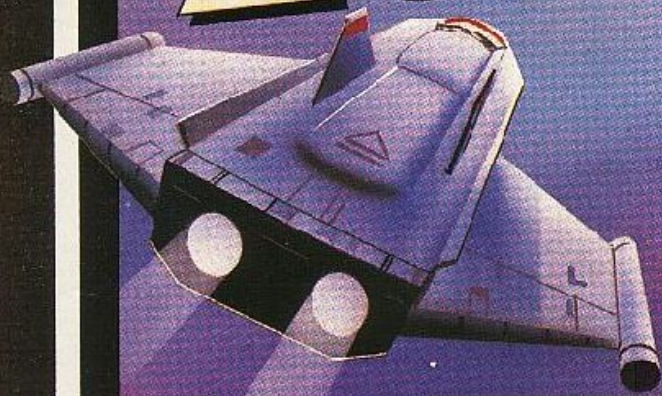
TANSOFT

ultima ZONE

A 100% machine code space trilogy—shoot the Warkons, avoid the bouncing Brunes, battle your way through the satellite zone. Requires 48k Oric.

£8.50

inc. V.A.T. post free



The HOBBIT

In co-operation
with
Melbourne House.

At last, this best selling adventure is available for the Oric based on J. R. R. Tolkien's book 'The Hobbit' (Included) a complete text and graphics adventure. Requires 48k Oric.

£14.95

inc. V.A.T. post free



Our software is available from all Oric dealers and most good software suppliers. In case of difficulty please contact us on Teversham (02205) 2261 or write to us at:

TANSOFT

Unit 1 & 2, Techno Park, Newmarket Road, Cambridge

COMPUTER CABINETS AND HOUSING UNITS



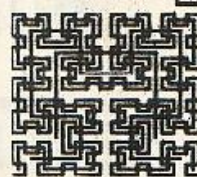
From only £13 + delivery

Send SAE for colour brochure
illustrating our range of
Computer Housing Units and
Cabinets

MARCOL CABINETS
PO Box 69, High Street, Southampton
Tel: 0703 731168 (24 hr answering)



HISOFT PASCAL DEV PAC



Quality ZX SPECTRUM* Software

HISOFT PASCAL 4T

"... I haven't seen any other compiler that could match Hisoft's Pascal" ... *Using the Spectrum Micro - Autumn 1983*
"This is a very impressive product ... of benefit to any Spectrum programmer" ... *David Bolton ZX CCMP/JT/IG Aug/Sept '83*
Just two comments from full length reviews of our powerful and virtually full implementation of Standard Pascal. The advantages of using Pascal are well-known - fast, self-documenting, and above all structured programs and now, with Hisoft Pascal, you can reap all these benefits on a wide range of home computers, including the 48K Sinclair Spectrum! Hisoft Pascal produces programs that run typically 40 times faster than equivalent ZX BASIC programs and, sometimes, up to 1,000 times faster!
Hisoft Pascal supports FOR ... DO, WHILE ... UNTIL, CASE ... OF, INTEGERS, REALS, CHARACTERS, RECORDS, POINTERS, SETS, ARRAYS etc. etc. - it is not a TINY Pascal but a virtually full implementation of the language allowing the user to develop true high-level language skills while attaining execution speed close to that of machine code. Complete with a 70-page manual.
Hisoft Pascal is also available in a variety of disk formats, including sequential FICF handling.

HISOFT DEV PAC 3

"... DEV PAC is most highly recommended. The documentation is first class." *Your Computer May 1983*
"... if you write programs in machine code, buy DEV PAC - it is the best currently on the market" *Adam Denning, ZX SOFT in Which Micro September 1983*
Two comments from reviews of earlier versions of DEV PAC - now we have DEV PAC 3 available, a powerful Z80 assembler with conditional assembly, assembly from tape to enable generation of very large code files, ORG, EQU, DEF, DEF, DEF, DEF, labels of any length - in fact all you need for fast (3,000 line per minute) and powerful assembly programming. But it doesn't stop there: DEV PAC 3 also includes an incredible debugger/assembler giving you a 'front panel' display of the Z80 system and allowing extensive debugging of your machine-code program, including single-stepping programs EVEN IN ROM!! Open up the secrets of low-level programming with DEV PAC 3.

Prices:

Hisoft Pascal 4T (ZX SPECTRUM) £25 inclusive
(NewBrain, CHAMP M2700 etc) £35 plus VAT
Hisoft Pascal 4D, many disk formats £45 inc.

Hisoft DEV PAC 3 (ZX SPECTRUM) £14 inclusive
(NewBrain) £25 inclusive

STOP PRESS Hisoft Pascal for the SPECTRUM now comes complete with a Turtle Graphics package allowing fast and easy production of complex graphic displays.
Hisoft Pascal and Hisoft Devpac also available on ZX Microdrive please write for details



HISOFT
13 Goosecroft, Cheddington
Leighton Buzzard, Beds. LU7 0SR
Tel: (0295) 668995



*and others

YOUR COMPUTER CLASSIFIED

01- 661 3036

Contact: Claire Notley

ADVERTISEMENT RATES

Copy Date

Lineage: 40p per word
(Min. 15 words)
Box No: £4.00 extra
Lineage advertisements are
prepayable and the order form
published in this section should
be completed and returned
with remittance. Credit Card
facilities are available.

Display — rates per scc (Min. 2scc)

One insertion	: £8.50
Three insertions	: £8.20
Six insertions	: £8.00
Twelve insertions	: £7.50
Display advertisers should preferably reserve space by phone.	

Closing date for Classified
advertisements is the 23rd
March.

Post to
Your Computer, Classified
Department, Room H211,
Quadrant House, The Quadrant,
Sutton, Surrey SM2 5AS.

Britain's Biggest Selling Home Computer Magazine

COMPUTER CASSETTES/PAPER

5 of C15 Cassette £2.60
10 of C15 Cassettes £4.90
5 of C20 Cassettes £2.90
10 of C20 Cassettes £5.60
Labels, Case & Postage Inclusive
Listing Paper (11" x 9.5")
500 Sheets only £5.00
Cheques payable to
C & S COMPUTER SERVICES
1-4 Sutcliffe Avenue, W2/72
Grimsby, South Humbs. DN33 1AP.

SPECTRUM 48K

GRAPHICS 3000

Enter up to 3000 User-defined graphics
speedily and effectively. You draw and
the Spectrum keeps you up to date
with the relevant information. On
screen 8 x 8 grid and single byte grid.
Edit, delete, transfer, save. All udgs
can be views with on screen display
area. £3.65

DELTA SOFT

27 Osborne Road, Calegreen,
Stockport, Cheshire

SPECTRUM CHESS

Dare you face The Turk

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

OCP now offer you the
twentieth century equiva-
lent of that Turk — a chess-
playing computer program.
**The Turk challenges you
to a game of chess!**

MANY OPTIONS INCLUDE:

- 6 Levels of Difficulty
- Demonstration Mode
- Board Editor
- Games Printout Facility
- Blitz Chess Against the
Clock
- Two Player Mode
- Unfinished Games can be
Stored
- Recommended Move

FULL INSTRUCTIONS PROVIDED

**CHESS THE TURK
ONLY £8.95**

Post order to
**Oxford Computer
Publishing,
P.O. Box 99, Oxford.**

134/4

SPECTRUM Mania Miner. Play any chess.
Send 75p and SAE, 119 Eulkingdon Road,
Bedworth CV12 9ED.

TRS-80 VIDEO GENIE

**NEWDOS-80
APL-80
PASCAL-80
FORTH (MMS)**

Details of these and over 200 other
programs are contained in our new
loose leaf catalogue price £1.00
(refundable) from:



MICROCOMPUTER APPLICATIONS

41 QUEEN'S ROAD
BLANDFORD FORUM
DORSET DT11 7LA

TEL: (0258) 55100

10

43K Spectrum m/code arcade pack. Krazy
King, Frogger, Breakout, Frooty £5.95. J.
Neighbour, 3 Harbour Wall, Bristol 9.

SOFT SAVE FOR THE VIC20

Allows you to back-up most commercially
available software of any memory size on a
another tape. Cassette with instructions.
£4.95

**SOFTSAVE. 65 STONEWOOD, BEAN,
Nr DARTFORD, KENT DA2 8BZ**

85

COMMODORE 64 games. Pac-Man,
Scramble, Escape, M.C.P., Menic Miner,
Krazy Kong, Machine Code Assembler. 25
each. Huge selection of Spectrum games,
e.g.: Stinkers, Jet Pac, Atic Atac. Send
stamp for lists to Littlecote Software Box
No. 777

134

VIC 20 COPYTAPE

Produce security back up copies of your
programs. Efficient and easy to use
program copies Basic, Machine Code,
Multi-part and Auto-Run programs onto a
new cassette. Works on any size VIC. For
cassette with instructions send
Cheque/PO for £5 to:
Roger Wolfendale, Dept YC, Laurel House,
Spinks Lane, Witham, Essex CM8 1EP.

131

BUS-TECH LYNX NEW RELEASES

- 1. YNKVADERS** Arcade game for the Lynx. Good
100% machine code implementation of Space Invaders with Fast
Smooth Graphics. £7.00 ☐
- 2. ROBORUN** This game has 7 levels which you have to
progress through with the hazard of radio
active barrels, guards etc. Each level is harder
till eventually if you are good enough you have
to face XPF2. Great entertainment with a built
in hall of fame. £6.00 ☐
- 3. WORD SEARCH** This program is based on a very popular game
of the same name. With a built in library of
words or your own words can be used. £6.00 ☐
- 4. JUMPING JOHN** Control John's simple fellow movements to
retrieve the emeralds. Your King has sent you
a lovely present to the castle of the evil Baron
Dog-Breath. Each stage of your quest
becoming harder as you leap the ramparts.
When the bell rings you move on to a higher
level. 5 levels of play with many varied
obstacles becoming harder as you progress.
£7.00 ☐
- 5. MAZE OF DOOM!** You are a brave wizard in Candor and your
quest is to free the land from the evil
oppression by seeking and taking treasure
from the temple of EVIL. Passing through the
complicated maze protected by Goblins,
Lizards and Werewolves etc. With spells and
siamina etc. to assist you. £6.00 ☐

NAME

ADDRESS

Cheques or P/O made payable to:

BUS-TECH
19 Landport Terrace,
Portsmouth,
Hants PO7 2RG.

Delivery for Christmas, all orders dispatched within 48 hours.
Send s.a.e. for full software list of 15 titles for your Lynx.
Dealer enquiries wanted UK + Europe.
Superb discount structure.

109

DO IT WITH TRANS-EXPRESS

TAPE TO MICRODRIVE

- Would you like to transfer your Spectrum programs from
- 1) TAPE TO MICRODRIVE
 - 2) TAPE TO TAPE
 - 3) MICRODRIVE TO TAPE
 - 4) MICRODRIVE TO MICRODRIVE

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

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

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

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

TAPE TO TAPE

Please send me _____ copies of **TRANS-EXPRESS** at £5.50 each

Name _____ I enclose cheque/PO for £ _____

Address _____

Send to: **ROMANTIC ROBOT** 113 Melrose Ave, London NW2

YC

DUPLICAS

The Dragon 32 Cassette Copier

Duplicas will copy **ALL** your present software at no risk to your original tape.

Duplicas copies will often load and run **BETTER** than the originals

NB Purchases are advised not to infringe copyright acts.

Price **£7.95 inclusive**

Cheque and PO's Payable to: -

QUICKBEAM SOFTWARE
67 Old Nazeina Road, Broxbourne, Herts EN10 6RN
Trade enquiries welcome

123

TEXAS TI-99/4A

The following programs all run on a standard TI99/4A

- ORTHELLO** £3.80
Battle your wits against the computer
- OXO** £2.95
Play against the computer or an opponent
- BATTLE SHIPS & CRUIZERS** £3.50
Over 200 different locations. Play an opponent or can you beat the TI
- HANGMAN** £3.50
over 400 different words. Play with the TI or play yourself
- PERSONAL ACCOUNTS** £3.50
- ADDRESS BOOK** £3.50
- ENDLESS CHAMBER (Adventure)** £3.50

Please add 50p Postage and Packing

We also require software for the TI-99/4A.

We also buy second hand Texas module & computers in fact anything for Texas (Drop us a line with your price)

LINGO DATA

33 Brown Cres, Sutton-in-Ashfield, Nott's NG17 4GY

102

Atom Owners! Build a colour module for under £10. Full construction details and demonstration programs £3.00 also speech module details £3.00. A. Worrall, 3 Oaklands Close, Bexleyheath, Kent LA6 7AP.

BACK-UP TAPE COPIERS

How and unique machine code programs that can provide security back-up copies of most software currently available. Supplied on cassette with simple instructions for the following machines:

- COMMODORE 64 £5.95
- VIC 20 £5.95
- BBC MODEL A/B £5.95
- ORIC 1 £5.95
- SPECTRUM 15/48K £4.95
- COMMODORE TAPE TO DISK TRANSFER UTILITY £9.95

Price includes VHS, post, and packing. Send cheques and PO's to

WALLTONE LTD.

Crown Courtyard, Bridge Street, Farnham, Wiltshire

Rhythm Synthesizer for 48K Spectrum. Autochord, drums, piano and metronome facilities. £5.00. Scott Mistle, No. 1 Bungalow, Fildes, Buryfield Common, Berks.

19

MAINS BUGS?

Meins-borne interference causes annoying data corruption and program crashes. Voltage spikes and power surges can cause permanent damage. Protect YOUR equipment:-

13A PROTECTA-PLUG absorbs power line spikes and surges. £7.95 for 1st. £8.95 for 2nd/3rd etc. (p&p 75p)

4-WAY SUPPRESSOR UNIT (13A) with 4 sockets, spike absorber and suppressors. £23.95 for 1st. £19.95 for 2nd. (p&p £1.50)

PROFESSIONAL SUPPRESSOR (13A) Multi-stage filter networks, high power spike absorbers, and earth-line choke. The best! £34.95 for 1st. £29.95 for 2nd. (p&p £2)

All units to BS613, also for hi-fi, videos, office equip. etc.

VAX CO, Hegarth House (D), Forchester Rd, Nottingham. NG3 6LE.

FOR SALE

TRS-80 Model 100 Portable Computer for sale. 24K expands to 32K Ram. Cables, Cassettes, Computer, Cassette Player + Manuals inc. £620.00

Tel: 01-741 9157 after 7pm
Mike Newman 2 Chichester Rents, Chancery Lane, London WC2A 1AG.

113

When replying to Classified advertisements, readers are recommended to take steps to protect their interests before sending money.

SPECTRUM SOFTWARE

HOBBIT £14.80, ARCADIA £5.35, JETPAC £5.35, COOKIE £5.35, FORTH £14.80, M/CODER £9.80, MANIC MINER £5.80. MANY MORE TITLES IN STOCK. BARGAIN PACKS REGULARLY. AUTO DISCOUNT SYSTEM. P&P NO. WE PAY. NO EXTRAS. 16p STAMP SECURES DETAILS ETC.

To: C.P.U., P.O. BOX 13, HERNE BAY, KENT CT6 5UF.
TRIED OF THE BEST
THEN TRY THE BEST C.P.U.

TECTEL ROBOTICS

CONTROL BOARDS FOR HOME COMPUTERS

ORIC

- ORIC DUUBRY £24
- 1 of 16 channel controller
- ORIC ADC £34
- Superfast 8 channel analog - digital scanner, 8 bit resolution.
- ORIC I/O port £29
- 16 programmable channels
- ORIC PRINTER £95
- 26 col. matrix, graphics couple sized print, ink & ribbons.

ZX81

- ZX81 DUUBRY £22.50
- 1 of 16 channel controller
- SX81 ADC £34
- Superfast 8 channel analog - digital scanner, 8 bit resolution.
- ZX81 I/O port £34
- 16 programmable channels
- ZX81 HI-RESOLUTION GRAPHICS £28
- stunning results.

ITEXT SOFTWARE a new range of educational programs.

TODDLERS (pre school)

- LEARN your ALPHABET
- LEARN to COUNT
- LEARN your COLOURS
- LEARN your SHAPES
- ABOUT the HOUSE
- ABOUT the KITCHEN
- ABOUT CLOTHES
- £3.95 each

MUMS & DADS

- ITEXT cookbook (English)
- ITEXT cookbook (Chinese)
- ITEXT cookbook (Italian)
- ITEXT cookbook (Indian)
- ITEXT Wine & Beer Making
- ITEXT Cookbook Desserts
- ITEXT Cookbook Confection
- £5.65 each

Send cheque or Postal Order to:

TECTEL

Telford Opportunities Centre, Halesfield 14,
Telford, Shropshire.
Tel. 0952-581738

P&P £1.50 for control boards £1 for tapes

74

NEW

Green Fingers

GARDENERS!!

Here's your **FIRST** computerised plant database!

- ★ Only 80 seconds to find the ideal plants to fit your special requirements.

You can ask for plants that suit up to any 5 out of 17 characteristics **simultaneously** (height, sun and soil needs, month of flowering, etc.). For example, if you wanted an evergreen shrub that liked partial shade to bloom in February/march, 'Green Fingers' would suggest 'Camellia japonica' or 'skimmia reevesiana' within 80 seconds of your entering your request.

- ★ Comprehensive details of over 350 flowers, shrubs and trees.
- ★ Simple look-up option using species names, common names, or part of names (e.g. 'lily' displays nine different types of lily, any one for which you can obtain fuller details within 60 seconds).

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

Practical Software
Dept. GF, 40 Worple Road,
London, SW19.

127

LYNX Software Library. Two weeks hire
£1.20. Annual membership £6.00. Stamp
for list. Les Wilson (LY) 100 Blenheim Walk,
Corby, Northants.

119

ZX SPECTRUM
32K RAM Up-Grade
£23.50 + VAT
SPECTRUM REPAIRS
£20.00 + VAT
MICRO-TEK
ELECTRONIC
SERVICES
01-520 6414

132

EDUCATIONAL programs for the SPECTRUM

Physics/math software written by
staffordshire teacher.
Area, volume, pythagoras, hokke's
law, electrostatics, optics, probability,
stats.

Each of these are quite lengthy which
actually teach and not just test as many
advertised programs.

The lot for only £3.99
state whether 16K or 48K machine
P.O./Cheques to:

C.F. Software,
196 Rolleston Rd.,
Burton on Trent
DE13 0LE

Enquiries 02831 35170

129

Commodore 64 & Vic 20 - 8K Soccer Club
Boss. Manage your own football team,
player formation, injuries, full league table
etc. only £2.99. D. Spencer, 230 Low
grange Avenue, Billingham, Cleveland.

"I WANT TO WATCH THE TV!"

How many times have you heard that or
maybe you want to watch it yourself.
When you are half way through your
masterpiece, the best fun thing begins -

No more!!

You need our... TV/Computer Aerial
Switching box. No need to keep changing
your leads or to touch your computer -

simply flick the switch.

Price £4.00 inc. VAT & p&p

Send payments to:

FLIGHT ELECTRONIC LTD.

Flight House

Quayside Rd, Southampton SO1 4AD.

121

DISCOUNT SOFTWARE

Big discounts on over 2,500 programs.
Games, Adventures, Educational,
Business.
APPLE, ATARI, BBC, COM, 64,
DRAGON, ORIC, SPECTRUM, VIC
20, ZX 81, CP/M, MSDOS.

Please enclose 25p in postage stamps and
state which lists are required.

MAIL ORDER SOFTWARE

*KNOWLE, JANE, WYKE.

BRADFORD, BD12 9BE.

(mail order only)

117

FOR use with knitting machines. Store and
design patterns. 48K Spectrum, £3.00.
Simon Rogers, 15 Elm Terrace, Westfield
Redstock, Bath.

124

SUPERIOR TAPE COPIER

We are convinced that the new 007 SPY is the
very best Spectrum tape copier available on
cassette. Find a better one & TWICE your
money will be refunded.

a. Can copy complete programs all in one

go.

b. Can copy programs up to a generous 48K

long.

c. Very simple to use.

d. Has copied all programs we know of.

e. Microdrive Compatible AND includes a

program to copy tapes to microdrive.

WARNING: You can buy a cheaper 'Mickey

Mouse' copier which copies only one section

at a time & has to be relocated after each. 007

SPY stays in Spectrum all told to go.

007 SPY is just £3.95

90

ZX-GUARANTEED (VC)

29 Chadderton Drive, Unsworth,

Bury, Lancs.

Tel 061-786 5712

SPECTRUM SOFTWARE

48K

Steve Silver adventure games.

Adventure 1 £5.95

Adventure 2 £5.95

Moolander £4.50

16K

Blitz + Code Breaker £4.50

Robotic Capers £4.50

48K Spectrum

Prices include p&p

Send Cheque/FO to:

W B Software

192 Seamer Rd, Scarborough

North Yorkshire YO12 4HG

Tel: 0723 70074

462/9

*****TAPE COPIER 5***** (new version)

Makes BACK UP copies of ANY type of SPECTRUM (16/48K) program (incl
headerless, m/c, unstoppable) easily with MANY UNIQUE features.
FULL MONEY BACK GUARANTEE if you are not satisfied.
MAXIMUM 5 STARS from Home Comp. Weekly with 3 out of 4 100%
RATINGS.

*LOADS in all program parts CONTINUOUSLY - even without pressing a key.
Other copiers require many loadings MASSIVELY saving you time and
trouble!

*M Drive - GENUINELY copies BASIC, M/CODE + arrays onto MICRODRIVE.
Stops programs VITAL to alter loading instructions to HELP make them run.

*BREAK at any time/continue loading feature.

*MAXBYTES makes a working copy of programs occupying the full 16K or 48K!

*Verifies. Repeat copies, Auto, Abort, Program name plus HEADER data.

*Copies HEADERLESS and other types. Indeed ALL programs that we are aware
of!

*Very user friendly and simple to use, with FULL instructions.

TAPE COPIER £4.50

Old customers updates at £1.50 or £2 with m/drive plus SAE and old tape

TAPE COPIER WITH M/DRIVE £5.50

LERM Dept YC

Cottingham, Mkt Harborough, Leics

110

*****TAPE COPIER 5***** (new version)

Makes BACK UP copies of ANY type of SPECTRUM (16/48K) program (incl
headerless, m/c, unstoppable) easily with MANY UNIQUE features.
FULL MONEY BACK GUARANTEE if you are not satisfied.
MAXIMUM 5 STARS from Home Comp. Weekly with 3 out of 4 100%
RATINGS.

*LOADS in all program parts CONTINUOUSLY - even without pressing a key. Other copiers require
many loadings - MASSIVELY saving you time and trouble!

*M Drive - GENUINELY copies BASIC, M/CODE + arrays onto MICRODRIVE. Stops programs -
VITAL to alter loading instructions - a HELP make them run.

*BREAK at any time/continue loading feature.

*MAXBYTES makes a working copy of programs occupying the full 16K or 48K!

*Verifies. Repeat copies, Auto, Abort, Program name plus HEADER data.

*Copies HEADERLESS and other types. Indeed ALL programs that we are aware of!

*Very user friendly and simple to use, with FULL instructions.

TAPE COPIER £4.50

Old customers updates at £1.50 or £2 with m/drive plus SAE and old tape

TAPE COPIER WITH M/DRIVE £5.50

LERM SOFTWARE

COTTINGHAM, MKT HARBOROUGH,

LEICS

96

THIS'LL TEACH YOU A LESSON!!

GEORGE LEVEL 1/2/3 Cassettes for the 48K SPECTRUM
with COLOUR and MOVING GRAPHICS

PHYSICS 6 Programs for £6.50

Chemistry 6 Programs for £6.50

OR BOTH for £12

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Checklist of 1000+ items

Corneal Software

"THE LODGE", Brandon Lane, Brandon, Durham DH7 8SJ

SPECTRUM £3.95 each
SUPER SLAMMER Hi Res machine code version of "Dart Slammer"
SPACE LARNS - A family space, board game. Lots of fun for 1 to 4 players.
STRINGY THINGS - A fun design program for string pictures. Many features. Hours of fun.
DOOR SLAMMER - A novel, brain teaser. Can you beat the ghost and complete the game?
BIOZAX - Fun, funny, Zodiak and Birthdays program. Ideal for family, teens and kids.
SPY TRAINER PART 1 (More with sound) semaphore format.
SPY TRAINER PART 2 (Spymaster-30) Code Word!
 (BUY BOTH PARTS 1 and 2 only £8)
DEALER INQUIRIES WELCOME 133

Give Earth floating point extension words. Full facilities. Trig functions, complex numbers and Turtle graphics. £4.50 (including full documentation) David McKelvie, 36 Northcott, Bracknell, Berks.

Spectrum Speedyload - halve your waiting time! This short program lets you save/load at 3000 Baud. Cassette (48K) £3.95. Ness Micro Systems, 100 Drakies Avenue, Inverness.

SPECTRUM WORLD MAP AND PLANNING GRID expandable for games and educational purposes. For cassette send £3.00. Cheque/P.O., SAE to J. Brown, 7 Bitterwood Road, Kildeminster, DY10 4EG.

114

ATARI/CBM SPARES

ATARI:
 Strong replacement joystick handle inserts @ £2.50/pair.
 Joystick handle-top fire button kit including insert and grip @ £2.95 each.
 48K RAM board for Atari 400 @ £66.45 each. All post free.
COMMODORE:
 Joystick repair service. New insert fitted and other repairs as needed. Send joystick and £2.95 - 50p p&p. Commodore approved. New Commodore joysticks only £6 + 50p p&p.
COMPUTER SUPPLIES
 146 Church Road, Boston, Lincs.
 PE21 0JX

BUFFER MICRO SHOP

SINCLAIR - VIC 20 - BBC MICRO

SOFTWARE GIFT VOUCHERS

AVAILABLE NOW £1 to £50
DRAGON 32 - COMMODORE 64

310 STREATHAM HIGH RD. LONDON SW16 639.10

MicroDrive Users Club

CALLED Microdrive Exchange. This news letter club is designed to help by the exchange of info and ideas.

Did you know you can pay up to £5.50 for a cassette to transfer tapes to microdrive and then they DON'T RUN?

Issue 1 will include: How to avoid this, plus transferring programs which normally over write the microdrive map, transferring via File Zoom, etc, etc.

Membership is 25 per year. Europe £8 per year.

Please make cheques payable to ZX Guaranteed.

Microdrive Exchange is run by G. A. Bobber.

ZX GUARANTEED
 29, Chadderton Drive, Unsworth, Bury, Lancs.
 Tel: 061-766 5712

116



WIN THE POOLS

48k

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

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

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

SPECTADRAW, 1 COWLEAZE, CHNNOR, OXFORD OX9 4TE



SPECTRUM GAME + "WORD PROCESSOR"

Join the Spectrum Software Club now, and choose a **FREE GAME CASSETTE** for you to keep from our Top Twenty Best Sellers listed below.

OVER 150 tried-and-tested quality games available at a discount from all the top software houses - Only the **VERY BEST** programs are stocked.

Our unique Exchange Plan means you can enjoy any game from our catalogue for up to 30 days for just £1.00. **EXCHANGE YOUR EXISTING GAMES** or the Free Game you get from us.

*** NEWSLETTER * HARDWARE DISCOUNTS * REVIEWS ETC ***TOP 20 TAPES*****

1 3D ANT ATTACK	48K	11 TRANZ AM	48K
2 ATIC ATAC	48K	12 PENETRATOR	48K
3 CHEQUERED FLAG	48K	13 HARRIER ATTACK	16K
4 LUVAR JETMAN	48K	14 MR WIMPY	48K
5 KONG	48K	15 BIRDS & BEES	48K
6 JET PAC	16K	16 DOOMSDAY CASTLE	48K
7 THE PYRAMID	48K	17 FOOTBALL MANAGER	48K
8 MANIC MINER	48K	18 HALL OF THE THINGS	48K
9 FLIGHT SIMULATION	48K	19 GOLF	48K
10 ARCADIA	16K	20 QUEST ADVENTURE	48K

MEMBERSHIP APPLICATION

Please enrol me as a member of the Spectrum Software Club. I enclose £9.95 (payable to Video International)

Send me the following **FREE CASSETTE**

(*Enrol before April 30th and get a FREE word processor).

Name _____

Address _____

Postcode _____

Spectrum Software Club (YC), Video International, 287-291 High Street, Epping, Essex, CM16 4DA

652/12

XyZ

spectrum software



WAS NUN? 48K - Grafik Adventure
 - deutschsprachig -

DM 39,90

FILE COPY & 48K-Cracker

DM 48,50

Und viele andere:

Atic Atac, Mr. Wimpy, Time Machine, 1984, Knights Quest...

COMING SOON: WHAT NOW? 48K Graphic Adventure

£11.00 inc p&p

XyZ Diepenbrockstr.9 D-4400 MUENSTER

Sinclair ZX Spectrum Software TEL: 0251/665594

Ständig die neuesten Programme vorratig - Lichte antordern - drif Wunsch auch Programme fuer andere Computersysteme - Oh-Preise Zzgl Porto & Versandkosten 126

BACK up 64 copy most programmes now available. Easy to use, will back up basic machine code without any risk to original. Cheques/P.O. for £6.50 to D. Jones, 5 Woodley, Chilton Fields, Ash near Canterbury, Kent. Warning: resale or hiring of copyright material is an offence. Phone: (0304) 81398.

89

BBC (B) ELECTRON duplicator enables you to make back-up copies of 99% of cassette based software including locked programs. Key-board. Audible recognition of a keypress both on one tape £3.95. J. Hannan, 48 Netherlands Avenue, Odsal, Bradford, Yorks.

115

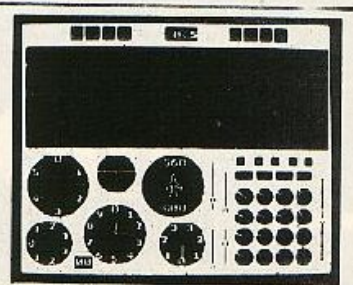
DRAGON 32 BBC MODEL B TR880 C/C 32K

747 FLIGHT SIMULATOR

Superbly realistic instrumentation and pilot's view is the main attraction which includes emergencies such as engine failure and system failures. This program uses high-resolution graphics to the full to produce the most realistic flight-deck display yet seen on a home computer. There are 21 real dials and 28 other indicators (see diagram). Your controls operate throttle, ailerons, elevator, flap, slat, spoilers, landing gear, reverse thrust, brakes, etc. You see the runway in true perspective. Use joystick and includes options to start with take-off or random landing approach. A real simulation, not just another game. (Your Computer Apr. 83)

Cassette £8.90 (P&P and VAT incld)

D.A.C.C. Ltd (Dept. YC)
 25 Wansley Road, Hindley,
 Gr. Manchester M28 3BN

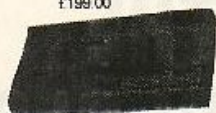


ACTUAL SCREEN PHOTOGRAPH 154/4

THE HOME COMPUTER CENTRE ENFIELD COMMUNICATIONS

COMMODORE 64
£199.00

BBC 'B' £395.00



SPECTRUM 48K
£129.95

ZX81, DRAGON, SPECTRUM, BBC, VIC 20, CBM 64

**ADVICE — INFORMATION —
PROBLEMS SOLVED
OUR TIME IS YOUR TIME**

Come and see our huge
selection of Software and
Books from all leading
software houses.

**Games, Business and
Educational.**

JOYSTICKS, PRINTERS, KEYBOARDS,
UPGRADES, CABLES ETC. ALWAYS IN STOCK

01-805 7434/7772
135 High Street
Ponders End
Enfield, Middx
EN3 4BB



SALES — SERVICE — MAIL ORDER

GAMES — GAMES — GAMES PROGRAMMERS REQUIRED

We are the sole distributors for Imagic Rom based game cartridges within the UK. We now require high quality programmers, and programmers capable of transcribing existing games onto these systems —

BBC
Dragon 32
Commodore 64
Vic 20
Spectrum
Atari Home Computers
Oric

'Royalties paid on all sales made world-wide'

All games will be marketed throughout Europe by the Imagic Distribution Centre under the exciting new label 'SCARAB' software.

Send your superfast machine code masterpieces in confidence to: —

A.A. Heles Limited
Imagic Distribution Centre,
PO Box 33, Harrowbrook Road,
Hinckley, Leics, LE10 3DN
A member of the Adam Leisure Group plc

670/12

NOTICE TO PARENTS from INFO-STREAM Computer Assisted Learning

If your son or daughter is weak in Maths or the Sciences? Or perhaps in Modern Languages? Help solve their problems with your home computer.

INFO-STREAM offers software for SPECTRUM, BBC, VIC 20 AND ZX81 micros covering most subjects in the school curriculum and catering for all ages and abilities up to revision aids for CSE, 'O' and 'A' levels. The range includes 'fun-to-learn' programs for the younger members of the family.

For a 42-page catalogue detailing over 220 educational programs, please send £1 (refundable on first order) to: —

INFO-STREAM (Dept YC3),
36a Chase Green Avenue,
Enfield, Middlesex EN2 8EB.

112

YOUR MICRO COULD TEACH YOU A THING OR TWO ABOUT THE FRENCH... ...OR THE GERMANS...OR THE SPANISH

A home computer is an expensive toy; and, if playing games is all you do with it, a toy is all it is.

Now, using the New Personal Computer Superlearning System (PCSS) you can have fun with your micro and learn something at the same time.

PCSS language courses comprise 12 lessons on 3 audio cassettes used in conjunction with a fourth software cassette, to add a new dimension to learning.

Initially the software package enables you to see the words you're learning; then, as your vocabulary develops, it will test your skill in your new language.

Anyone can learn this way — no previous knowledge of the language is required. The unique PCSS method develops your overall learning and memory skills in a way that's both relaxing and enjoyable.

Each PCSS language pack — French, German or Spanish — contains a comprehensive booklet detailing

the 12 audio lessons and the function of the interactive software. Additionally the booklet expands on the broader benefits of the PCSS method.

At only £29.95 per pack PCSS costs less than other home language courses yet it offers much more in terms of education and enjoyment.

Complete the coupon below and try PCSS for yourself — you'll be amazed what your micro can teach you.

Send your cheque or Postal Order for £29.95 made payable to:
**MDA Modon Associates Limited, 561 Upper Richmond Road West,
London SW14 7ED. (ZX81 users £26.95)**

or, alternatively phone **Teledata 01 200 0200** now, lines open 24 hours and quote your Visa, Diners Club, Access or American Express number.

Tick which Audio/software package you require. (Prices include VAT. Add £1.45 for postage and packing on each order.)

Please supply the following Audio/software Packages

FRENCH ☐ GERMAN ☐ SPANISH ☐

Name: _____

Address: _____

Machine Type: _____ Memory Size: _____

574/11

MDA

COMPUTERISED EDUCATION SYSTEMS

(PCSS software is compatible with the ZX81 (16K), ZX Spectrum, BBC Micro, Acorn Electron Micros.)

Each pack comes with a full money back guarantee if not completely satisfied

reprints

If you are interested in a particular article/special feature or advertisement in this journal

HAVE A GOOD LOOK AT OUR REPRINT SERVICE!

We offer an excellent, reasonably priced service working to your own specifications to produce a valuable and prestigious addition to your promotional material. (Minimum order 250 copies). Telephone Michael Rogers on 01-661 3457 or complete and return the form below.

To: Michael Rogers, Your Computer, Reprint Department, Quadrant House, Sutton, Surrey SM2 5AS.

I am interested in copies of article/advert.

headed featured in this

journal on pages issue dated

Please send me full details of your reprint service by return of post.

Name

Company

Address

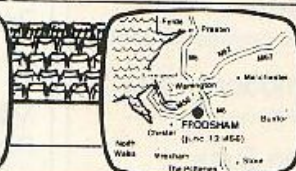
Tel No

totally confused?
made comparisons?
nearly compromised?

come to
northern
computers

completely committed!

THE
Showroom
for all
the
leading
micros



- ✦ BBC ✦ Electron ✦ Sinclair ✦ VIC64
- ✦ Dragon ✦ Printers ✦ Disk Drives
- ✦ Plenty of Software
- ✦ Books/Games ✦ Help & Advice
- ✦ Secondhand Computers

Churchfield Rd
FRODSHAM Ches.
WA6 6RD

**northern
computers**

Telephone:
FRODSHAM
0928 35110 10 Lines

THE computer centre of the NORTH

SELL IT WITH YOUR COMPUTER

Classified Rates

Linage: 40p per word (Min 15 words) — prepayable

Linage advertisers should complete this form provided in BLOCK CAPITALS. Phone number counts as 2 words. Name and address to be paid for if used in advertisement. Box Number if required is £4.00 extra.

Display — rates per sec (Min 2sec)

One insertion : £8.50
Three insertions : £8.20
Six insertions : £8.00
Twelve insertions : £7.50

Display advertisers should provide separate copy and preferably reserve space by phone 01-661 3036.

Method of Payment

Cheques etc. should be made payable to Business Press International Ltd, and crossed. I enclose herewith cheque/PO for

£.....
Please debit my Access/Visa/Barclay Card/American Express/Diners Club Int'l as below



SIGNATURE

Post to:

Cut out the order form and return together with your remittance to:
Classified Department, Your Computer,
Room H211, Quadrant House, The
Quadrant, Sutton, Surrey SM2 5AS.
(01) 661 3036

CLASSIFIED ORDER FORM

Please insert the following advertisement in Your Computer Classified Section

					LINAGE
					£6.00
					£8.00
					£10.00
					£12.00
					£14.00
					£16.00
					£18.00
					£20.00

No. of insertions required ☐ Box No. required YES/NO

NAME (Please include initials)

ADDRESS

Payment by credit card please state address card is registered

Daytime tel. no

THIS FORM SHOULD BE RETURNED BY 23 MARCH FOR MAY ISSUE PUBLICATION

Company Registered Number: 151537 (England) Registered Office: Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Hot★ lines

Acorn Computer

Telephone: Cambridge 0223-245200

Atari

Telephone: Slough 0753-24561

Computers

Telephone: Cambridge 0223-315063

Commodore CBM

Telephone: Slough 0753-74111

Dragon Data

Telephone: Bridgend 0656-744725

Sharp

Telephone: Manchester 061 2052333

Sinclair

Telephone: Camberly 0276-681566

Sord

Telephone: London 01 930 4214

Tandy Corporation

Telephone: Birmingham 021-6566101

Texas Instruments

Telephone: Bedford 0234-63211

DATEBASE

Local, national and international micro events are updated here. To publicise your event, phone Paul Bond on 01-661 3472.

Midland Computer Fair

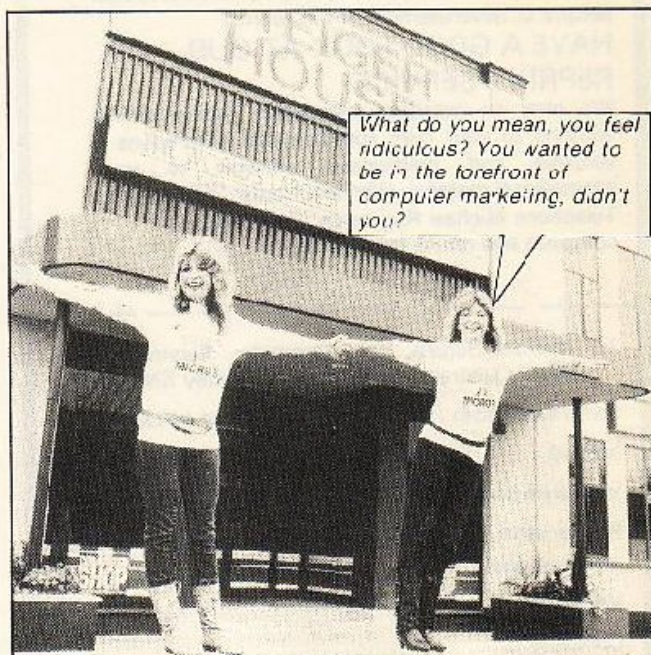
Hall 3 NEC Birmingham, from 4 to 7 May is the venue for this regional extension of the Computer Fair. Telephone Reed Exhibitions 01-643 8040 for more info.

Compec Wales

Cardiff University, April 10 to 12 for business computers, peripherals, micros, minis and C.A.D.s. Telephone 01-513 8040.

Electron & BBC Micro User Show

There might be some robots as well at the New Horticultural Hall, London, 29 March to 1 April. Telephone 061-455 8383.



Karen Page (left) and Marguerite Ryan link arms to hold back the micro-crazed hordes eager to rush into Steiger, claimed to be the world's largest computer store. The 25,000 square foot showroom at Stonebridge Park, north-west London is the first of many.

A		E		Melbourne House	15 19	Screens	84
AAE Software	30	Earls Court Computer Fair	200	Memotech	24 25 31	Seyern	41
AGF Hardware	42	Euro Electronics	198	Micro X	144	Seyern Software	28 29
ASE	210	Everyday Electronics	198	Microbureau	100	Shards Software	152
Abbox	7			Microcars	134	Silverlind	196
Acorn Computers	13 30 37	F		Microdeal	70	Sinclair Research	34 35
Addictive Games	206	First Byte	106	Micromanagement	178 181	Sir Computers	104
Advance Technology	101	Fox Electronics	92	Micromega	215	Skywave	50
Adventure International	83 127			Micronet 80C	10 11	Softtek	217
Amirog	211	G		Microperipherals	Inside Back	Software Index	148
Aquarius	186	GCC Cambridge	196	Cover		Software Library	90
		Galaset	210	Micropower	160	Software Projects	22 23
		Gilsoft	154	Microworkshop	9	Spectravision	220 221
B				Midland Computer Fair	216	Spectrum	138 143
BeeBug	170	H		Mikrogen	163	Spirit Software	142
Betasoft	58	Hewson Consultants	88 120	Mirrorsoft	204	Storm	76
Beyond Software	113	Hilton	41	Mogul	182	Stuart Tables	90
Big G Software	167	Hiscell	227			Swanley	132
Blaby	50			N			
Bucbyte	14	I		National Software Library	210	T	
Bytewell	14	ISP	43			Tandy Corporation	60
		Imagine	54 97 108	O		Tansoft	226
C		Incentive Software	27	Ocean Publishing	Back Cover	Tasman	146
CDS Microsystems	118 119	Industrial Process	196	Orange Enterprises	84	Terminal Software	6
CJE Micros	100	Interceptor Micros	201	Oric	128 130	Thoughts & Crosses	189
CP Software	203	Interface	48 154	Orion	76	Timedata	27
CRL	173 224 225					Tomorrow's World	96
Cambridge Micro Electronics	84	S		P		U	
Cardigan	58	Samar	152	PSS	197	Ultimate Play the Game	155
Cartell Software	20 21	Senart	170	Picturesque	90		
Cascade Games	193	See the Lion	Inside Front Cover	Pinehurst	205	V	
Certresoft	32 33	John Wiley	150	Practical Computing	223	Virgin Games	4 5
Commodore	62 63			Prentice Hall	198 199	Visions	115
Compusound	27	K		Printo Plotter	222	Visionstore	102
Computer Cabin	160	Kerrison Micro	56	Protssoft	195		
Computer Fairs	194	Kosmos	9	Protok	8 110 205	W	
Computer Link	212	Kuma	75			Wdgit	85
Computer Pro	52			Q		William Stuart Systems	96
Computertown	218 219	L		QED	144	Wyvern	40
Crystal Computers	213	LCL	205	Quick Silva	66		
		Level	212			Y	
D		Level 9	207			Your Computer	
DJL	26	Lamasoft	172	FD Laboratories	148 212	Subscriptions	190
DK Tronics	58			Fepints	52		
DRG Peripherals	38 39 41	M		Fomik	122	Z	
Datal	137	MC Lothlorien	202			ZX Microfair	208 209
Dean Electronics	214	Marcol	227	S		Zeal	58
Dynamics	132	Mayfair Micros	170	Sage	106	Zero	96

If you have been waiting for printer prices to fall ~ THE WAIT IS OVER !!

SHINWA CTI CP80 IDEAL FOR SCREEN DUMPS AND PROGRAM LISTING

The most popular 80 CPS Matrix Printer available!
Designed to be Epson compatible, with all
the same features.

- * FRICTION & TRACTOR AS STANDARD
- * 80 CPS * BI-DIRECTIONAL, LOGIC SEEKING * TRUE DESCENDERS
- * HI-RES BIT IMAGE + BLOCK GRAPHIC PRINTOUT MODES * SUB & SUPER SCRIPTS
- * ITALIC PRINTING * AUTO UNDERLINING
- * CONDENSED AND EMPHASISED PRINTING
- * EXPANDED AND DOUBLE STRIKE PRINTING
- * COMPACT LIGHTWEIGHT DESIGN



— FOR
USE WITH
POPULAR
MICRO'S
INCLUDING
BBC, IBM etc.

DAISYSTEP 2000 IDEAL FOR QUALITY PRINTOUT

A new low cost, low noise, fully featured Daisywheel Printer.

- * WORDSTAR COMPATIBLE * QUME COMPATIBLE RIBBONS AND
DAISYWHEELS * 20 CPS MAXIMUM * 10, 12, AND 15 CHARACTERS
PER INCH * PLATEN LENGTH: 13" * INTERFACE: PARALLEL -
CENTRONICS, OPTIONAL RS232 * WEIGHT: 9.5 kg.



— FOR USE WITH
POPULAR MICRO'S
INCLUDING — BBC, IBM etc.

THE KEYAKI 100% GUARANTEE

- Full 1 yr. no quibble warranty
- 14 day Money Back Guarantee
- Delivery within 7 days subject to availability



Telephone Credit Card Orders welcome.
Personal Collection welcome, Monday
to Saturday - 9.00 am until 7.00 pm.

**Up to £1000 Instant Credit available,
full written details on application.
Repayments quoted are correct at time of
going to press.*

To: Keyaki Ltd, Enterprise House, 44 Terrace Road,
Walton-on Thames, Surrey KT12 2SD

Please send me.....

Shinwa CT CP80 printers at

£238.85 inc. VAT & £10 Del.

and/or _____

DaisyStep 2906 printers at

£342.35 inc. VAT & £10 Del.

Name.....

Address.....

Postcode.....

Telephone.....

Tick box for details of Serial Interface options ☐

Tick box for details of Instant Credit up to £1000 ☐

I enclose my cheque no. for £.....

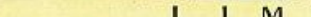
Please charge my Access/Barclaycard Card No.

Signature.....

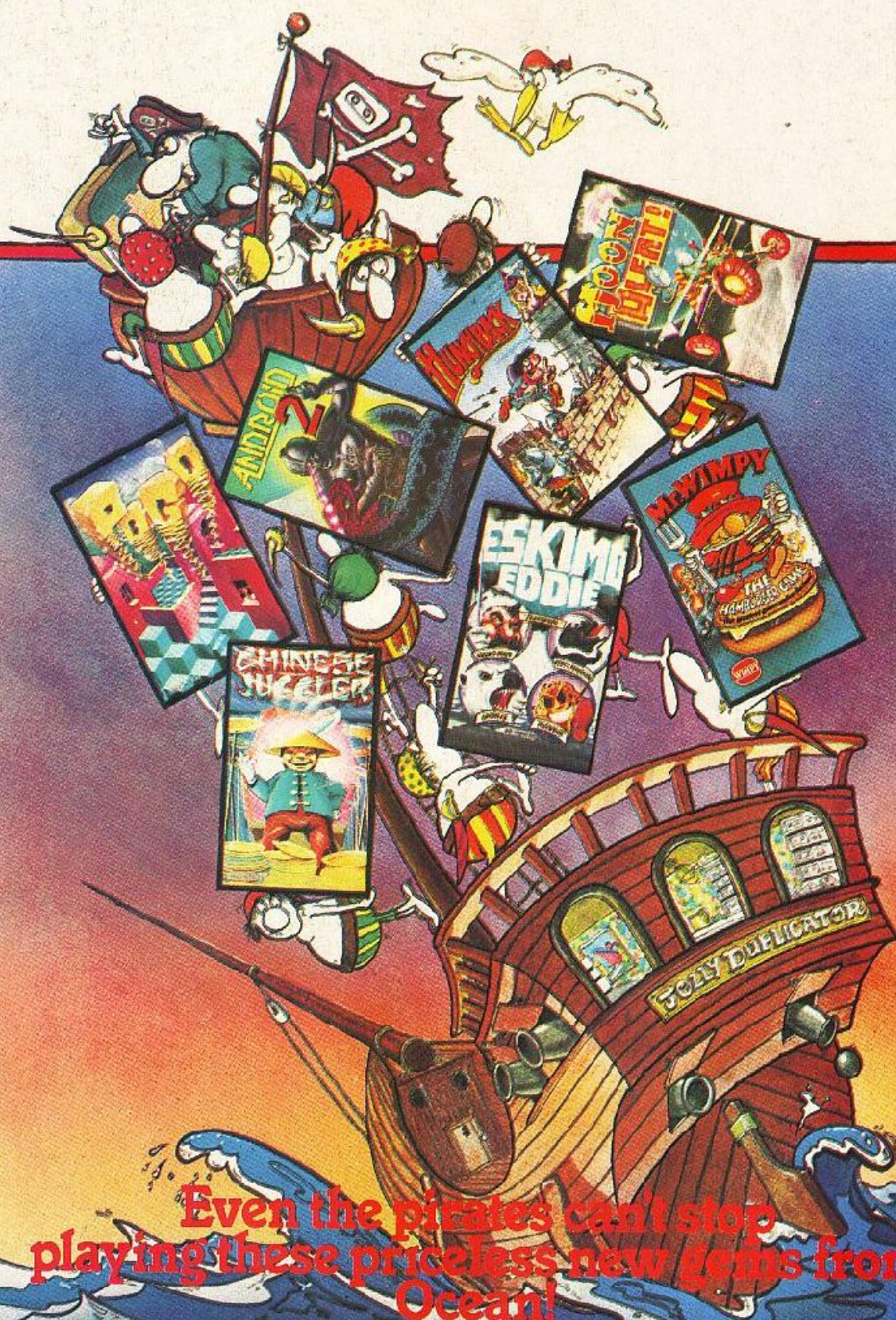


YC4

TRADE & EDUCATIONAL ENQUIRIES WELCOME

The logo for KEYAKI LIMITED. The word "KEYAKI" is written in large, bold, red capital letters, each contained within a black-outlined square grid. Below "KEYAKI", the word "LIMITED" is written in smaller, black, sans-serif capital letters.

Enterprise House, 44 Terrace Road, Walton-on-Thames,
Surrey. KT12 2SD Tel: 09322 42777



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

That's right, even the pirates will be dropping their duplicators to play Moon Alert, to join in the swinging fun with Hunchback, to attack with Android Two, jump for their lives with Pogo, spin themselves dizzy with Chinese Juggler, they'll just crack-up with Eskimo Eddie's Arctic action and there will be no stopping the captain once he gets his hook on Mr. Wimpy that zany burger battle. Don't you miss all the Ocean action get down to your local dealer now and join in the fun and games.

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

ocean

Chinese Juggler
Eskimo Eddie
Mr. Wimpy

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

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

Ocean Software · Ralli Building · Stanley Street · Manchester M3 5FD · Tel: 061 832 9143