

WIN A
SONY HIT-BIT MSX

YOUR

Canada	CS	4.00
Denmark	DKr.	35.00
France	Fr.	50.00
Germany	DM	8.50
Greece	Dra	290.00
Holland	DFI	8.50
Italy	L	4200
New Zealand	NZ\$	3.70
Singapore	S\$	6.25
Spain	Pts.	390.00
Switzerland	SFr.	7.00
U.S.A.	\$	3.95

(D72163)

90p

COMPUTER

NOVEMBER 1984

BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE

Vol. 4 No. 11

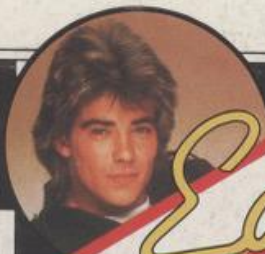
PIRACY: Are you guilty of stealing £100,000,000?



**NEW
SINCLAIR**
Details inside

MSX — Goldstar v. Canon, Sony and Mitsubishi
BBC Music, ZX-81 Red Ants and Oric Brood
CBM-64 Quick Load and Canyon
Spectrum Zoom and Multitask
Amstrad Word Processor

**GAMES TESTS VIC-20,
AMSTRAD, BBC**



THE
OFFICIAL

Eddie Kidd

JUMP CHALLENGE



If you've ever wondered how it feels to be Eddie Kidd... defying danger and gravity, soaring on a motor-bike over a long line of cars... here's your chance to find out!

This fabulous new game - Jump Challenge - has been produced for you by Martech, with a lot of help from Eddie himself.

At the age of 12, Eddie Kidd was jumping over oil barrels on a bicycle. At 18, he shattered the world record with his astounding leap of 190 feet - clearing 14 double-decker buses. Can you match his skill, courage, control and ice-cool nerve? Jump Challenge will show how you compare with the King of Motor-Cycle Stunts!

Just like Eddie, you'll start by trying to clear barrels on a bicycle... gradually working up to attempting Eddie's daring leaps which have thrilled millions around the world!

- ☐ 100% machine code
- ☐ separate control of bike and rider for incredible realism
- ☐ dangerous headwinds for added difficulty
- ☐ scoring system - for successful jumps
- ☐ joystick or keyboard option
- ☐ PLUS!!! You can enter the Official International Jump Challenge Competition!

Details on cassette insert

Available from leading software retailers OR order today by mail, price £6.95 (48K Spectrum) or £7.95 (Commodore 64, BBC 'B', & Electron) including VAT and P&P. Please make cheque or postal order payable to Software Communications Ltd. Allow 7 days for delivery.



SPECTRUM



SPECTRUM



CBM 64

martech

Martech is the registered trade mark of Software Communications Limited
Martech House, Bay Terrace, Pevensey Bay, East Sussex BN24 6EE

TRADE ENQUIRIES WELCOME. PHONE: (0323) 768456 TELEX: 87465 EXIM Brighton



48K SPECTRUM · COMMODORE 64 · BBC 'B' · ELECTRON

YOUR COMPUTER *Contents*

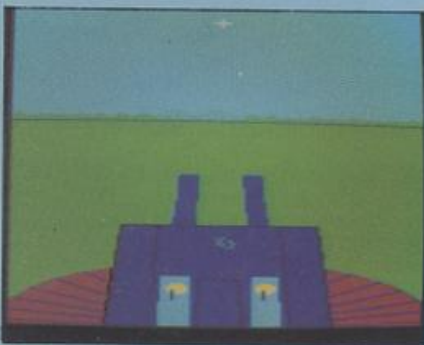
NOVEMBER 1984



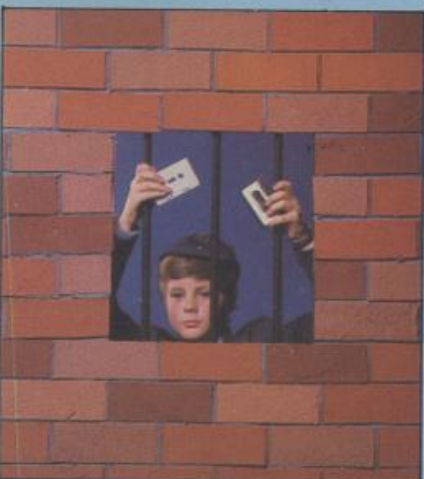
New Sinclair — page 42.



MSX machines: page 62.



BBC Gunner: page 91.



- 40 LETTERS AND EDITORIAL:** Basic is better; that was the bodge that was.
- 42 NEWS:** New Sinclair Spectrum Plus, Best music program yet and more.
- 45 FIRST BYTES:** Speech synthesis and recognition; also robots.
- 49 COMPUTER CLUB:** Lee Paddon gets a little tan in the Southend rain.
- 51 SOFTWARE SHORTLIST:** Try for a third down; go on down with Deus Ex Machina; try landing your interdictor at base without getting shot down. Latest games.
- 55 QUEST CORNER:** Hugo North leads adventurers through new mazes.
- 57 VIC-20 SOFTWARE REVIEW:** Paul Bond pats the old workhorse.
- 59 AMSTRAD SOFTWARE:** Paul Bond sees what's on the CPC-464.
- 60 BBC SOFTWARE:** Simon Beesley finds the Beeb far from on the wane.
- 62 FACE TO FACE WITH MSX MICROCOMPUTERS:** Glyn Moody gets to grips with the rigid uniformity of Japanese MSX machines, plus a Korean interloper.
- 67 THE YOUR COMPUTER GUIDE TO MICRO BUYS:** What microcomputers are around, what will be around shortly — allegedly. A guide for computer consumers.
- 73 PIRACY — THE BLACK FLAG:** Meirion Jones sets the scene for a tale of skulduggery, greed and treachery. What the big companies are really afraid of.
- 74 PIRACY — CONFESSIONS OF A HACKER:** A darkened studio, heavily backlit. Our man in the hood reveals some of the tools and tricks of the black art.
- 76 PIRACY — DEATH OF A SOFTWARE GIANT:** Was it piracy, or just bad business practice? Bruce Everiss on the last days in Imagine's bunker.
- 78 PIRACY — COMMODORE CBM-64 QUICKLOAD:** Defend yourself, landlubber. Quickloads make it hard to pirate your programs, thanks to Andrew Caple.
- 85 ALIQUID SIMPLEX:** Help Dr Hilfe with David Aspinall's Spectrum game.
- 91 BBC GUNNER:** Tim Humphries draws a bead on the foe.
- 93 VIC ELEVATORS:** They may have stopped making them, but your Vic-20 will soon be going up in the world with H Kaljouw's elevating game.
- 97 ORIC BROOD:** P H Phoeng un-yolks eggs-treme horror.
- 100 CBM-64 CAVERN:** Into the chasm with Patrick Edmond.
- 106 SPECTRUM ZOOM:** Mark Jones enables you to zoom in and get a close-up on any section of your screen display.
- 109 BBC MUSIC:** Allows you to enter the notes on the staves and then play them. Get in harmony with Nick Lea.
- 115 THE DRAGON CURSE OF ABU SIMBEL:** A voyage into the city of the damned. Mick Stevens is your bus conductor.
- 122 AMSTRAD WORD PROCESSOR.** Move paragraphs around.
- 129 ATARI ANIMATION:** Bring those spritely sprites to life.
- 133 QL 68000 DISASSEMBLER:** The first in a series on machine code for the QL. Phill Holliday initiates you in the rites of the machine.
- 141 ZX-81 ASSEMBLER:** Anthony Nwokoye allows you to enter machine code using Z-80 mnemonics.
- 147 SPECTRUM MULTI:** Multitasking for your Spectrum. Now you can have an Every and After command like on the Amstrad, thanks to Richard Taylor.
- 153 BBC RETROFITS:** John Dawson looks at add-ons for the Micro.
- 161 COMPETITION:** Win a Sony MSX.
- 163 ZX-81 RED ANTS:** Carlo Delhez helps you climb to the top of the heap. An absolutely vast maze, eleven times screen-size.
- 173 RESPONSE FRAME:** Tim Hartnell helps you with bugs.
- 175 SOFTWARE FILE:** Ten pages of software for most home micros.
- 203 COMPETITION RESULTS:** Who won the Psion Organisers.
- 248 DATABASE:** Paul Bond rounds up micro events.



STILL THE BEST AVAILABLE

FDS KEYBOARD

Gold plate contact keys are used, guaranteed life of 10⁶ operations



Tough ABS case,
225mm x 350mm x 65mm deep

It's easy to see why the FDS Keyboard is the best selling Spectrum keyboard in the world. This stylish, slim-line keyboard has been transforming Spectrums world-wide.

The keyboard contains all the graphic characters of your ZX Spectrum, plus additional function keys. It has 4 cursor control keys, an auto rub-out key, a separate key for full stop and comma, a full length space bar, shift keys either side and 2 function keys for direct entry into green and red E modes.

The FDS Keyboard has real individual contact switches and not a membrane like most other Spectrum keyboards on the market which are more expensive.

The case is easily adapted to allow the microdrive to fit inside along with the power supply.

Fixing is simplicity itself and no soldering or technical knowledge is required.

£49.95
+ £2.50 p&p

FD42 KEYBOARD

The FD42 keyboard is still a firm favourite when it comes to a low cost option for your ZX81 or Spectrum. It is now a "standard" to Sinclair users. Neatly presented in an attractive ABS plastic case it transforms the Sinclair computer into a useful professional unit, providing all the graphic characters of the ZX81 or Spectrum, with additional keys to aid the user. No technical knowledge is required for installation.

£29.95 + 80p p&p

RS232 PRINTERFACE - ROM based software.

Versatile printer interface. Comes complete with instructions and lead. **£34.95** 80p p&p

CENTRONICS PRINTERFACE - As above but for parallel printer with CENTRONICS input. Lead can be supplied at £7.95. Further details upon request. **£39.95** 80p p&p

SOUNDSTICK - Sound amplifier and Kempston compatible joystick interface **£19.95** 80p p&p



SEE PRESS
FOR
EXHIBITION
&
CHRISTMAS
OFFERS

THE MASTERUNIT



The Fuller Box can be bought separately for £29.95 and the Orator for £34.95 + 80p p&p

This is the ultimate games unit, containing not only the sound synthesiser from the Fuller Box but also the speech unit from the Fuller Orator.

It will probably be the only add-on you will need to buy after the Spectrum. We don't call this the Master Unit for nothing as it contains a Programmable Sound Generator, Joystick Controller, Beep Amplifier, Cassette Interface, Through Bus and 'Orator' Phoneme Voice Synthesiser plus a three-inch loud speaker and volume control.

Speech can be synthesised easily so that your micro can talk to you and play chords of music at the same time. Directly accessible in Basic it is able to say anything you command using the keyboard or a games program.

£39.95
+ £2.50 p&p

NORDIC KEYBOARDS U.K.

RANGLES ROAD,
KNOWSLEY, MERSEYSIDE

TEL: 051 546 0486

FULLER PRODUCTS ARE AVAILABLE THROUGHOUT THE U.K. AT ANY OF THE FOLLOWING DEALERS OR VIA MAIL ORDER - FROM TREMIVER LTD., 93a PACK LANE, BASINGSTOKE. TEL: 0256 69386 or CHESTER COMPUTERS BY MAIL, LINENHALL HOUSE, 88-90 WATERGATE, CHESTER.

U.K.

Spa Computer Centre,
Leamington Spa.
Microman,
Dundee.
Edinburgh Computers,
Edinburgh.
Microworkshop,
Surrey.
Computer Vision,
Cornwall.

LANCS

Bill Ginty's,
Bolton.
Barrow Computer Centre,
Barrow.
Cabin Computers,
Bolton.
Central Studios Ltd.,
Southport.

Computer Base,
Ashton-under-Lyne.

Computer World,
Lancs.

Computers of Dale Street,
Liverpool.

Elbee Computers,
Colne.

Format Computing,
Preston.

Multicoloured Microshop,
Redcar.

Tempo Computers,
Blackburn.

The Computer Shop (Morecombe),
Morecombe.

The Computer Shop (Lancaster),
Lancaster.

LONDON AREA

Square Deal,
London.

Rother Camera,
London.

Computers of Wigmore Street,
London.

Butler Micro,
London.

Adams World,
Edgware.

Aniro Software Ltd.,
Dartford.

Cambridge Computer Store,
Cambridge.

CHESHIRE

Computer Link,
Chester.

Chester Software Centre,
Chester.

Delta Micro,
Macclesfield.

MIDLANDS/YORKSHIRE

Bowies Computer Store,
Walsall.

Central Computers,
Dudley.

Complex Computer Stores,
Nottingham.

Dimension,
Leicester.

Erricks of Bradford,
Bradford.

Just Micro,
Sheffield.

JRS Software,
Worthing.

JCV Hi-Fi and Video Ltd.,
Warwick.

Harborough Home Computers,
Leicester.

Micropoint,
Lincoln.

Miles Better Software,
Chadsmoor.

Microman,
Crewe.

Micro Fun,
Rotherham.

Northampton Home Computer,
Northampton.

The Computer Store,
Doncaster.

The Home Computer Shop,
Northallerton.

The Software Centre,
Derby.

The Software Shop,
Birmingham.

Software City,
Wolverhampton.

North Notts Computer Centre,
Sutton-in-Ashfield.

PRE-CHRISTMAS OFFER

Kokotoni Wilf

Kokotoni Wilf is an arcade adventure program whose undisguised intention is to steal the title of 'best arcade adventure program bar none' from Jet Set Willy. Kokotoni Wilf must recover all of the pieces of the legendary Dragon Amulet (which has been scattered through time) for his master the great magician 'Ulrich'. Throughout the quest Wilf comes up against many dangers from huge Prehistoric Dinosaurs to hostile alien Robots, but the reward for recovering all of the pieces warrants the risk. The 48K program features a number of major advances over Jet Set Willy. The games designer, ELITE, stresses that each of the games 60 plus screens settings is genuinely high resolution as opposed to pseudo high-res and doesn't require a title to explain what you're looking at. The Sprite characters are of cartoon quality and exhibit their own unique personalities. Impressive claims. Jet Set Willy fans will no doubt feel both sceptical and intrigued. Now they can find out for themselves!

Available September 15th for-

Spectrum 48K £5.95 (Cass.)
Commodore 64 £6.95 (Cass.)
..... £8.95 (Disc)

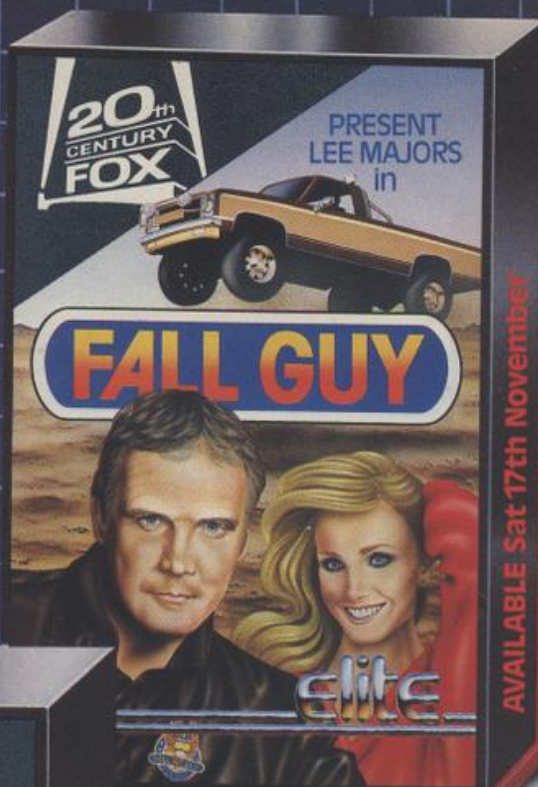
The Fall Guy

Colt Seavers is a top Hollywood stuntman who uses the extraordinary skills he displays before the camera when moonlighting as a modern Bounty Hunter, who apprehends and brings in Bail Bond jumpers. Colt is ably assisted by his would-be manager Howie, his beautiful stunt girl protege, Jody, and Terri the lady from the Bail Bond Company, who hires Colt when he's not before the cameras.

The cast of characters is:

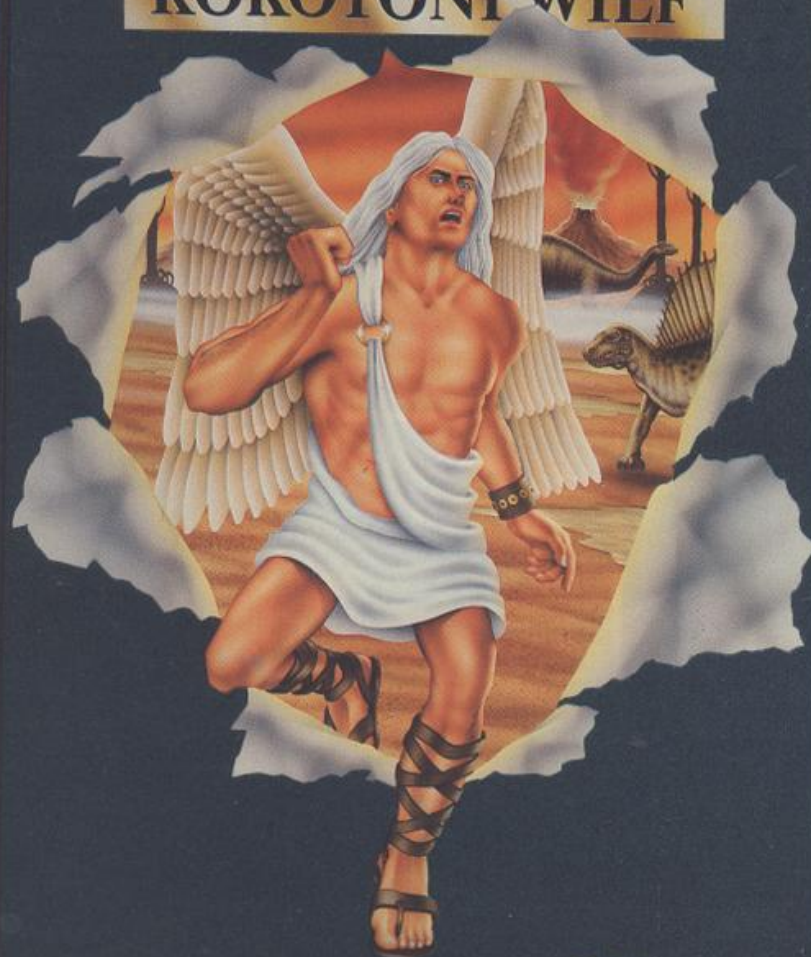
Colt Seavers	LEE MAJORS
Jody Banks	HEATHER THOMAS
Howie Munson	DOUG BARR
Terri Michaels	MARKIE POST

Available November 17th



AVAILABLE Sat 17th November

KOKOTONI WILF



elite

AVAILABLE NOW

Every single 'ELITE' product carries the unique 'ELITE' Holographic Sticker. Make sure your copy does, its your guarantee of quality.

48K Spectrum
and Commodore 64

Mail Order: Just send a cheque or P.O. payable to 'ELITE' or quote your credit card no.

Peripheral perfection

JOYSTICK INTERFACE



For ZX Spectrum

No more fumbling with the game control keys, now you can have joystick control on the ZX Spectrum. The Kempston joystick interface allows all joysticks in the Kempston range (and others that are Atari compatible) to be used with the Spectrum. Simply plugs into the edge connector. No modifications necessary.

ONLY £11.50

JOYSTICK PRO 3000



Maximum arcade quality features at a reasonable price. Features: ☐ Top fire button for one handed thumb control ☐ Trigger button for one handed index finger control ☐ Base fire bar for left or right handed control ☐ 8-way arcade quality leaf switches ☐ Rubber return action ☐ 1.5 metre cable. Commodore and Atari compatible. See joystick interface for Spectrum compatibility.

ONLY £12.75

JOYSTICK PRO 5000

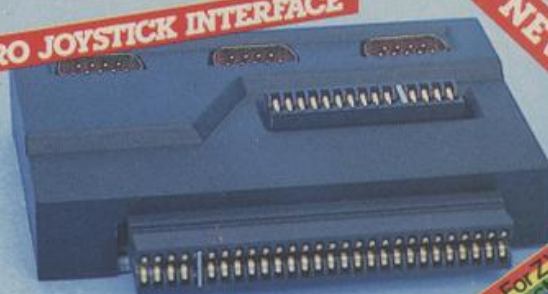


The ultimate joystick for the home computer. Features: ☐ Ergonomic design and nylon covered steel shaft ☐ 8-way arcade quality leaf switches ☐ Dual fire buttons for left or right handed play ☐ Rubber return action for smoothness ☐ 1.5 metre cable. Commodore and Atari compatible. See joystick interface for Spectrum compatibility.

ONLY £13.50

PRO JOYSTICK INTERFACE

NEW



For ZX Spectrum

Compatible with ZX Interface 1 the Pro-Interface has three 9-way D sockets. Two of the sockets allow compatibility with Sinclair/Psion software whilst the third offers the dual facility of both Kempston joystick software and cursor key software. The Pro-Interface also features a cartridge slot for ROM based software.

ONLY £19.95

RS 232 INTERFACE

NEW



For ZX Spectrum

At last an RS 232 interface for the ZX Spectrum allowing connection to any printer which follows the RS 232 protocol. The interface has its own EPROM allowing the use of keywords LLIST, LPRINT and COPY. We recommend the Brother EP44 Printer for use with this interface. Interface complete with cable and connector.

ONLY £45.00

CENTRONICS INTERFACES MODELS E&S



For ZX Spectrum

The Kempston centronics interface will allow you to utilise a vast range of printers with an industry standard centronics input port on the ZX Spectrum. **Interface E** has all operating commands held in an EPROM, so plug in and its ready to use. **ONLY £49.99** **Interface S** offering similar features as above but software routines are provided separately to initialise the interface before use. **ONLY £35.00**

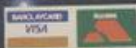
KEMPSTON

MICRO ELECTRONICS LTD

Full details on all our products are available on request. S.A.E. please. Most products are available from WH Smith, Boots, Spectrum Computer Centres, good computer shops or direct. All prices include VAT and P & P. Please allow 21 days for delivery.

Kempston Micro Electronics Ltd, Singer Way,
Woburn Road Industrial Estate, Kempston, Bedford, MK42 7AF
Tel: (0234) 856633 Telex: 826078 KEMPMI G

Trade Enquiries Welcome



Computers for Export

Sinclair
Oric
Commodore
Atari
Amstrad
Epson
Coleco



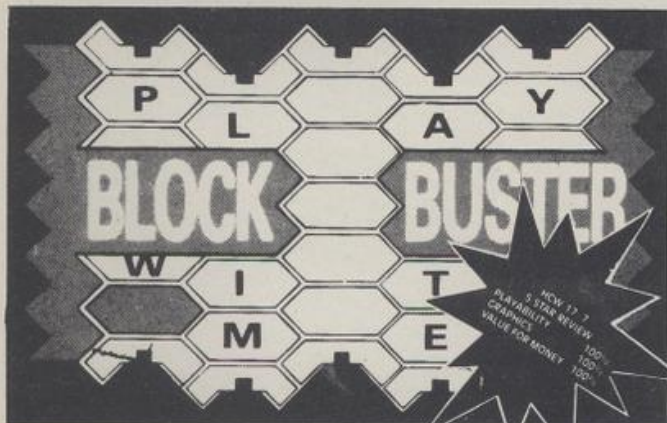
BBC
Sanyo
Microvitec
Apple
Apricot
MSX

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 answer phone
01-686 6362

**Galaset Ltd, 30 Bayford Road,
Littlehampton, West Sussex,
England. Telex 946240 Attn: 19001335**

**ADAPTED FROM THE POPULAR
T.V. SERIES!!!**



BLOCK-BUSTER is an exciting quiz game for ONE or TWO players and will appeal to a wide range of ages and skills with nine levels of play against the clock. The game tests speed of recall involving anticipation of the question as it 'unfolds' across the screen and speed of response dependant on the level of play.

BLOCK BUSTER is supplied with the **FIRST ADDITIONAL QUESTION TAPE FREE** to maintain the challenge of the game. Now available at good computer shops or direct with cheque/P.O. for £5.95 inclusive. ACCESS and VISA orders taken on our 24 Hour Hotline.

COMPUSOUND

DEPT HCW, 32-33 LANGLEY CLOSE, REDDITCH, WORCS B98 0ET
TELEPHONE (0527) 21429 (21439 24 Hr. HOTLINE)

REGARDEZ

LANGUAGE LEARNING AIDS FOR
FRENCH, GERMAN & SPANISH

FOR BBC(32K) · ELECTRON
SPECTRUM (48K)

As used in numerous schools and colleges these programs provide a highly successful aid to modern language learning. Each cassette contains a sophisticated control program and a comprehensive series of vocabulary lessons which can be used in a variety of self-paced learning and test modes. Words, phrases etc are displayed with all necessary accents and special characters, different colours are used for masculine, feminine and neuter words to assist gender learning.

The programs are suitable for beginners, 0-level and beyond as simple commands enable new lessons in vocabulary or grammar to be created by the user, edited as required, then permanently saved for later use. Invaluable for homework and exam revision!

Two cassettes are available for each language, together these contain a vocabulary of thousands of words; Level A provides 16 lessons in general subjects, Level B provides a further 16 lessons including adjectives, adverbs and fully conjugated verb lists.

Available from your computer store or by mail order Price £9.95
Also Available "ANSWER BACK General Knowledge Quiz" Price £10.95



KOSMOS

S.O.F.T.W.A.R.E

KOSMOS Software 1 Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX
Telephone (05255) 3942

Please supply the following programs

The French Mistress Level A @ £9.95	<input type="checkbox"/>	The French Mistress Level B @ £9.95	<input type="checkbox"/>
The German Master Level A @ £9.95	<input type="checkbox"/>	The German Master Level B @ £9.95	<input type="checkbox"/>
The Spanish Tutor Level A @ £9.95	<input type="checkbox"/>	The Spanish Tutor Level B @ £9.95	<input type="checkbox"/>
ANSWER BACK Quiz (Senior) @ £10.95	<input type="checkbox"/>		

I have a BBC/Electron/Spectrum computer (delete as necessary)

Mr/Mrs/Miss.....

Address.....

Post code.....

I enclose a cheque/postal order for £..... payable to KOSMOS Software

KOSMOS SOFTWARE DEPT YC10
1 Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX

Amazing how played out some things beco



become.

Will you think the same of your micro in 6 months' time?

Remember the days when every record player was gifted with a needle instead of a stylus. 45's were "in," 78's were "out."

Before the days of hi-fi and laser discs. When a graphic equaliser was a breakthrough on the football pitch instead of in music technology.

Look at a record player now and it's a museum piece.

It's like that with micros too.

The machine you thought would give endless hours of fun and interest often becomes a five minute wonder. Played out within months. Or so you thought.

But imagine communicating with other micro users on a nationwide mainframe system. Updating yourself

daily with the very latest computer news and reviews. Paging a special Bulletin Board. Feasting from "Prestel's vast menu. Even downloading a choice of software *absolutely free.*

In fact, imagine 30,000 pages at your fingertips and you've imagined what it's like to be on line with the Micronet 800 system.

For Just £13 a quarter (and, for most of you, a local telephone call whenever you want to connect up) you could subscribe to the Micronet system.

The only extra you need to connect up is a modem unit. Which is a small enough outlay for what it buys.

Micronet's features are almost limitless and constantly updating so why not see it in action at John Lewis stores, selected W. H. Smith shops and Spectrum UK dealers.

Or fill in the coupon for our brochure.

You'll find you won't want to play on anything else.



Please send me the full facts about Micronet 800.

Name _____

Make/Model of Micro _____

Address _____

Telephone _____

MICRONET 800, Durrant House, 8 Herbal Hill,
London EC1R 5EJ. Telephone 01-278 3143.

YC11

MICRONET 800, Durrant House, 8 Herbal Hill, London EC1R 5EJ.
Telephone 01-278 3143.

*Prestel and the Prestel symbol are trademarks of British Telecommunications.

Making the most of your micro.

University Software

UNISTAT

STATISTICAL PACKAGE

MULTIVARIATE REGRESSION: Main output consists of estimated coefficients, t-stats, standard errors, R^2 , corrected R^2 , standard error of regression, F stat, and Durbin-Watson stat. Further output options: multiple correlation matrix, var-covar matrix, ANOVA of regression, residuals, plot of residuals, interpolation. Data options: Log/ln option for each variable, no-constant regression, choice of dependent variable, selection of independent variables, auto-omission of linearly dependent variables.

ANALYSIS OF VARIANCE, SCATTER DIAGRAMS AND TIME SERIES PLOTS: One-way and two-way (without interaction) ANOVA tables, scatter diagrams of paired data and time series plots with auto-scaling.

STATISTICAL TESTS, CORRELATION COEFFICIENTS AND PROBABILITY DISTRIBUTIONS: Basic stats on each column of data (size, sum, mean, variance, std. dev.), Chi-square (contingency table), t (one sample, two sample, paired), F, Mann-Whitney U, and Wilcoxon signed rank tests. Pearson's, Spearman's rank and Kendall's rank corr. coeffs. Chi-square, t, F, binomial, Poisson and normal (std., non-std.) distributions. Results of tests and corr. coeffs are displayed with significance levels.

DESCRIPTIVE STATISTICS, FREQUENCY DISTRIBUTIONS AND HISTOGRAMS: Analysis of raw data or data with frequency counts. Raw data sorted and grouped. Choice of lower bounds and class intervals. Absolute, cumulative and relative frequencies. Histograms with up to 200 classes. Output displays sum, mean, mean deviation, median, variance, std. dev., 3rd and 4th moments, skewness, kurtosis, range, etc.

All programs are datafile compatible with Matrix Operations program in UNIMAX package. Data matrix capacity examples (columns by rows): **CBM-64:** 2x1250, 5x700, 10x380, **BBC-B:** 2x750, 5x400, 10x200, **48K Spectrum:** 2x1800, 5x900, 10x500, **CBM-64 (disk/cass):** £85, **BBC-B (disk/cass):** £85, **48K Spectrum (mdvcart/cass):** £60

UNIMAX

LINEAR PROGRAMMING PACKAGE

LINEAR PROGRAMMING: A powerful and instructive optimisation program capable of handling all sorts of linear programming problems (min/max, any combination of \leq , $=$, \geq constraints and $x_i \geq 0$, $x_i \leq 0$, $-\alpha < x_i < \alpha$ sign constraints). Primal, canonical, dual and their solutions are displayed in standard mathematical form. Unbounded problem and no feasible solution prompts. Edit option for all inputs. Capacity examples (variables by constraints): **CBM-64:** 10x35, 25x30, 40x25, **BBC-B:** 10x25, 20x20, **48K Spectrum:** 10x45, 25x35, 50x25.

MATRIX OPERATIONS: Inversion, transposition, determinant, pre- and post-multiplication, scalar multiplication, addition and subtraction of matrices and vectors. Any output can in turn be used as the input of the next operation without re-typing. Matrices can be saved or loaded at any stage. Datafile compatible with UNISTAT package. Capacities: **CBM-64:** 35x35, **BBC-B:** 25x25, **48K Spectrum:** 45x45.

CBM-64 (disk/cass): £60, **BBC-B (disk/cass):** £60, **48K Spectrum (mdvcart/cass):** £45.

ALSO AVAILABLE FOR 48K SPECTRUM
INTRODUCTION TO ECONOMICS SET: £25
ECONOMIC GEOGRAPHY: £9.95 • BIBLIOFILE: £9.95
POLYNOMIALS: £6.95 • INTEGRATION: £6.95

To: **UNISOFT LIMITED**
(Dept. E) 29 ST PETER'S STREET, LONDON N1 8JP.
TEL: 01-359 0978

Prices include VAT and delivery within the UK. For orders from Europe add £1.50, outside Europe £3.00 per item for airmail post. Dealers enquiries welcome.



COMMODORE 64, BBC-B, 48K SPECTRUM

- * Comprehensive user manual * Full data handling facilities (display, print, change, save, load)
- * All results can be printed out *



SUBSCRIBE TO BRITISH & AMERICAN

Computer magazines. Reach each month up-to-date information, New Products, Programming and understand more about computers.

BRITISH Magazines: Computer Answers-Input-Micro Decision-Personal Computer World-Personal Computer Games-Radio Electronics World-Sinclair Programmes-Sinclair Users-Your Computer-What Micro-Etc.

AMERICAN Magazines: Byte-Compute-Computers & Electronics-Creative Computing-Micro Computer-Micro Systems-Popular Computing-Small Business Computers-VIDEO Magazine, Etc.

Also NEW Books from all Publishers.

Service to all countries throughout the world.

Please write for prices.

Computer Magazines and Books

Haulterm Ltd. 500 Chesham House,
150 Regent Street, London W1
Tel 01-778 8746 01-439 6288

Self Adhesive Cassette & Disk Labels

- ★ 24 HOUR SERVICE FROM STOCK
- ★ AVAILABLE WHITE OR TINTED
- ★ 48 HOUR SERVICE ON PRINTED LABELS

CASSETTE LABELS ON A4 SHEETS - White only, suitable for small-offset printing or photocopying: 100 labels - £3.50, 200 - £6.00, 300 - £8.25, 500 - £12.00, 1000 - £21.85

CASSETTE LABELS IN ROLLS - Complete with tractor feed backing paper for over-printing by computer printer. Available white or tinted blue, pink, green, orange, grey or yellow. Minimum order 500 labels.

WHITE: 500 - £14.85, 1000 - £20.70, 2000 - £31.05
TINTED: 500 - £16.90, 1000 - £24.15, 2000 - £37.95

DISK LABELS - Available in 127 & 95 mm width for conventional floppy disk (36mm deep), or 71 x 69mm for the MSX style compact floppy disk. These labels are all on tractor feed backing paper with a range of tints as above.

WHITE, 95mm: 500 - £12.75, 1000 - £17.75, 2000 - £20.56
TINTED, 95mm: 500 - £15.20, 1000 - £24.65, 2000 - £34.36
WHITE, 127mm & Compact disk: 500 - £15.55, 1000 - £22.05, 2000 - £25.70
TINTED, 127mm & Compact disk: 500 - £21.35, 1000 - £31.05, 2000 - £43.65

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
SITTINGBOURNE
KENT ME10 3RN
Sittingbourne (0795) 28425

Self Adhesive Computer Labels —

Superfast

NO.1 SWORDS & SORCERY

NEW
RELEASE
AVAILABLE
20th OCT



WIZARDS power level 1 - 10



DRAGON power level 7 - 9



LYTCH power level 6 - 10



WEREWOLF power level 4
a selection of your opponents

SWORDS & SORCERY

Swords and Sorcery represents the first example of the ultimate in graphic adventures using the unique MIDAS system.

Swords and Sorcery differs from other adventures in that you guide your character through the unending corridors of the underworld on a quest for material, physical and/or spiritual power. The choice is yours.

You begin as a novice with limited abilities in the use of magic, sword play and stealth (lock picking, thieving etc).

As you wander the corridors, you will encounter beings meek and mighty, discover untold wealth and worthless trash. Some objects will increase your powers, whilst some will be dangerous and still others will be protected from pilferers (you!) by friendishly ingenious traps, all designed to help or hinder you on your pilgrimage to power and glory.

There are quests within quests within Swords and Sorcery, for those who want to follow them. Some are given others

must be found, and some are lost causes. There are many ways of opening the gate between the levels of the dungeons. Some are obscure and easy, others obvious and dangerous. The most profitable paths are both. The Ultimate goal of many will be to find the lost armour of Zob, which was un-made by its maker, and its parts scattered across the levels. What, where, how, who and why are answers to be found. All that is known is the prayer of the seekers:

WHEN DARK CABALLUS HIS COUNCILS LEND US
LET NOT THE RED CLUPEA HARANGUE US
TURN US FROM WHAT SEEMS TREMENDOUS AND
THUS TO ZOBS GREAT TREASURE SEND US.

You need never tire of Swords and Sorcery — when this dungeon can no longer hold you, the next awaits. . . there are a series of expansion modules planned to extend your enjoyment indefinitely.

Available on Cassette £9-95
SPECTRUM 48K OR COMMODORE 64

(Multi Dimensional Animation System)

MIDAS ADVENTURE CONCEPT

Stunning 3D graphic animation simulating video disk games.

A unique fully interactive adventure language using the latest ARTIFICIAL INTELLIGENCE techniques.

State of the art data compression techniques enabling enormous scenarios and vocabularies to be incorporated.

Real time Interactive Conflict Sequences. Talk to your opponent, attack them, flee them and even confuse them.

Joystick capability for movement, combat and actions through unique menu feature. Keyboard operation for more complex interaction with the adventure when time permits.

Develop your own unique player characters. For example — specialize in magic, swordplay etc.

Total expandability — your own characters can be transferred to future adventures and new opponents, scenarios and objects can be added to all the games. A series of expansion modules to increase indefinitely the playing life of each game written with MIDAS.

COMBAT LYNX

From DURELL
(Technical Support from Westland Helicopters)



Available now from most retail outlets

COMMODORE 64 – SPECTRUM 48k

Available soon

ORIC – BBC – AMSTRAD



DURELL sales dept., Castle Lodge,
Castle Green, Taunton, Somerset, TA1 4AB



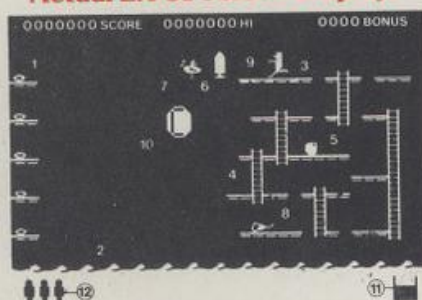
ZX-81 OWNERS

AT LAST
THE PROGRAM YOU'VE
BEEN WAITING FOR!

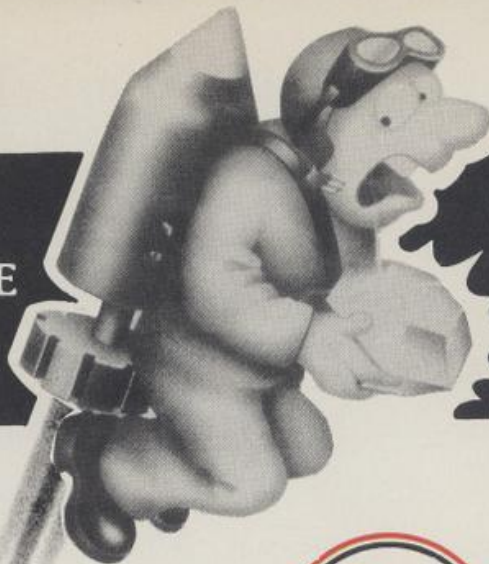
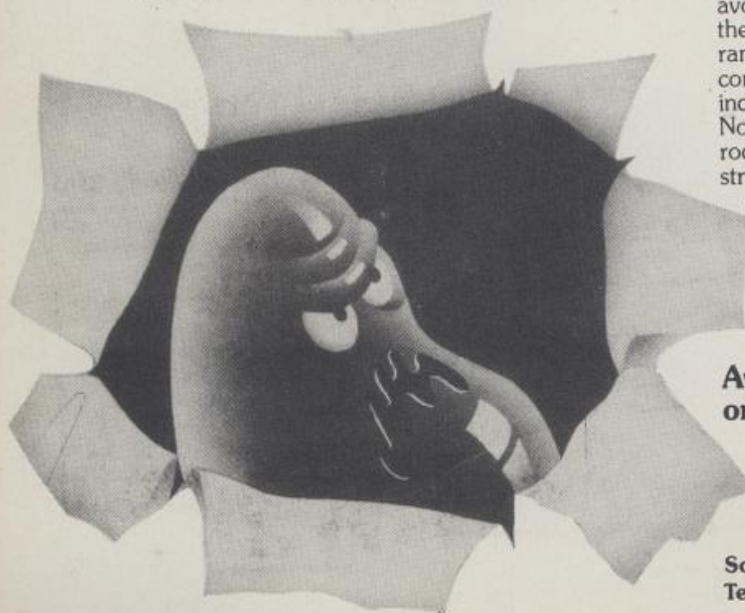
Rocket Man

with
**Hi-Res Graphics
on standard ZX-81 16K**

Actual ZX-81 Screen Display!



- | | | |
|--------------|----------------|-------------------|
| 1. Diamonds | 5. Fuel Cans | 9. Player |
| 2. Sea | 6. Rocket | 10. Bubble |
| 3. Platforms | 7. Vulture | 11. Fuel Gauge |
| 4. Ladders | 8. Leg of Lamb | 12. Men Remaining |



Get rich quick by collecting Diamonds that are simply lying there waiting for you!

Oh... I forgot to mention that there are one or two problems! There is an expanse of Shark infested water between you and the Diamonds and a strange breed of Bubble that seems hell bent on getting you in it! Somehow you must cross it...

You have a Rocket Pac to help you (a Vulture on higher levels) but you must rush around the platforms and ladders collecting cans of fuel (legs of lamb with the Vulture) and cursing that weird Bubble. Once you have enough fuel then it's Chocks Away!

Oh... but don't run out of fuel on the way - otherwise it's... **SPLASH!**

The aim is to collect all the diamonds from the far left hand side of the screen, whilst avoiding the rampant Bubble. These emerge from the sea and are hell-bent on returning to their watery habitat with you in tow. Sooner or later you are going to end up in the drink - The idea is to make it later!

By belting round the system of platforms and ladders, cleverly avoiding the Bubble, you collect the fuel cans which appear in random positions, until you consider that your fuel gauge indicates sufficient in the tank. Now you can go and collect your rocket. With the rocket-pack strapped to your back you can fly across the expanse of sea to collect the diamonds... but don't run out of fuel or your rocket-pack will simply disappear and you will wind up in the drink!

There are six stages with six different platform layouts. On stages 1-3 the Bubble, which floats in front of the platforms with uncanny ease, gets an ever increasing ability to home in on your position, making the task of staying alive more demanding with each stage. On stages 4-6 you once again start with the easiest Bubble (which is a blessed relief!) but the fuel cans are replaced by legs of lamb which you must collect to feed your vulture, and once it has enough energy (or you think it has!) you must flap across the water on its back to collect the diamonds.

Extra men are awarded for every 10,000 points - but **ONLY** once you have collected all the diamonds and so completed each particular stage.

GOOD LUCK!

Available from all good computer shops
or send cheque/P.O. for **£5.95** (inc P&P) to:

Software Farm, FREEPOST (no stamp required)
(BS3658) , BS8 2YY

Software Farm, 155 Whiteladies Road, Clifton, Bristol BS8 2RF.
Telephone (0272) 731411 Telex 444742 AFMADV G

No man's land

ORIC/ATMOS

ORIC/ATMOS

OTHER TITLES FOR CBM64/V20 SPECTRUM ZX81 AVAILABLE ON REQUEST



0503 CATEG-ORIC (action game). Take command of a cruiser engaged in battle against fighter planes and submarines. Use the radar and sonar systems to detect and destroy the enemy before you are sunk. £ 7.95



0540 STYX (arcade). Destroy the castles of the Dark One which guard the river Styx. Struggle against vultures, the eyes of the devil and his minions to vanquish evil. £ 8.50



0494 DEBUG (utility). A monitor/debugger to debug your programmes in machine code: position of internal registers, set breakpoints, step through programmes. £ 11.95



0496 OPTIMUM (home). Manage up to 4 different accounts, keep track of expenditure and compare with your monthly or yearly budget. Just what you need to keep the household accounts in order. £ 9.95



0495 FIRE FLASH (arcade). Prevent the aliens from sabotaging the fuel depot and avoid enemy fire by passing into hyper space. An attractive and challenging arcade game in 100% machine code. £ 8.50



0526 TYRANN (adventure). Can you find your way through the labyrinth and liberate Queen Tyrann from her torment? A first-class adventure game with text and graphics. £ 8.95



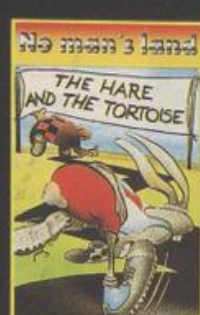
0514 THE DIABOLICAL TOWER (adventure). The Diabolical Tower has 60 floors, each one fraught with danger. Your mission is to seek out the treasure. £ 8.50



0510 MULTIFILER (business). A powerful programme for creating files. Choose your own criteria adapted to your requirements. Rapid sort and search features in machine code and possibility of memorising over 30000 characters. Extremely simple to use. £ 14.95



0463 PANIC (action). Catch the marauding apples by setting traps. 6 levels. £ 6.95



0515 THE HARE AND THE TORTOISE (education). A game for 3-8 year olds to teach the notions of right, left, up, down and counting. The hare and the tortoise decide to race. Who will win? The level of difficulty is adjustable to the child's ability. £ 8.50

OTHER ORIC/ATMOS TITLES

0497 ADDRESS BOOK	£ 9.95
0498 BANK ACCOUNT	£ 12.50
0499 BASIC PLUS	£ 9.95
0502 COMPUTER ASSISTED DESIGN	£ 8.50
0504 CHARACTER GENERATOR	£ 8.50
0465 CONCOURS HIPPIQUE	£ 5.95
0464 CW MORSE	£ 14.95
0506 FINANCIAL CALCULATOR	£ 9.95
0507 INVOICING	£ 14.95
0508 LEARNING FORTH	£ 16.95
0509 LIBRARY CATALOG	£ 9.95
0511 SCREEN KIT	£ 9.95
0513 SUPERCOPY	£ 9.95

RETAILERS CONTACT:

CentreSoft

PCS
DISTRIBUTION
LIMITED

OR ASK YOUR DISTRIBUTOR TO CONTACT US

DISTRIBUTORS AND OVERSEAS ENQUIRIES CONTACT:

JANET PELTON, INNELEC-NO MAN'S LAND 110 BIS RUE DU GAL LECLERC 93506 PANTIN CEDEX FRANCE TEL.: 33-1-840.24.31.

MAIL ORDER:

POST COUPON TO HIGH TECH UNITS 1 & 2 CONLON DEVELOPMENTS WATERY LANE DARWEN LANCASHIRE

PRICES INCLUDE POSTAGE AND PACKING FOR UK ONLY OVERSEAS ADD £2.

REF	TITLE	QTY	TOTAL PRICE

PO/CHEQUE ENCLOSED OR DEBIT ACCESS/VISA
IF CARD EXPIRY DATE:

IMPORTANT: All cheques or cards payable to NO MAN'S LAND and sent to High Tech.

NAME

ADDRESS

POSTCODE

Home computers.

The report
you've been waiting for:
simple, factual,
honest, comprehensive
and 100% biased.

ALL you need to know about computers can be summed up in one word: Commodore. (Well, we did tell you this would be biased).

We make everything you'll ever need to get the most out of home computing: all the *hardware* and all the software. (And if you don't understand what that means, simply look under "H").

That's what these three pages are all about: explaining what computers are (without the scientific jargon), how they work (without any technical mumbo-jumbo), and how you can get more enjoyment out of them (without much difficulty).

BASIC. Most home computers speak the same language. It's called BASIC. This is a more friendly way of saying "Beginners All-Purpose Symbolic Instruction Code."

There are different kinds of BASIC and, like languages, some are a little easier to understand than others. Like, BASIC 3.5 in the *Commodore Plus/4* and *Commodore 16*.

BOOKS you can read: "Teach Yourself Computer Programming With The Commodore 64" and "Programmers Reference Guide."

CASSETTE. Just as you keep your favourite music on cassette, so you can also keep your favourite computer programs on cassette.

You can either buy pre-recorded programs in a shop, or you can write them yourself. Cassettes are just one form of program storage and playback - see also *Cartridges* and *Disk Drive*.

To play cassette software you need a cassette unit. The Commodore 1530 and 1531 cassette units have been specifically designed to get the very best out of our computers, and provide consistently reliable results.



CARTRIDGES. These are programs that plug directly into the back of the computer itself.

CPU stands for Central Processing Unit. This is the computer's "brain," and as such it's what does all the hard work.



CHIP: silicon. A very complex electrical circuit miniaturised in silicon. It carries out the functions in the computer. Unlike other home computer companies, we make our own chips, so maintaining quality.

DISK drive. A program and data storage system, just like cassettes, but much faster. You can find and load the program you're looking for in seconds instead of minutes.

Diskettes, which can be used repeatedly for recording or re-recording programs, transfer information or instructions to and from the computer.

EDUCTION software from Commodore. We work non-stop with educationalists improving our range of programs for the pre-school to "O" level age groups and beyond.

Computers are an invaluable educational tool - versatile, patient and able to present information in an exciting way.

Our "Get Ready to Read" series, with lovable B.J. Bear, is recognised as an excellent



example of how it is possible to develop reading and writing skills in pre-school children.

ELEPHANT: well-known symbol of the Commodore 64's enormous 64K memory. And don't you forget it!



FOUR is for Commodore Plus/4, our very latest home computer with four, very popular built-in programs: wordprocessing, spread-sheet (financial planning), database (filing), and graphics.



It has an extensive 64K memory, with an exceptionally large 60K available for use. The Plus/4 comes equipped with the Commodore BASIC 3.5 with over 75 programming commands.

Other features include sound facilities, comprehensive graphics and 121 colours.

GORTEK and the Microchips is a unique programming course, for children of all ages, that links learning exercises with a space adventure story. **GRAPHICS.**

The pictures and diagrams on a monitor or TV screen, either high or low resolution.

All Commodore home computers have 62 graphic symbols to create low resolution pictures and diagrams, or high resolution modes that allow you to specify each pixel (or dot) on the screen.

(There can be up to 64,000 of these).

GAMES: Commodore produce them all, and more! From shoot 'em up games, to games of adventure and complex strategy.

HELP! On both the Commodore 16 and Plus/4 computers there is a very special feature: a HELP key. It does exactly what it says: it helps you to debug (which is the smart way of saying, "identify and correct errors") when you're programming.

It highlights errors right down to individual instructions.

HARDWARE. The computer itself - you can touch it. Whereas software's a program you can only see or hear (on the monitor) when it's running in the computer.



INTEGRAL software is software that is actually built into the computer, as on the Commodore Plus/4, the very latest in home computing.

INTRODUCTION to BASIC. Just as you don't need to understand how a car works to be able to drive it, you don't have to understand how a computer works to be able to use one.

But you will definitely get more enjoyment out of it if you do have a basic knowledge of programming.

Which is why "Introduction to BASIC" has become the most popular software tutorial.

It comprises 2 cassettes and an easy-to-follow, step-by-step manual.

INPUT/output: Input is information put into the computer from either the keyboard or a storage device. Output is information from the computer to either a screen, printer or storage device.

JOYSTICK and paddles. As well as improving speed and accuracy, these make games more real by putting the control of whatever it is on the screen directly into your hands.

KILOBYTE is 1,024 bytes. So "K" stands for a unit of 1,024 or 2^{10} . A 64K byte memory unit contains 64×2^{10} , or 65,536 bytes of memory. And if you don't understand all that, don't worry.

All that's important is knowing you can run more complex programs through a computer with a large memory, than one with a small memory.

LANGUAGE. This is a system of coding that can be understood by a computer. It allows you to "speak" to the computer, and for the computer to "speak" to you. Most home computers speak BASIC, but there are also other languages available for Commodore computers that have been designed for specific uses.

For example, LOGO and PILOT in education.

MONITOR: this is the screen on which you can see what you've typed into the computer, and also what the computer is saying back to you. You can use an ordinary TV screen, but more preferable is a colour video monitor, like the Commodore 1701.

This is a special device that produces much higher resolution than a TV, and so offers superb reproduction and clarity.

On top of which it allows the rest of the family to stay tuned-in to their favourite TV programme while you're tuned-in to your favourite computer program.

MODEMS allow computers to connect via a telephone line to other computer systems. Commodore 64 modem owners can communicate with other owners, join systems like Prestel/Micronet and an exciting new system called Compunet, where quality software is available cheaply or even free.



MEMORY. There are two basic types of memory: ROM and RAM.

Read Only Memory (ROM) is the computer's permanent built-in memory which tells the computer what to do. It doesn't disappear when the computer's switched off.

Random Access Memory (RAM), however, is for temporary storage.

It is the part of the computer's memory that's free for you to use. It can be erased and used over and



over again. It stores both data and instructions during the execution of a computer program. These are lost when you switch the machine off - unless, of course you store them on cassette or diskette.

NUMBER ONE. In the whole wide world, Commodore is No. 1 in microcomputers, and the Commodore 64 is the No. 1 best seller.



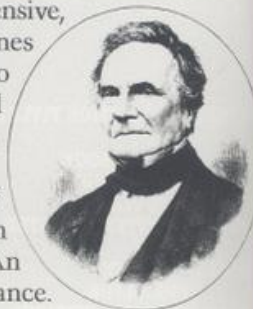
ORIGIN of the computer. In the 19th Century an Englishman, Charles Babbage, invented the first true computer. But his "Analytical Engine" was so ahead of its time, it turned out to be impossible to build!

The modern computer first appeared around the time of World War II. Britain's "Colossus" was vast, consumed vast amounts of electricity, required its own air-conditioned room, was unreliable and difficult to operate.

It had its limitations. Then came the amazing transistor... integrated circuits... and microcomputer.

The first desk top microcomputer in the world was the Commodore PET (this was a friendly name for Personal Electronic Transactor), in 1977.

In effect Commodore had taken hitherto huge, expensive, mysterious machines accessible only to eggheads, reduced the size and price, and put them into the hands of ordinary mortals in ordinary offices. An extraordinary advance.



PERIPHERALS. These are separate add-ons that will extend your computer's capabilities. Like our printers, storage devices and monitor.

PRINTER: One of the ways a computer can "speak" to us.

It means you can produce charts, letters, documents, pictures on paper

The Commodore range includes four printers and one printer plotter.

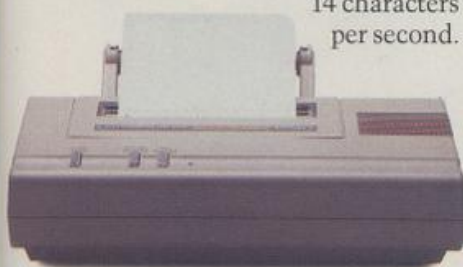
The MPS 801 dot matrix printer (so called because its characters are made up of dots) has a print speed of 50 characters per second, about five times as fast as the fastest secretary.

The MPS 802 dot matrix friction feed printer has a print speed of 60 characters per second and uses either single sheets or continuous stationery.



The DPS1101 daisy wheel printer (called that because, surprise, surprise, the print wheel looks a bit like a daisy), produces superb quality print on all letters, reports and documents (the kind of quality one desperately requires on a letter to the bank manager). There's a range of alternative type faces available on additional print wheels. Speed: 18 characters per second.

And the 1520 printer plotter (illustrated). This has 4 colours, and opens up a whole new world of graphic print-out ability. You can draw pictures, create graphic designs, plot graphs or construct bar and pie charts. Speed: 14 characters per second.



QWERTY—the 6 keys at the top left hand side of a standard typewriter. Unlike lesser machines, all Commodore computers have full-size, professional typewriter keyboards.

They have a solid, responsive feel to them. (The problem with rubber or membrane keyboards is they have a soft, spongy feel to them: you press a key, then wonder if the message got through).

RANGE. The range of Commodore software is enormous. There is something, as they say, for everyone: educational, business, home and games.



STARTER PACK. The Commodore 16 Starter Pack has been specially designed to introduce you to computing.

It contains everything you need to start home computing, complete in one box: a 16K computer, cassette unit, four superb software programs, and Introduction to BASIC Part 1.

It has a *Help* key in case you get into difficulties, and incorporates advanced BASIC, which has been specifically designed to simplify the programming process.

Other features include: 4 cursor keys, 2 joystick ports, an astonishing 121 colours, plus excellent sound and graphics capabilities.

TUNES. Commodore make software to help you compose your very own music.

All our home computers have great sound and music capabilities.

USER friendly. This is a program that explains itself as it goes along, or a computer that people can easily operate.

Every computer manufacturer now claims its products are "user friendly," but only Commodore really demonstrates it. For example, our *Help* key and use of Advanced BASIC.

VERTICAL integration is not as complicated as it sounds. All it means is that Commodore make everything to do with computers, from the silicon *chip* to the computer casing.

So we have complete control over everything, from design to manufacture.

It also means, of course, that we can design everything so you're able to get the very best out of your Commodore computer system.

WOMEN also are discovering computers—and not just in offices, but at home. Computers aren't sexist.



They were invented for everyone, and the fact that they're fun, exciting, educational, practical and time-saving are benefits that apply to women just as much as to men.

XMAS. There is no better time to give or receive a Commodore present.



YIPPEE! Yes, now you know (or should do) that computers are really interesting. They're not just about space games with horrendous monsters. Nor are they horrendously complicated machines that you need a maths degree to understand.

Computers are the future, and it's important that you and, even more so, your children don't get left behind in the past.

With a Commodore computer and a *peripheral* or two (and we now know what those are, don't we?) whole new leisure and business opportunities will immediately be opened to you.

Make the choice now and (just so long as it's Commodore) we promise you will never regret it.

ZIP us a line if you'd like more even more biased information on any Commodore products.

Write or telephone: Commodore Information Centre, 1 Hunters Road, Weldon, Corby, Northampton NN17 1QX. Tel: Corby (0536) 205252.



commodore

TWO GREAT NEW CHART CLIMBERS from

Alisto

Software

COMMODORE 64

WARLOK



Some time in the far future, the Colonial Union is crumbling and the planets Warlok and Aldarr are on the brink of war.

Returning from a mediation conference, an Aldarrian starship is attacked and boarded by the Imperial troops of WARLOK. Four robot drones containing top security information on the Aldarrian planetary defences, are discovered on board the starship and transported to WARLOK where, for interrogation and security purposes, they are each placed at the heart of a heavily fortified underground defence network.

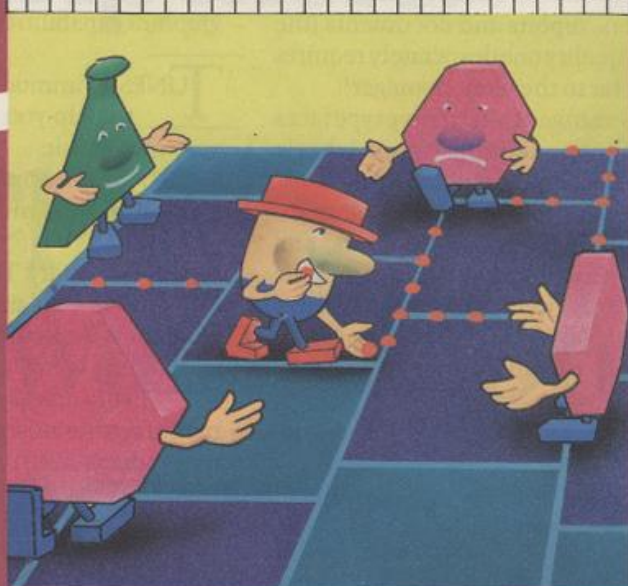
Your mission, as elite space fighter commander of the Aldarrian defence forces, is to enter the network and recover the robot drones before Warlok can discover the drones' access codes.

Before you get to the drones you must survive a lethal defensive network of attack robots, laser barriers oscillating droids and much more... Good luck, the fate of Aldarr lies in your hands.

WARLOK is a stunning, high resolution tour-de-force of arcade style fast action. From the first screen as you descend into the defence networks to the final release of the last drone (if you ever make it!) WARLOK is compulsive gaming for all arcade addicts from the hardened old-timers to rank beginners.

COMMODORE 64

HOOOPER



From the darkest, mysterious depths of Croatia came Hooper, Prince amongst his own people but ridiculed by humans due to his exaggerated facial features and large floppy hat - a symbol of greatness in his own land. Angered by the taunts of men, Hooper sets off in this cruel world to prove himself any man's equal.

In this, the first of his adventures, Hooper has to enter the infamous death grid where he must steal precious jelly beans from the dreaded Sneakers and Beeper. (The stuff that nightmares are made of). Once the beans are collected he must replace them with fakes then advance to another part of the grid, even more dangerous than before.

To complete his task Hooper must raid each of the eight sections of the death grid six times while nasties get faster and faster. May the strength of your ancestors guide you.

HOOOPER is a 100% machine code game written by MAK JUKIC.

Access and Barclaycard welcome.



Both programs

£7.95

in your high street.
If in difficulty
contact us
direct.

Alisto
Software

DEALER &
DISTRIBUTOR

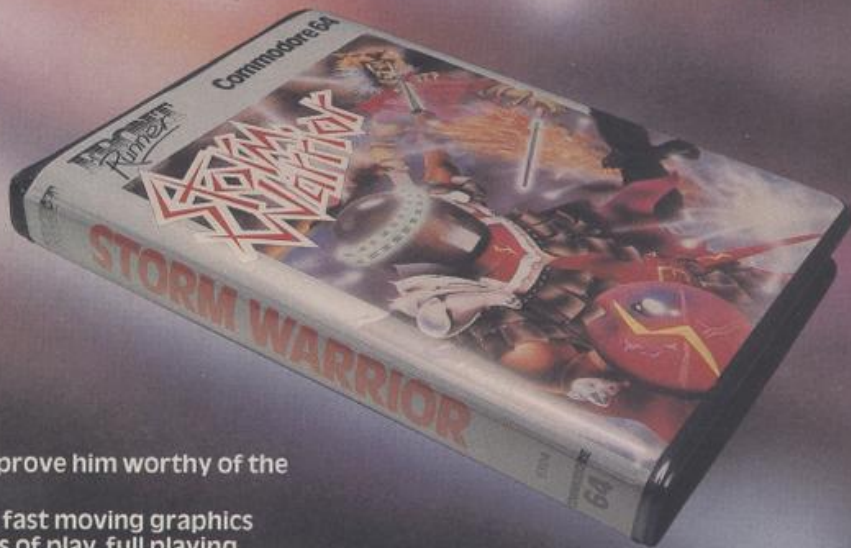
Enquiries Welcome

119, JOHN BRIGHT STREET,
BIRMINGHAM B1 1BE

Telephone: 021-643 5102

Exclusive distributor of SCOTT ADAMS PRODUCTS

Electrifying Action



Storm Warrior.

He needs no allies, his strength and agility will prove him worthy of the name - 'Storm Warrior'.

Storm Warrior is a 12 screen, all machine code, fast moving graphics adventure using 58K of RAM. It features 5 levels of play, full playing demo mode on the first four screens, game freeze facility and a fast loading system.

Commodore 64 Tape £7.95 Disk £9.95 (including VAT.)

The White Viper.

A great graphics adventure in the land of Demons. Coming Soon.

Commodore 64 Tape £7.95 Disk £9.95 (including VAT.)

Dead City Rescue.

The mind blowing, fast loading, 100 screen graphics adventure featuring 5 different speeds of scrolling to give an incredible depth of perspective. Mentally stimulating, strategy packed, visually stunning!

Commodore 64 Tape £7.95 Disk £9.95 (including VAT.)

FRONT
Runner

Meet the Challenge

Available from your favourite Software Retailer.

侍ソフトウェア SAMURAI SOFTWARE

Castle of the Skull Lord

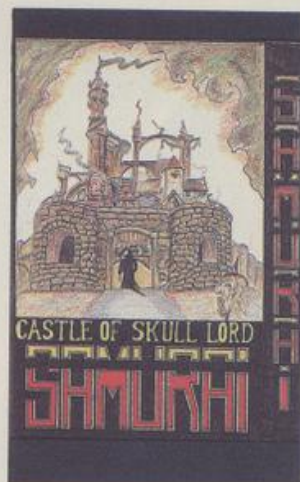
Packaged in a Special Presentation Box which includes a "Free Dust Cover" for your computer.

In a battle lost in the mists of time, the necromantic Skull Lord attacked and defeated a race of noble Dwarves. The Dwarves lost many treasures, the most valuable of these being the "Crown of Dwarves Kings". For many ages did they attempt to regain this artifact, and for many ages did they fail.

Now in desperation they call upon you, noble warrior, to attempt that which is beyond their power.

Your quest:— To regain the fabled crown and defeat the all powerful skull lord.

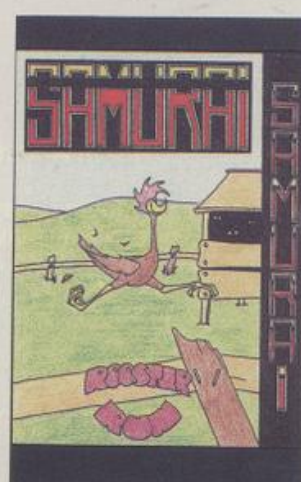
The adventure is of the classic format. Simple verb-noun combinations are expected, and will usually be understood.



Samurai Invaders



Ms. Mazey



Rooster Run

You control a fearsome Samurai warrior whose aim is to prevent the Alien invaders from gaining control of the earth. To help you in this task, you are armed with shuriken, fearsome oriental throwing stars.

Can you guide the intrepid Ms. Mazey around her garden maze and collect the daisies? Or will you fall victim to the evil skull riders? (In a garden?) Can you make it to the magical "flower pills". Will you get the "flower power" to zap the skulls? Will Ms. Mazey ever get to see the flower of her heart, Percy Chukka?

Why DID the chicken cross the road? You don't know? Neither do we, but with the help of this game you may just find out! Your aim is to guide the hapless rooster across the road, then, get in the boat and avoid the aquamarine hazards. What could be simpler?!

Please tick the correct boxes in the mail order coupon.

£8.95 AMSTRAD	£8.95 SHARP MZ711
<input type="checkbox"/>	<input type="checkbox"/>
£7.95 CBM 64	£7.95 DRAGON
<input type="checkbox"/>	modified versions
£5.95 SPECTRUM 48K	<input type="checkbox"/>
<input type="checkbox"/>	£7.95 VIC 20
£7.95 BBC	<input type="checkbox"/>
<input type="checkbox"/>	£7.95 TI 99/4A
£7.95 ELECTRON	<input type="checkbox"/>
SAMURI INVADERS	MS. MAZEY
£7.95	£7.95
Amstrad only	Amstrad only
<input type="checkbox"/>	<input type="checkbox"/>
	ROOSTER RUN
	£7.95
	Amstrad only
	<input type="checkbox"/>

SEND CHEQUES / POSTAL ORDERS TO

Samuri Software
16 Clapgate Lane, Goose Green,
Wigan, WN3 6RN
or Ring: Tele-Sales (0942) 495753 with
ACCESS / VISA No. for
IMMEDIATE DESPATCH.

Dead City Rescue

The supreme test of mental muscle.

A mind blowing, fast loading, 100 screen graphics adventure featuring 5 different speeds of scrolling to give an incredible depth of perspective. Mentally stimulating, strategy packed, visually stunning.

Commodore 64
Tape £7.95 Disk £9.95
including VAT.

FRONT
Runner
Meet the Challenge

Available from your favourite
Software Retailer.

Commodore classic now available
for all ATARI machines

Attack of the Mutant Camels



Llamasoft
AWESOME GAMES SOFTWARE



ATARI

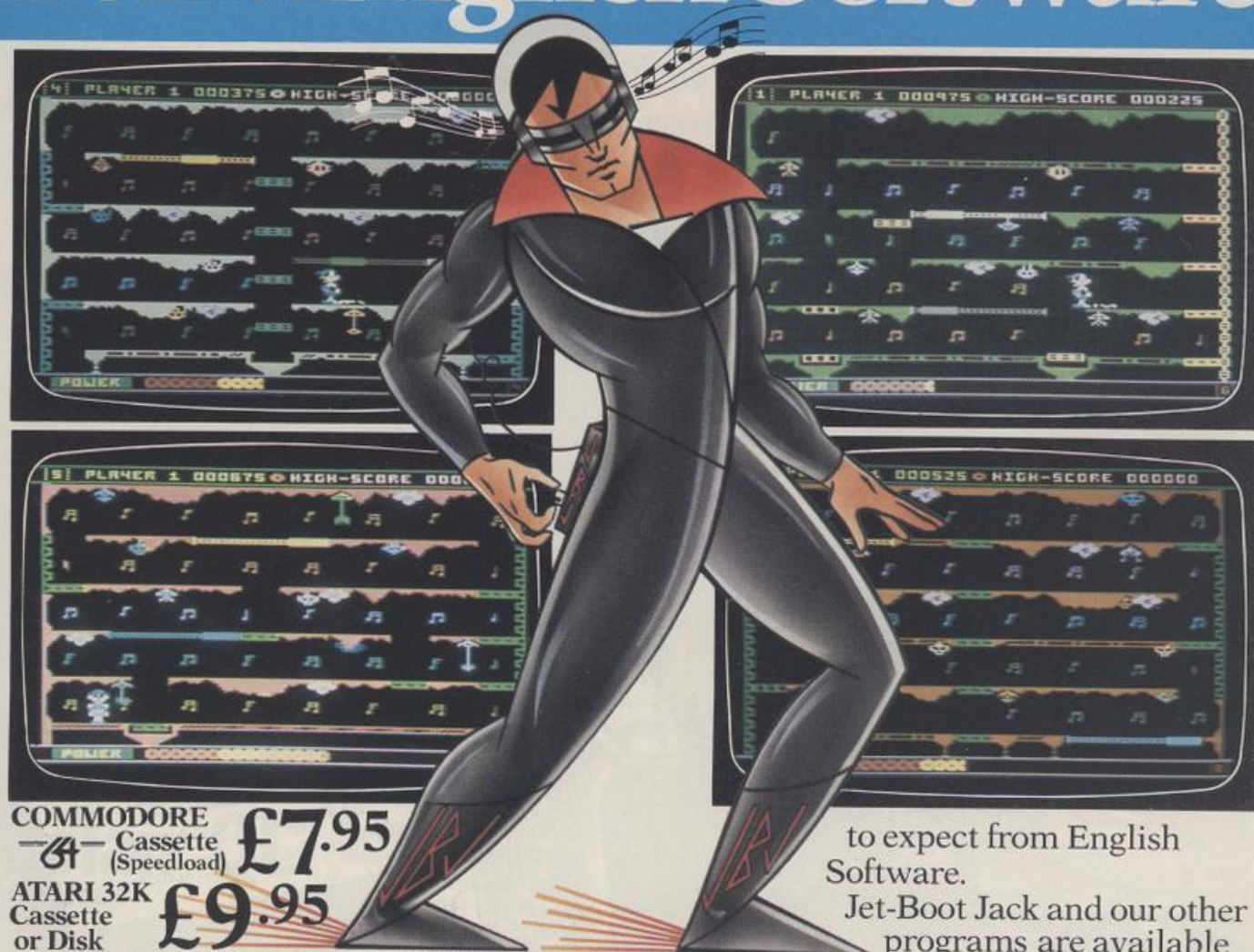
PRICE £7.50

PLUS THE USUAL AWESOME COMMODORE RANGE

LLAMASOFT SOFTWARE, 49 MOUNT PLEASANT, TADLEY, HANTS, ENGLAND.

Tune-in to Jet-Boot Jack. The massive hit from English Software.

NOW
AVAILABLE
FOR
COMMODORE
4



COMMODORE
4 Cassette (Speedload) **£7.95**
ATARI 32K Cassette or Disk **£9.95**

Jet-Boot Jack is fast heading for No 1 spot in the Atari games charts.

Because he's absolutely unique.

Jet-Boot Jack is the space-age jet-powered jogger who takes you on a chase through the vaults of the Record Pressing plant, collecting his favourite music as he goes.

Evil creatures try to thwart his every move, but Jack's special bouncing powers send them hurtling to their deaths!

Sliders and elevators provide access to new levels – but sometimes they turn nasty!

With 10 different screens and 6 skill levels Jet-Boot Jack will stretch your abilities to the limit.

Which, after all, is what you've come

to expect from English Software.

Jet-Boot Jack and our other programs are available from branches of Laskys, Greens and all good software dealers.

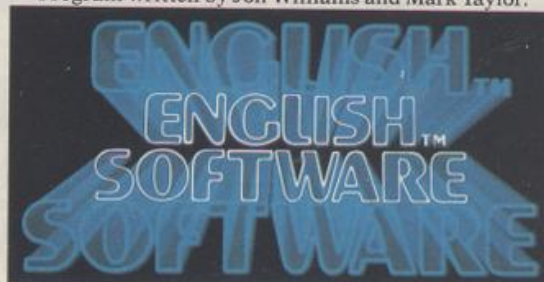
Telephone Sales Hot Line

(Access and Visa) **061-835 1356**

JET-BOOT JACK

© Copyright 1983 English Software

Program written by Jon Williams and Mark Taylor.



THE POWER OF EXCITEMENT

The English Software Company, Box 43,
Manchester M60 3AD Trade Enquiries Tel: 061-835 1358

(all English Software programs are sold according to the English Software Terms of Trading, copies of which are available on request).

For your COMMODORE 64

Guthbert Enters the Tombs of Doom

£6.95



Our intrepid
hero's BACK.
In his latest action
packed adventure!

INVENTORY

- ★ 200 PLUS LOCATIONS in ye High Resolution Graphics
- ★ My Olde Manual to help ye on thy way
- ★ "Evyl Ones" whych do inhabit the tombs
- ★ TREASURES in great abundance
- ★ MAPS & CLUES so ye don't get too lost.

Another Intrepid Hero
JESMON HYS

Mail Order Sales from
Microdeal Mail Order 41 Truro Rd,
St. Austell Cornwall PL25 5JE

Credit Card Sales    
Phone 0726 73456




Dealers Contact

MICRODEAL DISTRIBUTION
0726-73456

or **WEBSTERS SOFTWARE**
0483 62222

MICRODEAL

Selected Microdeal Titles available from computer dealers nationwide or from larger branches of

 **John Menzies** and 
Stores

Spectrum

Sensational ZX Spectrum Offer from Spectrum



ZX Spectrum 48K

Including

FREE!

Software 6 pack

Containing: • Computer Scrabble
• Computer Chess • Survival game
• Chequered Flag game • Horace
goes Skiing game • Make-a-Chip

Worth £56.70

SPECTRUM PRICE

£129⁹⁵

Sinclair QL 32-bit power . 128K RAM . ARRIVING SOON! ... business software ... it's the amazing QL!



SPECTRUM
PRICE

£399

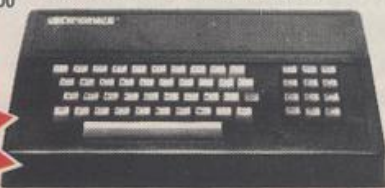
DK'Tronics Keyboard

D'Ktronic Lightpen £19.95
D'Ktronic Dualport Joystick
Interface £13.00

D'Ktronic Programmable Joystick
Interface £22.95

SPECTRUM PRICE

£45



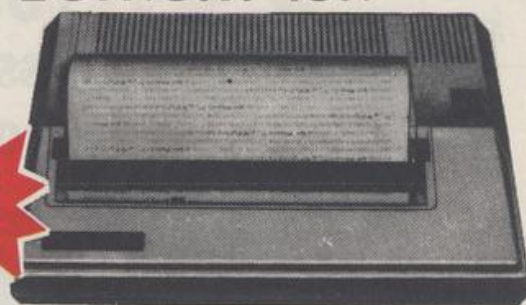
Plus! FREE 4 GAMES CASSETTE

Scoop Purchase! Timex 2040

Thermal Printer for the
SPECTRUM 48K

SPECTRUM
PRICE

£77⁵⁰



This top-value thermal dot matrix printer is designed especially for use with the Spectrum 48K computer. With a print rate of 80cps on no-ribbon thermal paper and a maintenance-free life, plus 80 dpi graphics capability, the 2040 really is a terrific buy at our low price!

The Rat Cheetah Remote Action Transmitter



SPECTRUM
PRICE

£29⁹⁵

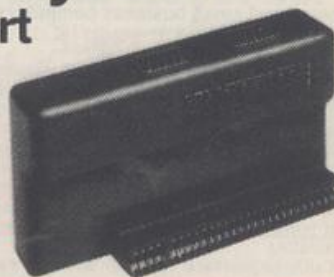
Cheetah's Remote Action Transmitter (R.A.T.) is the most sophisticated computer controller around. Cordless Infra Red transmission lets you sit back (up to 30 feet away) in your chair and enjoy the action! Electronic Touch Control system means no moving parts, superfast action, long life.

DK Tronics Joystick Interface — Dual Port

The 2 joystick facilities are:
1st port simulates 6789 & 0 keys; the 2nd port
simulates in (31) command. It will run any
software. 1-Using keys 6789 and 0; 2-Having
redefinable key function; 3-Using in (31) fully
Kempston compatible; 4-Any software you
write yourself

SPECTRUM
PRICE

£13



Computer Dealers

or prospective dealers. If you would like to
know more about becoming a SPECTRUM
APPOINTED DEALER on an exclusive area
basis please write to: Bob Cleaver,
Spectrum Group PLC, Hunting Gate,
Hitchin, Herts SG4 0TJ Tel: (0462) 37171

More from Spectrum...

Spectrum Computer Centres have no connection whatsoever with the ZX Spectrum Computer manufactured by Sinclair Research Ltd.

spectrum

NEWS!

WIN!

A fabulous holiday for you and 3 friends in sunny

Florida

Including Disney World
Kennedy Space Centre
& Florida Keys

WITH SPECTRUM
& COMMODORE

★★★★★PLUS★★★★★

£2,500

spending money

★★★★★PLUS★★★★★

The 10 Runners-Up each get a

£100 Voucher

to spend in any Spectrum store -
anywhere in the country.

Just look at the fabulous 1st prize in this new competition - a super holiday for you and 3 friends among the sun, sea and palm trees of Florida. PLUS, an incredible £2,500 to spend when you get there.

There's exciting day trips too to the Kennedy Centre, the famous DISNEY WORLD and more!

The competition closes on December 31st 1984 - call into your Spectrum dealer NOW and collect an entry form - you could win the holiday of a lifetime!

MICRO UPDATE

- Spectrum's own magazine for
home and small business computers
AUTUMN ISSUE

Have you seen our MICRO UPDATE magazine yet? It's Spectrum's own computer guide, published by the experts for YOU - and the Autumn issue will be out soon.

It's packed with illustrations and descriptions of just about everything you're likely to meet in home micro hardware, add-ons and accessories. Plus there's information on current software, and hints and tips from experts about home computing.

Call in to your local Spectrum dealer and get YOUR copy - it's great!

Just Arriving

New! Commodore 16

Including
Commodore
1531
Cassette
Recorder



THE PERFECT INTRODUCTION TO HOME COMPUTING

Introducing the new Commodore 16 - the advanced micro that's designed with the beginner in mind.

This brand new micro features a powerful 16K RAM, a full professional keyboard, superb graphics with 121 colours, plus terrific built-in sounds.

In its 32K ROM is a new BASIC 3.5 with over 75 commands including graphics plotting and program editing. There's a unique HELP key that highlights errors when you're learning to program.

It's a tremendous new micro and the Spectrum package includes a Commodore Model 1531 Cassette Data Recorder too. See it at your local Spectrum dealer now!



SPECTRUM
PRICE
ONLY

£139⁹⁹

Add-ons

Simon's Basic.....	£50.00
Intro to Basic Pt 1.....	£14.95
Intro to Basic Pt 2.....	£14.95
MPS801 Printer Ribbon.....	£9.95
MPS802 Printer Ribbon.....	£12.95
64 Magic Voice	
Speech Synthesiser.....	£50.00

**Sensational
Value!**
**Commodore 64
Compatible Data
Recorder
ONLY**

£34⁹⁹

Commodore 64 Package Offer



Including:

- Commodore 64
- A Joystick
- C2N Cassette Recorder
- 4 Cassette Games

AND ALL FOR ONLY

£249

Not all stores carry every advertised item, please phone before making a journey - prices correct at time of going to press E&OE



**Up to £1000
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 -29.8%

Latest News

for up to date news, information & offers from SPECTRUM - see PRESTEL page 600181 for details

See the super new Commodore Range at your local Spectrum Dealer - Now!



Just Arriving New!

Commodore Plus/4

Commodore's new, advanced Plus/4 bridges the gap between home and business micros in a way that's unique - and at a price that's unbelievable! The Plus/4 features, besides its powerful 64K of RAM memory, has a host of features to make computing easier.

For starters, there are four popular software packages built-in - Word Processing, Spreadsheet, Database and a Business Graphics program. That's all a small businesses needs - in a budget-priced micro!

Besides that, there's a HELP key that highlights errors in program lines, plus built-in graphics, advanced BASIC 3.5 with over 75 commands, separate cursor controls, a full 32K ROM and 4 programmable function keys.

SPECTRUM PRICE

£299⁹⁹

New! DPS1101 Printer



SPECTRUM
PRICE

£399⁹⁹

Commodore 1701 Monitor



£230

Commodore MPS802 Printer

SPECTRUM PRICE

£345⁰⁰



MPS801 Printer

SPECTRUM PRICE

£230



1542 Disk Drive

SPECTRUM PRICE

£229



1530 Data Recorder

£44⁹⁵



1531 Data Recorder

SPECTRUM PRICE

£44⁹⁵



For further information on these products - see Spectrum's own magazine MICRO UPDATE. Ask your local dealer for a copy!

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

Computer Dealers

or prospective dealers. If you would like to know more about becoming a SPECTRUM APPOINTED DEALER on an exclusive area basis please write to: Bob Cleaver, Spectrum Group PLC, Hunting Gate, Hitchin, Herts SG4 0TJ Tel: (0462) 37171

More from Spectrum...

spectrum

Micro Dealer UK's **TOP 50** Britains No.1 Weekly Software Chart



PROGRAM
New! Sherlock
Daley Thompson
Decathlon
Daley Thompson
Astro Chase
Flip & Flop
Monty Mole
New! Elite
Death Star Interceptor
New! Zim Sala Bim
Full Throttle
Olympicon
New! High noon
Hero
Forest at World's end
Bear George
Monty Mole 64
Lords of Midnight
Beamrider
New! Stuntbike
Battle for Midway
Frank N Stein
Pitfall
Tiler
Strip Poker
Star Striker
Jet Set Willy
New! Pitfall II
Gisburnes Castle
Sabre Wolf
New! River Raid
New! Black Hawk
New! Havoc
New! Enduro
Beachhead
New! Kokotoni Wilf
Wunda Walter
New! Delta Wing
New! Kokotoni Wilf
New! Zenji
T.L.L.
New! River Raid
New! Toy Bizarre
New! Jetpac
New! H.E.R.O.
New! Stagecoach
Giants Revenge
New! Poster Paster
Stop the Press
Matchpoint

SUPPLIER
Melbourne Hse
Ocean
Activision
Ocean
State Soft
State Soft
Gremlin
Acornsoft
System 3
Melbourne Hse
Micromega
Milec
Ocean
Activision
Interceptor
Cheetahsoft
Gremlin
Beyond
Activision
Ocean
PSS
PSS
Activision
Interceptor
Datasoft
Superior
Software Projects
Activision
Martech
Ultimate
Activision
Creative Sparks
Dynavision
Activision
Access
Elite
Interceptor
Creative Sparks
Elite
Activision
Vortex
Activision
Activision
Ultimate
Activision
Creative Sparks
Thor
Taskset
Sinclair
Psion

MACHINE PRICE
Spectrum £14.95
Spectrum £6.90
CBM 64 £9.99
CBM 64 £7.90
CBM 64 £8.95
CBM 64 £8.95
Spectrum £6.95
BBC £14.95
CBM 64 £9.95
CBM 64 £9.95
Spectrum £6.95
Spectrum £5.95
CBM 64 £7.90
CBM 64 £9.99
Spectrum £5.50
Spectrum £6.95
CBM 64 £7.95
CBM 64 £9.99
Spectrum £6.95
CBM 64 £9.99
CBM 64 £6.90
CBM 64 £14.95
Spectrum £6.95
CBM 64 £9.99
Spectrum £5.50
CBM 64 £9.95
BBC £7.95
Spectrum £9.99
CBM 64 £9.99
BBC £7.95
Spectrum £9.99
Spectrum £7.99
Spectrum £6.95
CBM 64 £9.95
Spectrum £7.99
Spectrum £7.99
CBM 64 £9.99
CBM 64 £9.99
BBC £7.95
Spectrum £7.99
Spectrum £6.95
Spectrum £6.95
CBM 64 £6.90
Spectrum £5.95
Spectrum £7.95

Amstrad Software all at £8.95

EDUCATIONAL SOFTWARE
Wordhang
Happy Numbers
World Wise
Animal, Vegetable, Mineral
Happy Letters
Happy Writing
Time Man 1

Time Man 2
Map Rally
ARCADE
GAMES
Home Runner
Harrier Attack
Sultans Maze
Spanner Man
Oh Mumy
Roland in Care

Roland on the
Ropes
Electron 22622
Gems of Stradus
Chess
Laser Wrap
Haunted Hedges
Codename Matt
Xanagrams
Hunter Killer

3-D Invaders
Alien break-in
Atom smasher
Electro Freddy
Fire Blaster
Admiral Graf
Spee
Star Commands
Crazy Golf
Punchy

BBC Model B Package Offer



HURRY!
Offer extended
WHILE STOCKS LAST

Including FREE!

• Cassette recorder • 5 pieces of software
when you purchase a BBC 'B' from Spectrum.

The BBC MODEL B, probably the most flexible personal microcomputer available today. Using powerful BBC BASIC, the BBC B is widely accepted as providing the educational standard for computer learning.

The model B features a variety of interface ports allowing easy connection not just of ordinary peripherals but also second processors or devices to give access to teletext or prestel services.

£ **399**



Cumana Disc Drives

CSX 100 CS 100
£129.95 £159.99

Super Value- For-Money Shado Data Recorder

Compatible with ACORN
BBC and ELECTRON micros



SPECTRUM
PRICE

Acorn Electron

The Electron gives high quality graphics output to either colour TV or monitor. Sound can be generated through the internal loudspeaker. The Electron comes complete with a free introductory cassette, containing 19 free programmes & two manuals - the User Guide and Start programming with the Electron."



SPECTRUM
PRICE

£ **199⁹⁵**

£ **32⁹⁵**

Not all stores carry every advertised item, please phone before making a journey - prices correct at time of going to press EAOE



**Up to £1000
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 -29.8%

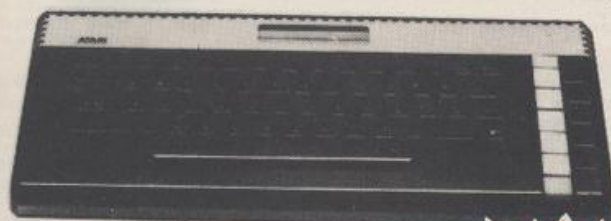
Latest News

for up to date news, information & offers from SPECTRUM - see PRESTEL page 600181 for details

Atari

A great line up from one of the first names in home computing...
...Now at Super New Low prices from Spectrum

Atari 800XL



• Powerful 64K RAM • 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

£199⁹⁹

Atari 850 Interface



SPECTRUM
PRICE

£99⁹⁹

Essential for more advanced work with their Atari computers. It provides 1 parallel output for a huge range of printers, and no less than 4 serial outputs which can be individually programmed for different purposes. It comes with a comprehensive manual, power pack & interconnecting cable to the computer.

Atari 1027 Letter Quality Printer

This superb Letter Quality Printer prints fully-formed letters just like a quality electric typewriter, making it the ideal word-processing companion for business correspondence. The Atari 1027 accepts single sheets of paper so you can even use your own letterhead paper.



SPECTRUM
PRICE

£249⁹⁹

Atari 600XL



The 600XL features a 16K RAM, expandable to 64K with the memory expansion module. There's a 24K ROM operating system including ATARI BASIC. Plus 16 colours, 11 graphic modes and 4 independent 3½-octave sound synthesisers. It really is a top-value micro - come in and see for yourself!

SPECTRUM
PRICE

£99⁹⁹

Atari 1020 Printer/Plotter

Using 4 colour graphics and text, the 1020 colour printer/plotter is perfect for creating charts, graphs & even artistic designs. Very quiet operation.



SPECTRUM
PRICE

£99⁹⁹

Atari 1010 Program Recorder



Add storage and retrieval capability to your Computer system without spending a lot of money. Uses cassettes to store text, programs & other information.

SPECTRUM
PRICE

£34⁹⁹

Atari 1050 Disk Drive



Add the Atari 1050 Disk Drive for fast, convenient data access by storing on compact, easy-to-handle 5¼" disks. Storage capacity with DOS 11 up to 127K bytes, (around 100 pages) of information per disk.

SPECTRUM
PRICE

£199⁹⁹

Atari Software

Entertainment	Tennis	(Cassette)	Macro Assembler
Asteroids	Defender	..... £22.99	(Disk)..... £19.99
Basketball	Dig Dug	..... £14.99	Micro Soft Basic &
Caverns of Mars	Donkey Kong	..... £14.99	Manuals (Disk)..... £49.99
Centipede	Donkey Kong JR.	..... £14.99	Mickey & the Great Out-
Chess	Joust	..... £14.99	doors (Disk)..... £24.99
Galaxian	Ms pac Man	..... £14.99	My First Alphabet
Jungle Hunt	Pole Position	..... £14.99	(Disk)..... £19.99
Pac Man	Robotron	..... £14.99	Paint (Disk)..... £29.99
Lone Raider	Logo & Manuals	..... £59.99	Microsoft Basic II &
Missile Command	Video Easel	..... £22.99	Manuals..... £49.99
Pengo	Music Composer	..... £22.99	Home Business
Qix	Assembler Editor	..... £22.99	Atari Writer..... £39.99
Space Invaders	Invitation to Prog 1	..... £19.99	Visicalc (Disk)..... £49.99
Star Raiders	(Cassette)	..... £19.99	Timewise (Disk)..... £19.99
Super Breakout	Invitation to Prog 2	..... £22.99	And many more.

Spectrum Computer Centres have no connection whatsoever with the ZX Spectrum Computer manufactured by Sinclair Research Ltd.

Computer Dealers

or prospective dealers. If you would like to know more about becoming a SPECTRUM APPOINTED DEALER on an exclusive area basis please write to: Bob Cleaver, Spectrum Group PLC, Hunting Gate, Hitchin, Herts SG4 0TJ Tel: (0462) 37171

More from Spectrum...

Spectrum

Sensational Printer Offers from Spectrum

Juki 6100

Super
Value!

Daisy Wheel
Printer



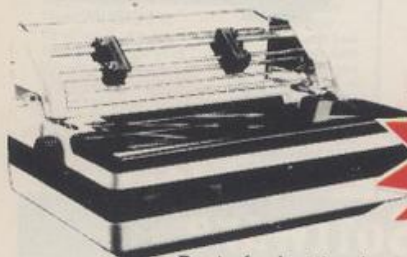
This fabulous new printer is a real breakthrough in the performance/value stakes! For a remarkably low price you get all these great features:

- Daisywheel printing • 20cps (av. 18cps Shannon Text) • 10/12/15 or Proportional character spacing • Bi-directional friction-feed • Tractor feed or cut paper • Centronics as standard; RS232C optional • 2K byte print buffer

£399

Quendata

Just look at this for value - a true daisy-wheel printer offering top quality printing at a remarkably low price. Print speed is 18/20cps, uni- or bi-directional printing (depends on software), variable pitch.



SPECTRUM PRICE

£289⁹⁵

Tractorfeed optional extra

Other Printer Bargains

SEIKOSHA

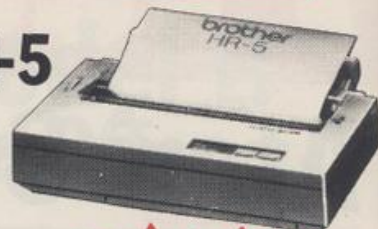
GP50A	£99.95
GP50S Spectrum	£99.95
GP500A	£179.95
GP550A	£229.00
GP100A MkII	£199.95

GP100VC VIC 20/64	£199.95
Friction Feed GP100/250X	£28.75
EPSON	
FX80	£503.70
RX80T	£286.35
RX80FT	£327.75

Brother HR-5

Super value printer that prints on plain paper, yet still fits in your briefcase.

- Operates on 4 standard batteries
- Incorporates Centronics or RS232C
- Bidirectional or unidirectional
- High quality Thermal head
- Prints at 30cps on plain paper (with ribbon) or directly onto thermal paper
- Weighs under 2kg



SPECTRUM
PRICE

£159⁹⁵



Brother HR-15

A great printer at a top-value price from Spectrum. Here's what you get:

- Letter-quality daisy-wheel printing
- Between 13 and 18cps
- Bi-directional printing
- Tractor-fed paper or single sheets
- Super low price!

£458⁸⁵

SPECTRUM
PRICE

Brother EP-44

"Transforming Office Machines", runs Brother's slogan - with these super-compact battery powered typewriters, it's easy to see why!

- Top quality thermal printing head
- 4K of text memory (3 A4 pages)
- Text centring if required
- 15-digit LCD display for pre-printing corrections
- Line-by-line edit facility



SPECTRUM
PRICE

£249⁹⁵

Smith-Corona D100

This superb dot matrix printer from Smith-Corona is a sleek, well-made machine that'll work with either tractor- or friction-fed paper. It offers a fast 120cps print speed, with 80 characters per line and a choice of well-defined typestyles. The D-100 incorporates a Centronics parallel interface.



Also available

Fastax 80
£225¹⁷

SPECTRUM
PRICE

£286³⁵

Not all stores carry every advertised item, please phone before making a journey - prices correct at time of going to press E&OE



Up to £1000
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 -29.8%

Latest News

for up to date news, information & offers from SPECTRUM - see PRESTEL page 600181 for details

There's a Spectrum near you...

AVON

BATH Software Plus, 12 York St
Tel: (0225) 61676
WESTON-S-MARE K & K Computers,
32 Alfred St Tel: (0934) 419324

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) 23391/2

BERKSHIRE

BRACKNELL Computer Centre, 44 The
Broadway Tel: (0344) 427317
SLOUGH MU Games and Computers 245
High St. Tel: (0753) 21594

BUCKINGHAMSHIRE

BLETCHLEY Rams Computer Centre,
117 Queensway Tel: (0908) 647744
CHESHAM Reed Photography & Com-
puters, 113 High St. Tel: (0494) 783373

CAMBRIDGESHIRE

CAMBRIDGE K P Computers Ltd, 19/20
Market St. Tel: (0223) 312240
(Open 6 Days)
HUNTINGDON T.S.C. Electronics, 3 All
Saints Passage, High St. Tel: (0480)
411579
PETERBOROUGH Pirbright Communications,
91 Midland Rd. Tel: (0733) 41007

CHANNEL ISLANDS

GUERNSEY Gruts, 3-5 The Poillett,
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
CREWE Microman Unit 2,
128 Nantwich Rd. Tel: (0270) 216014
ELLSMERE PORT RFR Computers, 1
Pooltown Rd. Whitby. Tel: 051 356 4150
MACCLESFIELD Camera & Computer Cen-
tre 118 Mill St. Tel: (0625) 27468
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.
Annes Parade. Tel: (0625) 526213

CLEVELAND

MIDDLESBROUGH McKenna & Brown,
206 Linthorpe Rd. Tel: (0642) 222368

CORNWALL

ST AUSTELL A B & C Computers, Duchy
House, 6 Lower Aylmer Sq.
Tel: (0726) 67337
TRURO Truro Micro Ltd, Unit 1, Bridge Ho,
New Bridge St. Tel: (0872) 40043

CUMBRIA

BARROW-IN-FURNESS Barrow Computer
Centre, 2/4 The Mall. Tel: (0229) 38353
CARLISLE The Computer Shop, 56-58
Lowther St. Tel: (0228) 27710
PENRITH Penrith Communications,
14 Castlegate. Tel: (0768) 67146
Open Mon-Fri till 8pm
WHITEHAVEN P D Hendren 15 King St.
Tel: (0946) 2063

DERBYSHIRE

ALFRETON Gordon Harwood 69-71 High
St. Tel: (0773) 832078

CHESTERFIELD The Computer Centre,
14 Stephenson Place Tel: (0246) 208802

DEVON

EXETER Seven Counties (Computers) Ltd, 7
Paris Street. Tel: (0392) 211211
EXMOUTH Open Channel, 30 The Strand.
Tel: (0395) 264408
PLYMOUTH Syntax Ltd, 76 Cornwall
St. Tel: (0752) 26705
TIVERTON Actron Micro Computers,
37 Bampton St. Tel: (0884) 262854
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
Lairdon Main Centre Lairdon. Tel: (0268)
416747
CHELMSFORD Maxton Hayman Ltd,
5 Broomfield Rd. Tel: (0245) 354595
COLCHESTER Brainwave 51 Head St. Tel:
(0206) 561513
GRAYS H Reynolds, 79 Orsett Rd.
Tel: (0375) 5948
ILFORD Woolfman's, 76 Ilford Lane.
Tel: (01) 478 1307
SOUTHEND Computer Centre 332 London
Rd. Tel: (0702) 337161

HAMPSHIRE

BASINGSTOKE Fisher's, 2-3 Market
Place. Tel: (0256) 22079
PORTSMOUTH (Waterloo) G B
Microland, London Rd., (Opp. Co-op)
Tel: (07075) 259911
SOUTHAMPTON L.T.C. Ltd., 112 East St.,
Tel: (0703) 333958/24703
WINCHESTER Winchester Camera &
Computer Centre, 75 Parchment St.
Tel: (0962) 53982

HEREFORD

HEREFORD Melgray Hi-Tech Ltd,
49 Broad St. Tel: (0432) 275737

HERTFORDSHIRE

HITCHIN GK Photographic & Computers,
68A Hermitage Rd. Tel: (0462) 59285
POTTERS BAR The Computer Shop,
197 High St. Tel: (0707) 44417
ST ALBANS (Herts) Clarks Computer
Centre 14-16 Hollywell Hill.
Tel: (0727) 52991
STEVENAGE D J Computers, 11 Town
Square. Tel: (0438) 65501
WATFORD SRS Microsystems Ltd., 94 The
Parade, High St. Tel: (0923) 26602
WELWYN GARDEN CITY D J Computers, 40
Fretherne Rd. Tel: (07073) 28435/28444

HUMBERSIDE

BEVERLEY Computing World, 10 Swaby's
Yard Dyer Lane. Tel: (0482) 881831
GRIMSBY RC Johnson Ltd, 22 Friargate,
Riverhead Centre. Tel: (0472) 42031
HULL The Computer Centre,
26 Anlaby Rd. Tel: (0482) 26297

ISLE OF MAN

DOUGLAS T H Colebourn Ltd.,
57-61 Victoria St. Tel: (0624) 3482

ISLE OF WIGHT

COWES Beken & Son, 15 Bath Rd. Tel:
(0983) 297181

KENT

BECKENHAM Supa Computers Ltd, 425
Croydon Rd. Tel: (01) 650 3569
BROADSTAIRS Video Vision 19/20 Willow
Court, St. Peters Park Road Tel: (0843)
63284 (No Early Closing Day)
BROMLEY Computers Today, 31 Market
Square Tel: (01) 290 5652
CANTERBURY Cbury Computer Centre 56/
57 Palace St. Tel: (0227) 62101
DOVER Kent Photos & Computers, 4 King St.
Tel: (0304) 202020
GRAVESEND Marshalls Computers &
Cameras, 3 Windmill St. Tel: (0474) 65930
RAINHAM Microway Computers Ltd., 39
High St. Medway Towns.
Tel: (0634) 376702
SEVENOAKS Ernest Fielder Computers,
Dorset St. Tel: (0732) 456800
SITTINGBOURNE Computers Plus, 65 High
St. Tel: (0795) 25677
TUNBRIDGE WELLS Modata Computers
Ltd, 28-30 St Johns Rd. Tel: (0892)
41555

LANCASHIRE

ACCINGTON PV Computers,
104 Abbey St. Tel: (0254) 36521/32611
BLACKBURN Tempo Computers, 9 Railway
Rd. Tel: (0254) 691333
BURNLEY IMO Computer Centre, 39/43
Standish St B811 1AP Tel: (0282) 54299
PRESTON Wilding's, 49 Fishergate.
Tel: (0772) 556250

LEICESTERSHIRE

MARKET HARBOUROUGH Harborough Home
Computers, 7 Church St.
Tel: (0858) 63056

LONDON

E6 Percival's, 85 High St. North, East Ham.
Tel: (01) 472 8941
E17 Erol Computers Ltd, 125 High Street
Walthamstow Tel: (01) 520 7763
E1 Pedro Computer Services Ltd, 47
Clerkenwell Road Tel: (01) 251 8635
E2 Devon Computer Centre, 155 Moorgate
Tel: (01) 638 3339/1830
N14 Logic Sales, 19 Broadway, The Bourne,
Southgate. Tel: (01) 882 4942
N20 Castlehurst Ltd, 1291 High Rd.
Tel: (01) 446 2280
NW4 Da Vinci Computer Store, 112 Brent
St, Hendon Tel: (01) 202 2272
NW11 Computers Inc, 86 Golders Green Rd.
Tel: (01) 209 0401/0279
SE1 Vic Odden's 6 London Bridge Walk.
Tel: (01) 403 1988
SE9 Square-Deal, 373-375 Footscray Rd.,
New Eltham. Tel: (01) 859 1516
SE15 Castlehurst Ltd., 152 Rye Lane,
Peckham. Tel: (01) 639 2205
SW16 Buffer Micro Shop, 310 Streatham
High Rd. Tel: (01) 769 2887
W1 Computers of Wigmore St, 87 Wigmore
St. Tel: (01) 486 0373
W1 Sonic Foto & Micro Centre, 256
Tottenham Court Rd. Tel: (01) 580 5826
W1 Ramsons 4 Edgware Rd. Tel: (01)
724 2373

GREATER MANCHESTER

BOLTON Wilding Ltd, 23 Deansgate.
Tel: (0204) 33512
MANCHESTER Lomax Ltd, 8 Exchange St.
St. Ann's Square. Tel: (061) 832 6167
OLDHAM Home & Business Computers Ltd,
54 Yorkshire St. Tel: (061) 6331608
ROCHDALE Home & Business Computers,
75 Yorkshire St. Tel: (0706) 344654
SWINTON Mr Micro Ltd, 69 Partington
Lane. Tel: (061) 728 2282
Late Night Friday
WIGAN Wilding Ltd, 11 Mesnes St.
Tel: (0942) 44382

MERSEYSIDE

BIRKENHEAD Fairs Cameras & Hi-Fi, Dacre
Hill, Rock Ferry. Tel: (051) 645 5000
HESWALL Thornguard Computer Systems,
46 Pensby Rd. Tel: (051) 342 7516
HUYTON Ian Houghton 5 Huyton Hey Rd.
Tel: (051) 489 5785
LIVERPOOL Beaver Radio, 20-22 White-
chapel. Tel: (051) 709 9898
LIVERPOOL (Aintree) Hargreaves, 31-37
Warbreck Moor. Tel: (051) 525 1782

MIDDLESEX

HARROW Camera Arts, (Micro Computer
Division) 42 St Ann's Rd.
Tel: (01) 427 5469
TEDDINGTON Andrews, Broad St.
Tel: (01) 977 4716
UXBRIDGE J K L Computers, 7 Windsor St
Tel: (0895) 51815

NORFOLK

FAKENHAM Fastview, 12 Norwich Rd.
Tel: (0328) 51319
KING'S LYNN Computer Plus, 40 Conduit St.
Tel: (0553) 4550
NORWICH Norwich Camera Centre 20
White Lion Str. Tel: (0603) 612537
NORWICH Brainwave 11A Castle Meadow
Tel: (0603) 663796
THETFORD C B & Micros, 21 Guildhall St.
Tel: (0842) 61645

NORTHAMPTONSHIRE

NORTHAMPTON Dormans, 22 Princes Walk
Grosvenor Centre. Tel: (0604) 37031

NOTTINGHAMSHIRE

NOTTINGHAM Jacobs Computers,
13 Middlegate Newark. Tel: (0636)
72594
WORKSOP Computagraphics, 132 Bridge St.
Tel: (0909) 472248

NORTHERN IRELAND

BELFAST Arthur Hobson Ltd, 37 Great Vic-
toria St. Tel: (0232) 246336
PORTADOWN Pedlows, 16 Market St.,
Craigavon County Armagh. Tel: (0762)
332265
LONDONDERY Foyle Computer Systems,
3 Bishop St. Tel: (0504) 268337
NEWRY Newry Computer Centre, 34
Monaghan St. Tel: (0693) 66545

NORTHUMBERLAND

MORPETH Telerents 31 Newgate St. Tel:
(0665) 513 537

OXFORDSHIRE

ABINGDON Ivor Fields Computers, 21 Stert
St. Tel: (0235) 21207
BANBURY Computer Plus, 2 Church Lane.
Tel: (0295) 55890
OXFORD Ivor Fields, 7 St Ebbs St.
Tel: (0865) 247082

SCOTLAND

ABERDEEN North East Computers, 1-3 Ellis
St. Peterhead. Tel: (0779) 79900
AYR Vennals, 6A New Bridge St.
Tel: (0292) 264124
DUMFRIES Vennals, 71 English St.
Tel: (0387) 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
Cadzow St. Tel: (0698) 283193

SHROPSHIRE

SHREWSBURY Computarama,
13 Castlegate. Tel: (0743) 60528
TELFORD Computer Village, 4 Hazeldine
House, Telford Town Centre. Tel: (0952)
506771

SOMERSET

TAUNTON Grays, 1 St James St.
Tel: (0823) 72986

STAFFORDSHIRE

STAFFORD Computarama, 59 Forgate St.
Tel: (0785) 41899
STOKE-ON-TRENT Computarama, 11 Mkt
Square Arcade Hanley. (0782) 268620
STOKE-ON-TRENT The Microchip, 37 Sta-
tion Rd. Biddulph Tel: (0782) 511559

SUFFOLK

BURY ST EDMUNDS Guildhall Cptr Ctr, 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 Computer
Division), 36 High St. Tel: (0276) 65848
CATERHAM Telecare, 35-37 Croydon Rd.
Tel: (0883) 6209
CHERTSEY Chertsey Computer Centre, 1
Windsor St. Tel: (09328) 64663
EPSOM The Micro Workshop, 12 Station
Approach Tel: (03727) 21533
HASLEMERE Haslemere Computers, 25
Junction Pl (Adj. Rex Cinema)
Tel: (0428) 54428
RICHMOND Crest Computer Services, 8 Hill
St. Tel: (01) 940 8635
WALLINGTON Surrey Micro Systems Ltd,
53 Woodcote Rd. Tel: (01) 647 5636
WOKING Harpers, 71-73 Commercial Way.
Tel: (04862) 25657

SUSSEX

BEXHILL-ON-SEA Computerware, 22 St
Leonards Rd. Tel: (0424) 223340
BOGNOR REGIS Bits & Bytes High Str. Tel:
(0243) 867143
BURGESS HILL Weald Computers, 247-249
London Rd. Tel: (04446) 41281
CRAWLEY Gatwick Computer Services, 62
Boulevard. Tel: (0293) 37842
LITTLEHAMPTON Alan Chase Ltd, 39 High
St. Tel: (09064) 5674

WALES

ABERDARE Inkey Computer Services Ltd.,
70 Mill St. The Square Trecynon.
Tel: (0685) 881828
ABERYSTWYTH AberData at Galloways, 23
Pier St. Tel: (0970) 615522
CARDIFF Randall Cox, 18-22 High St
Arcade Tel: (0222) 31960
LLANDUDNO (Gwynedd) Computer Plus
Discount, 15 Clonmel St. Tel: (0492)
79943
NEWPORT (Gwent) Randall Cox, 118
Commercial St. Tel: (0633) 67378
PENBROKE Randall Cox, 19 Main St.
Tel: (064) 662876
WREXHAM T E Roberts, 26 King St.
Tel: (0978) 364404/364527

WARWICKSHIRE

NUNEATON Micro City 1A Queens Road Tel:
(0203) 382049
RUGBY The Rugby Micro Centre, 9-11
Regent St. Tel: (0788) 70522

WEST MIDLANDS

COVENTRY Greens, 22 Market Way.
Tel: (0203) 28342
DUDLEY Central Computers, 35 Church Hill
Precinct. Tel: (0384) 238169
WALSALL New Horizon Computer Centres, 1
Goodall St. Tel: (0922) 24821
WEST BROMWICH Bell & Jones, 39 Queens
Square. Tel: (021) 553 0820

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 Raw-
son Square. Tel: (0274) 309266
DEWSBURY Home & Business Computers,
59 Daisy Hill. Tel: (0924) 455300
DONCASTER The Soft Centre 8 Queens-
gate Waterdale Centre Tel: (0302) 20088
HUDDESFIELD Richards (Formerly
Lauries) 12 Queen St. Tel: (0484) 25334
HULL Computer Centre 26 Anlaby Rd. Tel:
(0482) 26297
LEEDS Bass & Bligh, 4 Lower Briggate.
Tel: (0532) 454451
YORK York Computer Centre 7 Stonegate
Arcade. Tel: (0904) 641862

ANIROG

ZAGA

MISSION

This diagonally scrolling maze game features superb 3D graphics brilliant sound effects and requires 100% concentration to successfully manoeuvre your helicopter through unknown hazards in order to complete Zaga Mission and live to play another day — Commodore 64 — £7.95

Also available on Disk at £9.95

TRADE ENQUIRIES: ANIROG SOFTWARE LTD. 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 POSTAGE & PACKAGING

COMPUTER LINK

CONNECTORS IDC

Card Edge	(Trans-PCB)	2 Row Socket
10-way	£1.20	£0.85
14-way		£0.90
16-way	£1.60	£1.20
20-way	£1.90	£1.35
26-way	£2.40	£1.60
34-way	£3.10	£1.95
40-way	£3.40	£2.00
50-way	£3.85	£2.25
60-way	£4.80	£2.25

IDC SHROUDED HEADERS WITH EJECTING LOCKING ARMS

	Straight	Right Angle
10-way	£1.00	90
14-way	£1.00	£1.20
16-way	£1.25	£1.45
20-way	£1.40	£1.60
26-way	£1.70	£1.95
34-way	£2.00	£2.30
40-way	£2.15	£2.45
50-way	£2.30	£2.65
60-way	£2.45	£2.85

IDC D CONNECTORS

	Male	Female
9-way	£2.70	£3.20
15-way	£3.20	£3.70
25-way	£3.80	£4.45
37-way	£5.90	£6.80

IDC AMPHENOL

(Centronics)

36-way plug	£4.95
36-way socket	£5.95

PRINTER LEADS

ALL 1 METRE LENGTH

BBC	£9.95
BBC serial	£8.95
AMSTRAD	£16.75
MEMOTECH	£12.75
EINSTEIN	£12.75
IBM PC	£15.95
SPECTRUM interface	
1 to RS 232	£9.75
SPECTRUM interface	
1 to RS 232	£10.75
1 to Centronics	
CENTRONICS to	
Centronics	£15.20
DRAGON	£9.95

DIP HEADERS

Pins	
14	90p
16	£1.00
24	£1.40
28	£3.95
40	£2.15

TELEPHONE CONNS

Surface master	
jack socket	£3.75
Surface extn socket	£2.50
Dual outlet adaptor	£4.25
Line jack cord 3mtr	£1.85
BT jack plug	48p
4 core cable pair metre	15p
All surface units shuttered BT approved.	

SPECTRUM EXTENSION LEADS

6 inch extension cable M to F	£10.50
6 inch M to 2 F's	£14.75
12 inch extension cable M to F	£10.75

Other configurations made to order
Write or phone for quote

COMPUTER LEADS

Dual disk drive 1m	£10.25
Single disk drive 1m	£7.25
7 pin DIN plug to 2x3.5mm	
1x2.5mm Jack plugs	£2.25
5 Pin DIN plug to 2x3.5mm	
1x2.5mm Jack plugs	£2.20
6 Pin DIN Plug to 6 Pin	
DIN Plug	£1.95
2x3.5mm Jack plugs to	
2x3.5mm Jack plugs to	£1.25
7 Pin DIN plug to 5 pin	
DIN plug	£1.95
7 Pin DIN Plug to 3 pin DIN	
plug and 2.5mm Jack plug	£2.25
7 Pin DIN plug to 7 Pin	
DIN plug	£2.25
5 Pin Domino Plug to 5 pin	
Domino plug	£1.95
Phono Plug to Coaxial TV	
Aerial plug	95p

EDGE CONNECTORS

2x23-way (ZX81)	£1.85
2x28-way (Spectrum)	£2.10
2x6-way VIC20/64	£1.20
2x12-way	£1.60

DOUBLE SIDED PLUG BOARDS

ZX81 23-way	£1.25
Spectrum 28-way	£1.50

MONITOR LEADS

BBC 6-pin to start plug	£4.95
BNC plug to phono plug	£2.95
QL to colour monitor	£1.75
QL to mono monitor	£1.25

£12.95

CUSTOM ASSEMBLIES

ANY COMBINATION OF
IDC & RIBBON CABLE
LEADS MADE TO ORDER

SEND SAE
FOR FREE
CATALOGUE

Please add
15% VAT

Free p&p C.W.O. or use

COMPUTER LINK Dept YC 11, PO Box 1, Ware, Herts.
Telephone: 0920 5285

star ATTRactions



GEMINI-10X



12 MHZ VIDEO BANDWIDTH
RGB AND COMPOSITE VIDEO
MEDIUM RESOLUTION

£169.95
+ VAT = £195.44

£189.95
+ VAT = £218.44

120 CPS • BI-DIRECTIONAL LOGIC
SEEKING • FRICTION
TRACTOR AND ROLL
HOLDER STANDARD
• DOWNLOADABLE
CHARACTERS • ULTRA
HIGH RESOLUTION •
80 COLS • IBM PC
VERSION NOW
AVAILABLE



14 INCH COLOUR MONITOR
Also available in
TV/Monitor version at
£195.95 + VAT = £225.34

LOOK!

NEW LOWER PRICES ON EPSON, STAR & BROTHER

DAISYWHEEL PRINTERS

BROTHER HR 15 CALL FOR BEST PRICE
EPSON DX 100 £369.95 + VAT = £425.44
JUKI 6100 £325.00 + VAT = £373.75
DAISYSTEP 2000 £225.00 + VAT = £258.75

DOT MATRIX PRINTERS

COSMOS JP80 £169.00 + VAT = £194.35
EPSON RX 80 £198.95 + VAT = £228.79
EPSON RX 80 F/T £228.95 + VAT = £263.29
EPSON RX 100 £384.95 + VAT = £442.69
EPSON FX 80 £319.95 + VAT = £367.94
EPSON FX 100 £498.95 + VAT = £573.79
STAR GEMINI-10X £189.95 + VAT = £218.44
STAR DELTA 10 £319.95 + VAT = £367.94
STAR RADIX 10 £498.95 + VAT = £573.79

THERMAL MATRIX PRINTERS

STAR STX 80 £129.95 + VAT = £149.44
BROTHER HR 5 CALL FOR BEST PRICE
BROTHER EP 44 CALL FOR BEST PRICE

Cables - Paper - Ribbons - Sheet Feeders
Tractor Feeds - Interfaces - Call for Best Prices

CREDIT CARD HOT LINE

01-482 1711

Please add £10+VAT for delivery
Post your cheques/P.O.'s to:



DATASTAR SYSTEMS UK

UNICOM HOUSE 182 ROYAL COLLEGE STREET
LONDON NW1 9NN
Telex 295931 UNICOM G

TAX-FREE EXPORT & DEALER ENQUIRIES WELCOME
MONDAY-FRIDAY 9-6 SATURDAY & SUNDAY 10-1

Personal callers welcome. We are situated by the
junction of Camden Road by the railway bridge.

HIRE SPECTRUM SOFTWARE

OVER 280 different tapes for hire including **ARCADE, ADVENTURE, BUSINESS, EDUCATIONAL**, etc. - even an m/c Compiler. **FREE** 26 page catalogue. **FREE** newsletter, with hints, tips and our top tape chart.

OVER 3000 tapes in stock, with up to 60 copies of each title for fast service. All tapes sent by 1st class post.

LOWEST PRICES - hire up to 3 tapes at a time, from 63p each for two weeks hire. (Plus p&p and VAT). European members welcome.

Tapes for sale at DISCOUNT prices. Telephone 01-661 9240 (9am - 5pm) or write for further details, or complete the coupon and **JOIN TODAY** - you've nothing to lose!

SAVE £3.00!!

For a limited period, we are offering **HALF-PRICE** membership to readers of this magazine. Join now, **LIFE** membership is only £3.00 (normally £6.00).

SWOP SHOP

A new service from N.S.L. **SWOP** your unwanted tapes with tapes from other members for a small handling charge of only 60p (plus p&p and VAT).

NATIONAL SOFTWARE LIBRARY

42 Harefield Avenue, Cheam, Surrey SM2 7NE.

Enclose cheque/postal order for £3.00 for LIFE membership. Please rush my membership kit to me. If, within 28 days, I'm not delighted with your service you'll refund my membership fee..

Name _____

Address _____

YC10

THE UNIQUE **MSX**..amazing SYSTEM

When you buy your MSX computer, you enter a new dimension of Home Computing with software options on disk, ROM cartridge or cassette tape.

Peripheral options cover colour monitors, printers, disk

The Spectacular JVC HC-7GB



The HC-7GB personal computer from JVC is a new MSX machine designed for total compatibility between other MSX machines and all MSX software. A highly advanced 64 K machine, the HC-7GB has three display modes offering RF, composite video and RGB outputs. The HC-7GB MSX personal computer from JVC is the final word in home entertainment.

£275.00

THE JVC 7255 GB 14" COLOUR TELEVISION COMPUTER MONITOR



With full remote control

£269.95

JOYSTICKS

For extra versatility and sensitivity in control there is a range of high quality joysticks available from these famous manufacturers offering such features as double trigger and suction stability pads.



SANYO
MJY 002 £12.95

JVC HCJ615 £12.95



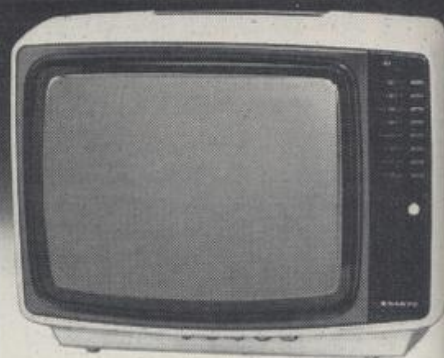
TOSHIBA

HX-J400 £12.95



SONY JS 55 £19.95

SANYO CTP3132 14" PUSH BUTTON COLOUR TELEVISION



The ideal budget price television for your home computer unit. Great value for money at

SANYO £179.95

SONY PRN-C41 PLOTTER/PRINTER

This Plotter/Printer produces red, green, blue and black images and characters. Pen replacement is easy and it takes a wide choice of paper sizes including FREE 'greetings pack' software.

SONY £249.95

RING TELEDATA 01-200 0200 FOR DETAILS OF YOUR NEAREST STOCKIST.
ANYTIME DAY OR NIGHT

g versatility

drives, light pens, plotters, joysticks, data recorders and RAM cartridges from many top name manufacturers in the home electronics field.

Their performance offers you unrivalled graphic and sound quality together with outstanding simplicity of use.

THE INCREDIBLE FISHER CFB1410 P MONITOR STYLE COLOUR TELEVISION



This superb, high technology 14" monitor style television has earned a high quality reputation as a reference in the field of home computer



monitoring. It features a full 17 function infra red remote control housed

in the front of the set. Other sophisticated facilities include direct audio/visual terminals in/out and smoked glass filter for perfect picture definition.

FISHER £269.95

SOFTWARE



TOSHIBA

SOFTWARE STARTER PACK

As a special introduction to your MSX computing, Toshiba offer a pack of 5 exciting computer games for **ONLY £30**

Pack consists of: ● 3D Golf ● Trick Boy ● Clapton II ● Pyramid ● Polar Star (Offer only available while stocks last)

Individual games available at **£7.95 each**

SONY ROM CARTRIDGE SOFTWARE A range of sophisticated Sony Rom Cartridge Software is available at prices up to **£19.95**



SANYO DR201 DATA RECORDER

An AC only recorder styled for computer use with all controls conveniently placed on top of the machine for ease of use.

£34.95



SANYO DR101 RECORDER

Specifically designed for use with personal computers, with phase shift switch, speaker monitor and AC/DC operation.

£34.95

SONY TCM737 DATA RECORDER

A mains or battery operated recorder ideal for use with your home computer. **£39.95**

JVC HC-R105 DATA RECORDER

The stylishly designed HC-R105 data recorder is an example of a machine produced to offer superb user convenience, exceptional performance parameters and reliable data transfer. The HC-R105 is a high speed machine giving very short access times to data. **£89.95**



KNIGHTS:

KNIGHT-OTHELLO	£5.95
The classic game now on MSX.	
VICIOUS VIPER	£5.95
Eat the men but don't bite your tail.	
EXPLODING ATOMS	£5.95
A strategy game for two players.	
SMASH OUT	£5.95
With key or joystick control.	
CAVE ADVENTURE	£5.95
Negotiate the labyrinth of treasures.	
MSX DEMONSTRATOR	£5.95
Realize the potential of your MSX.	
MSX GRAPHICS	£5.95
Demonstrate your excellent MSX graphics.	
TYPING TUTOR	£5.95
Score by response to flashing keys.	
JUNIOR MATHS	£5.95
Teaches children to add and multiply.	
MSX BASIC TUTORIAL PART 1	£5.95
Learn MSX Basic programming.	
MACHINE CODE LANGUAGE	£5.95
Write your own machine code programs.	
KNIGHTS MAIL LIST	£14.95
Store addresses and print labels.	
BUDGET ACCOUNTS	£14.95
Accounts with special forecast feature. (Available on disk or cassette).	

KUMA:

DRILLER TANKS	£8.95
Fight in tunnels fire breath Hectorians.	
BINARY LAND	£8.95
Unite the couple in the complex maze.	
FIRE RESCUE	£7.95
Rescue the mice from a burning building.	

ERIC & THE FLOATERS

ERIC & THE FLOATERS	£5.95
Recover treasure from the evil floaters.	
DOG FIGHTER	£6.95
Blast enemy aircraft out of the skies.	
HYPER VIPER	£7.95
Avoid venomous vipers in the labyrinth.	
SPOOKS AND LADDERS	£6.95
Trap spooks in holes & escape the mine.	
COCO IN THE CASTLE	£6.95
Rescue the maiden from the king's castle.	
CRIBBAGE	£5.95
Play 6 card cribbage with your MSX.	
HOLDFAST	£5.95
A local politics strategy game.	
HOME BUDGET	£14.95
Control your home income and expenses.	
WDPRO: Wordprocessor	£29.95
A professional quality wordprocessor.	
DATABASE	£19.95
A professional database program.	
ZEN MACHINE CODE PROGRAMMING SYSTEM	£19.95
Generate Z80 assembler language programs.	
KUMA FORTH	£39.95
A fully structured self extending language.	

COMMUNICATIONS WITH VIEWDATA	£19.95
Communicate through your modem.	
SPEECH SYNTHESIS	£69.50
(includes hardware card)	
Typed in words can be spoken.	

QUICKSILVA:

FRED	£7.95
Fred's adventures under the pyramids.	
BOOGABOO (The Flea)	£7.95
Avoid a deadly dragon inside deep caves.	
ANT ATTACK	£7.95
Escape the ancient city fighting ants.	
THE SNOWMAN	£7.95
Build a snowman avoid Monsters & Flames.	
GAMES DESIGNER	£9.95
Modify existing or write your own games.	



AMPALSOFT:

The "CHESHIRE CAT EDUCATIONAL SERIES" of programs will be made available to MSX users. ABOVE ARE ONLY A FEW OF THE MANY PROGRAMS AVAILABLE FOR YOUR MSX BY MAIL ORDER OR FROM YOUR LOCAL STOCKIST.

DON'T FORGET TO ASK YOUR DEALER FOR DETAILS OF CREDIT FACILITIES, EXTENDED GUARANTEES, ETC. AVAILABLE ON CERTAIN ITEMS.

AXIS
AT HOME WITH TECHNOLOGY

THE UNIQUE MSX SYSTEM

Complete

In the confused world of computer technology the unique MSX System has been adopted as a common standard for computer production by at least 16 of the biggest and best names in home electronics. This major breakthrough in the development of

The Sensational SONY HIT BIT



A 64K MSX Computer with an exclusive, built-in Personal Data Bank (firmware). This handy facility enables you to enter, store, recall and up-date all kinds of personal information such as appointments, addresses, telephone numbers, etc. Operation is simple, with instructions appearing on the screen every step of the process.

£299.95



Data from the Personal Data Bank can be saved on any data storage facility or on the **UNIQUE HBI 55 RAM CARTRIDGE**, available for

£39.95

KV1430 14" MONITOR STYLE, PUSH BUTTON CONTROL TRINITRON COLOUR TELEVISION

with front mounted RF terminal.

£239.95

HBD50 MICRO FLOPPY-DISK UNIT

stores up to 360K bytes of information on a 3 1/2" disk. Easily connected to the Hit Bit by using one of the expansion slots.

£349.95

The Superb SANYO MPC 100

This sophisticated piece of equipment offers all the advantages of 64K MSX computing. (complete with 4 programme starter pack)

£299.95

Plus a unique optional feature – **MLT001 LIGHT PEN**. This provides you with unlimited flair and flexibility in colour graphics design. This feature comes complete with a software package containing some intriguing graphic facilities.



CBP 3000 14" MONITOR STYLE COLOUR TELEVISION with removable smoked glass screen for higher definition.

£199.95

MLT001 LIGHT PEN
£89.95



PRICES SHOWN INCLUDE VAT AND ARE CORRECT AT TIME OF GOING TO PRESS. E. & O.E.

RING TELEDATA 01-200 0200 FOR DETAILS OF YOUR ANYTIME DAY OR NIGHT

NEAREST STOCKIST.

compatibility...

Home Computing brings you complete compatibility in hardware and software. To cater for all home computing needs, Axis have selected in these pages an unbeatable, top value-for-money

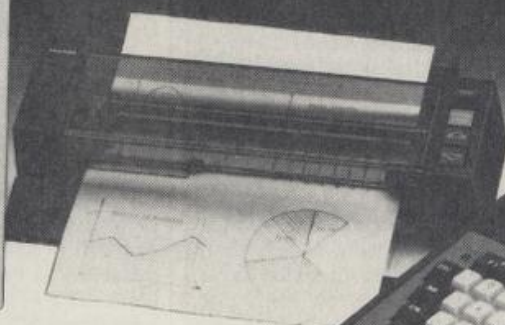
range of MSX computers, colour monitors, peripherals and software for you to choose from. "We believe that when you discover the benefits of MSX computing no other system will do".

TOSHIBA



The Star Value TOSHIBA HX10

The first MSX computer to be introduced into the U.K.



DR202 DATA RECORDER

Top of the range machine offering a host of high technology features.

£44.95

Offering superb facilities and outstanding value for the first time user or enthusiast. 64K Ram, 16 colour graphics, RF, video and audio connectors, plus ports for printer, disk drive and data recorder. (Including starter pack software).

£279.95

140E MONITOR STYLE COLOUR TELEVISION

The perfect partner for the HX10, providing excellent picture and sound quality.

£189.95

HX-P750 PLOTTER PRINTER

Easily connected to the HX10 through the printer interface. This printer features image and character plotting in 4 colours - red, green, blue and black - making it ideal for colourful graphs, pie and bar charts. Plotting speed is 285 steps per second.

£249.00

DON'T FORGET TO ASK YOUR DEALER FOR DETAILS OF CREDIT FACILITIES, EXTENDED GUARANTEES, ETC. AVAILABLE ON CERTAIN ITEMS.

AXIS
AT HOME WITH TECHNOLOGY

YOUR LETTERS

OU — BASIC IS BEST OK!



BASIC IS BEST

To counter your correspondents in the October issue who run down the ever popular Basic, there is another side to the debate. To take a small sample there are 23,000 Open University students with home micros, a third of them teachers and most of the rest in business and industry, with the following proportions 34 per cent BBCB, 15 per cent Spectrum, 11 per cent ZX-81, 6 per cent Commodore 64, 5 per cent Dragon, 4 per cent Apple, 4 per cent TI99, 3 per cent Tandy, 2 per cent each Vic20, Electron, 380Z, Atom, Pet, MZ80 and 1 per cent or less each of Genie, QL, Oric and others. They all have Basic as their *lingua franca* native language, which is easily converted from one dialect to another as Prestel, Ceefax and Basicode have shown; impracticable for other languages.

Indeed universal Basic common to all has Goto (stuff the pundits), Gosub, For..To..Step..Next, If..Then, so omit Procedure, Repeat, Until, While, Wend and Else which are not common to all. As they never teach you in 20 years, when you get down to it all, computers large and small only do three principal things:—they Loop, Branch and Gosub — equivalent to brackets in algebra; the rest is arranging input and output. As simple as that.

A recent survey among those OU students shows that 99.6 per cent do not want full time careers in computing but do "want to use their micros quickly and simply". So that means Basic, which after all was designed for that very purpose, so that the scientist, mechanic, executive or teacher could start programming within a day to help their job without a lot of elitist fuss.

It is also clear among those OU students that they have discovered for themselves, away ahead of academic staff, that programming their micros in Basic improves their studies and greatly increases their understanding of concepts in Maths, Science, Technology, Engineering, Social Science, Education, Business and Industry; and their time is at a premium.

The currently fashionable and transient structured programming and top down design — sacred cows if ever there was one; and what ever happened to yesteryear's fashionable algorithm — taught with Pascal in the OU's main computing course is a dismal failure with 51.6 per cent drop-out or failed — compare with 75 per cent normal pass rate — that is, 1163 students gave up costing £1 million of wasted resources of the taxpayers money. If the students were aircraft we would all be grounded; and if the staff who wrote the course were football coaches...!

It's comparable to the Army who ordered new boots and provided a sample, and then found they had 900,000 left boots only; with severe condemnation from the Parliamentary Audit Committee.

With "programs that generate programs" already on the wing there will soon be no need for these tedious, elitist and idiot fashions in structure and 30 languages; they will be as dead as yesterday's punched cards, in your lifetime. We are still in the Tiger Moth stage.

Sharpey,
OU Student,
Sussex.

AMSTRAD PEEK

In answer to Matthew Leach's letter in *Your Computer* September 1984, it is possible to peek the Amstrad CPC-464 ROM, but this must be done from machine code. The best way is to disassemble the ROM with a machine-code disassembler. Switching the ROM in with the following machine code routine.

ORG 4000H
CALL B900H
CALL B906H

JP start of machine-code disassembler

The ROM can now be disassembled but if you return to Basic, the ROM is switched out.

M.J. Dyos,
Little Sutton,
Cheshire.

ZX-81 SPRITES

With reference to my Sprite program for the ZX-81 in the September issue of *Your Computer*, it is bug-free. However, owners of ZX-81s with the unimproved ROM

will find that on running the demo program the Report Code C/100 appears. To rectify this problem the following Pokes should be carried out to the machine-code.

POKE 17403,82
POKE 17421,82
POKE 17435,82
POKE 17464,82
POKE 17468,82
POKE 17481,82
POKE 17485,82
POKE 17498,82

POKE 17575,82
POKE 17629,32
POKE 17695,41

Malachy Devlin,
Co. Tyrone.

HEX AND BUGS

I am the author of the Dragon Disco Lights program *Your Computer*, vol 4, No. 9. I would like to point out that my name is Ross not Ron as printed. Also I believe there

QL: THE BBC STRIKES BACK

I must protest at the gross inaccuracies and untrue sections of Kathleen Peel's second look at Sinclair's QL in the July issue. I quote "... In hardware terms, the QL currently represents the ultimate in technical achievement in the (under) £400 range ..."

The BBC instantly springs to mind as a £400 computer; here is a comparison in hardware terms.

QL

Monitor and TV ports.
Up to 80K ROM.
Up to 640K RAM.
Up to 64 on network.
2xRS — 232 — 19200/9600 max.
2 x joystick port.

BBC

Monitor and TV ports.
Up to 256K Paged ROM.
Up to 16 megabyte RAM through Tube and 16032 second processor.
Up to 256 on network.
1 x LRS — 232 — 19200/19200.
Improved RS — 232
4 channel, 8 bit A/D converter.
1 Mhz Bus.
User port.
Tube interface.

The BBC is 1.5 times as fast as the QL. Now, which computer is the ultimate in technical achievement?

The QL may not have been on the market long, but the situation between the BBC and the QL currently is:

	QL	BBC
IEEE	Under development	two available
Modem	Under development	many available
Teletext	?	yes
Mhz bus	?	built in
User port	?	built in
Monitors	Special one needed	Any
Serial int.	2 x RS232	1 x RS432
Fastest TX	19200	19200
Fastest RX	9600	19200
Network	Does not work	Econet, E-net etc.
Max net users	64	256
IBM upgrade	no	yes
Teletext display	no	yes
Sound	?	4 channel, 8 octave
Max cols	8	8/16
Max res	512x256	640x256
Function keys	5	10 (40 with shifts)
Text	85x25	80x32
Fastest data transfer k/sec.	0.08	up to 62.5
Speech	no	yes
Languages	Super Basic	Basic, Forth, Lisp, Pascal BCPL.

The QL at this stage is totally outclassed, in every field. Given time, the QL will improve but for my money I'll take the BBC every time...

Stephen Corcoran,
Aylesbury,
Buckinghamshire.

is an error in the hex code; the line headed 24656 should read:
810B1027008620B6.

As I no longer own a Dragon I am unable to list this, but it should now be correct.

Ross Gardler,
Havel Grove,
Stockport.

NO COMPLAINTS

With reference to Mr Doug Bullen's letter in the September issue, I feel honour-bound to take exception to the statement that a computer's bugs are in direct proportion to the complexity and versatility of the machine.

I have owned a Memotech MTX-512 since November last year, and, to date, I have found no bugs. Perhaps the use of a Z-80A CPU, in Mr Bullen's opinion, places it outside the scope of a "versatile machine", or perhaps the inclusion of three languages resident in ROM, plus a front panel display and Logo-style graphics commands make it a little limited in his opinion?

D.J.W. England,
Wroughton,
Wiltshire.

Lines 10-170 of September's ZX-81 program were left out. They are supplied below:

```
5 REM BARREL-BARRAGE
6 REM MISSING LINES
10-170
10 CLEAR
15 DIM D$ (793)
25 PRINT AT 6,24;
30 POKE 16418,0
35 FOR A=1 TO 14
40 PRINT " ";
45 NEXT A
50 PRINT "
"; AT 5, 18; " "; AT 6, 12; "
55 PRINT AT 22,31; " "; AT
21, 31; " "
60 PRINT AT 0, 0; "SCORE:
000000"; "HI: 000000"; "
LIVES: 5
65 PRINT AT 18,22; "...."; AT
0, 0;
70 PRINT TAB 13; " "
80 PRINT TAB 13; " "
90 PRINT TAB 13; " "
100 PRINT TAB 13; " "
110 PRINT TAB 13; " "
120 PRINT TAB 13; " "
130 PRINT AT 1,19; " "
140 FOR A=2 TO 4
150 PRINT AT A,19; "H H H"
160 NEXT A
165 RAND USR 17130
170 STOP
```

Many people may have a problem when typing in the game, "Track Chase" which was published in the October issue of *Your Computer*.

In listing 1, lines 120 and 130 contain some funny characters which are difficult to obtain. The lines should be entered as follows:

■ Type the line in as shown with spaces instead of the inverted " " characters.

■ Cursor back over the spaces, press CTRL and RVS On and replace the spaces with shifted "M" characters.

■ Press Return.

The Rem statements in listing 1 must be typed in.

TILTING TRAINS THAT only work on straight tracks, Bristol Brabazons and failed perpetual-motion machines don't get much of a look in when it comes to histories of great inventions of our time.

Accounts of technological advancements are always about people getting it right first time or stumbling across something important like the theory of displacement in the bath.

It would be a shame if chroniclers of home computing paint a picture of soaring achievement when we all know the real landscape is covered with low points littered with dodos.

For example, whatever happened to the Haven colour board for the ZX-81 which offered Spectrum colour at a price you could afford? Our review in the July 1982 issue found that this product didn't quite live up to expectations: "The screen went fuzzy orange and no cursor could be seen... Waves of a darker colour advanced down the screen and rippled the whole display."

Haven pluckily pronounced this problem "unusual", and suggested that the colour board performed differently with different TVs: "This was confirmed by testing the board supplied with a Bush, a Sony and a Ferguson. The poor-quality picture mentioned was obtained with the Bush, but no colour picture could be obtained at all with either the Ferguson or the Sony."

However, an alternative was being advertised in the same issue: "Now you can add a coloured background to your displays!" What silicon trickery lay behind this breakthrough? Yes, you've guessed it: "High quality PVC in either blue or green. Only £2.95+pp per pack of two."

If these hardware pioneers stand head and shoulders below the rest, then Warp Factor Eight's popular add-on reached new heights: "Lift off into

'83 with Hi-Stak. It makes your computing easier, faster, more reliable, less exhausting and simply more enjoyable." In its day the Hi-Stak was the latest in lumps of plastic. For £3.95 a pair the Hi-Stak stick-on legs fulfilled the claims made for them in the adverts by propping up the Spectrum to a more ergonomic angle.

But software disasters have also played a major role in the alternative history of computing. Leaving aside Space Invader — where you endlessly destroy a solitary alien struggling down the screen — let us turn to another chapter.

Bridge Software's Vic Invaders, renamed "The massacre of the saucepans" in our June 1982 edition, was too easy: "The invaders do not advance, there are no mystery ships, the base at the bottom zips along at rocket speed, and the invaders do not speed up when only a few remain."

Alternatively, there was Petals Around The Rose: "a number guessing game with a difference — it does not tell you the rules" or Neme's pontoon program which did not recognise pontoon.

Computer manufacturers should also take their share of the credit. Remember Sanyo's enigmatic PHC range which appeared in October 1982 and disappeared again in November? Or the Grandstand Tutor, the Textet TX-8000 and the Comx 35, built around the RCA 1802 chip that was more at home in early guided missiles?

If you would like to nominate a product which you feel deserves a place in the home computing house of horrors, write in to "Off-white Heat", Your Computer, at the address below. We'll publish the worst of your entries, libel-lawyers permitting, and find suitably awful prizes for the winners.

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 listings 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 WOLPE
Assistant Editor
MEIRION JONES
Software Editor
SIMON BEESLEY
Production Editor
IAN VALLELY
Sub-editor
PAUL BOND
Editorial Assistant
LEE PADDON

Editorial Secretary
LYNN DAWSON

Editorial: 01-661 3144

Subscriptions: U.K. £12.50 for 12 issues.

Printed in Great Britain for the proprietors
Business Press International Ltd, Quadrant House, The
Quadrant, Sutton, Surrey SM2 5AS. Tel: 01-661 3500
Telex/grams: 892084 BIPRESG. ISSN 0263-0885.
Printed by Riverside Press Ltd, Whitstable, Kent, and
typeset by Instep Ltd, London EC1.

ABC

154,334

January-June, 1984.

Advertisement Manager
NICK RATNIEKS 01-661 3127
Assistant Advertisement Manager
NEIL MARCHANT 01-661 8548
Advertisement Executives
NIGEL BORRELL 01-661 3660
JULIAN BIDLAKE 01-661 8458
KAY FILBIN 01-661 8484
Northern Office
RON SOUTHALL 061-872 8861
Advertisement Secretary
MAXINE GILL
Classified
LUCY O'SULLIVAN 01-661 3036
Publishing Director
CHRIS HIPWELL

Group Advertisement Manager
SHOBHAN GAJJAR
Your Computer, Quadrant House,
The Quadrant, Sutton, Surrey SM2 5AS.
© Business Press International Ltd 1984

Icon worshippers thrill to Island music

NEW PROGRAMS rarely cause excitement in the *Your Computer* office but The Music System from Island Logic had BBC enthusiasts shrieking with delight as they danced around the filing cabinets. Not only is The Music System the most advanced music program on the market it also uses Macintosh-style icon graphics to control the various elements.

Part 1 of System comprises a Printer and an Editor which allows you to word process with music — writing notes on staves and modifying existing tunes. The Editor had four voices including on disc percussion, 15 sound envelopes, choice of notation and automatic barline creation.

The Printer generates four-part music manuscript from your files so long as you have a Centronics printer. Part 2 has a Synthesiser which creates 30 tones which can be simultaneously edited on screen and a Keyboard which in addition to allowing you to use your QWERTY as a piano keyboard also allows you to record four tracks. There is also a sound and song library.

Each part can be bought separately on cassette for £13 or together on disc with a separate library disc for £25. The disc system also has a Linker module which allows you to combine single files into one piece.

This is Island's first computer program despite the fact that the company has had a dozen programmers slaving away over hot micros for the last year. A Commodore 64 version of The Music System is on its way amongst other products.

Putting a real plastic piano keyboard on the 64 gives Commodore's Music Maker an immediate appeal. For £30 you get the synthetic ivories together with a music book and a tape or disc of software which allows you to simulate eight voices with instruments such as guitar, piano and synthesiser. Set rhythms for bass or percussion backing are also available.



At the touch of a button

WHILE SPECULATION continued on whether Sinclair would upgrade the Spectrum or go for a cut down QL — "there are as many opinions on what should follow the Spectrum as there are people at Sinclair" says Nigel Searle — there seemed little chance that he would remember to include an on/off switch. There is not even one on the QL. So in the short term TEC of 24 Victoria Road, Bromsgrove, Worcestershire, are selling £5 plug-in on/off switches which clip on the top of your Spectrum. TEC claims that this positioning does not interfere with interfaces — but the Alphacom 32 printer, for instance, will not fit with the switch, and the really bad news is that not only does the new Spectrum Plus have no on/off switch but TEC switch will not fit either.

Yashica YC 64 MSX clone

CALLING ITS first home computer the YC-64 is a certain way for Kyocera to get its new MSX micro into the pages of *Your Computer*. Kyocera which makes the Tandy lap held

computer amongst others is selling the YC-64 under the Yashica name which is better known in this country for cameras. The computer has the standard MSX bag of chips together with 16K video Ram and 64K system Ram.



YOUR COMPUTER TOP 20

Game	Company	Machine
<input type="checkbox"/> Arabian Nights	Interceptor	BBC
<input type="checkbox"/> Beach Head	US Gold	CBM 64
<input type="checkbox"/> Decathlon	Activision	CBM 64
<input type="checkbox"/> Decathlon Ocean		CBM 64
<input type="checkbox"/> Encounter	Novagen	Atari
<input type="checkbox"/> Football Manager	Addictive Games	BBC
<input type="checkbox"/> Frak	Aardvark	BBC
<input type="checkbox"/> Full Throttle	Micromega	Spectrum
<input type="checkbox"/> Jack and the Beanstalk	Thor	Spectrum
<input type="checkbox"/> Jet Set Willy	Software Projects	Spectrum
<input type="checkbox"/> Lords of Midnight	Beyond	Spectrum
<input type="checkbox"/> Match Point	Sinclair	Spectrum
<input type="checkbox"/> Micro Olympic	Micro User	BBC
<input type="checkbox"/> Monty Mole	Gremlin	CBM 64
<input type="checkbox"/> Psycho Shopper	Mastertronic	Vic-20
<input type="checkbox"/> Sabre Wulf	Ultimate	Spectrum
<input type="checkbox"/> Scrabble	Little Genius	CBM 64
<input type="checkbox"/> Tornado Low Level	Vortex	Spectrum
<input type="checkbox"/> Valhalla 64	Legend	CBM 64
<input type="checkbox"/> Zaxxon	Adventure International	Spectrum

Electronic books from Tandy will run on BBC

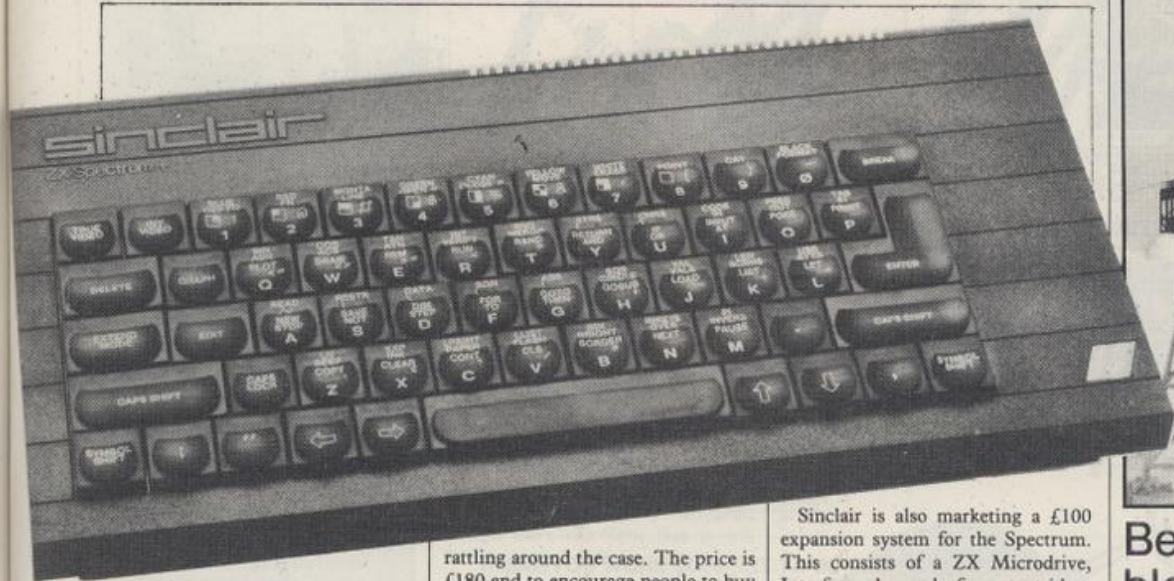
ONE OF THE strangest stalls at the Motor Show in Birmingham's National Exhibition Centre is Tandy and West Midlands County Council's joint effort. In case you need documentary evidence you can win an "I'm no Wally" certificate in a road safety competition.

Somehow this is supposed to

publicise Tandy's new electronic books which plug into the Tandy Colour Computer, or with an adaptor to a BBC Micro. The books have touch sensitive pages. A £20 music book called Professor Pressnote and a guide to the planets, Solar Explorer, which costs £17 are the first two releases.



New Sinclair looks like a sawn-off QL, performs like a Spectrum



SINCLAIR'S NEW Spectrum Plus or + as he prefers to call it is nothing more than a Spectrum in a new QL style box with realish keyboard and a reset button, plus six pieces of software Scrabble, Make a Chip, Chequered Flag, Chess, Vu-3D and the Tasword 2 word processor.

The keyboard is described as "professional" but despite company claims that Sinclair was "very keen to have a robust keyboard" ours had been amateurishly put together — several keys had fallen off and were

rattling around the case. The price is £180 and to encourage people to buy the Plus rather than the standard 48K Spectrum the free software deal with the standard Spectrum will be discontinued in the next few weeks. The good news is that thousands of Pluses have already been built so this time there should be no "coming soon — 28 days and counting" saga.

16K Spectrum production is increasingly aimed at overseas markets but Sinclair claims that there are no plans to stop production of the standard machine. Sinclair will be making 200,000 computers a month this winter.

Million pound bait one that got away

"EVERYONE'S JUMPING on the one million pound bandwagon" is Commodore's excuse for launching Spirit of the Stone — a treasure hunt

for the Commodore 64 with a potential seven figure prize for the winner.

The £15 program and book set contains a series of arcade games which gives clues to the whereabouts of 40 talismen hidden on the Isle of Wight, each containing a single diamond. Commodore is putting 50p into the royalty fund for every cassette sold — the fund will be closed when all the talismen have been discovered or when the fund reaches £1,000,000 or failing that in 1993. Program crackers may well have an advantage over those who stick by the rules. Short of the Isle of Wight slipping silently below the waves of the Solent during an earthquake the talismen will be found well before 1993.

The million pound target is equally unlikely to be met — Commodore would have to sell more copies of Spirit of the Stones than all the 10 best selling computer games so far put together.

Not the right Habitat

IMAGINE BUYING a computer sprayed a tasteful primary colour or perhaps covered in raffia. Habitat carried out a feasibility study but decided that computer fanatics were boring people who were not prepared to pay more for trendy looking micros.

Expansion is kids' stuff

REMEMBER My Talking Computer — now there is a new £18 120K expansion module for it which contains music, sentence making, digital time, alphabet colour, shape and size amongst its programs.

Sinclair is also marketing a £100 expansion system for the Spectrum. This consists of a ZX Microdrive, Interface 1, and four cartridges including an Introduction to Microdrive use, two "business" programs, Masterfile and Tasword Two, a blank cartridge and two of the best fun programs Ant Attack and Games Designer.

One final advantage of the Plus is that is that it is the first Sinclair that can stand on its own feet. The retractable legs give you a proper keyboard angle. The original Spectrum had none and the QL's continually fall out.

Christmas is cancelled

CHRISTMAS IS CANCELLED this year and that's official. Well the *Your Computer Christmas Fair* is anyhow. The Fair which was scheduled for November 30 through December 2

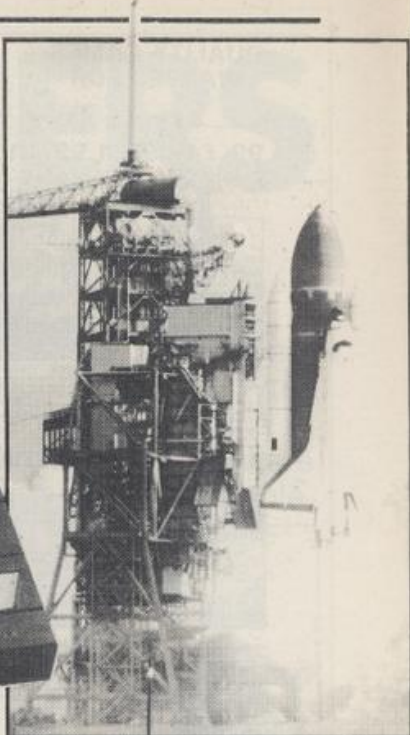
Be there at blast off

SPACE SHUTTLE computer malfunctions permitting three kids will win a chance to watch a space shot from Cape Canaveral next year.

Monitor maker Microvitec is sponsoring a Cub British Schools National Computer Challenge open to teams of three contestants who must be 16 years old or less. The winners will have an all expenses paid five day trip to Florida including the shuttle launch.

at Olympia has been cancelled because most of the games and computers which used to be mail order are now available through high street shops.

From the outside it looks like a perfectly normal £40,000 Aston Martin Tickford Trekker van but another way of looking at it would show you that it is the most expensive Apple Macintosh on four wheels. At the centre of the van sits a Mac with printer surrounded by the sort of accessories every computer user has come to expect — radio phones, drinks cabinet, raised roof viewing platform, sink, stereo, drinks cabinet and swivelling leather chairs.



**SPECTRUM, ATARI
CBM 64, VIC 20,
DRAGON 32
SEND NOW!**

ANNOUNCE THEIR OWN POCKET MONEY RANGE. MORE FUN AT LESS PRICE



CASEY JONES — Here is your chance to fly a piston engine, not only does this mean fly but also it has an unlimited supply of navigation needles.

Your mission: To go further than any mail has gone before, 10 weeks.

CS 5



MISSION ATTACK — Try your hand at flying a Harrier jet from an Air Craft carrier at sea, taking on crack pilots and missiles. Then on to your mission over land. **E1.3**

BLABY COMPUTER GAMES, CROSSWAYS HOUSE, DEPT YC, LUTTERWORTH ROAD,
BLABY LEICESTER. TELEPHONE 0533 773641 TELEX 342629 JRHHG



I could do that...

For this month's competition we would like you to write a Basic Fill routine. It should accept two inputs — giving the x and y co-ordinates of a point within an enclosed shape — and then proceed to fill in all the pixels within that shape. To make your task easier the routine only needs to handle convex figures — that is, figures whose outlines do not "turn in".

Perhaps the simplest approach to the problem is to move from top to bottom filling in horizontally up to the left and right outline. Another possibility is the "grass-fire" method where you spread out in all directions from the centre, keeping a record of filled pixels in an array.

Whatever approach you adopt you will need some way of detecting what is on screen. Spectrum and BBC owners can use the Point command while Commodore owners will have to Peek the screen memory. On the ZX-81 you can use PEEK 16396 + PEEK 256*16397 to find the start of the display file.

In awarding the £15 prize we will be looking for programs that do the job quickly and in as few lines as possible. Obviously if your machine already has a Fill command we expect you to ignore it.

September's competition asked you to write a program which would conduct a conversation between you and your machine. Some highly amusing conversation pieces were sent in. Typically the dialogue took an abusive turn with the computer heaping scorn on human intelligence. Most of these were, unfortunately, too long to print. Although the programs kept within the 20-line limit their Data statements were massively long.

Instead we plumped for a mini-version of Animals by Andrew Babbington, 31 Glen Iris Avenue, Canterbury.

BEGINNERS

first bytes

Starting out in home computing? First Bytes is for you. Just write to

Your Computer with any hardware or software problems, no matter how small or simple.

Robots

EVERYBODY KNOWS what a robot is. It is a machine with arms and legs and a tinny voice. If it is really good, it might make it into the android class. That, anyway, is the picture most people have from films and books. The reality is slightly different, though there are signs that it will become just as exciting over the next few years.

Surprisingly, the idea of a robot has been around for more than 60 years. The word was first used by the Czech playwright Capek in his play *Rossum's Universal Robots*. Robot comes from a Czech word meaning "work". The next landmark was in the 1940s, when the American writer Isaac Asimov formulated his three Laws of Robotics:

- A robot may not injure a human being, or through inaction allow a human being to come to harm.
- A robot must obey the orders given to it by human beings, except where such orders conflict with the First Law.
- A robot must protect its own existence as long as such protection does not conflict with the First and Second Laws.

Robots became a reality in the 1950s. They usually consisted of hydraulically controlled arms that performed a fairly simple task again and again, without variation.

In many ways, these first robots were simply glorified pieces of machinery that you might find on any

I'M NICKING YOU FOR BREAKING THE FIRST LAW OF ROBOTICS.



Andrew Babbington's winning mini-version of Animals.

```

100 DIM A$(512)
110 LET A$(1)="fox"
120 LET N=1
130 PRINT "Think of an animal..."
140 IF A$(2*N)<>" " THEN GOTO 250
150 PRINT "Is it a ";A$(N)
160 INPUT X$
170 IF X$="yes" THEN PRINT "One up to me!!"
180 IF X$="yes" THEN GOTO 120
190 LET A$(2*N)=A$(N)
200 INPUT " Then what is it";A$(2*N+1)
210 INPUT " Give me a question that would be true f
or a "
220 PRINT " ";A$(2*N+1); " but is false for a ";A$(2
*N); " ..."
230 INPUT A$(N)
240 GOTO 120
250 PRINT " ";A$(N);
260 INPUT X$
270 LET N=2*N + ABS(X$="yes")
280 IF N<256 THEN GOTO 140
290 PRINT " Too much, I quit!"
    
```

assembly line. The big breakthrough came when the newly-developed computers were hooked up to robots. This gave them a certain life of their own and brought them one step closer to the all-singing, all-dancing metalman.

A true robot has three basic properties. Apart from the mechanical

(continued on page 47)

More exciting games for your ZX

Athlete

So you didn't make the Olympics? No wonder, there's a selection of track and field events where you can show the selectors how you compare against some tough opposition. Sports (100m & 400m), Hammer Throw, Hurdles (110m & 400m).

Super Bridge

For beginners and experts alike. Designed to give above a range of players a good run for their money and to give beginners an excellent introduction without the worry of an impatient partner.

Make Music

A music synthesiser program designed to compose 3-part harmonies when used with the Zin, Filler and Timedate sound bases or any other using the AY 3-8912 chip where the 'OUT' command is known. (Bridges) ZX Computing



Buffer Adventure

Featuring the real life characters who work at Buffer Micro. Does your answer to the mystery behind the shop? Are the people who serve you quite as weird as they seem? An amusing, puzzle-like adventure.

Mysterious Fairground

All the fun of the fair, plus unimaginative horrors in the House of Horror and the Ghost Train before you can find the five pieces of treasure hidden somewhere in the Fairground.

Pools Predictions

Score draws, no score draws, home and away wins in this most diverse program to help you fill in that racing coupon. English, Scottish, Irish and Australian leagues for all your round-robin needs.



Racing Predictions

Cover in the flat racing season at the touch of the keyboard - all the major courses covered in this very friendly prediction program. Pick the first three home with confidence - not a pun!

Card Games

CRIBRAGE is the most fascinating of the series, produced in response to Crisbridge's address requests. Also in the same category are PAIRS, RINOC and PATIENCE.

Loony Bin

Mad adventure requiring cool logical thinking to escape from the asylum and travel the world following the clues. Uses all but 8 bytes of the Spectrum's 48k memory.



All prices include VAT. Add 75p p&p or call in person at Buffer. Trade enquiries welcome. Visa, Access, American Express, Diners Club.

Please send me the following games:

- ☐ Athlete ☐ S. Bridge ☐ Music ☐ Adventure
☐ Myst. Fair ☐ Pools Pred. ☐ Racing Pred
☐ Card Games ☐ Loony Bin

Name _____

Address _____

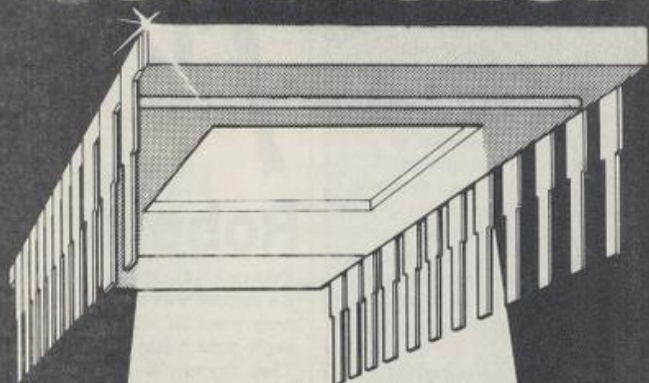
I enclose cheque/PO for

£ _____ YC

FREE
Blank Tape
with
every
purchase

BUFFER MICRO SHOP
310 Streatham High Road London
SW16 6HG Tel: 01-752 2887
Open Times: Sat 10.30-5.30
(Closed Mon)

The Complete Machine Code Tutor



Trust New Generation to strip the mystery away from Machine Code. Now the Complete Machine Code Tutor makes learning machine code simple so there's never been a better time to discover the really great benefits of machine code programming - see what the press says.

“A colourful, clear, interactive computer teaching package - the best I've come across in any field.”
Jan Watterson
Popular Computing Weekly

“This pair of tapes forms a worthy addition to the range, giving a thorough exposition from the most elementary level of machine code programming on the BBC Micro.”

Which Micro & Software Review

“The best machine code tutor and no serious Spectrum programmer should learn machine code without it.”

Crash

“By far the best attempt comes from New Generation Software who has recently issued its Complete Machine Code Tutor for the BBC and the Spectrum.”

Popular Computing Weekly

“New Generation have got a very nice product here. It's well thought out, easy to use, aesthetically pleasing, and (as far as I could tell) bug-free and crash-proof.”

“Overall then, an excellent idea, well executed.”

Computing Today

Supplied with full notes, this package teaches machine code the way it should be taught - at your own pace and actually from the microcomputer, not from a book. You learn programming the professional way, plus a few tricks of the trade. Available from all good computer stores at £14.95.



New Generation products are sold according to their terms of trade and conditions of sale.
FREEPOST, Bath BA2 4TD. Tel: 0225 316924

First Edition of New Generation Software is available from other computer shops and is larger in volume.

WHSMITH John Menzies

WOOLWORTH

SPECTRUM

PRIDE

(continued from page 45)

side of things you need some sort of sensory device to tell you what that mechanism is doing, for example how far it has moved its arm. Then you need a computer to analyse that information, decide what to do on the basis of it, and instruct the mechanical parts accordingly.

The same basic principles apply to home robots. To qualify for membership of the robot club, they need some kind of mechanical action controlled by a computer that can react to the outside world. Mechanical action includes simply moving.

Perhaps the simplest examples are some toys from Prism. These micro-robots respond to sound or infra-red light by hopping or wheeling along. In this case the mechanical element is slight, as well as being pretty useless, so the computer power is also small. But they do fulfil all the requirements.

More sophisticated home robots include models like Hero, Topo and RB-5X. They are also rather more expensive, costing up to £3,000 – so robotics has a long way to go before you can buy the equivalent of Sinclair's £100 Spectrum micro.

Topo is actually more of a robot peripheral than a true robot. It has no independent computational power on board, but is controlled via infra-red signals from a standard Apple II

computer. Topo has a younger brother called Fred who is even dumber – aren't they all? He can just about manage to hold a pen and draw with it, which is hardly in the R2-D2 class.

Hero and RB-5X are very similar to each other in design. They both have an on-board processor, a robot arm, and various sensors. Hero has a sound sensor and a light sensor. RB-5X also has bumper devices around its base to detect collisions. Both machines can be programmed to respond to feedback from the outside world.

For example, you could get the robot to move around a room, manoeuvring its way as it bumps into objects. It could then store the layout of the room and the objects, and so avoid them in the future. Or you could program it to move towards the brightest light in the vicinity, or even to the nearest human being, using its infra-red sensors to detect heat given off. Eventually robots could be used in the home as untrusting watch dogs, responding to the slightest noise, light, or heat from human bodies.

The big breakthrough in home robots will come when they can respond to spoken commands. After all, it's not much fun having a robot do everything for you if you first have to program it in machine code. The first few steps have been taken in this

BEGINNERS

first bytes

direction. For example Hero has a voice output facility which allows you to create words and sentences.

The home robot has some way to go before it is an everyday sight, but some people think that the situation now is rather like that of micros about 10 years ago. The models that are around are crude and not very powerful, but with great promise. So far it has been hobbyists who have bought them, quite content to get down to the nuts, bolts and chips level. But the next generation of machines could be as cheap and as useful as micros are today.

If you want to get a taste of this world, but can't quite afford the £1,600 for Hero in kit form, there is an alternative. For some years now, the micromouse competition has been

flourishing in this country and abroad. A micromouse is a small powered device with sensors and an on-board computer, that tries to find its way to the centre of a maze. It is, in fact, a fully fledged robot.

To build your own, you could do worse than follow the example of Alan Dibley, the U.K.'s leading micromouser. He uses plywood, balsa and card for the chassis, infra-red detectors and old Sinclair computers – literally sawn-off to fit on the wheeled assembly.

A micromouse competition is held each year at the Earl's Court Computer Fair in June. Alan usually wins. If you feel like challenging him, you can obtain more details of the micromouse competition by writing to John Billingsley, Department of Electrical and Electronic Engineering, Portsmouth Polytechnic, Anglesea Road, Portsmouth PO1 3DJ. Entry is free.

Speech synthesis/recognition

MOST HOME COMPUTERS will make a noise at you if you try hard enough. Some, like the BBC Micro, have a full three channels of music to serenade you with. Making your micro talk is a little harder, but by no means impossible.

As with most things to do with computers, the secret is to spoonfeed it. Words are broken down into their basic components. The micro then produces each of these, one after another. The fundamental elements of spoken words are called phonemes – hence the saying "don't phoneme us, we'll phoneme you".

For example the word "speech" has five: one each for "s", "p", "ee", "t" and "ch". It is relatively straightforward to program a micro to accept words broken up into these elements, and then to produce something like the right sound. The effect is the "I am a Dalek" sort of voice. Speech synthesis units are available for many micros including the Spectrum and BBC.

To get a micro to produce spoken output directly from the word itself is much harder. At the moment only relatively large systems can even begin to try to cope with the problems.

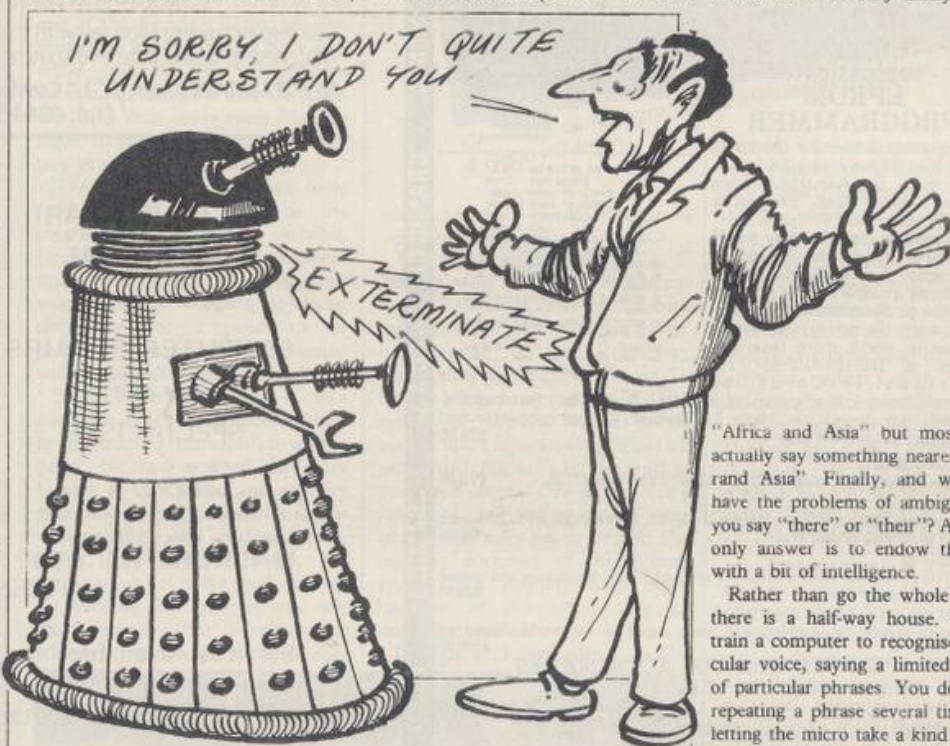
These are easy to describe and difficult to solve. Basically the spelling system of the English language is a mess. Just consider the group of letters "ough". How is a computer to cope with pronunciations as different

as "though", "rough", "bough", "thorough" and "through" – not to mention "hiccough", pronounced "hiccup"?

The answer is that the computer has to do it the way we do it, by the context of the surrounding words. This leads us into the realms of Artificial Intelligence, and an area where research is only just beginning to produce results. Clearly, though, the benefits could be enormous. For example it would be easy to adapt any program to work with the blind,

giving verbal messages or warnings. It would be possible to scan a printed document or book and have the micro "read" it out, doing away with the need for costly Braille books.

If a computer could give spoken messages, it would obviously be convenient if it could also obey spoken commands. The difficulties here are even greater than with speech synthesis. First there are technical problems of picking out the speech from the background noises. Slurring is a problem too. You may think you say



"Africa and Asia" but most people actually say something nearer "Africa and Asia". Finally, and worst, we have the problems of ambiguity: did you say "there" or "their"? Again, the only answer is to endow the micro with a bit of intelligence.

Rather than go the whole AI hog, there is a half-way house. You can train a computer to recognise a particular voice, saying a limited number of particular phrases. You do this by repeating a phrase several times, and letting the micro take a kind of audio average of the sound. This is stored together with the appropriate command it represents. When a spoken phrase matches this average closely enough, the micro will respond by carrying out that command.

Apart from the difficulties of distinguishing similar sounds, there is also the slight problem that this system only responds to the basic words it knows. So "delete" and "don't delete" will have the same effect on your precious files. Which is why you really need to give your micro that bit of intelligence.

CAMEL PRODUCTS

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

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

A brand new Spectrum programmer for 2764/128. Zero insertion force socket & software on tape. £29.95

PROMER-81-S

The very popular PROMER-81 for the ZX81 has been adapted to the Spectrum and the price kept low. NEW PRICE £24.95

ROM-81

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

A low cost reliable programmer for 2516/32, 2716/32 EPROMS. Requires 4xPP3 batteries. NEW PRICE £24.95

DHOB1

Compact. Mains powered. Safe. Fully cased. Up to 3 EPROMS. UV ERASER £18.95

DHOB2

With automatic timer £22.95

CRAMIC-SP

Ingenious software paged 16K non-volatile CMOS RAM to co-exist in the same area as Spectrum ROM. Easy storage and retrieval of BASIC, M/C or DATA on a 48K Spectrum £29.95

PRINT-SP

Centronics Interface with standard centronics Cable. Plus free introductory offer SP WRTIE text processor. £31.25

NIKE

Simple to use, rechargeable nickel-cadmium back-up power supply unit providing OVER 30 minutes extra life in the event of mains failure. £17.35

BLOPROM-SP

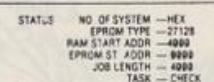
A uniquely

sophisticated

EPROM

PROGRAMMER

Eprom programmer for the 2516, 2716/32/32A/64/64A/28/128A, yes even the 64A/128A 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-SP. No Personality Cards, or other additions, just a Spectrum. Several inbuilt safety features. On-board Vpp generation. 28pin ZIF socket. Cabled connector and extender plug. ABS case. £29.95



STATUS NO OF SYSTEM — HEX
EPROM TYPE — 27128
RAM START ADDR — 4000
EPROM ST. ADDR — 8000
JOB LENGTH — 4000
TASK — CHECK

WHICH TASK DO YOU WISH TO DO
W) CHECK THAT EPROM IS CLEAN
X) READ THE CONTENTS OF EPROM INTO RAM
Y) BLOW AN EPROM WITH DATA FROM RAM
Z) VERIFY THAT EPROM DATA IS THE SAME AS IN RAM
Q TO QUIT R TO RESTART

FAST CODES AVAILABLE
D FOR WXYZ

As above but for ZX81. Programs 2516, 2716/32/32A/64 & 27128 £79.95

DREAM-81

64K Rampack with link options to disable 0-8-16K. Plus a 28 pin EPROM socket for 2716, 2732/2764 and 27128. £59.95

MEMIC-81

4K CMOS RAM with lithium battery. Easy SAVEing. 10yr storage and instant retrieval of programs. £29.95

INTRODUCING MULTEPROM

The most economical, sophisticated gang copier in the world. Based on BLOPROM £199.95

PRINTER/MONITOR ACCESSORIES

MSB Monitor Stand for BBC

17"x12"x3.75" £19.95

P&P £3.50

PSS Standard printer stands for OKI.

Epson etc. 15"x12"x4.5". P+P £3.50 £16.95

PSC-3 for Epson MX-100

etc. 21"x14"x3.75". P&P £3.50 £22.95

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% TLX 81574 CML

Cambridge Microelectronics Ltd. One Milton Rd. Cambridge CB4 1UY Tel: 02231 314 514

★ NOW AVAILABLE FOR THE AMSTRAD CPC 464!!

WIN THE POOLS?

SPECTADRAW 3 — THE LATEST VERSION OF THE ORIGINAL AND BEST POOLS PREDICTION PROGRAM FOR THE 48K ZX SPECTRUM!!

AND NOW ... AMSTRA-DRAW — THE FIRST POOLS PREDICTION PROGRAM FOR THE AMAZING NEW AMSTRAD CPC 464!!



- Supplied with Database containing data on over 10,000 matches since 1980!
- You update the Database each week — but no tedious typing, as team and division names already in program!
- Errors easily corrected — the program even checks your entries!
- Comprehensive instruction manual and menu driven program — easy to use, even for a newcomer to computing!
- Will forecast the least likely draws for those who prefer to bet on fixed odds!
- Built in perm generator — complete your coupon direct from the screen!
- Fully microdrive compatible! (Spectadraw only).
- Compatible with Currah Microspeech — the first pools program to read you its predictions! (Spectadraw only).

Spectadraw 3 for the 48K Spectrum£9.95 inclusive

Amstra-Draw for the Amstrad CPC 464£9.95 inclusive

(Cheques/P.O.s payable to B. S. McALLEY)

We dispatch every Monday with the database made up to include all matches up to the date of dispatch.

SPECTADRAW (Dept YC), 1 Cowleaze, Chinnor, Oxford OX94TD.
(Tel: 0844-52426)

SINCLAIR, ATARI

COMMODORE

COMPUTER REPAIRS

by the

SPECIALISTS



Walkers
COMPUTER SERVICE
AND REPAIRS

Telephone: (021) 643 5474

Telegrams

Shiplog Birmingham

Telex 337124 TWSLOG G

WALKERS will repair your MICRO quickly and efficiently.

Services available to suit the Customers requirements include "one-off" repairs and Quotations.

Most Repairs will be in the range

£15 to £30

subject to machine

FOR INFORMATION

PHONE 021-643 5474

CALL IN AT

58 OXFORD STREET, BIRMINGHAM, B5 5NX

OR SEND S.A.E. FOR DETAILS

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

Local news

Leytonstone

The East London Amateur computer club has catholic tastes; it caters for all micros, from Nascoms to Apples. It meets on the second and fourth Tuesday of each month. The venue is the main hall of the Harrow Green Library, Leytonstone. Interested parties should ring Fred Linger on 01-554 3288.

Orpington

State-of-the-art Orpington Computer Club can be contacted on Mailbox No. 068931263, or further details can be accessed on Clubspot 800 on frame 800841142. However, if your technology is still firmly rooted in the past you could always try phoning Tony Self on 0689 31263. They meet at Christchurch Hall in Charterhouse Road, Orpington every Friday. The club caters for a wide range of machines and interests.

Congleton

Congleton and District Computer Club meets on alternate Mondays at "Heather Brae", Sandbach Road, Congleton. Hardware and software discounts are available to members and a wide range of projects are under way using BBCs, Spectrums and Commodores. Contact Tony Harratt on Cheshire 6758.

Chinor

A new user group has been set up in the Chinor and Thame area of Oxfordshire. Users of all ages and machines are welcome. The group organises lectures, competitions and games evenings. It also hopes to start a library. It meets every other Thursday at Mill Lane School Hall, Chinor. Further details from Bryan McAlley on 0844 52426.

COMPUTER

club

Lee Paddon finds himself depressed in an out-of-season Southend-on-Sea until he discovers the secret of BBC's Elite at the local computer club. Perhaps he could give Simon Beesley some tips — see page 60.

SOUTHEND-ON-SEA can be a depressing place out of season. The still-lit illuminations glare mournfully down on any remaining tourists who might have got the month wrong and still be found wandering along the seafront.

Just a few yards along the seafront from the pier stands the Esplanade Hotel, looking suspiciously like a large pub. It is also the home of Southend Computer Club which can be found by entering "Go North" after you reach the bar.

Robin Knight is the chairman and one of the founders. The club was formed back in the low-res black-and-white days of 1979 when Acorn Atom's and TRS80's were the staple diet. The club meets every Monday night from 7.30 to 10.30 and has now grown to 86 members.

There was nearly as much noise coming from the club as the neighbouring amusement arcades. Decathlon is popular at the moment and several young Olympic hopefuls were furiously waggling joysticks; definitely not a game to be undertaken without rigorous training and a thorough medical beforehand.

Simon Rush was showing a clean pair of heels or a deadly pair of lasers to all comers in Acornsoft's new Elite game. He had attained the dizzy heights of competent, and a pretty gruesome array of accessories for his ship with three days continuous play. "Well, two-and-a-half really, my Saturday job got in the way". His tip for budding Elite players was very much down to earth: "Save the game whenever you dock"; even the aces



Chris Pitt demonstrates his insurance quotation system based on a Galaxy 3 micro.

sometimes need a quick spot of reincarnation.

Robin Knight explained "a lot of games playing goes on at the moment but we hope some more serious work can take place once we move to our new venue at the Rocheway Community Centre. They've got 13 BBCs hooked up to an Econet system. We can also lock the games players into a separate room while we get on with the more serious stuff in peace and quiet." One of the club's first jobs will be to write some educational software to exploit the teaching potential of the Econet system and possibly help other members of the centre take an interest in micros.

Enough of future plans. At the

moment the club struggles along with a collection of black and white T.V.'s and a large toolbox. However, this lack of equipment was made up for by the members who seemed to favour disc drives.

This apparent affluence might have something to do with Steve Sullivan, one of the club's founders, who runs a local shop called Estree Software which offers generous discounts to club members.

There was a notable lack of copying going on. Robin Knight explained "At the last meeting we decided to outlaw it. We simply switch off the computer of anyone seen doing it. This seems punishment enough as it takes a fair amount of patience and hard work to copy a program."

Away from the games players, Stig was demonstrating his dexterity with a screwdriver and a soldering iron as a tape recorder underwent emergency surgery. By the end of the evening the patient was alive and well again and demonstrating a program analysing Stig's taste in contemporary music in terms of a line wandering around a telly screen driven through his Spectrum's ear socket. "I started mending really old tape recorders but my Mum decided I should get up to date and so she bought me a copy of *Your Computer* — the first time." Needless to say Stig has never looked back.

For more information about the club, contact Robin Knight on Southend-on-Sea 335747.



The Spectrum section in full swing — the game's the thing.



FOR DRAGON AND TANDY USERS

**SATURDAY 17TH AND SUNDAY 18TH NOVEMBER
10 A.M. UNTIL 6 P.M.**

THE ROYAL HORTICULTURAL HALLS

If you own a Dragon or Tandy colour computer this is *your* show.

The *first ever* show organised in the United Kingdom for these machines.

All the very latest *hardware, software, interfaces and peripherals* will be there. Your chance to get up to date, try and buy all *that's* new.

We'll also be organising events and competitions with *great prizes*. The manufacturers will be staffing *advice centres* to help with all your queries.

Exhibitors will have *special offers* on their products so you can *save money* too!

Large gangways and comfortable rest areas will make sure you can see everything and sit in comfort when you want.

This will be a show for the *whole family*, plenty to see and plenty to do.

If you want to miss the queues just clip the coupon below.

Computer Marketplace (Exhibitions) Ltd. Part of the Rushworth Dales Group, 20 Orange Street, London WC2H 7ED.

HOW TO GET THERE

The Royal Horticultural Halls are just off Victoria Street a few minutes walk from Victoria or Parliament Square.

Buses 11, 24, 29, 70, 76 and 88 run up Victoria Street.

Mainline stations; Waterloo, Charing Cross and Victoria.

Underground stations; St. James park (District and Circle lines), Victoria (District, Circle and Victoria lines).

There is an NCP car park in Abingdon Street, a few minutes away.

To: Computer Marketplace (Exhibitions) Ltd, 20 Orange Street, London WC2H 7ED.

Please rush me _____ (qty) adult tickets at £2 each and _____ (qty) tickets for under sixteen year olds at £1 each for the 6809 colour show. I enclose cheque to the value of £_____

Name _____

Address _____

Postcode _____

Telephone _____

6809 is the registered name of Motorola Ltd.

Star★ chart

Battle of Midway

PSS
Wargame
CBM-64
£9.95

★ ★
A flawed attempt to recreate the famous Battle of Midway. All you have to do is sink the four Jap carriers and they all troop off the map, victory to you! Well, that's the idea. So how come after sinking four carriers you then get hit by their aircraft and lose the game? Some nice touches of presentation, easy to order units Eastern Front fashion, but fatally flawed as a simulation.

H.E.R.O.

Activision
Shoot'em-up
Spectrum
£9.99

★ ★ ★ ★
Assuming anyone ever goes down a coal mine again, you may be called upon to rescue them if they get trapped. Our hero has to drop down mine shafts, blowing up a wall here, zapping a nasty spider there, and so on till he saves his man. Sounds simple enough, and it is to start off with. However, each successive shaft is harder. In some the walls are deadly, in others you can't even see the walls!

Ancipital

Llamasoft
Arcade Adventure
CBM-64
£7.50

★ ★
A silly scenario. A crack squad of Ancipitals have to go around breaking down walls whilst various other things try to stop them. There are 81 rooms in all. Fast, with good graphics and sound. Not terribly original, but enlivened by the usual Jeff Minter humour. The way you knock down walls changes with every room, movement and firing is a bit tricky.

SOFTWARE

Interdictor Pilot

Supersoft
Commodore 64
Simulator
£17.95

★ ★ ★ ★
SIMULATOR AFFICIONADOES need no longer feel earthbound. Interdictor Pilot claims to give you all the thrills and spills of zapping aliens plus have all the usual features you'd expect from a simulator.

Be warned, however. This is not the sort of game you get to grips with in an afternoon; the 50-page pilot's manual gives that away.

In order to keep down the body count, you are thoughtfully provided with a simulator with which to practice zipping around the cosmos. The simulator even allows you to slow things down and freeze the enemy while you walk up to him and shoot him. This thoroughly unsporting option didn't seem to work on the review copy.

Still, being unsporting and underhand is something you learn all about in this game. You have a device called a transponder which identifies you, and you to your enemy. However, interdictors have the ability to change their call sign. So the idea is to slowly move up to the unsuspecting enemy, then give

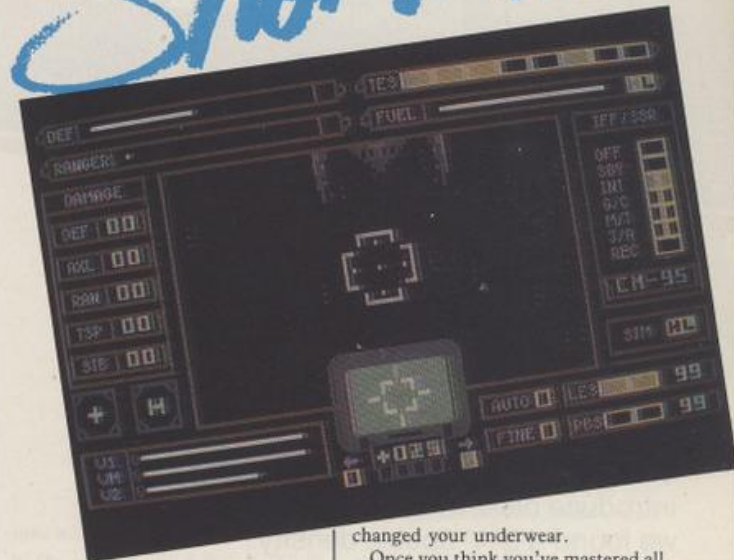
Deus ex Machina

Automata
Spectrum 48K
Unique
£15.00

★ ★ ★ ★
HOW DO YOU start to review this game? With most, you say its similar to A, or an enhancement of B; but this game is just unlike anything you've seen before, there is no reference point.

The plot goes along these lines. Just before the last mouse on earth died, it climbed into this machine, and had, well, a slight accident. You must, as some kind of life force within the machine, guide this accident through to becoming some sort of life form. Weird, huh? All this is done in synchronisation with a sound track which features such luminaries as John Pertwee, Ian Dury and historian and nuclear disarmament campaigner E.P. Thompson. John Pertwee is the main narrator, and guides you through the game with a sort of space-age version of The Bard's Seven Ages of Man.

During each of these seven ages, some ill will assail your little accident as you guide it through life. How well you cope with your task is reflected in your rating which you



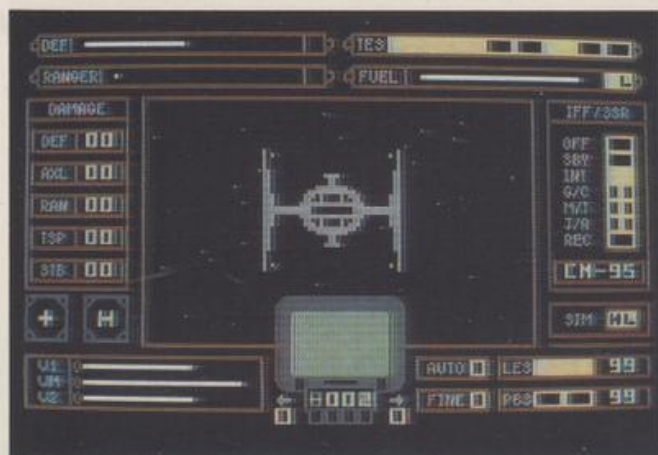
him a quick blast up the rear shield. Works every time, unless that is he does it to you!

Like any simulator worth its salt, there are plenty of controls to play with and instruments to watch. You have 20 controls to play with and a dazzling array of instruments which tell you everything from the I.D. of the nearest ship to the day you last

changed your underwear.

Once you think you've mastered all this in the simulator, you get on with the real thing, life and death stuff.

Having zapped all the bad guys, now you get the hard part. Between you and getting some shuteye at the local spacepost are the automatic space station defences — and boy, are these lads jumpy. Your course, speed and transponder must all be correct or it's curtains.



take on with you to the next section of the game. Eventually it is hoped, you will make it to the end in some kind of shape, expressed as a percentage.

The graphics in this game are quite outstanding, considering the limitations of the machine and really add to the overall flavour of the game.

Automata have without doubt produced something which is totally original here which might just give the software industry the creative jolt it so badly needs. Non-sexist, non-racist and non-violent: it should have come with a 'G.L.C.-approved' label. No longer

is it the mind-numbing business of going about slaughtering anything in our path, before it kills us, the mentality induced by many games. This game is trying to show how the computer game can be a stimulus to the imagination. I just hope they don't start interviewing computer programmers like pop stars: "Could you explain the meaning of your latest game to our viewers?" stuff.

It certainly is a very enjoyable game, however, it may not be the sort of addictive game you play hour after hour.

Few computerniks will be able to resist playing God with their machine.

The best name in memory is now also the best name on record...

You no doubt know our name for disk drives. We've spent years on research, development and marketing a range of drives second to none. A logical extension for us was to introduce diskettes. Only when we found a 5¼" double density diskette up to our stringent quality control requirements, and at a price that made sense to the end user, were we ready to put our name to it.

This is the result, a diskette of top quality, complete with a plastic protective case for the ten-pack (we also sell them individually!) together with index stickers.

Cumana diskettes are available now, as single or double sided 40 or 80 track, from your local computer dealer. Don't trust it to chance, go for the best name in memory...



Cumana Ltd., Pines Trading Estate, Broad Street,
Guildford, Surrey, England, GU3 3BH.
Tel: Guildford (0483) 571666. Telex: 859380.



Star★ chart

Star Commando

Terminal Software
Amstrad CPC-464
Shoot 'em-up
£8.95

★ ★

If MAT is an example of the evolution of a game, I'm afraid I have to say that Terminal Software's Star Commando is an example of relative degeneration. The highlights of this program for me was entering a sector on which no data was available and being attacked by a bunch of giant strawberries. This is yoghurt making on the grand scale. As a conventional shoot-'em-up, it's fine.

The screen shows a head-on view of attacking aliens, together with power, score and danger level displayed in a square at the base of the screen. The long-range scan option is just a disguised way of opting for different screens and strategy does not come into it. Frankly it's hard to see how a galaxy run by giant strawberries could be any worse off than it is already.

Roland in Time

Indescomp
Amstrad CPC-464
Platform game
£8.95

★ ★

Roland In Time from sunny Spanish software house Indescomp is an Amstrad original. Sadly it's not all that original and the graphics are not as interesting as the company's implementation of Roland on the Ropes — or Fred, as he is known on the Spectrum.

A timewarp facility catapults you into different frames of a ladders-and-levels game. The frames have titles like "Roman Fort", "Njorl's Dragonboat", "Seen my Ballista?" and "West of Dome 9". You move around picking up power pills and trying not to bump into nasties.

American Football

Argus Press Software
Spectrum 48K
Sport simulation
£9.99

★ ★ ★

AMERICAN FOOTBALL simulations have been around almost as long as Lunar Landers and Hammurabis. Essentially, this offering from Argus Press is simply a refinement of this hoary old classic with some nice touches and pretty graphics thrown in.

The instruction book contains the basic rules for American football, along with a phrase book to explain the essential slang of the game to the ignorant Limies. Then on to the game proper with an explanation of what to do. The game can be played against the computer or by two humans. The attacker selects a play in secret and then the defender enters his play. By comparing the two, and introducing a random element, the computer works out the results of the play, whilst you watch your best quarterback getting flattened on screen.

The tactics seem to be to try and run for the first few 'downs' to see if you can make the ten yards required, and only resort to a risky pass if things look desperate. Of course, this is exactly the tactic your opponent will be expecting, so you have to spice it up with the odd unexpected pass now and then.

The screen display is very helpful, showing the pitch itself, the score,

Countdown to Meltdown

Creative Sparks
Spectrum 48K
Arcade Adventure
£7.95

★ ★ ★ ★

SOMETHING DISTURBING has happened at the local nuclear power station, there's been a bit of an explosion and most of the human staff have been killed. However, there are still a bunch of aggressive androids hanging about trying to stop your bunch of androids from closing down the plant before you all get blasted to kingdom come.

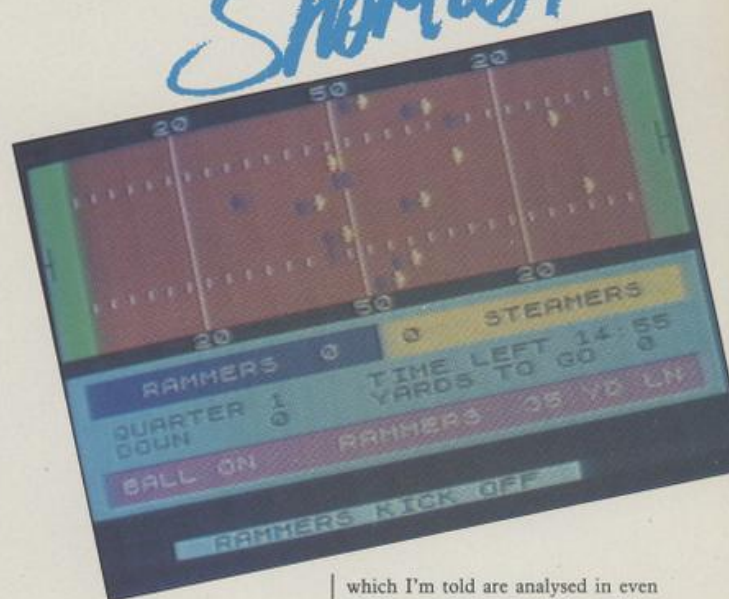
Your job is made no easier by the fact that someone has inadvertently lost the plans so you don't know where the core room is; also the radiation level is rising all the time, which is no fun, even for an android.

A description of the scenario hardly does justice to the game. There are two thousand rooms spread over eight levels. You have eight androids, only one of which you can control at a time. Each of these androids has different abilities: strength, intelligence and so on.

These abilities govern the ease with which he can use the various bits of equipment scattered all over the place. Each android can only carry eight pieces of equipment.

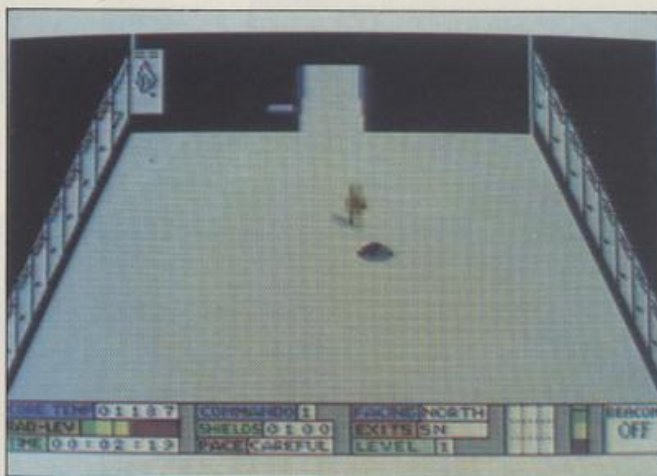
SOFTWARE

Shortlist



time left, yards required and 'downs' to go. There is also a help screen in case you forget the two letter code for the particular play you want, of which there are 15. After the match, you get a whole bunch of statistics,

which I'm told are analysed in even more excruciating detail than cricket averages. This game may well go down well Stateside, and it is probably going to remain the best version of this old classic, but for the true English man, it may soon lose its appeal.



The game avoids the tedious adventure game "suck it and see" approach by telling you how to use each piece of equipment; none of this "try every verb I can think of, something's gotta work" stuff that we normally have to resort to.

The graphics are excellent. Although the huge number of rooms I achieved by having a limited number of room types, this is enhanced by the "Star Trek" type doors and lifts. Some of the doors are broken and have to be fixed. This can be awkward if you've got a dumb android on your hands; the unfriendly attentions of the reactor guardians do not help either.

This is a well-designed game which will hold its appeal even after you've found the reactor. Getting all the stuff you need together is fun.

Sultan's Maze

Gem Software
Amstrad CPC-464
Maze game
£8.95

★ ★

GEM SOFTWARE'S Sultan's Maze gives you the same down the corridor view that you get in Romik's 3D Monster Maze, but has more of a myth attached to it. Apparently the Sultan of Baghdad was robbed on a visit to England. His personal champion pursued the robbers into Hampton Court maze. You have to retrieve all the jewels, steering yourself around by the numeric keypad.

A L I E N



In space no one can hear you scream.



NAVIGATOR
Shy, Skilful and
Intelligent — Panics Easily.



EXECUTIVE OFFICER
Direct, Imaginative,
Cautious, Loyal.



SCIENCE OFFICER
Secretive, Unlikeable, Brilliant —
Occasionally Illogical.



CAPTAIN
Solid, Dependable, Courageous —
Excellent Leader.



ENGINEERING OFFICER
Physically Strong, Low I.Q.
Potentially Rebellious.



3RD OFFICER
Willful, Ambitious,
Authoritative, Resourceful.



ENGINEERING OFFICER
Cynical, Rebellious,
Untrustworthy, Unflappable.

THE CREW
Personnel
files follow —
yours to
command —
well almost.

MIND GAMES
SPECTRUM 48K · CBM64



**Featuring
the unique
Personality Control System**

No. 1 Golden Square, London W1R 3AB, Telephone 01-437 0626

£8.99

NEWS

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

The crystal ball

Coming soon from Adventure International is Spiderman, written by Scott Adams as a follow up to the successful Incredible Hulk. Like Hulk, the adventure will be text and graphics and be available for a wide range of home computers.

Scott Adams also has two others on the way — Sorcerer of Claymore Castle and Return to Pirate Island. The latter is a sequel to the earlier, and immensely popular, Pirate Adventurer.

Beyond The Infinite is the title of Digital Fantasia's latest. Expect it in your shops soon.

The Final Mission is the third part of Incentive Software's Ket trilogy for the 48K Spectrum. The earlier two were Mountains of Ket and Temple of Vran. While all three are self-contained adventures, solving all of them could win you a video recorder from Incentive in a competition to celebrate the release of the complete saga.

A helping hand

For BBC adventurers wrestling with Acornsoft's superb PHILOSOPHER'S QUEST: Being grabbed by a sad octopus?

KNI FO ELTTOB A TI EVIG
Have you ceased to exist?
"KNIHT" TON YHW OS MA I
EROFEREHT KNIHT I

For stymied players of Adventure International's THE COUNT:

Stake keeps getting stolen when you fall asleep in the brass bed?
TESOLC YTSUD EHT NI TI
KCOL
Coffin locked from the inside?
TES SAH NUS EHT RETFA TI
GNINEPO YRT
HUGO NORTH

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.

The Count

BBC B
£7.95

Adventure International

ALTHOUGH THIS extremely popular adventure has been around for some time, it has only recently been converted for the BBC B micro-computer. Now owners of this micro can share in the pleasures and mind-stretching of one of the classics in the adventure genre.

Written by Scott Adams, who is something of a legend among adventure buffs, The Count sets you down in Dracula's castle, your mission being to seek out the Count and destroy him. You start the adventure in a brass bed where you have just awoken, in the afternoon, from a deep sleep. There's no point in trying to escape from the castle before you've completed the job — the local peasants will lynch you if you attempt to sneak out!

The adventure accepts the traditional verb/noun command input and the location descriptions are fairly short. But what sets the Scott Adams' adventures high above others are the tantalising puzzles and dry wit of the author. Among many bizarre objects and incidents you'll come across in The Count are a laughing bat, a bottle of blood which is delivered to the castle front door, and an unreliable flag pole.

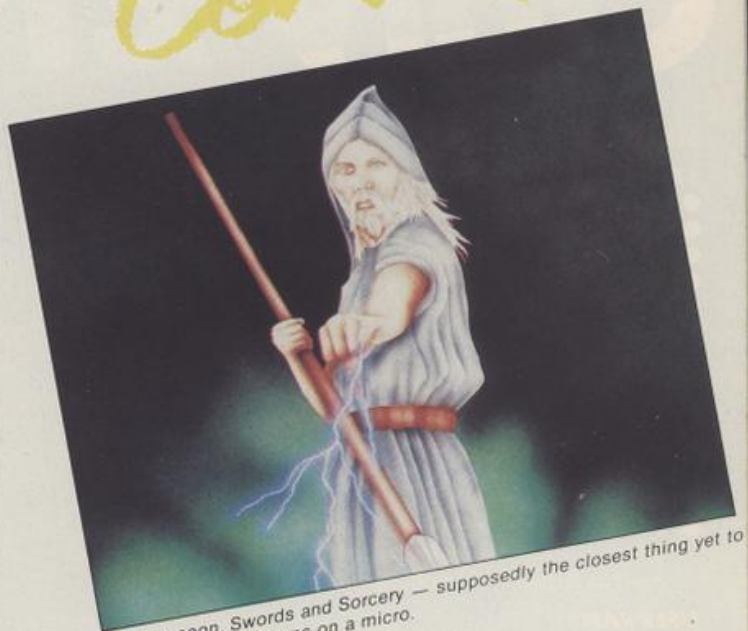
You only have a certain time limit to accomplish the deed; watch out when the sun sets! You'll find a couple of useful hints on this testing adventure over in the Helping Hand column.

Robyn Hode

48K Spectrum
£9.95

Runesoft

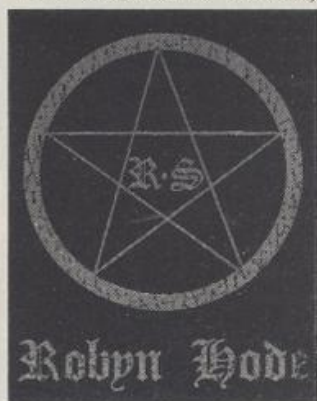
NOTE THE Olde Englishe spelling — the adventure is set in the 13th century, all the place names and spelling are based on original ballads of Robyn and his Merrie Men. In



Coming soon. Swords and Sorcery — supposedly the closest thing yet to Dungeons and Dragons on a micro.

fact, in order to make this adventure as authentic as possible, a great deal of research has been conducted, including reference to such historical documents as the Domesday Book and early maps.

The adventure is massive,



providing over 400 locations for you to heigh-nonney-no around. Because it is so large, the adventure comes in two parts on the single cassette, each part using all 48K of the Spectrum's memory. To get to play part two, you'll need to finish part one first — this will give you a two-part code as your password to the second half.

The vocabulary is similarly impressive — over 120 words in all — yet response is immediate. The entire program being in machine code, generated with the aid of The Quill.

The plot: Maid Marion has been captured by the Sheryffe and held in

Nottingham Castle on a charge of treason. Although it may well be a trap, Robyn decides to rescue her without the aid of his men. Can you, as the outlaw of Scherwoode Forest, outwit the Sheryffe and so save fair Marion?

If you fall, mortally wounded, Lyttle Johnne carries you to Kirklees Priory where, on your deathbed and bow in hand, you fire off a perfect final arrow through the open window before expiring. Beat that for a poetic demise! Odds Bodkins and by my troth, this is indeed a smashing adventure, highly original and beautifully put together.

Mysterious Fairground

48K Spectrum

£6.95

Buffer Micros

A QUILL-GENERATED adventure, this one has an intriguing setting. As you can gather from the title, the adventure takes place inside a strange fun fair where your objective is to recover five hidden items of treasure.

You start inside the fairground, a locked gate dashing any thought of a quick exit. A cursory trip around the nearest locations reveals a garden — I wonder if those bean plants can be watered? — a hall of mirrors, a rifle range and a ghost train.

The ghost train gives you your first major problem. Inside this ride, you experience a sense of the unnatural so shouldn't be surprised to find something unpleasant lurking there.

MEMOTECH MTX500

The Ultimate. Only £199.

OVER
£35.00
WORTH OF
FREE
SOFTWARE

MEMOTECH MTX500 MAJOR FEATURES

STANDARD I/O PORTS

- Variable rate cassette port (up to 2400 baud)
- Two joystick ports using Atari configuration
- Centronics-type parallel printer port
- ROM cartridge port
- Uncommitted parallel input/output port
- Internal ROM board port
- Hi-Fi output port
- 4-channel sound through TV speaker
- PAL composite video colour Monitor port

THE RS232 COMMUNICATIONS BOARD

(required for disc expansions)

- Two independent RS232 ports
- 60-way Disc Drive Bus supporting up to four 5.25 and/or 8 inch floppy disc drives, plus instant access Memotech Silicon Discs, and Hard Discs with capacities up to 32 Megabytes

USER RAM

- Optionally expandable to 512K in increments of 64, 128, or 256K

24K OF ROM which includes:

- MTX BASIC
- Noddy, a simple, text-handling language
- A powerful Assembler/Dissassembler – sections of machine code can be created and run by calling the Assembler from within BASIC
- The sophisticated Front Panel, which displays the contents of all registers (including the F flag register) and pointers during program execution
- All four languages can be used interactively with each other, and with the user

ROM EXPANSIONS

- MTX NewWord, a 32K word processing package
- Hisoft PASCAL, written specially for the MTX Series

THE KEYBOARD

- Full size, 79-key, full-stroke professional quality keyboard incorporating:
- Main Block with typewriter-style layout
- A separate 12-key numeric/editor keypad
- Eight programmable function keys (16 with shift)

HI-RES GRAPHICS MODE

- 256 × 192 pixel resolution plus
- 32 × 24 Text in 16 foreground and background colours
- All 16 colours (i.e. 15 colours plus transparent) are available on the screen together
- 32 user-definable easily controllable sprites
- 128 separate GENPAT statements providing a huge range of user-defined characters

TEXT MODE

- Text resolution is 40 × 24 characters plus
- 128 user-defined characters
- Eight user-definable virtual screens or "windows" (available in all modes)

For further information, please contact:

MEMOTECH

MEMOTECH LIMITED STATION LANE INDUSTRIAL ESTATE
WITNEY OXON OX8 6BX

TELEPHONE: (0993) 2977 TELEX: 83372 MEMTEC G



THE NEWS THAT Commodore is to cease manufacturing the Vic-20 must have brought a nostalgic tear to the eye of many a home computer owner. It is rather like the roll-out of the last DC-3 aircraft, or the final German-built Volkswagen Beetle. It seems incredible that Commodore has already manufactured a million computers in their recently-opened Corby facility — but the company will be rolling machines off the production line at the rate of one every 2.5 seconds when up to strength. Sadly, the Vic will not be part of this great future — tomorrow belongs to the C-16.

This has not deterred the company's software arm from releasing more new software for what must be one of the world's most ubiquitous computers.

Bomber Mission, for the Vic-20 plus 16K expansion is a compact flight simulator, supposedly putting you in the pilot seat of a World War Two fighter-bomber. First, select your target — it could be anything from an armoured column to a submarine pen or a power station — then pick your weapon system: tall boys, fragmentation bombs, blockbusters.

The computer then puts up the cockpit display. It's a fly-by-instrument job, even with the extra 16K the Vic is not up to giving you much of a view out of the window, until enemy fighters turn up.

These judder about the screen in best Vic-20 rough-scrolling graphic fashion giving you an opportunity to use up your ammunition.

Over the target the bombs are automatically armed. You press the fire button and a message appears telling you the result.

You then have to turn to bearing 0 to fly home, and be sure to lower wheels and flaps above 1,000 feet and get speed in the area of 120-150 knots. I was destroyed quite a few times by pre-emptive strikes on the runway — the trickiest thing in this simulation is getting your plane off the ground before you're blown up. Each mission has a time limit and you must land before it ends. As a last gasp for the Vic-20, this program is quite an achievement — but it will bring a wry smile to the faces of Spectrum fighter jocks.

At the other end of the scale from quality software produced on behalf of the manufacturing company to ensure old hardware stocks keep moving we find the licensing trend. This is where a software house decides to let someone else have the bother of selling a line which has been around for a while.

This is good news for Vic-20 owners in the case of Omega Software — "the last word in software" — because they're doing a Mastertronic and selling everything for 1.99. Omega was the last word in Vic-20 software for Anirog, it would appear, since all the Omega

Paul Bond wallows in nostalgia as the last Vic is rolled out of the hangar

VIC GAMES

games looked at for this review hail originally from that house.

Omega's Gunslinger is, in fact, Anirog's High Noon — a four-cactus scenario where you steer your cowboy around the screen, using a joystick and 16K expansion. You are better off playing the game with another human since the micro takes a sadistic delight in shooting you dead immediately the game starts, just so it can play the funeral march. The theme music is Mungo Jerry's "In the Summertime", which should appeal to devotees of '60s novelty hits.

Battle Ground is like Space Invaders tipped

Game	Company	Price
Bomber Mission	Commodore	£4.99
Gunslinger	Omega	£1.99
Battle Ground	Omega	£1.99
Space Pirate	Omega	£1.99
Bricks	Palace	£5.99
Squish	Palace	£5.99
Dodo Lair	Software Projects	£5.95
Perils of Willy	Software Projects	£5.95

on its side. Imperial walkers move toward the right-hand side of the screen which you defend by moving behind your bases and shooting or zipping out and laying barriers in their path to delay them.

Space Pirate, which needs 16K expansion, is set in a space shooting gallery presented in perspective. The targets emerge from a box in the upper centre of the screen and weave about frustrating your attempts to put the cross-hairs square-on and blast them to smithereens. The explosions are very good, I must say. The second level includes indestructible ships which collect the target

ships, reducing your score. A neat little shoot-'em-up, good value at this bargain price.

Palace Software presents us with two "exciting and frustrating" arcade-style games for unexpanded Vic-20s, excitingly and frustratingly titled Bricks and Squish.

Squish is a shove-things-around-and-squash-icky-things game. The graphics are pure Vic-20 primitive, which is all you can expect given unadorned onboard memory. Little purple scorpion-like creatures menace the protagonist who runs about waving his arms and making the sort of footstep noises you hear between tracks on avant-garde rock albums. Twenty levels and watch out for the bug bullets.

Bricks I found more frustrating than exciting. You are at the bottom of the screen. Bricks rain down. You dodge them. The idea is to climb up using the fire button until you reach the top of the screen. You can jump up only one brick at a time, but jump down any number of bricks.

Perils of Willy, also from Software Projects, but with 16K more of elbow room is more impressive graphically. The cassette inlay tells us you are a little the worse for alcohol and you must stagger home, catching the notes of music that hang in the air. The loading screen puts up the tell-tale "Miner". It is in fact a ladders-and-levels game, with lots of jumping on to platforms, sliding along conveyor belts, and being eaten by dogs. The game is a dire warning to people who insist on seeking out the Pub of the Year in Richmond, rather than just going to their local.

Punchy from Mr Micro runs on a Vic-20 with 16K. You must guide Bobby the policeman through various obstacles to rescue Judy from where Punch has imprisoned her.

This includes jumping over spiders on the flat, catching a magic carpet across the sea, and hopping along a castellated rampart. Have you ever castellated a rampart, missus? Enough of this alternative humour. I was a little spoilt by having seen this on the CPC-464, flicker-free graphics, smooth-scrolling etc., and frankly I had a hard time figuring out what some of the things were supposed to be on a Vic. Punch could have been the Honourable John Selwyn Gummer for all I knew.

A brave try, but you know what they say about the limitations of the machine. Well, here I am, saying it again.



A New Leader Emerges



protek
JOYSTICK INTERFACE

**Protek
Switchable
Joystick
Interface**

It is so easy to use—there's no software patch tapes or programming required. Simply plug in and flick the switch for compatibility with all games requiring a joystick.

Available for immediate delivery,
retailing at £19.95.

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

Protek

IT'S EARLY DAYS yet, but it's clear that not only do you get a monitor for your money when you buy an Amstrad CPC-464. You also get a rapidly-expanding software base.

"Software houses tend to take promises of hardware availability with a pinch of salt," said Amsoft boss William Pole when I asked him how the CPC-464 managed to attract all this interest. "We've had Amstrad machines out at software houses since last December."

A lot of the Amstrad software consists of old Spectrum favourites re-implemented for the 464. That doesn't worry Amsoft — "We just wanted plenty of software to be around when the machine came out."

Re-implementation of Spectrum software makes sense — both machines share the Z-80 CPU; software houses' fancies may also have been tickled by similarities in specification which the Amstrad shares with MSX. Another factor which Amstrad has in common with MSX is that both will appeal to that lost generation that wouldn't have been seen dead fooling around with rubber-mat keyboards, tape recorder level controls, dodgy cables and awkward power-packs.

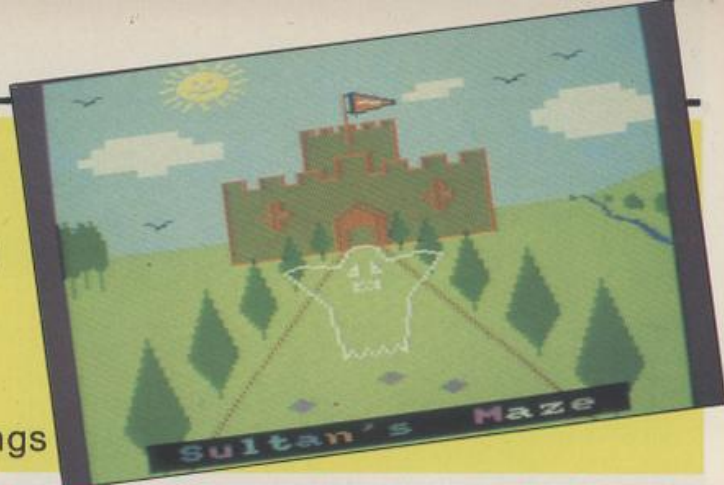
Yes, it's true. The built-in cassette recorder loads first time, every time — at least it did while I was looking at software for this review. One of the best games to find its way onto the 464 from its Spectrum spawning ground is Derek Brewster's Codename MAT — acronym for Mission Alien Termination as many devoted vidkids will know.

Tracing its heritage from the old granddaddy of computer games, Star Trek, via Atari Star Raiders, the game finds you in command of the *USS Centurion*. You can call up a long range scan, a solar chart and a sector scan showing a 10 by 7 grid. This galactic A-Z shows you where our boys are and what planet or satellite the evil Myons are encroaching on.

The game has two main options: you can play as pilot with deployment of Earth defence fleets under computer control: or you can play as commander — you control deployment of fleets. Moving from one part of the sector grid to another is achieved by placing the cursor over the destination point, and pressing W to engage warp drive. Tricky, this. You have to keep the cursor central on the screen or else you will end up in some galactic cul-de-sac with everybody on the bridge arguing like it's the family outing to Bracklesham Bay.

Myon fighters are easy meat for the average space cadet, but cruisers are really nippy and the motherships are mean mothers. At the higher level they attack you immediately until you zap their shields — then they retreat, recharge and return to the attack. And that is the secret of this game's appeal: the aliens are no pushover.

Paul Bond meets some old friends in new surroundings



AMSTRAD GAMES

Strategy definitely comes into Master Chess, implemented for Amsoft by Mikro-Gen. While I doubt that this game could play those Russian boys out of town like Bobby Fischer does in the Prefab Sprout song, it is nevertheless an excellent tutor.

The screen displays the chessboard and pieces together with the current level of play on the right-hand side and a history of the 13 most recent pairs of moves for reference on

Game	Company	Price
Codename MAT	Micromega	£8.95
Master Chess	Mikro-Gen	£8.95
Monster Maze	Romik	£8.95
Atom Smasher	Romik	£8.95
Alien Break-In	Romik	£8.95
Galactic Plague	Indescomp	£8.95
Electro Freddie	Sosoft	£8.95
Gems of Stradus	Kuma	£7.95

(All except Kuma programs available from Amsoft)

the left-hand side. This scrolls upward as you play. There are 10 levels of play, numbered 0-9.

An opening book of 6,000 moves is included in the program; apparently the program can look ahead as far as 27 moves on certain opening gambits. Looking ahead is a good thing to do in a maze filled with monsters — like in Romik's 3D Monster Maze. The game which won such rapturous acclaim when introduced on the good old ZX-81 is beginning to look a little tired now on the Amstrad, as are most of the Romik retreads like Atom Smasher and Alien Break-In. Nevertheless, the latter is probably one of the best straight shoot-'em-ups around; I have

even heard aficionados speak of the BBC implementation in the same breath as Zalaga — praise indeed.

Paco Suarez, one half of Indescomp's indefatigable Paco and Paco who produced the graphically excellent Bugaboo for the Spectrum, has however created a stunning Space Invaders variant for the CPC-464. In Galactic Plague, everything happens so quickly that one is tempted to start doing Neil impressions — "What's happening, man?"

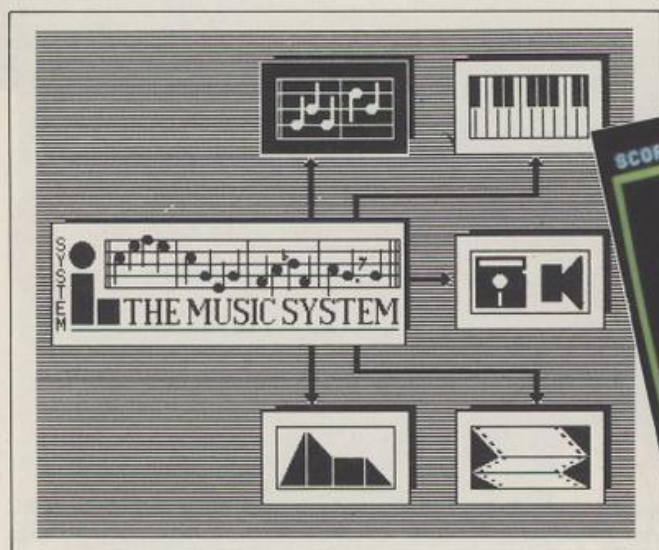
Brightly coloured space fighters zoom across the screen dropping bombs in a diagonal criss-cross wave pattern. The game seems almost unplayable, but as various strategies are developed by the player it looks possible to survive long enough to score at least 300. Wow-ee.

Your Computer has already reviewed Sosoft's Electro Freddie (Software Shortlist, October) and Kuma's Gems of Stradus (Software Shortlist, September). Protek's Hunter Killer submarine game written by Rod Hopkins in fact made its debut in Spectrum format in the August 1983 edition of Your Computer. Some 50 titles are scheduled for release in the next three or four months, 20 of which will appear on the Amsoft label. Level 9 are implementing most of their adventure titles for the 464 and Ultimate Play The Game were one of the first companies to get an Amstrad. The next wave of releases will include some very brainy stuff, like a sound designer and also a screen designer. The latter is from DJL, famous for Ms Pac-Man, and is described as "the Rolls-Royce of screen designers." Tasword and languages like Abersoft Forth will also arrive in time, making the Amstrad a very respectable machine indeed.

The clincher is the release of the Hitachi three-inch add-on disc drive. For less than £200 you get access to 180K of memory on each side of a disc. This and the capacity to run CP/M 2.2 will appeal to the "serious user", whoever he is. For the games player — well, average cassette loading time is about eight minutes. Discs promise eight seconds.



BBC SOFTWARE



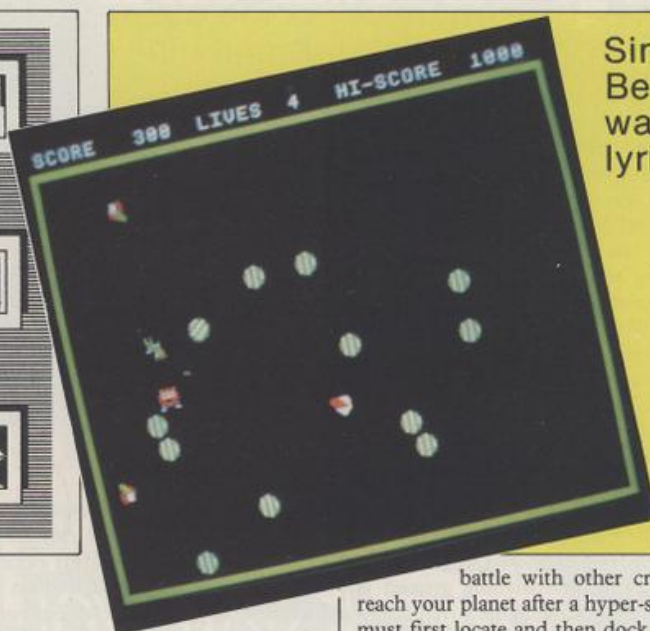
SOME PEOPLE ARGUE that BBC games over the last year have not generally improved on the standard set by Acornsoft's first releases — Snapper and Planetoids. It has also been suggested that the supply of new software is about to dry up. But in fact, far from being on the wane, BBC software is definitely thriving.

In particular the space epic, *Elite*, marks Acornsoft's return to form. This is a blockbuster of a program which combines elements of *Star Trek* games, flight simulators, and trader games. It also has points in common with Atari's *Star Raiders* — the game deemed by Jeff Minter and the editor of *Practical Computing* to be the greatest ever written.

The aim in *Elite* is to roam the galaxy as commander of a spaceship and by a mixture of trading and combat improve your status from "harmless" to "elite". In the trading stage you need first to choose a suitable planet.

Long and short range charts show the options while entering Status mode gives such detailed information as the nature of a planet's inhabitants, its form of government, and technological level.

Getting to a new planet, however, plunges the player into arcade action. On the way you



Simon Beesley waxes lyrical.

battle with other craft. When you reach your planet after a hyper-space jump, you must first locate and then dock with a rotating Coriolis space station — a difficult feat of manoeuvring.

In the action sequences the screen manages to combine a view of space in Mode 4 high resolution with a console display below in Mode 5 colour. Planets, space stations, and other ships are shown in motion in 3D complete with hidden line removal.

This description barely conveys the scope and complexity of the game. Acornsoft is organising a monthly competition around it. Players who want to join the Order of *Elite* will have to study the 61-page training manual thoroughly and then notch up hours of flight experience.

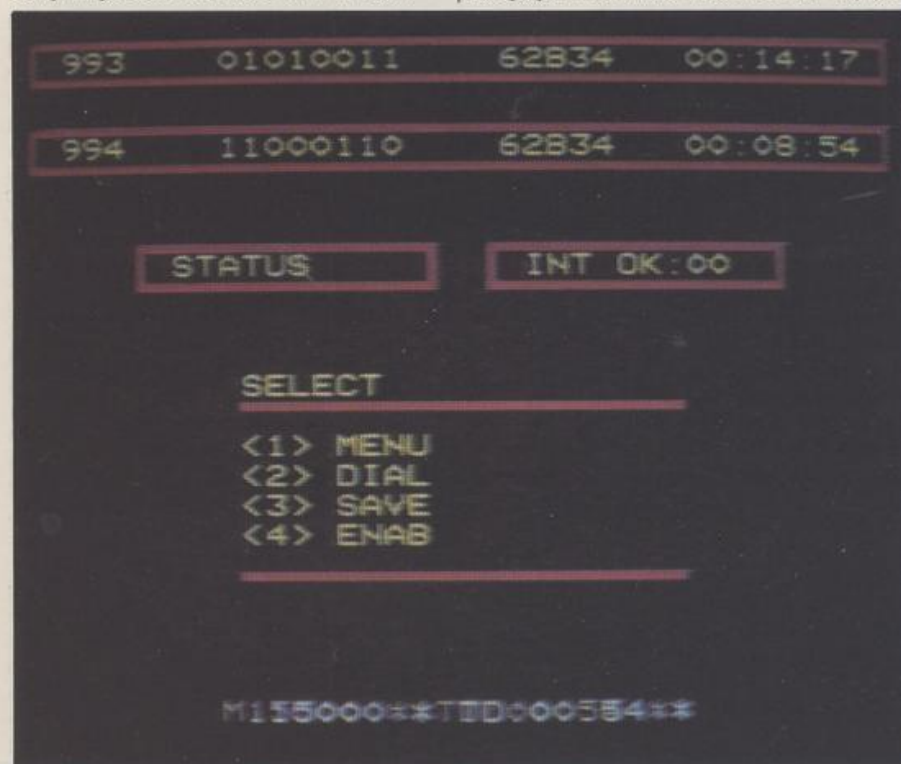
Good though *Elite* is it has to yield first place to Island Logic's *The Music System* — not a game but easily the most impressive piece of software in this month's batch. Island Logic is a new software house formed by the record company Island Records.

For almost a year a team of 12 has been working on the program. The end result is a package which makes other music programs on this, or indeed any other home micro, look crude by comparison.

The Music System consists of five programs, or modules, managed by a control program. Perhaps the most striking of these is the Editor module. Displaying some superb graphics it allows you to write notes on staves using the full range of musical notation.

Island Logic rightly describes it as the musician's equivalent of a word processor. Up to 860 notes can be entered in any one of four voices. Each note can be assigned volume and one of 15 envelopes. You can also set the tempo, transpose the key, and mark the bars automatically. Changing a note is simply a matter of pressing a cursor key to shove it up or down the staff.

When you have composed your piece you



can play it back and watch the notes scroll across the screen. Alternatively you could use the Linker module to combine it with another composition or load in a backing track.

There is a Library disc which contains a large number of predefined envelopes, rhythm tracks, and sample compositions. For a vivid demonstration of the Editor's power load in Bumble Boogie, a jazzed up version of the Flight of the Bumble Bee. Up the tempo and you can enjoy the spectacle of notes bouncing up and down the stave at a rate of 200 beats per minute.

To create new sounds there is a Synthesiser module which displays graphs of the volume and tone envelopes. In the Keyboard module you have a superior version of Quicksilver's Muproc: it lets you lay down four tracks using the Qwerty keys which it displays as a piano keyboard.

Both these features are common enough, although not usually so well implemented. Quite a new feature is the Printer module. With this you can create a four-part musical manuscript by dumping it to the printer in either high or low resolution.

Apart from its range of facilities what lifts TMS out of the ordinary is the ease with which it can be used. The entire system is driven by menus together with Macintosh-like icons. And it even includes message windows which paste over the display.

Perhaps the best tribute one can pay to TMS is that it is probably the first program that would not draw scorn from practising musicians — providing, of course, that they were not put off by the rather tinny quality of the BBC's sound.

Back on the games front, there is Acornsoft's Tetrapods, a much simpler game than Elite but in its own way just as addictive. You control an Asteroids-style triangular ship. Scattered around are numerous pods, which resemble peppermint lozenges, and a couple of Killer Bees. In later screens the bees are assisted by the more vicious Red Devils and Poison Orbs.

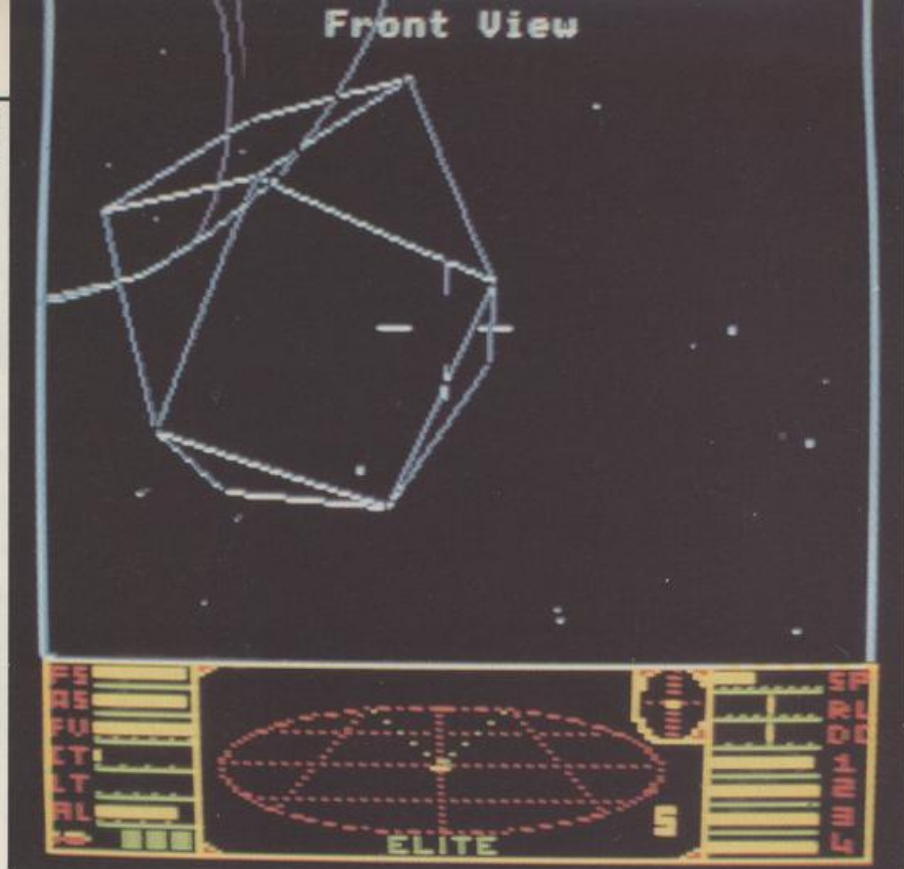
It is possible to shoot some of these creatures but more satisfying is to enlist the aid of lizards. These are what hatch out when you hit a pod. Like heat-seeking missiles they are relentless in pursuit of the nearest life-form.

To complicate matters the scene is one of constant motion with bullets bouncing off the sides, pods behaving like billiard balls, and wriggling lizards tracking their prey. It is like looking at a cell colony under a microscope.

By contrast Acornsoft's other two releases are disappointing. Drogna is a two player board game which first appeared on the TV series *Adventure Game*. Although a fun game which calls for a high level of skill, it is only marginally enhanced by being translated to the computer screen. What is needed is a one player option against the computer.

Volcano requires you to pilot a helicopter across Mount Crona, avoiding an eruption of blue rocks. On the other side are some humans who need to be carried back to safety. The graphics here are lacklustre and, while the game is challenging, it lacks variety. Acornsoft would have done better to have attempted a version of the definitive helicopter game, *Chop-lifter*.

If there is already a great game on another machine, converting it to the BBC often



succeeds better than striving for originality. AtariSoft has made a good job of translating its classic game, Pole Position.

Most of the original features are here. You are competing in the Atari Grand Prix against a dozen or so other racing cars. Crash into them and you burst into flames. Take to the verge if you like but it slows you down and you risk hitting a hoarding.

These and other effects such as gear changes and the mountain backdrop, which scrolls when you corner, are convincingly rendered. The all-important engine sounds are not quite as satisfying as they are on the original. The BBC can't reproduce the deep throaty roar of the Atari cars. And the scrolling is not as smooth. Nonetheless this is the best race-track game available for the BBC.

Converting a platform game to the BBC is not quite so easy. An essential feature of the genre is that there should be numerous different screens. But on the BBC there is not enough memory to store a great variety of screen layouts.

Durell's Manic Miner-type game, Mineshaft, gets round the problem by stripping away such extraneous details as zany flying objects, and concentrating on sheer tortuousness. The cast of hostile objects is small and many of the screens use the same conveyor belts or crumbling floors. But to make a successful jump your timing has to be of split-second

accuracy, while finding the correct route is even more critical than usual.

To prove the point, one of the 20 screens — entitled The Resting Place — does without any moving obstacles. You have simply got to travel from A to B — a bit like trying to find a foothold on the North Face of the Eiger. It is a relief to discover you can move on to the next level by pressing Escape.

Needless to say this level of difficulty is just what the platform enthusiast looks for. Together with a restful soundtrack — a rendition of *Greensleeves* — and smooth animation it makes Mineshaft superior to such rival games as Bigger and Ghoul.

Would-be hackers can serve their apprenticeship on System 15000. A hacker, of course, is someone like the teenage hero of the film, *War Games*, who uses a modem and the telephone system to break into computer databases.

System 15000 is the name of the simulated communications system which this game puts at your disposal. Apparently your friend Richard's company Comdata has been ripped off to the tune of \$1,500,000. He wants you to save the company by breaking into a chain of computer databases.

Throughout, the game provides a convincing simulation of the hacker's task. On screen it gives a typical viewdata display. It maintains the realism by producing a telephone sound.

At the start you are supplied with the telephone number and code of a single database. By viewing this you gain leads which allow you access to others. Each may contain information about names and associated codes or vital financial and company data.

In all there are 16 databases to crack and as many red herrings along the way. Expert hackers might possibly solve the problem in one day-long sitting but it is more likely to take weeks or months. In this respect the program is like an adventure game. But otherwise System 15000 is that rare phenomenon — a genuinely novel game.

The Music System Elite	Island Logic	£24.95 (disc)
	Acornsoft	£14.95
		£17.95 (disc)
Drogna	Acornsoft	£9.95
		£11.95 (disc)
Tetrapods	Acornsoft	£9.95
		£11.95 (disc)
Volcano	Acornsoft	£9.95
		£11.95 (disc)
Mineshaft	Durell	£5.95
System 15000	AVS	£12.95
Pole Position	AtariSoft	£9.99

MSX REVIEW

MSX MUST HAVE seemed like a good idea at the time. Good for the user, who could be sure of buying a stable machine, with what was likely to prove a huge range of games and other software. Good for the manufacturer, who could avoid going out on any draughty and lonely limbs, and save on costs by sticking to components that were in plentiful and cheap supply.

But there is one tiny problem. For the whole idea of MSX to work, you have to impose fairly strict rules of what an MSX computer must and must not have. This means that all MSX machines are much of a muchness. They all run the same Basic from Microsoft, have a Z-80A processor, and use similar sound and graphics chips. So when it comes to buying a particular model, you have to choose between very similar machines.

The four micros reviewed here — three "official" Japanese MSXers, and one interloper from Korea — show the different ways manufacturers have tried to make their machine stand out from the crowd. The most obvious way is the packaging. Although every machine has the same keyboard, including special keys like Graph, Select and Code, and a cartridge slot, joystick ports and various

video outputs, where you put them on your plastic box is up to you. And you certainly have plenty of room. MSX machines seem so far to have pretty greedy footprints.

One of the tell-tale signs of an MSXer is its cluster of cursor keys, set to the right of the keyboard. Sony's Hit Bit Uses four trapeziums — or is that trapezia? — arranged in a square. These are nice and large but very shallow, so you feel curiously unsatisfied when you hit them.

The Mitsubishi ML-F80 uses a similar plan, but squashes the left and right cursor. They do, however, have deeper travels. For my money, the Canon V-20 wins the day in this department. Rather daringly, it uses bold large rectangles, two large ones for up and down, and two smaller for left and right. Again, they are rather shallow, but their shape somehow compensates for this.

In fact Canon has played it big and bold throughout its machine. The five function keys doubling up to 10 with the Shift key that the MSX scheme of things demands, extend right the way across the top of the keyboard. In programming this is really useful. For

example in MSX Basic, F4 is programmed as List and F5 Run. With such big targets it is easy to flick a nonchalant finger in their general direction and obtain the desired result.

The other machines all tuck the function keys away to the left-hand side of the keyboard, and use skinny little strips for keys. In-depth discussions of the width of function keys may seem completely over the top, but differences between MSX machines do really come down to this level. Most people pay far too little attention to the keyboard. After all, this is where you actually get that hands-on experience. Normally you don't have any choice. If you want the Spectrum you just have to put up with those funny rubber keys. But with the MSX range, the feel and layout of the keyboard could well be the deciding factor between machines.

MSX keyboards have much more than just the standard QWERTY keys. Most keys can generate three or four different characters when used with the Shift key, Graph key, Graph and Shift key, Code key and Code and Shift key. There is a special foreign accents key just for sticking on umlauts and circumflexes.

Other unusual keys on all machines include

AUTUMN COLLECT

Blacks and greys are the MSX colours for this autumn. But can our man on the catwalk, Glyn Moody, tell the difference between the Canon, Mitsubishi or Sony styles and the £230 Goldstar's coarser cut?



CTION

such things as square and curly brackets, pound signs and Spanish tilde signs. One effect of this generosity is that Return and Back Space keys are slightly too far away if you are trying to touch-type with your hands stationary on the keyboard.

The Canon scores again in choosing to put the accents key mentioned above to the right of the right-hand Shift key. It is therefore much harder to press Return by mistake — only too easy on the other machines.

All of the MSX machines have TV, video and audio outputs, cassette port, MSX printer port, two joystick ports and a second cartridge slot which can function as an expansion bus. Ports and on/off switches are all over the place on different machines, but there are no startling innovations.

The cartridge sockets are generally in the top right-hand corner of the machine — except for that individualist Canon, who puts it in the top left-hand corner. This may well be more convenient for right-handed games players who wish to flip in mid-stream from one zapping cartridge to another without ever loosening their fevered grip on the joystick.

Moving on to the software, one way of adding something to a machine's appeal is to stick in a few ROMs' worth of software. This will leave the basic structure of the machine intact, and preserve the MSX format. Sony has followed this path with its Personal Data Bank.

On powering up the Hit Bit, you are given a short menu of choices. One of these takes you straight to Basic. The others let you use an address book and memo pad program which are held in ROM. These are not very sophisticated, but you can store about 50

(continued on page 65)



GET SET FOR ACTION

Protek Joysticks and Joystick Interfaces give you arcade-quality on the ZX SPECTRUM, BBC MODEL 'B', ORIC ATMOS & ELECTRON COMPUTERS. The perfect Christmas gift for the computer buff.



**GIFT SETS INCLUDE: —
BBC MODEL 'B' GIFT SET**

INCLUDES

- Quickshot I Joystick
- Protek BBC Interface

£19.95



**ZX SPECTRUM —
GIFT SET**

INCLUDES

- Quickshot I Joystick
- Protek Switchable Joystick Interface and a Free Games Cassette

£24.95



**ZX SPECTRUM
"SWITCHABLE
INTERFACE" £19.95**

A new Joystick Interface that's compatible with all Joystick controllable software. There's no programming or software patch tapes required. Just flick the switch to select the system you require.



**ORIC ATMOS 48K PROGRAMMABLE
£29.95**

Now you can use any 'ATARI-TYPE' Joystick including Quickshot II Joystick to control your arcade software. You can select up to nine keyboard functions and programme these into your Interface. No software tapes or patch programmes required.

**ELECTRON
PROGRAMMABLE
JOYSTICK
INTERFACE
(Available November)**

Now you can use any 'ATARI-TYPE' Joystick including Joystick II to control your arcade software. You can select up to nine keyboard functions and programme these into your interface. No software tapes or patch programme required.

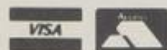


**BBC MODEL 'B'
JOYSTICK
INTERFACE
£11.95**

Just plug this Interface into your 'ANALOGUE-IN' port and you can now use any standard 'ATARI-TYPE' Joystick including Quickshot II Joystick.



Protek



Protek Computing Ltd, 1A Young Square,
Brucefield Industrial Park, Livingston, West Lothian. 0506 415353. Telex No. 727559

(continued from page 63)

names with up to 80 characters' worth of information in the address and telephone book. You can then search through them either by name or number or address. Lists of addresses can be saved to tape or cartridge.

If these first programs are a little unimpressive, they at least hint at possible directions in which MSX micros may develop. In an effort to woo buyers to particular machines, manufacturers will probably be forced to offer more and more glamorous ROM extras.

The MSX Basic itself, of course, is sacrosanct. So there can be no tampering here to tweak its performance or facilities. But to be fair, that is not really necessary anyway. Microsoft has done a good job in providing a powerful and clean Basic. Some of the commands were discussed in detail in the Toshiba review in the September issue of *Your Computer*. Everything you would expect from a reasonably structured Basic is there, along with powerful sound, graphics and sprite commands. Out of a nominal 64K RAM, you are left with only 28,815 bytes program area. Editing is carried out simply and efficiently using the cursor, insert and delete keys.

Text and graphics modes are entered using the Screen command. The default value is Screen 0, which allows 40 columns and 20 rows. Three rows at the bottom are given over to the function key labels. These automatically switch when you press the Shift key to flip from F1-F5 to F6-F10. Screen 1 gives you 32 columns. Screen 2, the high-resolution graphics mode allows 256 by 192 pixels. Screen 3 is the low resolution mode, with 64 by 48 coarse pixel elements. The image is stable and the colours reasonable.

16 colours are available, but in the high-res mode there are restrictions as to how foreground colours may be assigned to individual bits. Another problem is that text may not be mixed directly with graphics. Graphics commands include plotting, line, circle and box drawing, area filling, and sprite commands. Up to 32 sprites can be handled at once.

Two types of sound commands are included, both of which use the TV speaker. The Sound command itself allows you to specify 13 parameters defining channels, loudness, pitch and envelope. A more civilised command is Play, which lets you input letters such as A, C, E, which are interpreted as the appropriate musical notes of that name. Altogether there are three musical channels,



and also a simple Beep command.

Other features of the Basic include a Def Fn which allows you to define additional functions, and useful programming aids like Tron which turns the program trace on, and error-trapping routines like and Erl and Err, giving the error code and the line which generated it respectively. There is also a real-time clock accessed via the variable Time.

Running a series of standard Basic benchmarks is instructive. In ordinary loops and Gotos, the MSX machines emerged as about half as fast as the BBC, and twice as fast as the Spectrum. But in one speed checks designed to test the maths routines — such as calculating sines, logs and so on — the MSX micros were markedly slower. This is mostly due to the fact that they work to 14-digit precision. This is hot stuff for a home micro, but the penalty you pay is loss of speed in intensive number-crunching activities. For games this should be no problem.

After manufacturers have done their utmost in hardware and software to make their MSX micro into an MSXtra micro, they have only one weapon left: the price. And this is where it gets interesting for you.

Since, in functional terms, there is very little to choose between the various machines, it would be perfectly reasonable to buy purely on the basis of price. Therefore, you would expect manufacturers to be locked in a life-or-death price war. Which rather goes against the spirit of gentlemanly co-operation that lies at the heart of MSX.

Alternatively, the manufacturers could come to an equally gentlemanly agreement to keep their prices roughly comparable, so that there were no gross differentials, and also to keep them profitably high. At the moment, this appears to be what is happening. Both the

almost bound to come down dramatically from their present high levels. So wait if you can. Secondly, if you really must be the first on your street with one of these dark gleaming machines, make sure you try out as many as possible, especially the keyboards.

As time goes on, it is also likely that manufacturers will offer an increasing number of "added-value" features. Again, check these out thoroughly before deciding.

Sony Hit Bit and Mitsubishi ML-F80 weigh in at a hefty £299.95. The Canon breaks ranks slightly with a price tag of £279.95. These are all 64K machines. Although MSX allows for smaller RAM sizes down to 16K, manufacturers seem sensibly to be pushing the top of the range versions in this country.

This kind of tacit agreement works fine while everyone sticks to it. The danger is that some outsider will come in and use the very strength of MSX against itself. That is, it will produce a totally MSX compatible machine, but for half the price, say. Since there will be functionally little difference between the top and bottom of the market, the intruder stands to clean up.

There are signs of this already in the Korean MSX machine reviewed here, the Goldstar FC-200. In all important respects this is identical to the honest-to-God Japanese models — except that it is £70 cheaper. True, the whole machine does look a bit like a Mickey Mouse toy version, with garish red, green and blue keys. But on powering up, the differences prove only skin deep.

Unfortunately for the Japanese manufacturers, their bright peripherals will be no help either. Sony has produced a stylish but rather unwieldy plotter costing £250, a 320K disc drive for a steep £350, and various joysticks, including an infrared one for £65. Apart from being hideously expensive, the disc drive is also rather badly designed. For reasons of cooling, presumably, the entire case is perforated with large holes — just asking for coffee or other sticky liquids to be poured in. The other manufacturers will no doubt follow suit in announcing add-ons when the machines are released over the next few months.

Peripheral MSX appeal

But again the complete compatibility of MSX means that you can use any manufacturer's equipment with another's. So once you have bought your cheap but workable MSX micro, you can then pick and choose similarly amongst the peripherals. For once, it looks as if things could be going the user's way.

Whether the whole MSX philosophy is going to result in an MSXplosion is another matter. Personally, I think that the U.K. market will prove hard to breach, largely because of local aberrations like Sinclair, and the strong Commodore following here. The new Commodore Plus 4 in particular seems to offer practically everything that an MSX micro does, but with a neater design and useful bundled software. The Amstrad, too, will be a strong rival.

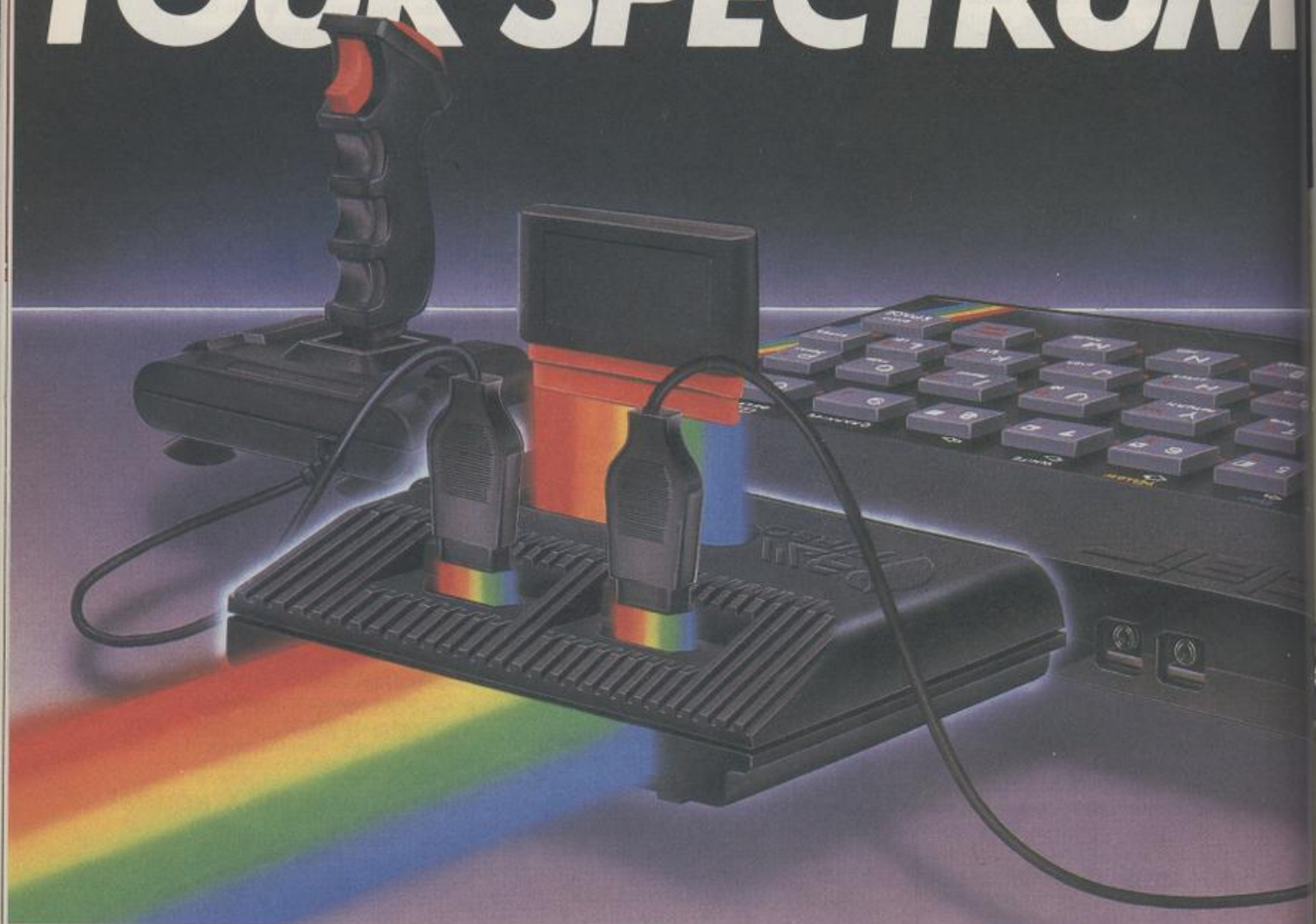
But there can be little doubt that the machines will sell, and that huge numbers of games will be written for them. It could be though, that a plateau will eventually be reached where every last drop has been squeezed out of the Z-80 that lies at the heart of the MSX philosophy. It is not clear where MSX will go after this first wave of machines.

Certainly, we can expect — one day — much more exciting games on something like the QL. As ever, it really is a question of paying your money and taking your choice.

CONCLUSIONS

- MSX is here, and here to stay. The concept will prove more relevant to the first-time buyer than to the hardened games addict or machine-code programmer.
- The machines are sensibly designed, and have an especially good Basic. The standard of construction seems high.
- When it comes to buying an MSX machine, there are two things to remember. First, that prices are

TURBO CHARGE YOUR SPECTRUM



Outperforms any Spectrum interface

The unique Turbo interface from Ram gives you all these features – and more – in one unit:

- * A variety of interfaces including: Rom cartridges, two 9-way D plugs for standard joysticks, PLUS full expansion bus at rear.
- * Compatible with Kempston and Protek protocols.
- * Works with latest Quickshot Mk II auto rapid-fire joysticks!
- * Choice of Rom cartridge or tape cassette software.
- * Instant program loading with cartridge software.
- * Built-in power safety device – unique to Ram Turbo.
- * Full one year guarantee.
- * Immediate availability – 24 Hr despatch on receipt of P.O./ credit card details (cheques – seven days).
- * Incredible value – only £22.95.

So don't wait around – simply complete the coupon and send it to us today.

Or call our credit card hot line on 02514 25252. (Access and Visa welcome).

Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA.

Please send me:

_____ Spectrum Turbo Interface(s) at £22.95
+ £1 p+p (overseas orders £3 p+p)

_____ Quickshot II Joystick(s) at £9.95
(Only when purchased with Turbo – normally £12.95 + £1 p+p)

I enclose cheque/postal order or charge my Access/Visa for: £ _____



Name _____

Address _____

Tel _____

To: Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA.

24 Hr
despatch for
credit cards and
postal orders

YC/11/84



Trade and export enquiries welcome.

BARGAIN BUYS — UP TO £50

These machines have been around for some time now, are competitive prices. They are worth considering as basic entry about to disappear from the market and are available at very machines to see what computing is all about.

COMPUTER	Hardware	Operating System/Basic	Software	Accessories
ZX-81 Sinclair £30	Black and white only. Touch sensitive membrane keyboard is barely adequate but this is the cheapest computer. 1K RAM. An ageing design.	Good editor with syntax checked keyboard data entry. Basic is very slow. Chunky graphics and no sound.	Lots and lots of very good cheap software considering the machines limitations.	Keyboards, joysticks, printers, lots of choice, relatively cheap. Good books. Add on memory.
MC-10 Tandy £50	Colour with chunky graphics — no user defined graphics. Sound through TV speaker. 3/4 size keyboard — moving hard plastic keys with space bar.	Keyword or typed in full entry. Microsoft Basic.	There are games, not many and adequate is about the right description.	TP10 printer, also very cheap. Add on memory 16K.
SORD M5 Computer Games Ltd £50	Colour and Sprites. The MSX chip set coupled to the worst keyboard of the three colour computers. 4K 3 channel sound.	The best operating system software for a m/c Z80 programmer, access to everything. Pity about original price and keyboard. Basic is a bit weak.	Very little software available, but what there is, is good quality.	Available but only from manufacturer, no other sources.
AQUARIUS 1 Radofin £50	Chunky graphics — no user defined graphics. No sound, keyboard only a little better than the Sord.	Microsoft Basic but no editor, keyword or typed entry.	More than Sord or MC10 but again, only adequate.	Printer, memory, joysticks and discs available relatively cheaply.

COLOUR COMPUTERS — UP TO £100

The machines in this range offer more than the bare minimum performance and each has its own particular strong points. The Vic-20's software base is extensive and cheap. The Atari's software is the best, but expensive.

COMPUTER	Hardware	Operating System/Basic	Software	Accessories
ATARI 600XL £89	Very good real keyboard. Newish design. Sprites and good sound — 4 channel. 16K needs special tape recorder.	Very much better Basic than original Atari. Nice screen editor with syntax checked data entry.	Some of the very best, but cartridges are expensive and soon cost a great deal more than the computer.	Printers, joysticks, discs, memory. Average prices — look for special offers.
VIC-20 £89	Good real keyboard. Limited characters per line 3 channel sound. 3K mem needs special tape recorder.	Limited Basic with a good line editor.	Very large number of quality cheap cassette games available. Some require additional memory.	Printer, joysticks, disc, memory, average prices.
TANDY CoCo £99	Moving key keyboard. Lowish colour resolution. 16K memory. Sound through TV speaker. RS232 port.	Line editor, abbreviated error messages show computers age.	Can run OS-9 on expanded system to provide user with mini computer feel. New learning book may be the shape of things to come.	All things available but do tend to be expensive. Can be extended to become a limited business machine.

LARGER MEMORY COMPUTERS — UP TO £150

The larger memory generally permits more extensive and better quality cassette-based games.

COMPUTER	Hardware	Operating System/Basic	Software	Accessories
DRAGON 32 £99.95	Real keyboard but feels a little tacky. Sound through TV. 32K.	Very similar to Tandy CoCo on which it was based.	Some good cheap software.	Printers, discs, joysticks etc, reasonably priced.
ATMOS ORIC £99.95	Good real keyboard. 3 channel sound.	A vast improvement over the original Oric 1 which had cassette loading difficulties.	The lower UK profile of the Oric/Atmos will not help in the availability of software.	Printers, discs reasonably priced.
SPECTRUM Sinclair (6 Pack) £129.95	Moving key rubber keyboard worst of this group, weak sound. The Spectrum is becoming overpriced in the current market.	Single keyword entry with full syntax check on line entry. Design becoming dated now.	By far the largest cheap quality software base of any UK machine. The standard by which other games are judged.	Printers, joysticks RS232 interface Microdrives etc. Generally cheap though some items could be cheaper.
AQUARIUS 2 36K £129	Good real keyboard. Limited chunky colour graphics. Sound through TV speaker.	Microsoft extended Basic with reasonable editor. Some of the feel of MSX in this Basic.	Limited software availability likely to be a problem.	Aquarius 1 accessories fit and just about everything available from printer, joysticks, memory to cheap discs.

THE BEGINNINGS OF BUSINESS USAGE — ABOUT £200

The Memotech has the ability to become a limited business machine but there is unlikely to be a tremendous amount of software for it. The Commodore has the software but not the ability. The Electron needs a fair amount of expansion which effectively changes the price bracket it occupies.

(continued on next page)

(continued from previous page)

COMPUTER	Hardware	Operating System/Basic	Software	Accessories
COMMODORE 64 £199	Average keyboard. Very good sound facilities, needs a special cassette recorder.	Minimal Basic, does have sprites but not easy to use, or sound, from Basic.	Do like cartridge football. Games tend to be more expensive than, say, Spectrum.	Everything — big selection.
ELECTRON ACORN £199	A cut down version of the BBC computer. Good keyboard. Single channel sound. Overpriced.	Runs slower than the BBC but quality Basic. Can run mixed Basic and machine code programs.	Quantity increasing all the time.	Needs expansion box before accessories can be hung on to computer.
MEMOTECH MTX £239	Very solid machine with average keyboard — includes separate numeric keypad.	Built in assembler/disassembler plus Noddy language besides Basic. Line syntax checker. Can expand to a CP/M system.	Limited in quantity but of reasonable quality.	Everything, but little choice.
AMSTRAD £240	Includes black and white monitor and built-in cassette drive. Quality keyboard and limited cassette control.	Nice operating system. Basic is quick but could be more user friendly in graphics and sound department.	Needs the colour monitor to really be used as a games machine. TV adaptor available. Some nice games.	New machine, items just beginning to appear.

TOP OF THE RANGE — ABOUT £400

These machines cover the top end of the games machine range and the bottom end of the business machines.

COMPUTER	Hardware	Operating System/Basic	Software	Accessories
BBC ACORN £399	Very old design. Not long before the new ABC's take over. Well overpriced because of captive market.	Very fast, against which all others are compared. Can run mixed Basic and machine code programs.	Not as good as specification is capable of producing. The best for educational uses.	Big choice in all price ranges. Can become expensive with a big footprint on the desk.
QL SINCLAIR £399	Uses the IBM alternative microprocessor (MC68008). The hardware is the best in the price range, still a few bugs to be knocked out.	Look out for 3rd party vendors to provide multi-user/multi-tasking o.s. that works. 4 software packages in price that are improving in quality — slowly.	Very few at present, but all the best software is being programmed for it at present. Worries about cartridges, pricing and piracy.	Needs care when choosing monitor and printer, they don't all work with the QL.
AMSTRAD £349	Includes colour monitor and cassette drive. Not always easy to read 80 column text but display rock steady. Stereo sound.	Quick Basic with nice editor easily learnt.	The B/W monitor is more suitable for business use. Some very good software.	Few at present but coming soon.
EINSTEIN £499	Includes a 500K 3" disc drive. Nice keyboard and reasonable sound.	Clean machine with Basic loaded from disc. CP/M capability.	Predominantly a business machine between the QL and the ABC's and the new Apricot.	Not much at present but it should be all available in time.
ADVANCE 86A £400	Upgradable to IBM PC compatible. Looks different from other computers with keyboard storage in main console. Good keyboard. Takes up a lot of desk.	Very nice full screen editor, the IBM standard Basic. Faster than IBM machine.	Surprisingly little for the basic machine, but masses for the full blown expanded version. Software is comparatively expensive.	Most IBM accessories are suitable, the cost is higher than other accessories listed.
ALPHATRONIC £347	Very good keyboard with excellent feel. Very limited graphics.	Full screen editor, with Microsoft Basic.	Very little, requires expansion to CP/M level before much software available.	Discs, printers etc to full CP/M compatibility.

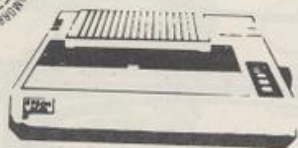
COMING SOON

Some new computers will be launched prior to Christmas and they will have varying degrees of success in achieving a place in the market. The following group is my assessment of the machines based on a brief encounter.

COMPUTER	Hardware	Operating System/Basic	Software	Accessories
COMMODORE 16 £140	The replacement for the Vic-20. Nice keyboard, good sound.	Better Basic but a very conservative specification.	Can't help but be good. Initially certain to be cartridge and expensive. There may not be a UK driven cassette base this time.	All Commodore accessories should fit.
ENTERPRISE £250	One year on from initial showing, the impact is considerable less. Whether a better buy than Amstrad is doubtful. Keyboards on the machine I've seen poor.	Good Basic but the competition is no longer overawed by the specification.	Bound to be good, but whether there will be sufficient to sustain the machine is questionable.	Coming soon.
COMMODORE +4 £250	Very nice feel to the machine with a good keyboard. Sound facilities not up to those of the CBM-64.	4 very simply built in packages, but they are quick and usable. Better Basic than 64. Packages are word processor, spreadsheet, database and business graphics — no sprites.	Certain to follow 64 standard, only question is the availability of cheap cassette-based software.	Some differences in the connectors may mean some new accessories. Joystick ports are different etc.
MSX £250	Can be bought in any shape, colour to suit taste. Real keyboards, moving key. From 16K upwards memory.	Bound to become THE home micro standard with the ability to run CP/M software when expanded.	Already substantial and before long all new games will be here first.	Everything including the new quick discs.

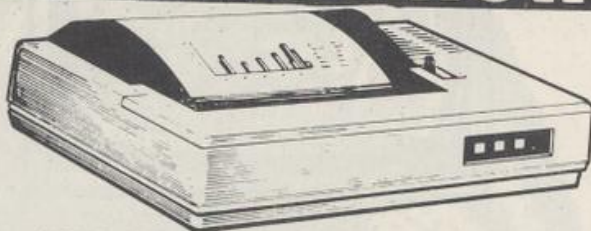
**Printer Problem? 0730 68521 any day
including Sunday and we will sort it out!**

EPSON PRICE SPECIALS



EPSON RX80 (DOT MATRIX)	£249	£199	+ VAT = £228.85
EPSON RX80FT (DOT MATRIX)	£285	£229	+ VAT = £263.35
EPSON FX80 (DOT MATRIX)	£438	£324	+ VAT = £372.60
EPSON MX100 (DOT MATRIX)	£475	£369	+ VAT = £424.35
EPSON RX100 (DOT MATRIX)	£450	£389	+ VAT = £447.35
EPSON FX100 (DOT MATRIX)	£569	£499	+ VAT = £573.85

NEW! Canon PW-1080A £289.00



+ VAT = £332.35

80 cols; High speed printing, 160 CPS; bi-directional logic seeking; fantastic 27 CPS near letter quality; 23 x 18 matrix; very quiet - less than 60 dB; 4, 5, 6, 8 10, 12, 17 CPI; down loading for user-optional characters; high resolution graphics; handles various forms, roll paper, fan fold, single sheet and multipart copy paper.

ALSO AVAILABLE THE CANON PW1156A as above but 156 cols **£399.00** + VAT = £458.85

PHONE 0730 68521 INCLUDING SUNDAY!

JUKI 6100 just £329 + VAT = £378.35



20CPS: Bidirectional & Logic 10, 12, 15 & Proportional Spacing; Wordstar compatible 2K Buffer; 13 inch Platen Underline; backspace & lots more Centronics Interface Standard

**OPTIONAL RS232
TRACTOR AND
SHEET FEEDER**

SHINWA CP80 £179.00 + VAT = £205.58



Friction and tractor feed as standard. 80cps. Bi-directional logic seeking 13 x 9 dot matrix giving true descenders, sub and superscripts Italic printing and auto underlining Condensed, emphasised, expanded and double strike (can be mixed in a line). Parallel interface fitted as standard

**WE WILL MATCH ANY GENUINE PRICE ADVERTISED
SCI(UK) IS NEVER BEATEN ON PRICE**

**MANY MORE PRINTERS
AVAILABLE 1,000s OF
BARGAINS
SEND NOW
FOR THE
FAMOUS
SCI(UK)
CATALOGUE**



24 hour nationwide delivery by Securicor £9.50 + vat. Bankers Orders; Building Society Cheques; Postal Orders; - same day despatch. All orders covered by the Mail Order Protection Scheme. Nationwide maintenance contracts arranged. Educational discounts very welcome.

**FIDELITY 14" COLOUR
MONITOR &
COMPOSITE VIDEO**



£189.00

+ VAT =
£217.35

We have interfaces for all types of computers, including CBM 64, Vic 20, APPLE, TRS 80, IBM, BBC, SPECTRUM, QL ETC



SCI(UK)
TEL: 0730 68521

**FREEPOST
(No Stamp Needed)
PETERSFIELD
HANTS GU32 2BR
TELEX 86626 MYNEWS G**

**DEALER ENQUIRIES
WELCOME WRITE
FOR DETAILS
PERSONAL CALLERS
WELCOME**

12 HIGH STREET, PETERSFIELD, HANTS GU32 2 JG

URGENT ORDER
PLEASE SUPPLY
Name _____
Address _____
Credit Card _____
Number _____
STAMPS FREE POST
PETERSFIELD, HANTS GU32 2BR

First, a question.

Who do you think are the world's most avid consumers of microcomputers?

The ingenious Japanese?
The fashionable French?
The acquisitive Americans?

Believe it or not, it's we British who own more micros per person than any other nation on earth.

Yet, despite its amazing impact, the microcomputer has only just begun to scratch at the surface of our lives. Without doubt, the best is yet to come.

Use and Abuse.

In several recent surveys, some astonishing facts about micro use and abuse were revealed.

It was discovered that the micro is hopelessly under-utilised. If you're already a micro owner, your own experience may well confirm this unhappy state of affairs.

Brainpower. A source of knowledge.

For thousands of years, the key to self improvement has been in the hands of the written word. Now, thanks to the Brainpower range, it's very much in the hands of the micro.

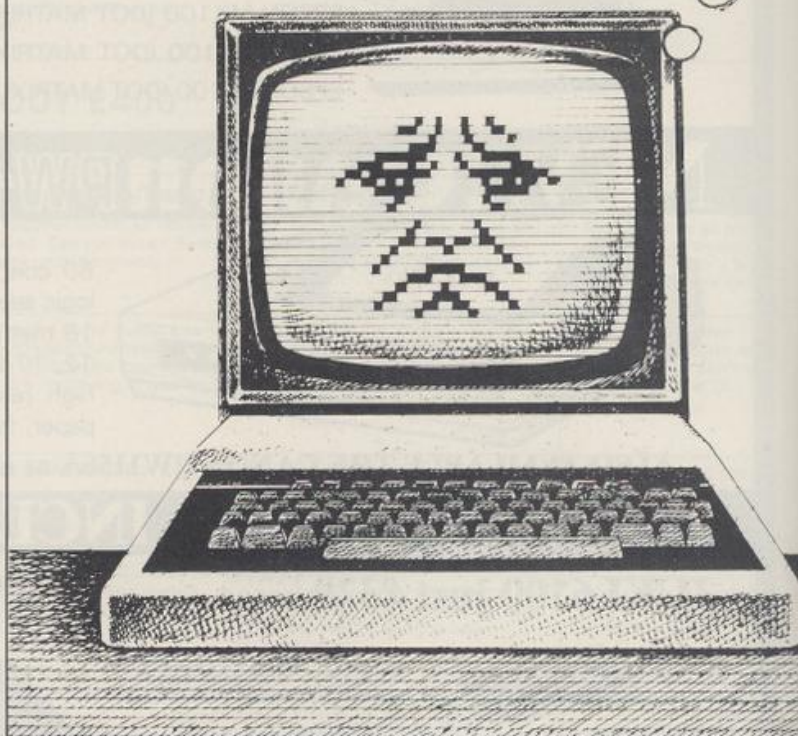
As the Brainpower range demonstrates, this does not require prior knowledge of micros, or how they work.

The Brainpower concept has been devised as *integrated* applications and educational software. And its aim



Each Brainpower title provides a unique three part package: an applications program; a teaching program and an illustrated manual and interactive tutorial - integrated applications and educational software.

WHEN WILL HE STOP
USING ME LIKE A TOY AND
START USING ME LIKE
A COMPUTER ?



Now you and your bring out the best

is to stretch both your mind and your imagination.

It offers a unique way to realise your own full potential and that of your micro. In a way you could never hope to achieve from the printed word alone.

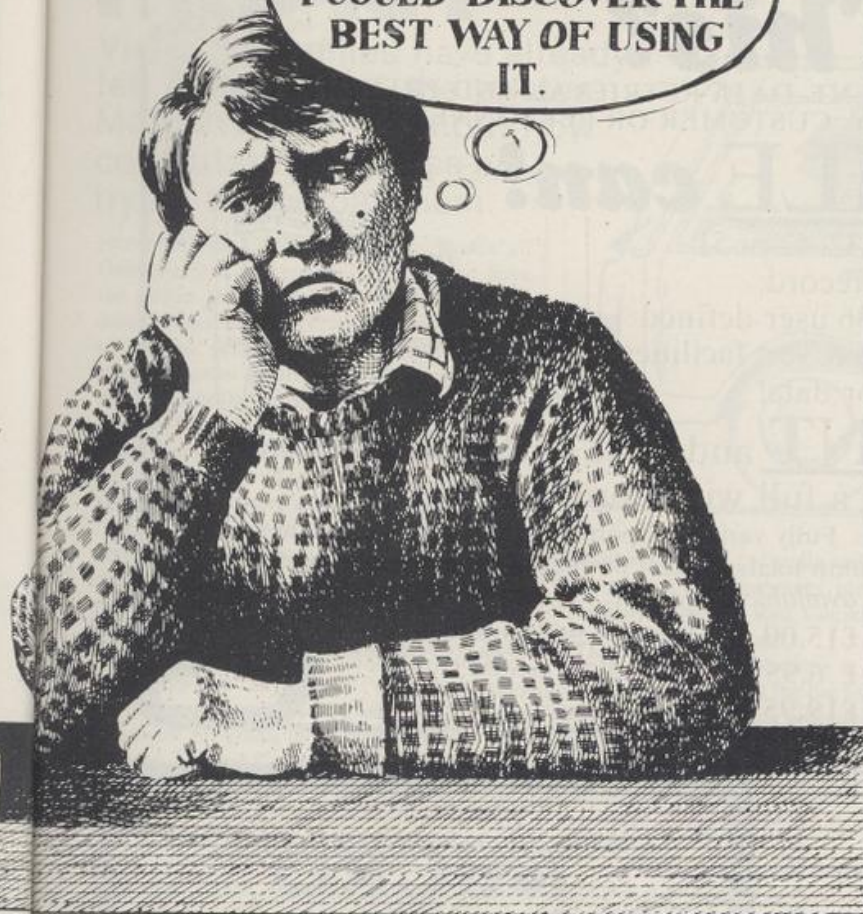
In this respect, the Brainpower range stands on its own.

A unique concept.

All the Brainpower titles share one thing in common, apart from their stimulating subject matter, that makes them unique.

You will find each title comprises three distinctive elements: A teaching program that helps you to get to grips

IKNOW HE'S GOT A
BRAIN IN THERE. IF ONLY
I COULD DISCOVER THE
BEST WAY OF USING
IT.



your micro can best in each other.

with the subject at your own pace. An applications program to put what you learn into action. And finally, with each package, you get an expertly written book and interactive tutorial.

	SPECTRUM 48K	BBC B Tape	BBC B DISK 40/80 Track	COMMODORE 64 Tape	COMMODORE 64 Disk
Tick your choice	£14.95	£19.95	£24.95	£19.95	£24.95
Decision Maker		N/A	N/A		
Numbers at Work		N/A	N/A		
Star Watcher		N/A	N/A	N/A	N/A
Entrepreneur		N/A	N/A		
Project Planner	N/A				
Forecaster	N/A				

Please add £1.50 for postage and packing

* I enclose a cheque or postal order, crossed and made payable to Triptych Publishing Ltd for £

* Please debit my Access/
Barclaycard, number



STAR WATCHER

The secrets of the heavens are yours. Isolate all the constellations as well as main stars for easy identification. Even turn stars and constellations on and off at will. Screen by screen, you will see exactly how the 1,500 brightest stars move through time and space. And all from any point on the Earth's surface at any time of the year.

Star Watcher is without doubt the definitive home observatory.

DECISION MAKER

Should you buy a new house? Change jobs? Have children? Start your own business? Such decisions should not be taken lightly. Armed with Decision Maker, you can be quite sure of examining every avenue, and arriving at a rational, structured answer.

If you value the way you run your life, you need Decision Maker.



NUMBERS AT WORK

Tackle all the number problems you're likely to face in daily and business life. From straightforward multiplication and division of fractions, through decimals, percentages, ratios, mark-ups and margins to compound interest, depreciation, VAT and PAYE.

Numbers at Work gives you a distinct edge, since you will be able to both understand and manipulate numbers at will.

PROJECT PLANNER

Project Planner teaches you how to divide even the most complex project down into meaningful components. Learn how to determine the length and importance of every single task, and those elements critical to the fulfilment of your plan. Even anticipate problems you hadn't envisaged.

You have the measure of any situation because you have the fullest possible grasp of all the factors which affect it.

FORECASTER

Forecaster takes the guesswork out of forecasting, by accepting that tomorrow's events will be best predicted on the basis of today's facts. Armed with Forecaster, sales targets and growth trends, even sporting events and election results can be accurately and very quickly predicted.

Invaluable to you in both your private and business life.

ENTREPRENEUR

Entrepreneur teaches you all the steps required to plan and start your own business. It will forecast your first 18 months' cash flows, generate your Profit and Loss Account and Balance Sheet. Help you in discussions with your bank manager and partners. Explain the notions of assets, liabilities, overheads, working capital, cash flow and break even point.

Invaluable to anyone who is planning a business venture.

NAME

ADDRESS

POSTCODE

TELEPHONE

SIGNATURE

Send to: Triptych Publishing Ltd, (TBL Book Service Ltd) FREEPOST, CAMBERLEY, SURREY GU15 3BR. All goods fully tested and returnable if in any way defective. Allow 28 days for delivery. *Delete as applicable.

BRAINPOWER

for spectrum 48k

With MYRMIDON'S
Micro-Print[®]
up to 51 columns!

MASTERFILE *can!*

Works with most popular printer interfaces. Fully variable report widths (over 100 columns) and lengths. Powerful numeric editing and column totals. Almost no reduction in space available for data. *Many more products available. Send SAE for details!*

Many more products available. Send SAE for details!

MASTERFILE version 09	£15.00
MF-PRINT	£ 6.95
MASTERFILE with MF-PRINT	£19.95

*All programs mailed 1st class by return.
Prices include VAT and postage within Europe.*
New Address: Campbell Systems
(Dept.YC) 57 Trap's Hill, Loughton,
Essex, IG10 1TD, England 01-508 5058



SPECTRUM 48K	COMMODORE 64	BBC 'B'	
FULL THROTTLE	5.95 FLIP & FLOP	7.75 FRAK	7.85
3D TANK DUEL	5.20 MANIC MINER	6.50 OVERDRIVE	6.80
LORDS O' MIGHT	8.50 EVIL DEAD	5.90 FORTRESS	7.65
CRUISE	5.35 ASTRO CHASE	7.75 STOCK CAR	6.80
MANIC MINER	4.95 BLAGGER	6.50 AVIATOR	11.97
SABRE WOLF	8.25 BEACH HEAD	5.90 MR. WIZ	6.90
BLUE THUNDER	5.85 PITFALL	8.20 CLASSIC ADVENT	6.80
STAR TRADER	4.85 DALEY'S DECAT	6.85 THE MINE	6.80
JET SET WILLY	4.75 MONTY MOLE	6.85 DUDE RIDER	6.80
MUGSY	5.95 VALHALLA	11.50 HOBBIT	11.97
WAR O' T WORLDS	6.75 AZTEC CHALLENGE	7.50 SPOOKS & SPIDERS	6.75
PSYTRON	6.50 COCO	6.50 E A T I E S W I N	N 3
CAVELON	4.95 SON OF BLAGGER	6.50 STAR STRIKER	6.90
FIGHTER PILOT	6.35 HULK	8.50 ZALAGA	7.65
JACK & BEANSTALK	4.95 STRIP POKER	8.50 GIBBURNS CASTLE	7.45
TRASHMAN	4.75 BOZOS NIGHT	5.50 GHOUL	6.80
ROLLING TYRES	4.95 DEATH STAR INT	8.50 JCB DIGGER	8.85
MONTY MOLE	5.85 MISSION 1	8.50 TWIN KING VALL	8.80
MISSION 1	5.85 HERO	8.50 CYCLOP ATTACK	8.20
RESCALLION	5.85 DARE DEVIL DEN	6.95 DROGNA	8.65
GIANTS REVENGE	5.85 AUTOMANIA	6.85 FOOTBALL MGR	6.80
ATIC ATAC	4.75 BLACK HAWK	6.90 BATTLE ZONE 2000	6.40
KOSMIC KANGA	4.95 WARLOCK	7.00 BEETBEE	7.23
AD ASTRA	4.95 ADVENTURE QUEST	8.60 BLAGGER	7.09
NIGHT GUNNER	5.75 JUNGLE ADVENT	8.25 BRAINSTORM	7.45
ANTICS	5.75 SHEEP IN SPACE	6.40 CAS OF RIDDLES	6.45
HOBBIT	11.45 TROLLIE WALLIE	5.95 CHUCKIE EGG	8.75
HULK	8.50 R MUTANT CAMLS	6.40 DARE DEVIL DEN	6.69
FOREST AT W/END	4.50 STAR TROOPER	5.75 HULK	8.45
S.O.S.	5.85 ENCOUNTER	8.75 METEORS	6.95
DUNDEON ADVENT	8.75 FRASHMAN	8.50 FRANKLINS TOMB	6.35
ADVENTURE QUEST	8.50 BLUE THUNDER	5.85 TANKS	6.95
T'DO LOW LEVEL	4.75 ANDROID II	5.90 SPECIAL OFFERS	
FOOTBALL MNGER	5.55 GILLIGANS GOLD	5.75 While stocks last	
MOON ALERT	4.90 AZTEC CHALLENGE	7.50 TIMETREK	2.98
AUTOMANIA	5.75 CYBERTRON MISM	6.85 ZARM	2.98
BLACK ALLEY	4.75 GHOULS	6.85 ASTEROID STORM	2.70
HARRIER ATTACK	4.95 P BEAR TAPES	6.95 ALIEN SWIRL	2.70
THE INFERNO	5.50 DATA PRO	8.75 DEMON DEC'TOR	2.70

Order now and receive our special savings offer

PLEASE STATE WHICH MICRO

S.A.E. FOR FULL DETAILS

Chq/P.O. to:

STARBYTE

Dept A, PO Box 91, Rickmansworth,
Herts WD3 6JB

70-71 Wilton Road, Victoria, SW1
(Three minutes walk from Victoria Station)

- * All popular Home Computers including BBC, Spectrum, Commodore, Oric, Amstrad etc.
- * Software (over 1500 popular titles)
- * Accessories (Printers, Disk Drives, Monitors, Joysticks etc., etc.)

*** SPECIAL OFFERS ***

BBC 'A'	£249.00
MEMOTECH (MTX 512)	£249.00
ATARI 400	£ 79.00
ATARI 800	£149.00
DRAGON 32	£129.00
APPLE IIe + DISK DRIVE + CONTROLLER	£749.00
CABLE MONITORS	£150.00

Bargain prices on selected software

All offers subject to availability, prices inclusive of V.A.T.

(HURRY! LIMITED STOCK!)

Open Monday-Saturday 10am to 6.30pm
Telephone 01-630 5995

THE £100,000,000 ROBBERY

PIRACY

Video companies have already felt the power of the pirates. Meirion Jones finds out how computer companies are trying to combat them.

NOT SINCE Johnny Kidd had them *Shakin' all Over* nearly a quarter of a century ago have the pirates been such hot news. Everybody's doing it from the market traders selling bottles of dubious yellow coloured water under the misspelt names of famous French perfumes to the upmarket jewellers selling bogus Cartier watches faked in Mexico.

As Terri Anderson of the British Phonographic Industry which has led the campaign against audio cassette counterfeiters explains "the whole business of intellectual theft is getting out of hand — there can hardly be a consumer product that you can't buy a pirated version of — shoes, jeans, records, software..." Even some software house heads admit to the temptation. "If you could photocopy cars" says David Potter of Psion — the company that has sold over 500,000 Flight Simulator programs to Sinclair owners "we'd all have Ferraris."

All the problems that the computer industry now has with piracy — an unauthorised copy of a program is made every three seconds — were experienced first in the audio and video industries. "Two years ago" as Peter Duffy, Director of Investigation of the film business's Federation against Copyright Theft says "every feature film that was released was pirated that week or before it came out".

The worst case was ET which was seen in millions of British homes, months before it was even premiered in this country. Unlike British software houses which originally concentrated their wrath on schoolkids making occasional copies to swap with friends, FACT went for the big boys. In alliance with BPI which was cracking down on audio copying they helped force through the 1983 amendment to the Copyright Act which Duffy says "totally transformed the position".

Raids on counterfeiters put many of them out of business with £2,000 fines and two year prison sentences as a deterrent. Projectionists hurrying out of the cinemas late at night as the last strains of God Save the Queen died away were ambushed by police before they could make an undetected overnight copy for the video pirates.

Audio tape counterfeiters were also hit hard by BPI raids although it is still waging a "Home-taping is killing music" campaign against casual copiers and demanding a levy on blank tape to reduce the margin between buying an album on cassette and taping it from a friend. But as the 1983 law has made it more difficult for the counterfeiters to make a



dishonest living out of audio and video so they have moved into computer piracy where as Quicksilver director Rod Cousens points out "the law is a grey area".

Now that organised crime is moving in to computer game piracy the big software houses are taking a less hostile attitude to schoolkids who make a one-off swop for a friend. "Help us smash the counterfeiters and we won't send the police in on search and destroy missions to the home of every Spectrum owner" is the message.

The Federation against Software Theft — FAST — has been set up by the likes of IBM, Acornsoft, Sinclair, Microsoft, WHSmith, Thorn EMI and Virgin to get the same legal protection for software that already exists for records and videos. Nicholas Lyell the Member of Parliament for Mid Bedfordshire signalled the new initiative with a Ten Minute Bill in July which increases the chances that one day it will be made law.

He told Parliament "The video pirates who used to make pirated copies of video tapes and

films, and whose activities are now being substantially curbed by the Copyright Amendment Act 1983 are now turning their attention to the piracy of software." He pointed out that "At least one operator has his own factory with sophisticated duplicating equipment and a substantial distribution network." He also explained the new realistic mood of the software houses "We are not after the schoolboy, but we are after the commercial pirates."

Industry figures like Quicksilver's Rod Cousens now see making copies for swaps as "an occupational hazard" which needs to be stopped by "technological advances" such as the speed loaders which make audio copying more difficult, and increased use of discs and cartridges. Anyone copying "for commercial gain" will feel the full force. Quicksilver was one of a dozen companies which backed August's Arctic co-ordinated raids in Hull on small-time operations advertising their products in local papers.

Zap clubs too are on the target list of the companies. "They should be hit" says Mike Dixon of Frontrunner software — part of the K-tel group. Schools are blamed by many companies for not setting a good example. "Teachers are the worst offenders" according to Randal Robertson of FAST. He blames this piracy "in the education field as one of the main reasons for the lack of good educational software". Companies are unwilling to invest in development if they are going to sell insufficient units to cover the cost. That's why Randal says "in the short term the user may gain but in the long term he will lose out."

The new conciliatory mood of software houses to their customers — instead of regarding them as the enemy seems to be paying off. Quicksilver has been surprised how many of the members of its Gamelords club have volunteered information to their Super Pirates Squad — which has helped to squeeze out some of the counterfeiters.

PIRATE HOTLINE

We want to know if anyone near you is selling counterfeited computer games. We are not interested in Johnny next door who has made one copy of an outdated game but in people who are making money by stealing other people's work. You can often tell pirated tapes by their lack of identifying marks on the cassettes — for instance the butterfly mark on Quicksilver products. Phone Your Computer Pirate Hotline on (01) 661 3465 and we will treat any information you give us in confidence.

BREAKING AND ENTERING

Confessions of a pirate. Our old friend Henry Morgan reveals the tricks of the zapper's trade, smashing the protection that hides program secrets.

HACKERS OFTEN derive as much pleasure from defeating a company's protection mechanisms then breaking into the program, altering it to taste and making a back-up copy as they do from actually playing the thing, more so in some cases. This article specifically looks at some of the protection mechanisms applicable to the Sinclair Spectrum, but the principles and the moral of the story apply equally to all home computers.

Way back in 1982, when the first commercial games were marketed for the Spectrum, very few authors bothered to protect their programs. It seems that software piracy had not been heard of. These early programs offered no challenge to those who wished to copy them, all that was necessary was to have sufficient knowledge to read a program "header". This is the very short burst of 17 bytes which follow the first "tone" when a program block is loaded into a Spectrum, and comprises the information which the computer needs to know about that block; that is whether it is in basic or machine code, which part of memory it is to be loaded into, how much there is of it, does it auto-run and so on.

It is very easy to isolate and read headers, and so no Spectrum program can ever be made absolutely secure. Most software loads in two or more sections, all that was needed to copy a program back in those days was to Break into the Basic block, save it with the appropriate line to make it auto-run then load the code block and save it defining the start and length, all this information is available in the headers.

Of course it wasn't long before software houses realised that their work was all too easy to rip-off, and so a number of ingenious mechanisms began to appear to stop the home

user from being able to break into the software.

Two simple mechanisms which soon appeared were the DF-SZ and the ERR-SP. I will explain what these are. If you read the Spectrum manual, you will find a section on the "system variables".

System variables, also known as run-time variables, are numbers held in a special part of the computer's memory whose only purpose is to allow it to know what it is doing and what is going on inside it. DF-SZ is a good example of a system variable, it lets the Spectrum know how many lines are to be reserved in the lower portion of the screen for reports. Normally there are two lines, and so DF-SZ holds the value 2. DF-SZ can be altered by POKEing a different value into 23659, which is its address in the system variables area. If its value is changed to 0, then there will be no spare lines available for the reports such as Break to be written, and the computer crashes if one is encountered. So you cannot just break into the program.

ERR-SP is a little more complicated in that it occupies two locations, 23613 and 23614. It points to an address in memory where an instruction is waiting to be performed if a report such as Break or Stop needs to be produced. It is very easy to point this variable to a part of memory which causes spectacular crashes if the program is broken into, simply by fiddling with the values using the Poke command. These two mechanisms will stop anyone from successfully breaking into a Basic program, but the Spectrum has a simple device to defeat them.

A Basic program can be Merged instead of Loaded, and instead of auto-running just sits there waiting for a hacker to list it! Clearly DF-SZ and ERR-SP were inadequate on their own as real protection.

As you know, blocks of machine code are normally loaded in and then run by short Basic programs which precede them, using a Usr command. Since it is so easy to disable any protection present in the Basic block, software houses had to look for methods of protecting the code itself.

Load in short bursts

Some programs can be found which load in very short bursts of bytes after the main block of machine code has been loaded, these serve to protect the main block which will crash if they are not present. Often they are mini programs themselves which modify the code in some way, either by providing data or by



Henry took just half an hour to make a copy of Imagine's Zoom.

altering its position in memory. A determined copier will use his knowledge of header reading to simply load each section in and then save them sequentially, but wait... the copy crashes when run.

This is usually because of another system variable, Frames. This is actually a clock, it is incremented 50 times per second and the value is therefore constantly changing. Frames occupies three locations, although only one is usually checked by the protection mechanism. How does it work? A short block of three bytes is loaded into Frames, which will immediately begin updating the values. A short time later, one of the first set of instructions in the code block will compare this value with a pre-determined value held somewhere, it doesn't matter where, in memory.

If the result is not what it should be, that is if it was a copy then the program will direct the computer to do a system reset. This is not a difficult mechanism to disable, indeed there are several methods which hackers can and undoubtedly do use. Those with no knowledge of machine code will normally alter the Basic loader so that the block is loaded into Frames irrespective of where it was saved from. A more elegant approach is to disassemble the offending section of code and nullify it.

So, we see that the headers preceding blocks of code give the game away every time. It wasn't long before programs came on the market featuring sections of code which



Ant Attack: hard to crack.





loaded in without headers. To demonstrate how this works, it is necessary that you understand a little machine code, but do not worry, I shall explain all. The Spectrum Rom is actually a machine-code program that carries out all the Basic commands, including those involved in loading and saving software. Indeed, a large chunk of Rom is devoted to these procedures.

Save a block

It is quite possible to save a block of memory and it doesn't matter whether its Basic or code or whatever without a header, as long as the microprocessor, the computer's brain, is first told some basic facts about what you are doing. This has to be done in machine code, since there are no Basic commands that will do the job. The microprocessor — in the Spectrum its a Z80A — can be thought of as a chest of drawers, with the drawers in two rows, and given letters, A B C D E etc. These drawers are actually called registers, and registers next to each other can be paired if necessary, eg BC, DE. On its own a register can hold a number from 0-255, but a pair can hold 0-65535.

For a block to be saved without a header, the A register is loaded with the value 255, the IX register is given a number corresponding to the start of the block, the DE register pair is told the length of the block and the Rom save routine is called at location hex04C2, which by-passes the header mechanism.

Such headerless sections are themselves loaded in not by a Basic loader, but by a block of code.

The instructions which do so are extremely simple, again the A register is given the value 255, the IX register to a position of memory where the program is to go to and the DE register pair the length. Also, the Carry flag must be set, the F or Flag register is a sort of microprocessor system variables, Carry being one of the variables, that is, given a value of "1", and the Rom routine called at hex 0556.

The headerless system is ingenious, but it still relies upon a section of code which must be loaded in the normal way, and this is vulnerable to anyone with a disassembler. An increasingly popular trick is to load in a block of code, often without a Basic loader, which

apparently auto-runs itself. This is a very simple technique, but it can be very effective if combined with headerless sections. How does a block of code autorun? As you might expect, it is due to our friends the system variables. You now know that these are continually updated by the computer and in effect at any one moment in time hold a complete record of the state of the computers memory.

If a block of code is saved so as to include the system variables the Basic program area and also the machine stack, a few bytes found just below Ramtop, it will run when loaded back in from where it left off — code blocks which autorun include a USR command just after the save. For instance:

```
10 SAVE "NAME" CODE 23552, 4000
20 RAND USR 27000
```

where 23552 is the start of the system variable.

Copying a program saved in such a fashion is actually quite simple, and so it is really no deterrent to the hackers. If the program is not too long, a budding pirate could simply clear Ramtop to a suitably low address load the code above it and save from there.

When you want to play the thing, you merely load it back to the original address.

If the program length is too long to allow Ramtop to be covered to a sensible level, the pirate merely needs to generate an error report — but how? Quite simply, he or she loads the block in using either a machine coded loader, as previously described, with a length speci-



PIRACY

fication set too high. On encountering insufficient bytes on the tape the computer would be put back into Basic, allowing the hacker to continue from there. Easy isn't it?

But you say, what if DF52 or ERR-SP had been previously set? If you remember, the save routine produces a report in the lower screen when actuated, and so no auto-run code block can have these mechanisms. Unless it is a headerless block!

What does one do if the program block occupies the full length of Ram from 16384 the start off screen Ram to 65535 P-Ramtop. Again machine code is resorted to, but this time a short program is written from within system variables to load the program as a headerless block from 16384 to 65535 but excluding those bytes occupied by the loader. Such programs, complete with headerless files are no longer rare.

All the mechanisms that I have described, and one or two I still have up my sleeve, cannot stop a potential pirate from connecting up two cassette recorders and simply dubbing the programs. What they do however is make life awkward for the hacker. It does nothing to stop the large scale criminal pirates who are the ones that actually defraud the companies of their money by copying tape to tape. I do not believe that schoolkids or hackers defraud the companies of much revenue, simply because I am sure they probably spend all their available pocket money on games anyway, and even if they do pirate a few copies, in most cases simply because they've already spent their money.

The cake is only so big. Is there a system then that is fair to the hacker that actually buys the tapes, but makes life awkward for the large-scale pirates? There is. Owners of Jet Set Willy by Software Projects, or Night Gunner by Digital Integration will have noticed a protection mechanism requiring the input of a code before the game could be played — once again it is easy to nullify such a mechanism but the long scale copiers who actually need to mimic both the game and cassette inserts need to go to extra trouble — perhaps they won't bother. Mathew Smith with his Jet Set Willy could have made life difficult for the hackers with headerless files and so on, but chose not too — and witness the result.

Immense interest was generated in his game leading to all manner of Pokes being published in many computer magazines, which I am sure generated more sales revenue in turn — free advertising. In conclusion then, what is the hackers view?

The hacker probably likes a bit of a challenge, but no unfriendly 48K headerless autorun code blocks. He likes to dabble around in the code, and may perhaps make a back up copy or two. How much does this defraud the software company? Not much. The only mechanisms so far which actually inhibits the large scale tape pirates is the colour code as seen in Jet Set Willy — and this is no obstacle for the hacker. So, 10 out of 10 for Mathew Smith and his fertile mind, I will certainly be looking out for his next offerings.

IMAGINE: WHAT WAS THE NAME OF THE GAME?

In 18 months Imagine shot from nowhere to the top and back again. Many blamed piracy for the collapse. Imagine's operations director Bruce Everiss disagrees...

THE POPULAR MISCONCEPTION of Merseyside is of a riotous Toxteth backing onto strike-bound docks. People see it as a fluke that the area has been the centre for pop music for the last 20 years. Now Liverpool's emergence as a leading force in the micro industry seems somewhat surreal.

The reality is that Merseyside has a fair share of the electronics industry with major companies such as Plessey and Marconi. The area also has an unfair share of traditional data processing with lots of big installations such as the National Giro, Royal Insurance, Littlewoods, the Ministry of Defence, BICC and Unilever. A further factor is the excellent reputation of the computer departments at Liverpool University and Liverpool Polytechnic and also the private sector training of computer staff at KBS.

Against this background it is not surprising that one of the first computer stores in Britain was set up in Liverpool and traded successfully in 1978. Microdigital's customers set up some of the earliest and most enthusiastic computer clubs in the country. Microdigital's staff often left to set up or work for new microcomputer firms, spawning an industry. Two well-known ex-Microdigital staff are Eugene Evans and Mark Butler. Microdigital was absorbed by Laskys in 1980 which resulted in yet more staff leaving to work elsewhere.

Among the Liverpool companies was one of the first games software houses, Bug-Byte, owned by Tony Baden and Tony Milner. Then, as now, the two Tonys ran their business cautiously, preferring safe gradual growth. Two staff at Bug-Byte, Mark Butler the sales manager and David Lawson a programmer, did not agree with this policy and sought a more aggressive approach.

Both were offered, and turned down, a share in the ownership of Bug-Byte. Due to the clash of personalities David Lawson was given notice in late 1982 followed by Mark Butler who left of his own volition. They formed Imagine Software.

Knocked on doors

David wrote a superb Galaxians/Invaders-type shoot-'em-up game, Arcadia, for the Vic-20 and Spectrum. Mark Butler knocked on doors and sold it. There was a shortage of software in the shops at Christmas 1982 which Imagine met by doing deals with duplicators and by trucking software all over the country. Arcadia went to number one and stayed there. Imagine invested the proceeds of its success in advertising and started a high-profile image that was to remain.

The economics of games software is like high-stakes gambling. To launch a game properly costs anything from £10,000 upwards

and if it fails all is lost. If it succeeds it is a licence to print money as the manufacturing cost is so low compared to the retail price. Through 1983 all Imagine releases succeeded and thus Imagine became the undisputed number one games software house.

David and Mark found themselves in a situation that they were not equipped to cope with, catapulted from obscurity to fame and fortune in a few short months. Realising this they sought advisors, both professional and management. This advice, by and large, made Imagine more successful still. Eventually, however, by taking wrong advice and ignoring sound council, decisions were made that led to the downfall of Imagine.

Mistake number one was that Mark and David believed that Imagine's success proved them to be good businessmen and that they could thus apply their talents to other businesses. Against advice they tried to run an advertising agency, Studio Sting, along with Steven Blower. They gave Steven 10 per cent of Imagine and in return each owned a third of Studio Sting. Studio Sting failed. The reasons behind the failure are many but include the following: First, the relationship between the two companies was never defined and areas of responsibility were never laid down; second, there was insufficient management resources to have any control over events or to institute systems; third, when things started going wrong the relationship between Steven and his co-owners broke down.

Mistake number two was not employing a professional accountant until just before the end, again against advice. This meant that there was insufficient financial control. It was not possible to discover whether anything was profitable or not. Money was spent without knowing whether it could be afforded. Funds were not available when they were most needed. Incoming invoices were paid without being checked.

In the beginning none of this mattered because there was no much profit to finance them — hence the downfall. The wages bill was over £50,000 a month, not because of high wages but because of the large number of employees.

The rents and rates bills were enormous because of the insistence on prestige and because of moving twice to bigger premises while still paying for the premises vacated. Comparatively little was spent on advertising.

Mistake number three was the refusal to manage technical staff. David Lawson insisted that programmers, artists and musicians were special and that any attempts of management would reduce productivity, obviously the reverse is true. While the administrative, sales marketing, accounts and warehouse staff were well managed and earned their salaries the technical staff could do as they pleased. This was excused on the basis that they worked at home or because discipline would reduce creativity. The reality was that it took over 50 technical staff to produce Imagine's products, usually late and usually with bugs still in them.

Mistake number four was to be taken in by their own publicity instead of reality. This is an obvious human failing but one which they were warned to guard against, especially as the publicity seemed to create a largely false picture. An example is to take a



Bruce Everiss and another, David Lawson, were "catapulted from obscurity to fame and fortune in a few short months."



Operations director
Bruce Everiss:
"The economics
of games
software is
like high-stakes
gambling."

programmer and make him famous; after that no matter how good he is at his job he is held in esteem because of his publicity.

Mistake number five was the Marshall Cavendish project to produce 26 games across five machines — this was worth as much as £11 million to Imagine over two years. The first problem was not to give these games sufficient priority, thus losing the contract. The second problem was keeping on the staff and therefore the overheads after losing the contract.

Mistake number six was the Megagames. After six months work and at a cost of several hundred thousand pounds the games were nowhere near completion. It was obvious that Imagine could not afford the cost of writing them never mind the cost of mass-producing the special hardware necessary. Despite this Imagine's best resources were committed at the expense of producing any good "ordinary" games to pay to keep the company going.

Internal politics

Mistake number seven was allowing internal politics to flourish. The tougher things became the worse were the politics with certain people looking after their own naked ambition at the expense of the company. Certain wives were allowed to interfere at will with the running of the company. It became difficult for staff to identify the motives behind actions.

Despite the meteoric rise and fall of Imagine, some good things have come out of it. Imagine created the market as we now know it. By deliberately having a high profile and with the use of hype, especially in the national daily press, the games software industry was born. Prior to Imagine the industry was small and fragmented with its products appealing to a small specialist audience. Imagine popularised the industry and created a switch in consumer spend. The industry has gone from mail order

to high street multiples.

Imagine led with product quality. Look at a few pre-Imagine games and be amazed at their crudity. Imagine set standards in playability, originality and use of graphics and sound that were quickly imitated by the whole industry. When Ultimate got ahead in graphics quality Imagine responded by employing professional artists to produce the bit patterns.

Imagine was departmentalised with clearly defined areas of responsibility and a well-developed management reporting system. The rest of the industry has largely followed suit.

Imagine showed the way with marketing software as a mass consumer product: Good PR is essential these days — Imagine was the first. Every new advertising idea was subsequently copied as were the insert cards.

Imagine had the first professional sales team with a sales manager, telesales and export telesales, sales and market research and an export manager. For the first six months turnover at least doubled each month. Eventually, well over half all sales were from export.

Imagine was developing a new type of product that was enjoyable as a game but which educated the player. The first such product, Sidney Meets His Match, was completed but never marketed.

Imagine was starting with the use of professional psychologists to look at game playing *per se*. By looking at the motivation the hope was to produce more playable, more addictive games.

Imagine's contribution

Imagine was looking at alternative input devices including electrodes to monitor brain waves and thus allow thought control of games.

The best thing to come out of Imagine is not yet obvious. Time will surely show that those people who worked at Imagine have a lot more to contribute to the microcomputer industry. Already, there are former staff working for Ocean, Bug-Byte and Software Projects using knowledge and skills gained while at Imagine. Many former staff have now formed their own companies doing what they did at Imagine but reaping the rewards for themselves.

Already, there are at least five new companies on Merseyside composed of these people. It is too early for any of them to have made their mark but there is little doubt that they will. A small flock of Phoenix rising from the ashes of Imagine.

NEWS

Issue 1 March 1984

IMAGINE -

A SOFTWARE SUCCESS STORY

A year after its formation in the front room of a Merseyside house, Imagine Software Limited has mushroomed into the world's largest independent company in the fast-moving world of home computer games.

...a £35,000 a year earning potential after Imagine's launch of his 'Wacky Waiters' for the VIC.

Other 'top ten' games have followed in quick succession. There have been 'cuties' like 'Ah Diddums' and 'Molar Maul' for the Spectrum, arcade-style blasters such as 'Zzoom' and 'Zip Zap' for the Spectrum, and the occasional outstanding game bought-in from other programmers, such as 'Jump' (now re-released on the Spectrum) and 'Arax' and 'Arax'.

were among the first to use the processing power of the Apple II and to rapid program development. This has now been superceded by the use of Sage 'super-micros' with disk storage and the ability to line and simplify highly complex machine code routines.

Imagine also employ their time professional artists and to work with programmers in the visual and aural new games.

For the future, Imagine is highly quoted co

Program 1.

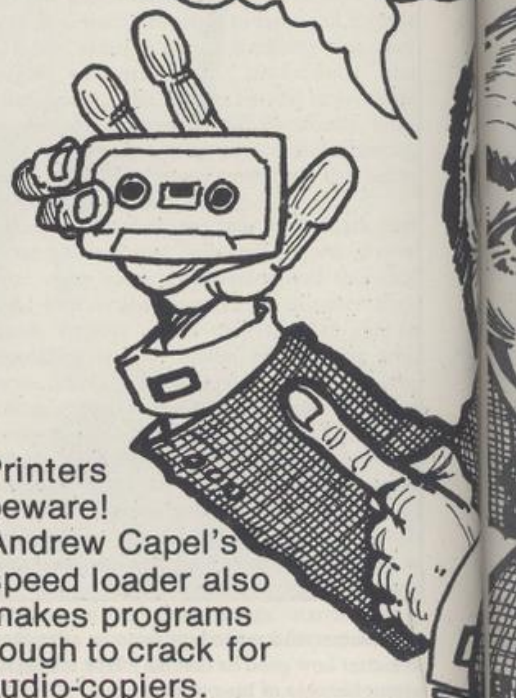
```

100 REM PROGRAM ONE : (C) AM CAPLE 1984
170 POKE53280,6:POKE53281,6:PRINT"GENERATING CODE"
180 PRINT"PLEASE WAIT"
185 PRINT"DONE" :TAB(17):"LINES":TAB(31):"TO DO" :178
190 LN=10000:ER=0:AD=49152
200 F=0:READA$:IFA$="END"THENPRINT"CODE OK":END
210 IFLEN(A$)<24THENPRINT"WRONG NUMBER OF DIGITS":GOTO300
220 T=0:L=4:GOSUB900:IFERTHEN900
230 IFAD<0THENPRINT"BAD ADDRESS":GOTO300
240 L=L+N=0
250 GOSUB900:IFERTHEN900
260 POKEAD+N,D:N=N+1:IFN<8THEN250
270 TL=T:L=4:GOSUB900:IFERTHEN900
280 IFTL<0THENPRINT"CHECK SUM":GOTO300
290 LN=LN+10:AD=AD+8:K=LN/10-1000
300 PRINT"IT":TAB(4):K:"":TAB(36):178:K:"":GOTO200
800 PRINT"ERROR":PRINT"DATA":A$
810 PRINTTAB(F+10):"1":PRINT"1"
820 POKE53280,2:POKE53280,4:GOTO820
900 C=L:D=0:FORG=1TOL:F=F+1:D=MID$(A$,F,1)
910 IFD<"0"ORD$>"9"OR(D$>"9"ANDD$<"A")THENPRINT"ILLEGAL DIGIT":ER=-1:RETURN
920 Q=ASC(D$)-48+7*(D$>"9"):T=T+Q:D=16*D+Q:NEXT:RETURN

10000 DATAC00078AD0D0DCA9008D0F008F
10010 DATAC0008DCAE06D0DCA07DCA900AD
10020 DATAC010598D0FDCAD20D049008B
10030 DATAC010018D20D0C3D008E00071
10040 DATAC020EE9011E0C280D0A50078
10050 DATAC0298E1059C602A900850077
10060 DATAC0308F4C84C080CF90530088
10070 DATAC030A59E3016A527C5200079
10080 DATAC040B009A900852685270062
10090 DATAC0484C84C0C68E9A0E8D009E
10100 DATAC05020D0E0C3688B0C68F0087
10110 DATAC0508D02A8A8F9A08858F0096
10120 DATAC060A5B349F9A629F007090
10130 DATAC068D1FBD08F4C71C0910097
10140 DATAC070FBA6FBE4FD006A500A7
10150 DATAC078FCC5FEF0B0E886F00BC
10160 DATAC080D002E6FC68A869A0094
10170 DATAC0808685840A58309CE008C
10180 DATAC09026D0F1E6274C84C0007F
10190 DATAC090A01B20A7C49005A00077
10200 DATAC0A00F850268AD20D085007C
10210 DATAC0A82A9038D20D0A900077
10220 DATAC0B085E8E526852785020074
10230 DATAC0B8A908858FA97F8D0D0A9
10240 DATAC0C0D0C0D0D0DCA9008D0E0A3
10250 DATAC0C0D0C0D0FDC9A008D0500A3
10260 DATAC0D0DCA910D0D04CA9FF00A9
10270 DATAC0D8D07DC8D06DCA4100A6
10280 DATAC0E0038D9F02AD15038D0081
10290 DATAC0E8A002A9008D1403A90071
10300 DATAC0F0C08D1503A8D129DF007C
10310 DATAC0F88501A9018D0EDCA90094
10320 DATAC100598D0FDC9A008D0D0096
10330 DATAC108DC50A58F3008AD010087
10340 DATAC110DC30F7A91E859EC60098
10350 DATAC1180278A9008D0EDC8D0088
10360 DATAC1200FDC9A97F8D0DCA9008E
10370 DATAC128818D0D0C20CE558008C
10380 DATAC130A52A8C901D008593006E
10390 DATAC138A588D901F005A930081
10400 DATAC1404CEDF586C184C2AD009C
10410 DATAC14801DC10FBA53349010077
10420 DATAC150290118691C859E8D0071
10430 DATAC158FFC9C487F024B1800A5
10440 DATAC160C93AD0F52077C4800081
10450 DATAC16805204FC4B006A900874
10460 DATAC170384C39C2A5885C10085
10470 DATAC178A58C85C2A5B929FE00A5
10480 DATAC18085B9A93C85FA9500097
10490 DATAC18885FAD90385FC85FE00A8
10500 DATAC190A90F8528A9008529007A
10510 DATAC1982099C0A50210034C0062
10520 DATAC1A030C2A063202FF1A00068
10530 DATAC1A800B94103202FFC8007E
10540 DATAC1B0C010D0F5A202A93A0074
10550 DATAC1B8204CC2A204A92D00074
10560 DATAC1C04CC2A0FFC80487F000A4
10570 DATAC1C812B1B8C93AF00C0008F
10580 DATAC1D01080F1D94103F0EC007D
10590 DATAC1D84C82C1A000893D03007A
10600 DATAC1E099FB00C8004D0F5008C
10610 DATAC1E8AD3C034A05892901007F
10620 DATAC1F0D026A5C185FBA5C20091
10630 DATAC1F885FCAD0F3F0338D3D00A8
10640 DATAC2000385FAD4A003ED3E0084
10650 DATAC2088385FAD4A003ED3E008C
10660 DATAC21085FAD5FC65FE65FE00B4
10670 DATAC218A5938529A5F85C1008F
10680 DATAC220A5FE85C2A90485280085
10690 DATAC2282098C0A05020D0C0071
10700 DATAC2302019C546029007A50059
10710 DATAC2383EA62DA4E6020EA008D
10720 DATAC240C4A5B92902D0F2A60080
10730 DATAC248C1A4C26048A92020006C
10740 DATAC250D2FF6820D2FFA9200092
10750 DATAC25820D2FFA92420D2FF0092
10760 DATAC2608D3C03206DC2CBED008F
10770 DATAC2683C034C6DC248A4A0087
10780 DATAC2704A4A2078C268290F0078
10790 DATAC278C90A900269066930006E
10800 DATAC2804CD2FF78AD0DDCA500A8
10810 LATAC2880109089501AD20D00064
10820 DATAC29049018D20D0A58B8D0080
10830 DATAC29804DC58C8D05DCAD00A9
10840 DATAC2A00EDC09018D0EDC850092
10850 DATAC2A802A50129F7850168006F
10860 DATAC2B0A868A685840A02E0086
10870 DATAC2B82A7C4900160A52006D
10880 DATAC2C0C908900020DAC4780078
10890 DATAC2C8A97F8D0DDC8D0DD00C2
10900 DATAC2D0AD14038D9F02AD150086
10910 DATAC2D803DA002A9938D14007F
10920 DATAC2E002A9C28D1503A900079
10930 DATAC2E88D0EDCA9918D0DDC0087
10940 DATAC2F0A9708588B8D04DCA9009C
10950 DATAC2F803858C8D05DC4280094
10960 DATAC300A200A9028D20D0A0006E
10970 DATAC3080EDC09018D0EDC50091
10980 DATAC310A900502A502F0FC006D
10990 DATAC318AD1DC1012C0D0F0007F
11000 DATAC32088D0EDCA908D20D0008E
11010 DATAC328A00AD01DC3007A90071
11020 DATAC3301E959E4C6DC3E1FA009D
11030 DATAC338A008A200068866020069
11040 DATAC340A201A90091E8868C0070
11050 DATAC348A802F0FC8D0EFA6009D
11060 DATAC350FBE4FD006A5C500A8
11070 DATAC358FEF08A886F8D0C800B3
11080 DATAC360E6FC4C2AC3A90085008F
11090 DATAC36802A502F0FC78A900007C
11100 DATAC3708D0EDC20E3C520D0A00F
11110 DATAC378C4586085FBA58C900A1
11120 DATAC38001F085A5F84CDEF50094
11130 DATAC388AD20D0852A9A0085007E
11140 DATAC3908EA5E8D3F03A5AF00A8
11150 DATAC3988D4003A5C18D3D03008D
11160 DATAC3A0A5C28D3E03A5E923008D
11170 DATAC3A8010A09018D3C0300067
11180 DATAC3B0FFC8C487F04EB180081
11190 DATAC3B8C93AF00AC010E0F10085
11200 DATAC3C09941034C1C38402006E
11210 DATAC3C82077C4801EA858D0094
11220 DATAC3D0303A58C8D3C0388008E
11230 DATAC3D8204FC4B00EC92D00093
11240 DATAC3E00A2077C4B00520A00C
11250 DATAC3E8C4B004A9083860A50082
11260 DATAC3F08E8D3F0338ED3D030094
11270 DATAC3F8A58C8D4003ED3E030094
11280 DATAC40090E9A402A920C010062
11290 DATAC408B008994103C0C010066
11300 DATAC410D0F8A93C85FA9500096
11310 DATAC41885FAD90385FC85FE00A8
11320 DATAC420A920852820B6C2A5006E
11330 DATAC428ED013A2008D3D030079
11340 DATAC43095FB8E004D0F6A90098
11350 DATAC43808852820B6C220190067
11360 DATAC440C5A5A8D20D0A959E008A
11370 DATAC448F00236604CEAC4C008A
11380 DATAC450C4B7B007B1B8C920082
11390 DATAC4580F51586C8C4B7B00090
11400 DATAC46014B1B838E93000D0078
11410 DATAC468C90A9008E90790050082
11420 DATAC470C910800160386020085
11430 DATAC4784FC4B029C924D0250087
11440 DATAC4802B5C48020858B9007B
11450 DATAC48808858C205CC49002006F
11460 DATAC4901860A2040688268C006D
11470 DATAC498B00EAD0F71865800097
11480 DATAC4A085B8C4C8C43860200080
11490 DATAC4A8D0BC4F018202F1A9008D
11500 DATAC4B00D20D2FFAD01DC30008B
11510 DATAC4B80A91E859E386020082
11520 DATAC4C00C4D0F0A501291F0080
11530 DATAC4C88501A90085C0186006D
11540 DATAC4D0A9102401D0022A01004E
11550 DATAC4D81860A000A008D010062
11560 DATAC4E0DC1006CA0208D00095
11570 DATAC4E8F360A9008D04D4A9008E
11580 DATAC4F0C38D0D04A9408D010081
11590 DATAC4F8D4A900A9FF8D02D400A4
11600 DATAC500A9078D03D48D05D4007F
11610 DATAC508A9F98D06D4A9418D009D
11620 DATAC51004D4A9408D04D4100071
11630 DATAC51860A90685C0A50109006E
11640 DATAC520209501A90D20D2FF0072
11650 DATAC52860A9C68D3003A9C10078
11660 DATAC5308D3103A978D32030072
11670 DATAC538A9C38D330360AD9F0091
11680 DATAC540028D1403AD0028D006C
11690 DATAC5481503A9258D04DC90085
11700 DATAC550400D05DC9018D0E0024
11710 DATAC558DC60A900858865B0091
11720 DATAC560A90185BA998385B008E
11730 DATAC568A9C558CA90C85B700A5
11740 DATAC570A90085FBA9C085FC0089
11750 DATAC578A28FA0C8A9F820D000A2
11760 DATAC580FF186056464C20420074
11770 DATAC5884F440520312E3000085E
11780 DATAEND

```

TENSE, NERVOUS
WAITING FOR YOU
NOTHING LOADS
QUICK LOADS



Printers
beware!
Andrew Capel's
speed loader also
makes programs
tough to crack for
audio-copiers.

VFL is an alternative Datassette communications program for the CBM-64. Not only does VFL improve on speed and reliability but on versatility as well. It runs in approximately 1.5K bytes, and fluctuates between 1,500 and 3,000 baud giving an average of roughly 2,200 baud for an evenly distributed file.

Here is a list of VFL's features:

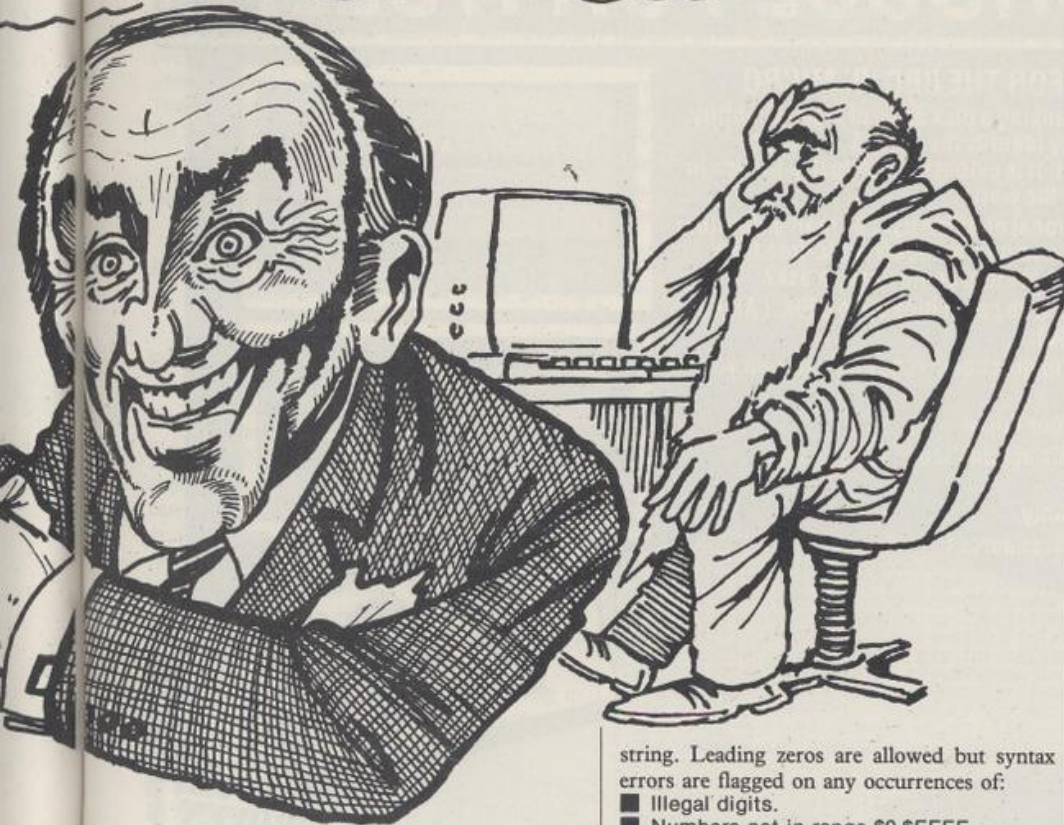
- Communicates up to 9.5 times faster than the normal kernel routines.
- Runs directly from Basic replacing the original CBM V2 Load, Save and Verify commands.
- Code may be saved within the routine to machine code.
- Code may be force-loaded to any specified location.
- Invisible loading facility, preserving the variable pointers.
- Full error reports.
- Occupies no Basic program area.
- May be called in machine code using the standard kernel routine addresses and formats.
- Visual and audio task completion signals.

```

11580 DATAC4F0C38D0D04A9408D010081
11590 DATAC4F8D4A900A9FF8D02D400A4
11600 DATAC500A9078D03D48D05D4007F
11610 DATAC508A9F98D06D4A9418D009D
11620 DATAC51004D4A9408D04D4100071
11630 DATAC51860A90685C0A50109006E
11640 DATAC520209501A90D20D2FF0072
11650 DATAC52860A9C68D3003A9C10078
11660 DATAC5308D3103A978D32030072
11670 DATAC538A9C38D330360AD9F0091
11680 DATAC540028D1403AD0028D006C
11690 DATAC5481503A9258D04DC90085
11700 DATAC550400D05DC9018D0E0024
11710 DATAC558DC60A900858865B0091
11720 DATAC560A90185BA998385B008E
11730 DATAC568A9C558CA90C85B700A5
11740 DATAC570A90085FBA9C085FC0089
11750 DATAC578A28FA0C8A9F820D000A2
11760 DATAC580FF186056464C20420074
11770 DATAC5884F440520312E3000085E
11780 DATAEND

```


US, FED-UP WITH GROWING OLD
YOUR COMMODORE? REMEMBER,
ADS FASTER THAN 'YC'
LOAD.



- Full motor control.
- Retains video output.

To link the new routines to the operating system the system vectors ILoad and ISave must be altered. A small program within VFL changes these vectors and may be called by:
SYS 50473

Once ILoad and ISave have been changed Basic will call on VFL until:

- Obviously power down.
- A system restore is called.
- A 6510 BRK instruction is executed.

In cases two and three the system call above will rechain VFL. Case one poses much more of a problem.

SAVE
SYNTAX:

SAVE [<FILE-NAME STRING>],
[<DEVICE NUMBER>],
[<SECONDARY ADDRESS
NUMBER>]

DEFAULT : NULL STRING,1,0

Only the first 16 characters of the file-name are saved on the header. Names shorter than the limit are padded with trailing spaces. When a colon is included anywhere in the file-name string it will signal the end of the file-name and the presence of two numeric parameters. These two numbers represent the addresses of the first and last bytes sent to the Datasette.

They should be written in hexadecimal, prefixed by a dollar sign and separated by a dash. Spaces are permitted between the colon and the first dollar sign, the last digit of the first number and the dash, the dash and the second dollar sign and between the last digit of the second number and the end of the file-name

string. Leading zeros are allowed but syntax errors are flagged on any occurrences of:

- Illegal digits.
- Numbers not in range \$0-\$FFFF.
- Second number is less than the first.
- Any character other than a space

between the colon and first number, first number and dash etc.

The secondary address number:

Bit 0 = 0 code relocatable on load

Bit 0 = 1 code may not be relocated and is always loaded back at the address from which it was saved.

Once your command has been accepted the usual motor tests are performed, which may result in a prompt. When the appropriate keys are closed VFL pauses for a second to allow the Datasette to reach operating speed. While the header tone is being sent the border displays static, red and cyan bars. When data is being transmitted the bars are more active, are narrower, and change to light grey and light blue. When all the data has been despatched a tone will sound and the motor is stopped. An example is:

SAVE"FRED:\$8000-\$8000",1,1

This saves one byte from address 32768 with a file-name of Fred (+ 12 spaces) and protects it from force-loading.

LOAD/VERIFY

SYNTAX:

LOAD [<FILE-NAME STRING>],
[<DEVICE NUMBER>],
[<SECONDARY ADDRESS
NUMBER>]

DEFAULT : NULL STRING,1,0

The file-names on the cassette are only compared as far as the length of the file-name in memory up to a maximum of 16 characters. Any characters over this limit will be ignored but no error will be generated. If a program is saved by typing:

SAVE"HERBIDATIOUS"

it may be loaded by typing:

LOAD"HERBI"

Again a colon is significant, but in this case only one number is expected by the syntax.

(continued on page 81)

CBM-64 QUICK LOADER

The preloader.

```
10 REM* PRELOADER : (C) AM. CAPLE 1984
20 P=PEEK(2054):IFP=43THEN80
30 POKE2054,P+1:POKE53280,6:POKE53281,6
40 PRINT"*****VFL IS LOADING"
50 FORF=1TO2000:NEXT:PRINT"X"
60 POKE56,207:POKE52,207
70 LOAD"":1,1
80 PRINT"*****VFL HAS LOADED:38":SYS50473
90 POKE56,160:POKE52,160:NEW
```

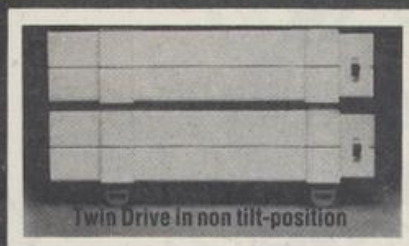

THE DISK DRIVE YOUR MICRO WOULD CHOOSE FOR ITSELF

THE TEAC 5¼" DISK DRIVE FOR THE BBC 'B' MICRO

Any self-respecting BBC 'B' Micro seeking a disk drive of high reliability and performance would immediately identify the TEAC 5¼" as the complete solution. A quality product, it is extensively industry-proven in major systems applications all over the world.

Now available for the home, educational or office user by mail order from Computamate, the TEAC 5¼" Disk Drive guarantees trouble-free high speed data access every time: and what more could a micro ask?

- Single and dual models available with capacities up to 800K. (All 80 track models are switchable 40/80).
- Supplied with leads, utility disk, instructions: ready for use with your BBC 'B' Micro DFS Disk Interface.
- Oatmeal moulded box to match your micro.
- Fully stackable, plus extending tilt-action "legs" to ease disk insertion.
- 12 months parts and labour warranty.
- Computamate is supported by the resources of a major multi-national public company.



Twin Drive in non tilt-position



Single Drive in tilt-position

From
£94 Ex VAT
INDUSTRY PROVEN

How to order:

By post – complete the coupon with your requirements and return to:
Dept. YC 11, Computamate Data Products,
Scotia Road, Burslem, Stoke on Trent, ST6 4DX
Enclose your cheque/P.O. (made payable to Computamate) or use your Access/Barclaycard number.
By telephone – ring 0782-811711 to purchase by phone (credit card holders only).

SATISFACTION GUARANTEED
OR WE WILL REFUND
YOUR MONEY.

computamate

(Computamate Data Products is a division of Thomas French and Sons PLC)

INTRODUCTORY PRICES ONLY

SINGLE DRIVES	COST (Incl. VAT)	QUANTITY	TOTAL (£)
FD-55A SS 40TK 100K	£108.10		
FD-55B DS 40TK 200K	£129.95		
FD-55E* SS80TK 200K	£135.70		
FD-55F* DS 80TK 400K	£164.45		
TWIN DRIVES			
FD-55A SS 40TK 100K	£212.75		
FD-55B DS 40TK 200K	£253.00		
FD-55E* SS80TK 200K	£253.00		
FD-55F* DS 80TK 400K	£309.35		
DUAL DRIVES (with integral power supply, available only in metal non-tilting box at present)			
FD-55A SS 40TK 100K	£301.30		
FD-55B DS 40TK 200K	£342.70		
FD-55E* SS80TK 200K	£343.85		
FD-55F* DS 80TK 400K	£399.05		
Post and Packing (First Unit)	£5.75		
Post and Packing (each additional unit)	£2.50		
*Price includes 40/80 switch			
MEDIA			
Box of 10 Diskettes 40TK SS	£18.50		
Box of 10 Diskettes 80TK SS	£21.25		
Box of 10 Diskettes 80TK DS	£27.00		
Postage & Packing per box of Diskettes	£1.00		
			TOTAL £

Post to: Dept. YC11,
Computamate Data Products, Scotia Road,
Burslem, Stoke on Trent, ST6 4DX

Name _____

Address _____

Post Code _____ Telephone _____

*I enclose cheque/P.O. for £ _____

*Please debit my Access/Barclaycard Number _____

Signature _____

(Credit Card orders must be signed by the card holder. Address above must be the same as card holder)

*(Please delete as appropriate)

For further information on these products, or for details of other exciting products, including TEAC 3½" and 3" Disk Drives, telephone 0782 811711.

Enquiries from Dealers and Educational Authorities welcome.

A black and white cartoon illustration. In the foreground, a man with a large, expressive face, wearing a dark suit and tie, is smiling broadly while holding a video camera up to his eye. In the background, another man is sitting at a desk, looking down at a computer monitor. The style is a simple line drawing with some cross-hatching for shading.

```

10 REM PROGRAM TWO : (C) AM CAPLE 1984
20 POKE53280,6:POKE53281,6:PRINT"***"
100 DIMI$(56):FORF=0TO56:READI$(F):NEXT:DIMC$(15)
101 C$(0)="-4E514[4[4E2X2[404E0X3[4[4E1X1[4]"
102 C$(1)="-":E614[4[4E7X7[404E9[4[4E8X8[4]"
103 C$(2)="-71$514[4[42$2J2[414$0J3[41]1$1J1[4]"
104 C$(3)="$*: $614[4[4$7J7[404$9[4[4[4$8J8[4]"
105 C$(4)="-L4:514[4[4:2C2[4F4:0C3[441:1C1[4]"
106 C$(5)="-.:614[4[4:7C7[424:9[4[4[4:8C8[4]"
107 C$(6)="-M4#514[4[4#2K2[4H#0K3[4]:#1K1[4]"
108 C$(7)="-/:#614[4[4#7K7[404#9[4[4[4#8K8[4]"
109 C$(8)="-[4R514[4[4T2R2S2[494[4X4[4T1R1S1[4]"
110 C$(9)="$&:R614[4[4T7R7S[424R9Y4[4[4R8[4[4]"
111 C$(10)="$B0$5A0[4$2$2A2[4V400U4[4$101A1[4]"
112 C$(11)="$":B6[4[4B707A[43409W4[4$808A9[4]"
113 C$(12)="-6045[4[4624272[4=44084[4614171[4]"
114 C$(13)="$+46[4[4444777[41449[4[4[444978[4]"
115 C$(14)="-50N5[4[452N2:2[4<4N0D4[451N1:1[4]"
116 C$(15)="$<:N6[4[44N7:7[4P4N9[4[44C4N8:8[4":DIMM(12):FORF=0TO12:READM(F):NEXT
200 PRINT"*** ** DIS-ASSEMBLER (C) AMC 1984 ***"
205 INPUT"X START ADDRESS ..... 49152#####":AD
210 INPUT"X END ADDRESS ..... 50576#####":EN
220 INPUT"X OUTPUT DEVICE NUMBER ..... 3####":DE
230 INPUT"X SECONDARY ADDRESS ..... 0####":SA:OPEN4,DE,SA
335 PRINT#4:PRINT#4," DISASSEMBLY OF:AD:"TO":EN:PRINT#4
240 D=AD:L=4:GOSUB8000:L=2:0$="" $+=D$+" ":
260 D=PEEK(AD):F$=MID$(C$(INT(D/16)),<DAND15>*2+1,2):D$=ASC(RIGHT$(F$,1))-48
270 GOSUB8000:D$=0$+D$:F$="" :N=M(MD)
280 FORG=1TO2:IFN=0THEN0$=0$+" ":GOTO291
290 AD=AD+1:D=PEEK(AD):GOSUB8000:0$=0$+" "+D$:V$=D$+V$:N=N-1
291 NEXT:ONMD+1GOTO350,350,350,355,370,310,320,330,330,340,300,340
300 D=PEEK(AD):D=AD+1+Q4*(Q/127)*256:L=4:GOSUB8000:L=2:V$="$"+D$:GOTO370
305 V$="$($+V$+",$):GOTO370
310 V$="$($+V$+",$):GOTO370
320 V$="$($+V$+",$):GOTO370
330 V$="$+V$+",$):GOTO370
340 V$="$+V$+",$):GOTO370
350 V$="$+V$:GOTO370
355 V$="R":GOTO370
360 V$="#$"+V$
370 PRINT#4,0$:"":I$(ASC(F$)-35):":V$:IFAD<ENHENAD=AD+1:GOTO250
380 PRINT#4:PRINT#4," OK FINISHED":PRINT#4:CLOSE4:END
9000 D$="" :FORF=1TO L:DX=D/16:R=D-16*DX+48:D=DX:IFR>57THENR=R+7
9010 D=CHR$(R)+D$:NEXT:RETURN
9900 DATARD,AND,ASL,BCC,BCS,BEQ,BIT,BMI,BNE,BPL,BRK,BVC,BVS,CLC,CLD,CLI,CLV
9010 DATARC,CPX,CPY,DEC,DEY,DEI,EOR,INC,INX,INY,JMP,JSR,LDA,LDX,LDR,LST,NOP
9020 DATARA,PHA,PHF,PLA,PLP,ROL,ROR,RTI,RTS,SBC,SEC,SED,SEI,STA,STD,STX,TAX
9030 DATATY,TSX,TXA,TXS,TYA,???
9040 DATA1,2,1,0,0,1,1,1,2,2,1,2,1

```

Program 2 may be used to disassemble the object code. If you use this routine to debug the code file, note that there should be no invalid op-codes before the address 50568 decimal (\$C588 hex).



ACTIVISION
Your computer was made for us.

BEYOND

CHALLENGING SOFTWARE

*Psytron...
Contender for game
of the year.
Personal Computer
News.*

*Lords of Midnight
THE game for
the Spectrum
Personal Computer
Games*

*You can
profit from
our success*

*Psytron —
Graphically
brilliant.
Daily Mail*

*LORDS OF MIDNIGHT
the thinking persons
computer game
Micro Adventurer*

*Psytron - An
enormous program
Crash.*



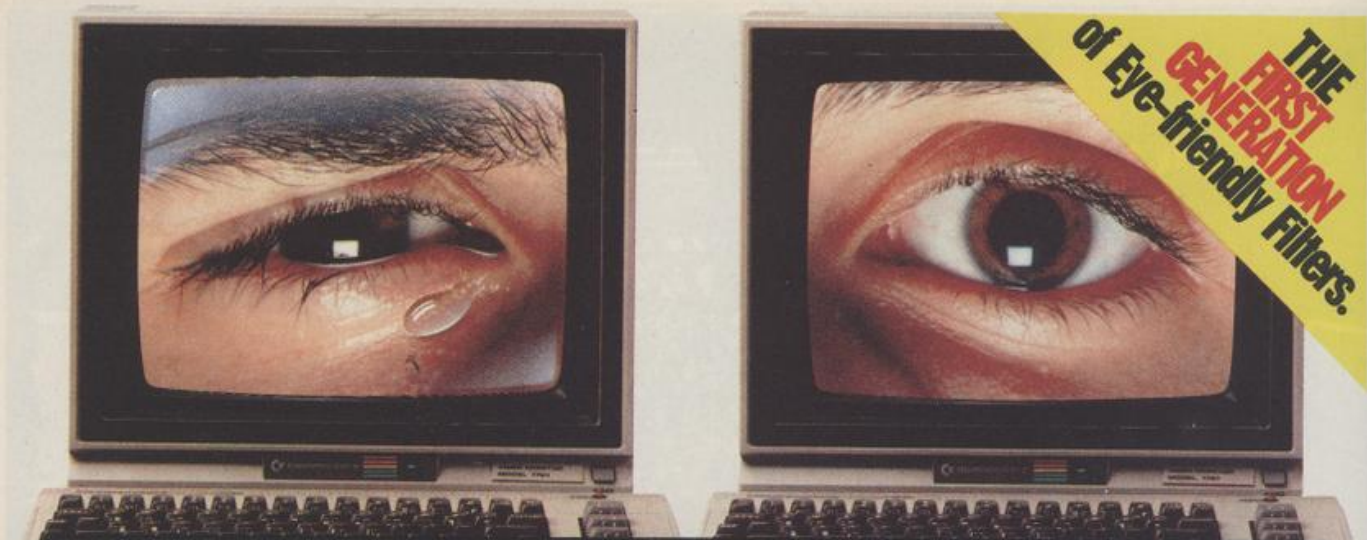


PSYTRON. SPECTRUM & COMODORE 64
LORDS OF MIDNIGHT. SPECTRUM
DOOMDARKS REVENGE. SPECTRUM
PSI WARRIOR. SPECTRUM
MYCHESS II. COMODORE 64
Mr. ROBOT. COMODORE 64
AZTEC. COMODORE 64
ANKH. COMODORE 64

BEYOND
ORDERLINE 01 837 2899

BEYOND, Competition House, Farndon, Market Harborough, Leicestershire LE19 9NR

**THE FIRST
GENERATION
of Eye-friendly Filters.**



Treat your eyes to a Romag CEAF. Only £19.95

Unique technology: British made laminated glass, aspherically curved Contrast Enhancement Antiglare Filter.

Up to now, contrast-enhancing filters have always been flat—and so has their performance, because the screen of your TV, monitor or VDU is curved.

Up to now, most filters have been plastic—because it takes mindbending technology to bend optical-quality laminated glass.

Up to now, filters have been expensive—awkward production techniques have meant price tags from around £50 to well over £100.

Forget all that: the Romag CEAF is here. British designed and manufactured by space age military technologists, CEAF is profiled to fit your display screen, giving you the ultimate in contrast enhancement and antiglare performance. For under £20, this first generation of eye-friendly filters diffuses all specular reflections, gives sharper image clarity from edge to edge of the screen and greatly enhances display colours.

Mounted and removed in seconds by invisible velcro fastenings, the anti-static, anti-shatter CEAF is a major step forward in the operational safety of

computer displays—unprotected screens can cause blurred vision, watery and itchy eyes, headaches and (according to such authorities as the Institute of Ophthalmology) even permanent changes in eyesight.

Scratch-resistant, durable and easily cleaned without expensive sprays and agents, 9", 12" and 14" CEAFs are available from leading retailers at only £19.95 including VAT.

Or fill in the Freepost coupon and your CEAF will be despatched within 48 hours. Orders can also be placed around

the clock by phoning the CEAF Department on (091) 414 5511, quoting your Access Card number. For other screen sizes, please ring or write—the CEAF prices for 'specials' would be considered very competitive.... if there was any competition!

To ROMAG, FREEPOST, CEAF Dept. YC, Blaydon on Tyne, Tyne & Wear NE21 4BR. Telephone: (091) 414 5511.

My TV/Monitor/VDU is: _____ (make)
_____ (model) _____ (size)

My Computer is: _____ (make/model)

Please send me: _____ 9" CEAF(s)
_____ 12" CEAF(s)
_____ 14" CEAF(s)
at £19.95 each, inc. P&P.

I enclose cheque/P.O. No. _____
for £ _____ made payable to ROMAG.

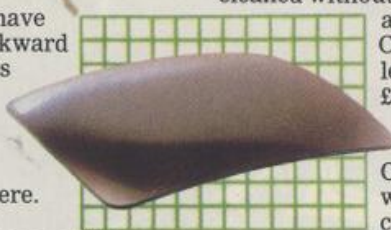
OR My Access Card No. is
[] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] []

Name _____
Address _____

Tel: _____

**ROMAG
CEAF**

The filter which eliminates all competition
CEAF is a Registered Trade Mark.



ROAD FROG by courtesy of Ocean Software.

MTA 4628

EVERYTHING is going wrong for Professor Hilfe today. First, he leaves his laboratory after a bad day's work to get a bite to eat. When he returns, it is only to find that he left the power on, connected to his experiment. The circuitry has overheated, and caused his generators to fail, sending massive power surges throughout the laboratory. This has caused a fire to break out, and if that wasn't enough, it has somehow caused all his chemical apparatus to come alive!

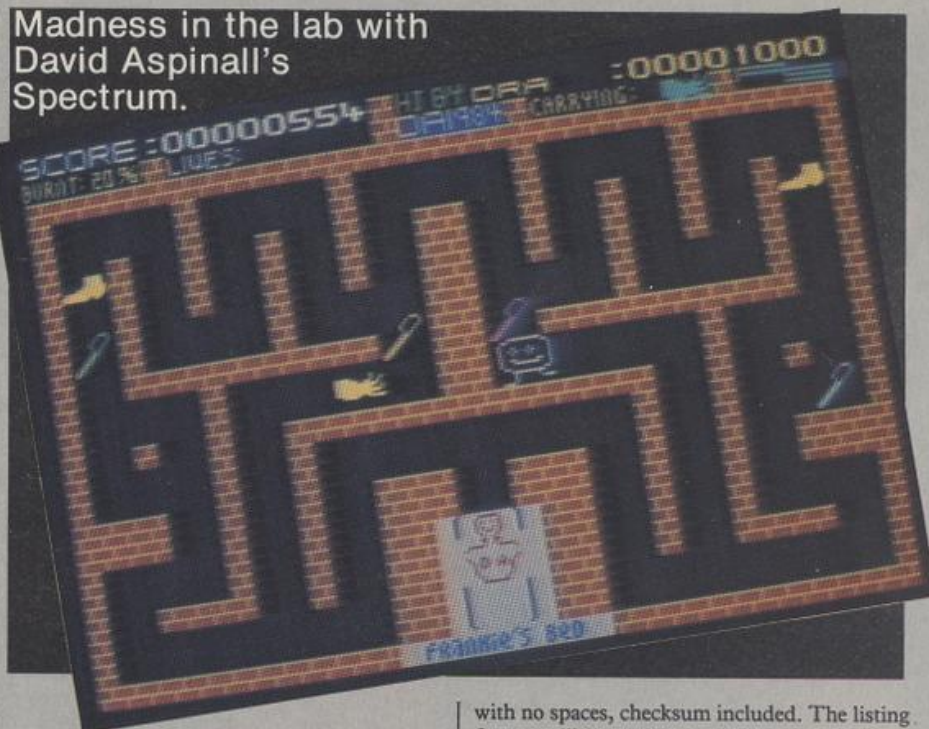
But, all is not lost for Hilfe. For the main pieces of his pride and joy, Frankie his robot, are still intact, although scattered around. If he could just manage to carry each piece, one at a time to Frankie's bed then his life's work might be saved. But will it all end there? You have to guide Professor Hilfe around his laboratory, avoiding Barmy Bunsens, Crazy Conicals, Terrible Test-tubes and the like, taking one part of Frankie at a time to his bed.

I have written a special loader for typing in the hex codes, which are extensively checksummed. Another problem created in the writing of this program, is that the code isn't all in one place. In fact roughly two-thirds of it is above RAMtop, and the rest below: 3K in a Rem line and a further 118 bytes crammed into the printer buffer. For this reason, we will have to modify the hex loader twice to put the code in place.

So, first things first. It is best to have at least one totally blank short tape on which to put the finished product, and another on which to store the hexloaders and half-finished efforts. I shall now detail the procedure step by step:

ALIQUID

Madness in the lab with David Aspinall's Spectrum.



SIMPLEX

1. Type in the loader program for the finished game, but don't run it. Save this at the beginning of your blank tape, using
SAVE "ALIQUID" LINE 1

2. New the computer, type
CLEAR 26969

and enter the first version of the hexloader. Save this on another tape.

3. Now start typing in the main bulk of the machine code, from Dump 1. If at any time you wish to stop and start again later, type 5 and then save the program on the other, non-finalised tape. Enter the hex digits one row at a time



Loader program for finished games.

```
10 BORDER 0: PAPER 0: INK 0: C
LEAR 26970: PRINT INK 7: AT 10,1:
"ALIQUID SIMPLEX IS LOADING..."
AT 8,10: INK 5: "PLEASE WAIT" AT
0,0: LOAD ""CODE: LOAD ""CODE
LOAD ""
```

The hexloader.

```
5 DEF FN H(H$)=16*(CODE H$(1)
-48-(7 AND H$(1)>"9"))+CODE H$(2)
-48-(7 AND H$(2)>"9")
10 FOR N=26970 TO 32767 STEP 8
12 PRINT N: LET C=0: POKE 236
58,8: INPUT LINE H$
14 IF H$="5" THEN GO TO 100
16 IF H$="E" THEN STOP
20 IF LEN H$>18 THEN PRINT "
ERROR": BEEP .1,-10: GO TO 12
22 FOR M=0 TO 7
24 POKE N+M, FN H$(M+2+1 TO M
+2+2): LET C=C+PEEK (N+M)
26 PRINT " : H$(M+2+1 TO M+2+2
);
```

```
28 NEXT M
30 IF FN H$(17 TO 18)=C-255
+INT (C/255) THEN PRINT "=";H$(1
7 TO 18): NEXT N: PRINT "O.K."
1" STOP
32 PRINT "ERROR": BEEP .1,0:
GO TO 12
100 SAVE "SO FAR" LINE 120: SAV
E "AS CODE SO FAR"CODE 26970,N-2
6969
110 PRINT "SAVED...": STOP
120 RANDOMISE N: CLEAR 26969: L
OAD ""CODE: LET N=PEEK 23670+25
5+PEEK 23671: CLS: GO TO 12
```

The Rem creator.

```
10 FOR N=32600 TO 32644: READ
A: POKE N,A: NEXT N: RANDOMISE U
SR 32600: PRINT "NOW DELETE L&N
ES 10 AND 100"
100 DATA 33,200,92,1,14,5,11,2,05
,85,22,33,203,92,34,93,9,5,11,2,05
,84,1,1,3,54,141,3,93,94,11,2,05
,234,1,1,1,3,0,8,93,9,11,2,05
,177,3,2,2,4,0,35,54,13,2,01
```

with no spaces, checksum included. The listing format will be the same as it is here. If at any time a checksum doesn't correspond to the total modulus 256 of the eight other bytes entered, a Beep will sound, and you will get the same prompt address to enter that row again.

4. Once you have finished this, the loader will end, and you can save the resultant code after the loader program on the finalised tape:
SAVE "MC"CODE 26970,5798

5. Now edit the following lines of the hex-loader and change them to:

```
10 FOR N=23363 TO 23481 STEP 8
100 SAVE "SO FAR" LINE 120:
SAVE"XDAT"CODE 23363,118
120 RANDOMISE N: LOAD""CODE:
GOTO 12
```

6. Run the hexloader again, and enter the data from Dump 2, the printer buffer data. When this is all correct, type:

```
SAVE "XDAT"CODE 23363, 118
and record on to the finalised tape.

```

7. Next, edit the hexloader again:
10 FOR N=29800 TO 32755
100 SAVE "AS SO FAR"CODE 29800, N-29799

```
120 RANDOMISE N: CLEAR 29799: LOAD
""CODE: LETN=PEEK
23670+256*PEEK
23671: CLS: GOTO 12
```

8. Now type as a direct command
CLEAR 29799: RUN

and enter the codes from Dump 3, once again use S to save a partly finished version.

9. After you have finished this, do not save it on the finalised tape but the other one, and with:

```
SAVE"REMLINE"CODE 29800,2955
```

10. Now pull out the plug or otherwise clear the computer, and type in the Rem creator program; take care with the machine code in

(continued on page 87)

QUALITY CONTROL FROM CREATIVE SPARKS ON C64

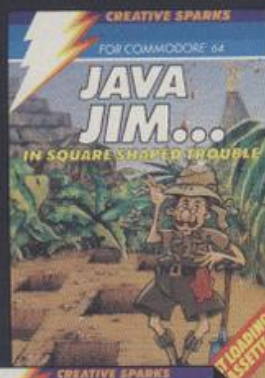
**For those
who demand
excellence**



JAVA JIM

Guide Java Jim around the screen digging near square holes as he searches for ancient relics. You will have to avoid the lumps of sizzling lava being continually showered down on Jim from the still active volcano in this highly original fun game.

4 full graphic all action screens.
20 levels of play.
High score feature.
Fast loading cassette.



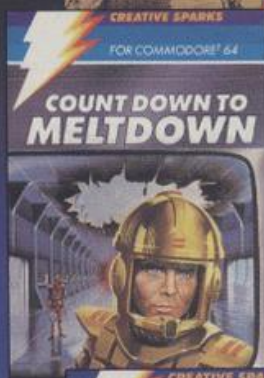
COUNTDOWN TO MELTDOWN

An amazing graphic action adventure game which puts you in charge of a team of androids trying to reach the core of a nuclear reactor before it explodes.

This game has over 2000 rooms to be negotiated and every single one of them is in 3D!!

Probably the most exciting game yet developed for the C-64.

Fast loading cassette.

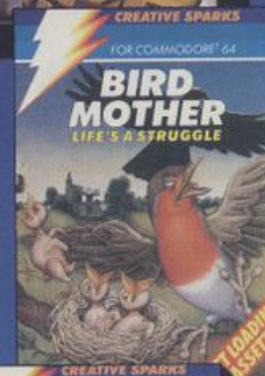


BIRD MOTHER

This is a delightfully original game which uses nature as the setting for a highly compelling and challenging game. Guide the Bird Mother as she builds her nest and raises her young, finally protecting them from a predator hawk.

Fast loading cassette.

The stunning graphics and music in Bird Mother are not to be missed.

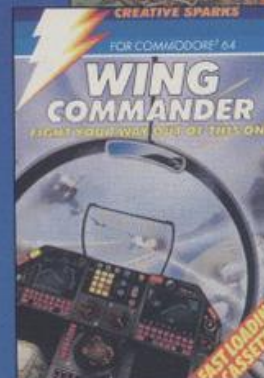


WING COMMANDER

This is a highly sophisticated flight combat simulator which puts you in the pilots seat. Highly advanced machine code programming has ensured you feel every stomach lurching dive and roll.

With 17 separate controls to be monitored and several ground targets to be defended from the attacking enemy bombers. This game will stretch your skills to their limits.

Fast loading cassette.



CREATIVE SPARKS

Available from All good computer software stockists.

Send me (tick as required)

- | | |
|--|-------|
| <input type="checkbox"/> JAVA JIM TNCE163 (C64) | £7.95 |
| <input type="checkbox"/> COUNTDOWN TO MELTDOWN TNCE273 (C64) | £7.95 |
| <input type="checkbox"/> BIRD MOTHER TNCE263 (C64) | £7.95 |
| <input type="checkbox"/> WING COMMANDER TNCE203 (C64) | £7.95 |
| <input type="checkbox"/> My local stockist's address | |
| <input type="checkbox"/> Your full list of games | |

Game/s at £7.95 each £ : p

+ single P&P sum : 30p

Total to send £ : p

Method of payment

By cheque or PO (no cash) made payable to **TECS**

or

Enter card no.

Sign below:

Credit card sales: UK buyers only.
Response within 21 days.

☐ By Access

☐ Barclaycard

Creative Sparks,
Department MO,
296 Farnborough Road,
Farnborough, Hampshire, GU14 7NF.
Telephone: (0252) 518364.

Name

Address

YC1184

the Data at line 1000 as it isn't checksummed. Run this, then delete 100 and then 10. You should now be shown the long Rem at line 1 the machine has created — just to save you some typing! Try to avoid pressing Enter now or after reports as you'll have to sit through the listing again. Type:

LOAD "REMLINE" CODE 23760

and reload the data you save earlier from Dump
3. The Rem will now not list properly, and

3. The Rem will now not list properly, and

[illegible]

Dump 2.

should have 1 Rem Dacode at the top. Type line 10 in, as below:

10 RANDOMISE USR 23762

and now save the completed program on the finalised tape after 'Xdat', using:

SAVE "ALL. MAIN" LINE 10

11. Now clear the computer, rewind the tape and test it all.

If anyone who does not fancy typing in the program would like a tape of it, I can supply them at £3 each so long as you write your address clearly, from 16 Viking Way, Pilgrims Hatch, Brentwood, Essex, CM15 9HX.

Dump 1.

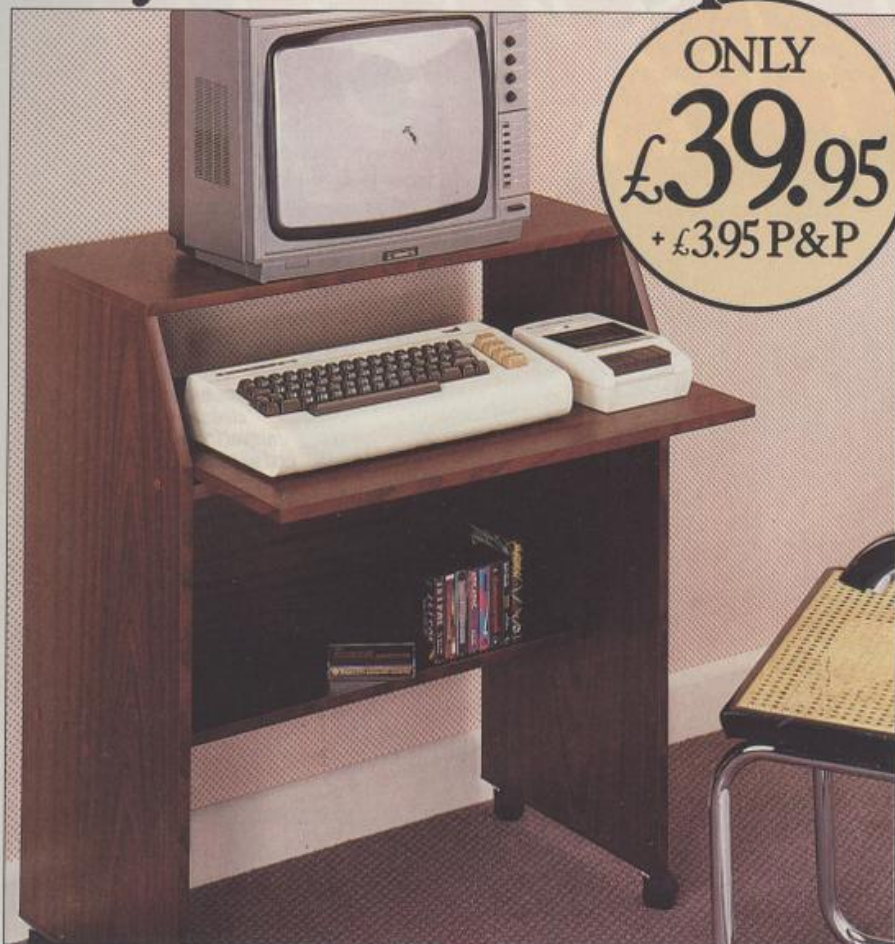
[The page contains dense, illegible text arranged in vertical columns.]

(continued on next page)

[illegible]

[The page contains dense, illegible vertical text columns.]

At last the ideal home for your home computer.



ONLY
£39.95
+ £3.95 P&P

Now you can house your total computer system, video or hi-fi in superb style with these three elegant and practical cabinets. No more clutter. No trailing wires. And better protection for your valuable units.

And although you might expect beautiful furniture of this quality to cost the earth, the price is only £39.95 each (plus £3.95 p+p).

FURNITURE THAT WILL ENHANCE YOUR HOME



Each of these fine units is British made and finished by craftsmen in either a rich mahogany or stylish teak look. Beautiful surfaces that are heat resistant, scuff resistant. And assembly couldn't be easier. In minutes you'll create classically stylish furniture that will last for years.

SAVE UP TO £7.90

IF YOU BUY 2 OR MORE UNITS

Order more than one of these fine units and you need only pay a total of £39.95 for postage and packing. If you buy all three you could save £7.90. Simply fill in the coupon and send today.

THE MOBILE COMPUTER DESK

Hardware, software, here's somewhere for it all, right at your fingertips.

For your TV or monitor, a rigid, wide desk top with room for a telephone and modem beside it.

Beneath it there's a large shelf for your keyboard, disk drives or cassette recorder. A surface that smoothly slides away when you've finished computing.

Within the body of the desk another shelf stores your tapes, disks, joysticks, books, manuals and magazines. And rounding it off nicely are four smoothly running castors for easy mobility.

DON'T MISS THIS UNIQUE OPPORTUNITY

To order simply fill in the coupon. We'll despatch your furniture within 3 working days of receipt of order. Allow 28 days for delivery.



24 HOUR TELEPHONE ORDERING

Credit Card holders can order simply by ringing Leeds (0532) 776260 at any time day or night 7 days a week.

THE CLASSIC GUARANTEE

All products are guaranteed against defects in materials and manufacture for 12 months and if for any reason you're dissatisfied with the goods simply return them to us unused within 30 days and we will refund the purchase price in full. This guarantee in no way affects your legal rights.

And some neat ideas for your video & hi-fi too.

THE SLIMLINE VIDEO UNIT

This ingenious cabinet houses both your TV and video in perfect harmony, whatever their dimensions. The hand-

some smoked glass doors with magnetic catches help keep dust off sensitive video equipment and there is a deep brass handled drawer where you can securely lock away your video cassettes. Four gliding castors create total manoeuvrability.

A stunningly attractive unit at a stunningly attractive price.

Order now in Teak or Mahogany finish.



ONLY
£39.95
+ P&P

THE STACKING HI-FI CABINET

The functional yet beautiful answer to a room swamped with wires and separate hi-fi units.

Here's how it all stacks up.

A smooth, even surface for your turntable. Beneath it behind an elegant smoked glass door, two deep shelves, one adjustable, for your amplifier, tuner or cassette deck.

At the base a storage section with brass dividers to keep your collection in mint condition.

Order your unit in stylish Teak or rich Mahogany finish.



ONLY
£39.95
+ P&P

Classic Mail Order

W. A. Smith (Leeds) Ltd., T/A Classic Mail Order Lowfields Way, Leeds LS12 6HQ.

Please post to Classic Mail Order Lowfields Way, Leeds LS12 6HQ. Please send me (fill in box(es) with number(s) required).

		QTY REQ	PRICE	SUB TOTAL
COMPUTER DESK	CL601	Teak	£39.95	
	CL602	Mahogany	£39.95	
VIDEO CABINET	CL603	Teak	£39.95	
	CL604	Mahogany	£39.95	
HI-FI CABINET	CL605	Teak	£39.95	
	CL606	Mahogany	£39.95	

Postage & Packaging £3.95

TOTAL

I enclose a cheque/postal order for £_____ made payable to Classic Mail Order or please debit my Access/Visa/Diners/American Express Card

No. _____



Signature _____

Name (BLOCK LETTERS PLEASE) _____

Address (BLOCK LETTERS PLEASE) _____

Postcode _____

Remittance should be made payable to Classic Mail Order YCII

Please allow 28 days for delivery.

All prices incl. VAT Delivery subject to availability UK only (excluding C.I.)

Classic Mail Order Registered office: Lowfields Way

Leeds LS12 6HQ. Registered number 1530897.

Approximate dimensions: Hi-Fi Unit - Width 500mm Depth 430mm Height (inc. rubber feet) 900mm. Computer Desk - Width 700mm Max. Depth 380mm Height (inc. castors) 840mm. Video Unit - Width 720mm Depth 415mm Height (inc. castors) 510mm

WIN **£25,000** AND SAVE THE WORLD **Eureka!**

250 K OF PURE MYSTERY BY IAN LIVINGSTONE

- 5 complete Adventures, each with its own Arcade, in one multi-load mega-program: "Eureka!" is the ultimate computer Epic.
- Epic in scale: "Eureka!" spans five eras of history! You battle against the dinosaurs, outwit Nero and his gladiators, join the Knights of the Round Table, escape from Colditz, and finally into 1984 defeat the evil master of the Caribbean who is holding the world to ransom.
- Epic in sheer size — there's more than 250K for you to get yourself killed in.

5 PROGRAMS IN ONE

- All 5 Adventures are linked — but you can choose to play them separately. And they all have REAL TIME built in. So if you don't think fast, you wind up as a pterodactyl's lunch, die of over-exertion in a Roman orgy, or just lose your mind...
- "Eureka!" is not just an Epic — not just an Adventure. At the start of each historical era, you face an Arcade Action test, to decide your strength level for the Adventure to come.
- The better your score, the stronger and faster you'll be.
- And it'll keep you on your toes, with constantly-changing, static and moving graphics. Brilliant music and sound effects add to the excitement.
- As part of the "Eureka!" pack, you receive a full-colour illustrated booklet, containing cryptic riddles and mysterious illustrations. Using booklet and screen together, you steadily unravel the clues and build up a secret phone number piece by piece.
- If you're first to ring it, you save the world and collect the £25,000!
- Quite a package! And to give everyone a fair chance, "Eureka!" will be released simultaneously worldwide on October 31st, 1984. No packs will be available until that date. All orders received by mail or phone by 26th OCTOBER will be despatched by post on the 31st right across the world. So order now, and be one of the first off the mark.

THEN THE RACE IS ON!!!

DEvised BY IAN LIVINGSTONE



The storylines for "Eureka!" are by Ian Livingstone, whose "Fighting Fantasy" books have sold over 2,000,000 copies. He's dreamed up some rather nasty tricks and twists for you in this Epic, because he has also devised the cryptic clues and conundrums in the booklet that goes with the program. He's the one who knows the answers.

"Eureka!" was programmed by Andromeda teams led by Hungarians Donát Kiss and András Császár. It took the equivalent of 5 YEARS to create, and the skills of 4 graphic artists, 2 musicians and a professor of logic too. We told them to stretch the hardware's capabilities, and make sure you were kept awake for hours!! They've done it...

£7 BONUS

When you order "EUREKA!" before 26 OCTOBER 1984, you receive an additional bonus: £7 voucher off the price of the **TROJAN LIGHT PEN** from PSL MARKETING. Normal price is £17.25. You buy it for just \$10.25.

Spectrum 48K or
Commodore 64
(TurboLoad)

Full-colour booklet,
packed with cryptic
clues to help you
unravel the mystery —
and win the £25,000
reward

Music and
sound effects
built in

High quality,
full-colour, static and
moving graphics

Just clip the coupon. Or, for even faster action,
order by Credit Card on the
"Eureka!" Telephone Hotline 01-460 6000.

Eureka!

Send your order now to:

"Eureka!", FREEPOST, Dept 400, Mount Farm, Milton Keynes, MK1 1HQ

NO STAMP NEEDED

To: "Eureka!", FREEPOST, Dept 400, Mount Farm, Milton Keynes, MK1 1HQ

Please send me "Eureka!" packs, complete with cassette, full-colour booklet, instructions and rules, at \$14.98 each PLUS 50p post & packing. If my order is received before 26 October 1984, I will receive a free \$7 voucher towards a Trojan light pen. Please allow 14 days delivery for orders received after 26 October.

MY COMPUTER IS	to order	Total at \$15.50
COMMODORE 64		
SPECTRUM 48K		
	TOTAL \$	

24 HOUR PHONE
HOTLINE NUMBER
01-460 6000
For Credit Card Orders

I enclose payment by cheque/PO, payable to DOMARK LTD.

OR Please charge my Credit Card ☐ VISA ☐ ACCESS ☐ AMEX ☐

Card Number

Expiry Date Date

Name Signature

Street

Town Post Code YC

The race for the £25,000 starts on 31 Oct 1984 and closes on 31 Dec 1985.



Hit those planes before their air-to-ground missiles hit you in Tim Humphries' BBC game.

Unfortunately your guns can only withstand three hits resulting in destruction or, if you let 10 planes pass, you are retired from your position due to total destruction of your city.



```

10REM **** By Tim Humphries 1984 ****
20T%=RND(-31)*HSZ=500
30ENVLOPE1,3,0,0,0,0,0,0,121,-10,-5,-2,120,120
40ENVLOPE2,133,0,1,1,-10,0,0,121,-10,-10,-8,126,0
50VDU23,240,126,192,160,144,156,167,196,255,23,241,7,12,20,39,228,148,140,255
60VDU28,16,16,16,16,16,16,16,16,23,254,60,126,255,255,255,126,60
70VDU23,250,0,0,6,48,48,48,0,23,255,255,255,255,255,255,255,255,23,248
80,0,0,16,56,254,255,255,23,246,0,0,56,60,127,255,255,23,247,0,0,0,0,0,255,255
,255
90VDU23,233,0,0,0,0,0,24,24,23,234,0,0,0,24,60,60,60,23,235,0,0,0,24,60,6
0,126,60,23,236,0,0,56,124,56,124,254,124,23,237,0,60,126,126,126,126,23
,238,60,126,126,60,126,255,255,126
100FORI=230TO232:VDU23,J%,RND(255),RND(255),RND(255),RND(255),RND(255),RND(25
5),RND(255),RND(255):NEXT
1100I=1:DO:GOTO120:IF I=5,AX(4)=FORK%+0TO30:CX(K)=1+30*CBOS(K%15#P1):CY(K)=1+
50*ISIN(K%15#P1):NEXT
120MODE2:VDU23:8202:0,0,0,0,1:FORI=0TO10:PRINTTAB(0,I,X):CHR$(141):CHR$(132):CHR$(157)B
PC13:CHR$(131):"GUNNER":NEXT
110PRINTTAB(0,23):CHR$(129):CHR$(157):CHR$(135)" By Tim Humphries":TAB(24)"Copyr
ght 1984"
120PRINTTAB(5,41):CHR$(130)"Keys ":"TAB(6,7):CHR$(129)"LEFT":CHR$(131)" ":"Z":TAB
(6,9):CHR$(129)"RIGHT":CHR$(131)" ":"X":TAB(6,11):CHR$(129)"UP":CHR$(131)" ":"
":"TAB(6,13):CHR$(129)"DOWN":CHR$(131)" ":"TAB(6,15):CHR$(129)"FIRE1":
130PRINTTAB(10,131)" ":"RETURN":TAB(5,18):CHR$(130)"OR JoyStick":TAB(0,22):CHR$
(132):CHR$(157):8FC2:CHR$(136):CHR$(135)"PRESS SPACE OR FIRE TO START":PROCP1
140MODE2:VDU23:8202:0,0,0,0
150VDU19,0,6,0,0,19,15,0,0,19,13,0,0,19,14,4,0,19,5,7,0
160GOLD0,2,1MOVE0,10,MOVE1279,0,PLOT85,0,60,PLOT85,1279,60,0,GOLD0,4,MOVE0,60,5I
DRAW1279,60
170B$=STRING$(20,CHR$(247))
180FORC%+0TO20:B$=B$+CHR$(244+RND(3)):NEXT
190B$=B$+CHR$(241)+CHR$(240)+CHR$(241)+CHR$(240):BS1=10:FORK%+0TO20:B$=B$+CHR$(244+RND
(3)):NEXT:B$=B$+STRING$(20,CHR$(247))
200TX=700:SY=0:HTX=2:PLX=0:PROCP1
210PROCP1
220GOLD0,1,1:FORJ%+0TO20:MOVE39,0,MOVE639+60*CBOS(J%/20#P1),0+200*ISIN(J%/20#P1)
:PLOT85,639+60*CBOS(J%/20#P1),0+200*ISIN(J%/20#P1):NEXT
230FORJ%=9TO12:VDU19,1,X,1:0:NEXT:VDU19,9,4,0
240CX=9:PLOT85,0,0TO70:GOLD0,CX,MOVE39,0,DRAMA39+60*CBOS(J%/70#P1),0+200*ISIN(J%/
70#P1):CX=CX+1:IFCX=13: CX=9
250NEXT
260CX=9
270GOLD0,4,MOVE300,0,MOVE350,300,PLOT85,979,0,PLOT85,929,300,MOVE500,300,MOVES
20,450,PLOT85,560,300,PLOT85,570,450,MOVE780,300,MOVE756,450,PLOT85,720,300,PLOT
85,710,450,GOLD0,13,MOVE300,0,DRAWK350,300,DRAWK350,290,300,DRAW779,0
280MOVE430,0,DRAWM860,140,DRAWM70,140,DRAW710,0
290MOVE430,0,DRAWM660,300,MOVEB49,0,DRAWB10,300,GOLD0,6,MOVE460,0,MOVE470,150,P
LOT85,50,0,PLOT85,550,150,MOVEB20,0,MOVEB10,150,PLOT85,740,0,PLOT85,740,150
300GOLD0,3,MOVE480,150,VDU19,254,4,0,VDU19,150,VDU19,150,VDU19,254,4,GOLD0,13,MOVE500,110:
DRAW60,60,MOVE770,110,DRAWM770,110,GOLD0,3,MOVE480,150,VDU19,254,4,0,VDU19,150,VDU19,150,VDU19,254,4,0
310AX(0)=0+AX(1)+5:AX(2)=B1+AX(3)+2+AX(4)+24:CFX=250+CX+RND(40#6):TX=X-140#6
Y%=620+RND(120):Y=0:0:RX=0+CX+0+MX+3
320SOUND1,-1,15,1,1:FORIX+0TO500:NEXT: SOUND1,-15,150,1
330COLOR14:PRINTTAB(8,18):VDU255,9,9,255
340PROCP1:ane
350COLOR13
360REPEAT
370IFHTZ<PROFCend:PROCH=1:GOTO270
380PROCP1:ane
390IFEX=1:PROCCap1:GOTO450
400J+J+6:G=6+.005
410IFRND(110)-5#K<RND(3)-2:FORQ%+0TO4:AX(Q%)=AX(Q%)+RX:NEXT
420Y=Y-(R$(K1+Q20)):"Y%Y%+(4#3)
430SOUND1,1,-(Q4),98,10
440IFJ%>1FRND(10)=2:PROCP4

```


YOU MARVELLED AT BEACH-HEAD...
 NOW ACCESS PRESENT THEIR LATEST MASTERPIECE:
RAID OVER MOSCOW

commodore 64

The most breathtaking
 3-D graphics yet seen on
 the Commodore 64!

Gripping arcade action

Multiple scrolling
 screens



STATUS: READY

MEN

SCORE: 00000



VELOCITY X 00TK/H COORDINATES X 000
 Y 00 K/H Y 000
 TIME TO IMPACT: 05:39:6 ALTITUDE 00
 BOMBERS SCORE: 00000



CONFIRMATION ENEMY LAUNCH DETECTED
 LAUNCH SITE: 0000
 TARGET: MONTREAL
 TIME TO IMPACT: 05:44:1
 BOMBERS SCORE: 00000

The Soviets launch a nuclear strike against major cities in the United States and Canada. With our own nuclear arsenal dismantled, in accordance with the Salt IV Arms Agreement, the Soviets believe their treachery will lead to total world domination. Our only hope is our space station equipped with stealth bombers, which can fly undetected in Soviet airspace.

As squadron leader, you must lead your commandos on a virtual suicide mission, knock out the Soviet launch sites, and then proceed into the city of Moscow. Armed with only the weapons you can carry, you must seek and destroy the Soviet defence centre to stop the attack! Top multi-screen action!

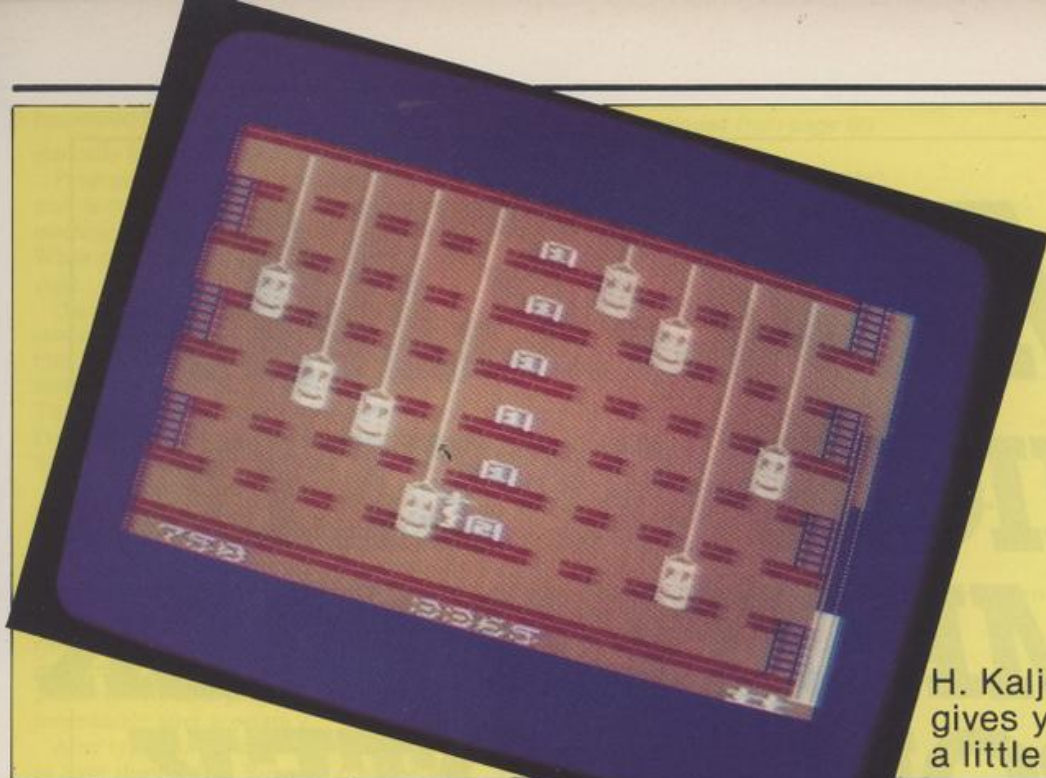
Available on **CASSETTE** £9.95 **DISK** £12.95



THE FIRST 64 GAME TO
 REACH No.1 IN THE CHARTS
 Available on **CASSETTE** £9.95 **DISK** £12.95

U.S. Gold is stocked by all leading
 computer stores including:
 BOOTS WH SMITH JOHN MENZIES
 WILDINGS WOOLWORTH

Dealers! For information on how to become a U.S. Gold Stockist write to: CentreSoft, Unit 10,
 The Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Telephone: 021-359 3020. Telex: 337268.



H. Kaljouw
gives your Vic
a little lift

ELEVATORS IS A GAME of skill written for the unexpanded Vic-20. The elevators have run amok in a huge building. They have to be switched off but there is one problem, the main switch is on the top floor of the building. The elevators are useless so you will have to use the stairs.

So far it looks easy but there are a few problems. First of all you have to dodge the eight elevators, which is pretty tough in itself, and secondly you have a time limit to cross each floor. If you get hit by an elevator or if you pass the time limit you are dead, and you have to start at the ground level again. At the start of the game the time limit is 15 seconds. If you manage to reach the top of the building the time limit decreases by 2.5 seconds. You have three lives.

There is a bonus to be found in the middle of each floor, except for the ground level. Each bonus is numbered from one to four. When you walk through a bonus, it is automatically replaced by another one which is worth a further 100 points. The highest bonus is worth 400 points.

Each time you cross a floor safely, you automatically go to the next floor. You get 500 points plus extra points depending on the time you have left. When you have crossed the top floor safely you get 4,000 points. Then you have to start at the ground level again. The time limit goes down by 2.5 seconds.

Elevators uses machine code and 25 user-defined characters. To make the game fit in the unexpanded Vic I had to write it in three parts, and even then there was no space left to add Rem statements.

Program 1 contains the data for the machine code and the user-defined characters. There are checksums for both. If you have typed in a wrong number the program will end with an error message. After program 1 is run it automatically loads and runs the second program.

Program 2 gives you the title screen, instructions and the scoretable. It also tells you which key to use — “,” = left and “.” = right. After program 2 is run, it also auto-

(continued on page 95)

VIC

Program 3.

```

1 REM * ELEVATORS 3 *
2 REM
3 POKE36879,142:PRINT"JW":POKE36869,255:POKE36878,10:POKE7160,104:POKE7161,11
4 HI=PEEK(7160)+256*PEEK(7161)
5 GOSUB900
10 P=8120:V=0:SC=0:R=0:V1=32:V2=32:W=0:N=3:F=60
15 F=60:TI#="000000"
20 GOTO100
30 SYS7137
40 GOTO575
100 O1=PEEK(203):IF O1<37AND O1<29 THEN I10
105 R=-1:IF O1=37 THEN R=1
110 IFX=0ANDR=-1 THEN R=0:GOTO160
115 IFX=20ANDR=1 THEN R=0:GOTO160
117 IFR=0 THEN FORA=1 TO7: NEXT:GOTO160
118 O1=PEEK(P):O2=PEEK(P+22):IF O1<30OR O1>59 THEN V1=01:V2=02:GOTO600
119 IF O2<30OR O2>59 THEN V1=01:V2=02:GOTO600
120 O1=PEEK(P+4):O2=PEEK(P+R+22)
121 POKE36875,200:POKE36875,0
125 IF O1<37AND O1<42 THEN R=0
130 IF O1=32AND O2=32 THEN I150
135 IF O1=33AND O2=33 THEN I150
140 IF O1=30AND O2=30 THEN I150
145 GOTO600
150 POKEP,V1:POKEP-22,V2:P=P+R:X=X+R
155 V1=01:V2=02
160 POKEP,45+2*R:POKEP-22,44+2*R:POKEP+30720,1:POKEP+30636,1
165 GOTO30
500 FORA=1 TO130:POKE36879,132:POKE36876,255-A:FORB=1 TO13: NEXT:POKE36879,140: NEXT
510 POKE36877,0:W=4000:GOSUB850:POKEP,30:POKEP+30720,6:POKEP-22,30:POKEP+30636,6
P=8120
515 FORA=7734 TO9064 STEP66:POKEA,30:POKEP+30720,1: NEXT
520 X=0:R=0:V1=32:V2=32:TI#="000000":F=10:GOTO160
575 K=INT(TI/F):IFK=0 THEN S06
582 POKE7833+K*22,37:IFK=1 THEN POKE7811+K*22,37
585 IFK=14 THEN I600
586 GOTO20
600 N=N+1:POKE36877,220:FORL=15 TO1STEP-1:POKE36879,L:FORM=1 TO7: NEXT: NEXT:POKE36
877,0
610 POKE36878,10:IFN=0 THEN I650
620 POKEP,V1:POKEP-22,V2:FORA=1 TO1:POKE36879,A:44: NEXT:POKE36879,A:32:TI#="000000"
625 IFN=1 THEN POKEP,184:32
630 FORA=7855 TO8163 STEP22:POKEA,36: NEXT:P=8120:X=0:V1=32:V2=32:R=0:GOTO160
650 PRINT"*****RESTARTING OVER*****":PRINT"*****RESTARTING OVER*****":PRINT"*****RESTARTING OVER*****"
(HI/256)
655 POKE7160,(HI-PEEK(7161)*256):GETA#
657 IF A#="Y" THEN CLR:GOTO4
660 IF A#="H" THEN PRINT"J":POKE36869,240:END
665 GOTO655
700 POKEP,32:POKEP-22,32:P=P+R:X=X+R:POKEP,45:POKEP-22,44:POKEP+30720,1:POKEP+30
690,1
727 IFP=7744 THEN I500
730 FORA=PTOP-44STEP-22:POKEA,30:POKEP+30720,6:POKEP-22,45:POKEP+30636,1:POKEP-4
4,44
740 POKEA+30676,1: NEXTA:FORB=60 TO1STEP-9:FORV=192-8 TO192+8STEP4:POKE36876,V
750 NEXTV:W=500:INT(15-K)*15:GOSUB850:P=P+66:R=0:V1=32:V2=32:TI#="000000"
770 FORA=7855 TO8163 STEP22:POKEA,36: NEXT:GOTO160
800 POKEP,V1:POKEP-22,V2:P=P+R:X=X+R:W=(O1-37)*100:V1=01+1:V2=32:IF O1=41 THEN V1=3
2
830 GOSUB850:GOTO160
850 SC=SC+W*20*INT(W/20)
855 FORI=1 TOW/20
860 SC=SC+20:IF SC<0 THEN ITH=SC
865 PRINT"*****SCORE*****":PRINT"*****SCORE*****":PRINT"*****SCORE*****"
870 POKE36876,230:POKE36876,250:POKE36876,0
875 FORO1=1 TO5: NEXT
880 NEXTT

```

(program 3
continued on
page 95)

MODEM.

HIGH-SPEED

COMPUTER TALK

FROM PROTEK

Inter-computer communication is easy in anyone's language, thanks to the Protek Modem. Acoustic coupling provides a reliable link between the computer and the telephone line. There are no connection charges, the unit is totally portable. The flexible link between the mouth and ear-pieces ensures a reliable connection between most telephones.

For £59.95



Interface Packs including software
are available for the following
computers:—

- ZX Spectrum 48K £24.95
- BBC Model 'B' Micro £14.95
- CBM 64 £14.95
- Oric Atmos 48K £24.95 (available September)
- Electron £24.95 (available September)

Features include:

- Two operating modes 1200/1200:1200/75
- Battery powered
- Totally portable
- LED Indicator
- Compatible with any standard RS 232 Interface

● British Telecom Approved

Protek

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

THE ADVENTURE EVENT OF THE YEAR BY
JOHN SHERRY

The Prince

WINNER OF THE 1984 CAMBRIDGE AWARD

Characters in order of Appearance:



Baron Grasper — a landowner



Ambrose — a cleric



Porcus — a merchant



Fernando — a tipstaff



Gamp — a stall holder

plus supporting cast



and finally

The Prince



THE FIRST ROLE PLAYING GAME FOR FOUR PLAYERS



Available for Spectrum 48K at £7.95 from larger branches of Boots or mail order from
Cases Computer Simulations Ltd., 14 Langton Way, London SE3 7TL
Telephone 01-858 0763



ORIC

Go to work on an egg in P.H. Phoeng's cracking game for the Oric or Atmos computer. Go on and poke that yolk!

BROOD IS WRITTEN on an Oric-1 48K computer. But as I have not used any bugged Basic commands nor any ROM calls, only a few changes need to be made for Atmos conversion.

Just add one to the X-coordinate of the Plot commands in the following lines: 115, 270, 275, 315, 380, 400, 640, 645, 650, 680, 685, 695, 700, 705, 775, 2005, 2140. Also change FOR A=3 TO 34

in line 690 into

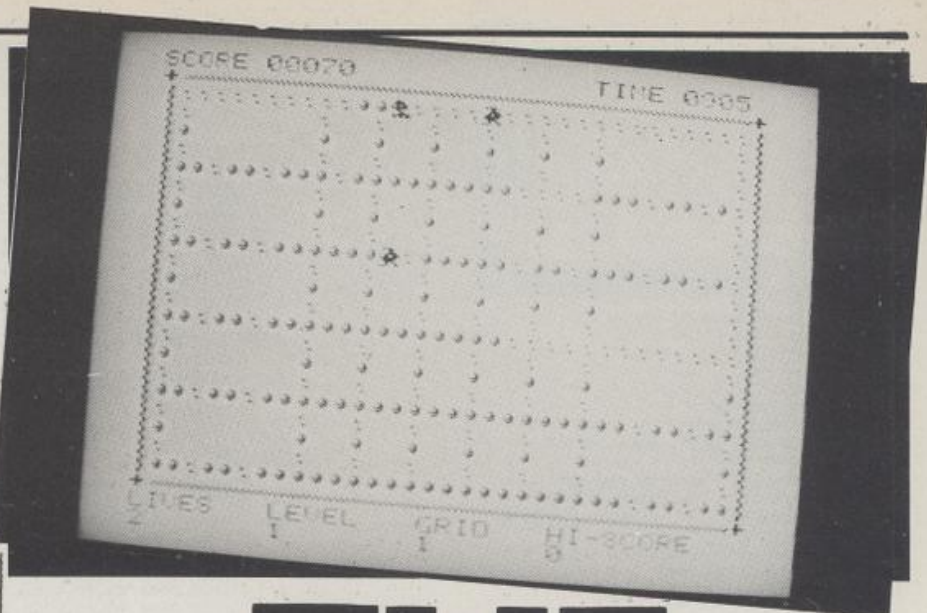
FOR A=4 TO 35

The main loop of the game is written in machine code — #9800-#9A50, entered with Basic — while the rest is written in Basic. The program uses approximately 7K of RAM memory.

The game can be played with the keyboard or with a joystick attached to the right port of a Pase joystick interface. The player is also offered a choice in sound volume.

The player finds himself on a grid in an incubator and the object is to destroy the Munzter's eggs before they hatch. The brood-gridders, who protect the eggs, will make the job a bit harder. But while the player is able to leave the grid, these brood-gridders have to stay on the grid.

The player is equipped with the z-ray, a weapon that will freeze the brood-gridders but



THE BROOD

at the same time speeds up — by 10 times — the hatching of the eggs.

When all eggs are destroyed the player moves on to the next grid. There are nine different grids. There is a life bonus after every third finished grid while the speed level will be increased after every sixth grid.

If you want to practice on a particular grid, change the grid variable (GR) in line 655.

Variables.

GR : grid number
HI : high score
LE : speed level
LI : lives
R : finished grids counter
SC : score
T & TS : time
V : sound volume

Oric Brood.

```

5 TEXT:CLS:PAPER3:INK4
10 HIMEM#97FF:POKE618,10
15 FORA=8880TO88BA7
20 POKEA,19:NEXT
25 PRINT"LOADING M.C."
30 GOTO1000
95 REM MAIN LOOP
100 SOUND1,RND(1)*99,V
105 CALL#9800
110 SOUND1,0,0:A=PEEK(17)
115 PLOT16,0,3+A*2:SOUND2,100,V#A
120 IFPEEK(15)<36THEN200
125 T=T-A*9-1:IFT<1THEN150
130 WAIT5-LE:GOTO100
150 REM EGGS HATCHED
155 POKE#BBCB,48:SOUND1,250,V
160 WAIT100:POKE4,165:POKE5,37
165 FORA=1TO30:SOUND1,150,V
170 CALL#99FA:SOUND1,0,0:NEXT
175 POKES,167:CALL#99FA
180 SOUND2,900,V:WAIT100
185 POKE(DEEK(0)),162:POKE5,39
190 FORA=1TO51:SOUND2,A*5,V
195 CALL#99FA:NEXT
200 IFPEEK(15)=0THEN300
205 REM LOSE LIFE
210 A=DEEK(0):FORB=127TO32STEP-1
215 POKEA,B:SOUND2,B,V:NEXT
220 SOUND2,0,0
225 LI=LI-1:DOKE18,#BF91:PRINTLI
230 WAIT200:CLS
235 IFLI>0THEN660
240 SC=""
245 FORA=8881TO88B5
250 SC=SC+CHR$(PEEK(A))
255 NEXT:SC=VAL(SC)
260 A$="GAME OVER"
265 IFSC>HITHENA$="HIGHEST SCORE":HI=SC

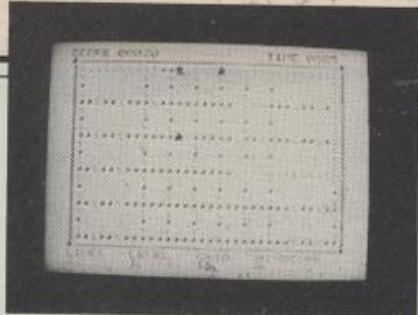
```

```

270 PLOT9,10,A$
275 PLOT9,12,"TRY AGAIN ? (Y/N)"
280 GETA$:IFA$="Y"THEN640
285 IFA$<>"N"THEN280
290 DOKE621,48000:POKE623,27:END
300 REM FINISHED
305 CLS:GR=GR+1
310 IFGR=10THENG=1
315 PLOT14,9,"BONUS 0"
320 FORA=0TO3:B=88BCB+A
325 POKE#BD26+A,PEEK(B):NEXT
330 FORA=1TO200:SOUND2,RND(1)*100,V
335 NEXT:SOUND2,0,0
340 C=0:FORA=0TO4:SOUND1,200+50*A,V
345 B=PEEK(88B5-A)+PEEK(88D29-A)
350 B=B-48+C:C=0
355 IFB>57THENC=1:B=B-10
360 POKE(88B5-A),B+128
365 WAIT80:POKE(88B5-A),B
370 SOUND1,0,0:NEXT
375 R=R+1:IFR/3>INT(R/3)THEN430
380 PLOT14,11,"LIVE BONUS":LI=LI+1
385 FORA=0TO200:SOUND1,ABS(100-A),3
390 NEXT:SOUND1,0,0
395 IFR/6>INT(R/6)THEN430
400 PLOT14,13,"LEVEL INCREMENT"
405 IFLE<4THENLE=LE+1
410 FORA=1TO10:FORB=1TO6
415 MUSIC1,B,A,V:MUSIC2,1,A,V
420 WAIT1:NEXTB,A
425 SOUND1,0,0:SOUND2,0,0
430 WAIT200:GOTO660
600 REM INITIALIZE, SET UP SCREEN
605 PLAYS,2,0,0
610 CLS:PAPER3:INK0
625 FORA=1TO24:PRINT:NEXT
630 DOKE621,48080:POKE623,21
635 PRINT" LIVES","LEVEL","GRID","HI-SCORE"

```

(continued on next page)



(continued from
previous page)

```
640 PLOT2,0,"SCORE 00000"
645 PLOT26,0,"TIME"
650 PLOT15,0,CHR$(12)+CHR$(3)+"Z-RAY"+CHR$(8)+CHR$(4)
655 SC=0:LI=3:LE=1:GR=1:R=0
660 CLS:DOKE18,8BF91
665 PRINTLI,"LE,"GR,"HI
670 A=INT(RND(1)*3)+20:IFA=20THENA=18
675 FORB=3TO23:POKE#BB80+40*B,A:NEXT
680 PLOT0,0,4:PLOT0,24,1:PLOT0,25,1
685 FORA=2TO22:PLOT1,A,9:NEXT
690 FORA=3TO34:PLOTA,1,38:PLOTA,23,38:NEXT
695 FORA=2TO22:PLOT2,A,38:PLOT35,A,38:NEXT
700 PLOT2,1,43:PLOT35,1,43
705 PLOT2,23,43:PLOT35,23,43
710 GOSUB900+GR*10
715 POKE0,251:POKE1,187:CALL#99A9
720 POKE0,252:POKE1,187
725 POKE2,A:POKE3,B:CALL#99D1
730 POKE0,C:POKE1,D
735 POKE2,E:POKE3,F:CALL#99D1
740 RESTORE
745 FORA=OTO18:READB:POKEA,B:NEXT
750 REM ZERO PAGE DATA
755 DATA252,187,1,1,36
760 DATA27,188,32,1,165
765 DATA59,191,32,21,165
770 DATA191,0,0,35
775 POKE14,8:PLOT31,0,T#
780 T=VAL(T#)
785 GOTO100
800 REM JOYSTICK DATA
805 POKE#9804,0:POKE#9805,4
810 POKE#9809,173:POKE#980A,176
815 POKE#980C,138:POKE#980D,24
820 POKE#980E,105:POKE#980F,32
825 POKE#9810,170:POKE#9814,191
830 POKE#9815,176
835 POKE#9820,183:POKE#983A,175
840 POKE#9854,190:POKE#986E,189
845 GOTO200
900 REM GRID DATA
910 A=31:B=62:C=4:D=188:E=3:F=18
915 G=207:T#="1000":RETURN
920 A=31:B=62:C=255:D=187:E=5:F=30
925 B=183:T#="1000":RETURN
930 A=1:B=8:C=20:D=188:E=1:F=8
935 G=235:T#="1500":RETURN
940 A=3:B=15:C=15:D=188:E=3:F=15
945 B=181:T#="1500":RETURN
950 A=12:B=36:C=255:D=187:E=4:F=32
955 G=198:T#="1500":RETURN
960 A=8:B=32:C=31:D=188:E=8:F=32
965 B=183:T#="1000":RETURN
970 A=71:B=35:C=255:D=187:E=7:F=35
975 B=193:T#="1000":RETURN
980 A=21:B=12:C=17:D=188:E=2:F=12
985 G=215:T#="1500":RETURN
990 A=8:B=32:C=253:D=187:E=5:F=35
995 B=199:T#="1000":RETURN
1000 REM REDEFINE CHARACTERS
1005 FORA=OTO18:READB:NEXT
1010 FORA=47368TO47423
1015 READB:POKEA,B:NEXT
1020 REM BROOD-GRIDDER
1025 DATA28,4,14,27,62,28,10,49
1030 REM PLAYER
1035 DATA8,28,42,62,8,4,31,21
1040 DATA4,14,21,31,4,8,62,42
1045 REM GRID
1050 DATA0,0,8,0,0,4,0,0
1055 REM EGG
1060 DATA63,51,41,33,33,51,63,63
1065 REM EDGE
1070 DATA4,4,8,8,4,4,8,8
1075 REM MUNZTER
1080 DATA9,18,10,31,21,14,10,19
1085 FORA=46384TO46391
1090 READB:POKEA,B:NEXT
1095 DATA0,0,0,21,42,0,0,0
1100 REM MC
1105 FORA=402TO422
1110 READB:B=VAL("0"+B#)
1115 POKEA,B:NEXT
1120 DATAAD,1,3,48,AD,3,3,48
1125 DATAA9,CO,8D,3,3,A9,80
1130 DATA8D,F,3,AD,F,3,8D,0,4
1135 DATA68,8D,3,3,68,8D,F,3,60
1140 FORA=89800TO89A50
1145 READB:B=VAL("0"+B#)
1150 POKEA,B:NEXT
1155 DATA20,2,4,AE,8,2,A0,0,E0,84,DO
1160 DATA7,E6,11,4C,19,98,E6,11,E0
1165 DATA38,F0,2,86,F,A6,F,A5,4,91,0
1170 DATAE0,B4,DO,16,A2,0,20,D6,98
1175 DATA81,0,C9,26,DO,6,20,E2,98,4C
1180 DATAAD,98,E6,3,4C,84,98,E0,9C
1185 DATA0,16,A2,0,20,E2,98,B1,0,C9
1190 DATA26,DO,6,20,D6,98,4C,AD,98
1195 DATAC6,3,4C,84,98,E0,AC,DO,16
1200 DATAA2,0,20,F5,98,B1,0,C9,26
1205 DATADO,6,20,EE,98,4C,AD,98,C6,2
1210 DATA4C,84,98,E0,BC,DO,E,A2,0,20
1215 DATAEE,98,B1,0,C9,26,DO,6,20,F5
1220 DATA98,4C,AD,98,E6,2,C9,21,DO,3
1225 DATA85,F,60,85,4,C9,A5,DO,1C,C6
1230 DATA10,38,E9,81,85,4,A2,4,FE,B1
1235 DATABB,BD,B1,8B,C9,3A,DO,9,A9
1240 DATA30,9D,B1,8B,CA,4C,9A,98,A5
1245 DATA12,49,1,85,12,91,0,A5,10,DO
1250 DATA3,85,F,60,A5,11,C9,1,DO,3C
1255 DATAA2,3,8D,C7,8B,C9,30,DO,6,CA
1260 DATADO,F6,60,EA,EA,A2,2,4C,95
1265 DATA99,18,85,0,69,28,95,0,90,2
1270 DATAF6,1,60,38,85,0,E9,28,95,0
1275 DATAB0,2,D6,1,60,F6,0,DO,2,F6,1
1280 DATADO,85,0,DO,2,D6,1,D6,0,60
1285 DATA84,11,A2,5,85,4,81,0,E0,5
1290 DATADO,17,A5,3,DS,3,80,11,20,E2
1295 DATA98,A1,0,C9,22,90,5,D6,3,4C
1300 DATADO,79,20,D6,98,A5,2,DS,2,80
1305 DATA11,20,F5,98,A1,0,C9,22,90,5
1310 DATADO,2,4C,7D,99,20,EE,98,85,3
1315 DATAC5,3,80,11,20,D6,98,A1,0,C9
1320 DATA22,90,5,F6,3,4C,7D,99,20,E2
1325 DATA98,85,2,C5,2,80,11,20,EE,98
1330 DATAA1,0,C9,22,90,5,F6,2,4C,7D
1335 DATA99,20,F5,98,A5,3,DS,3,80,1A
1340 DATA20,E2,98,A1,0,C9,22,80,6,20
1345 DATADO,98,4C,86,99,D6,3,C5,12
1350 DATADO,3,85,F,60,95,4,A9,21,81
1355 DATA0,E0,5,DO,5,A2,A,4C,2,99,A2
1360 DATA3,DE,C8,8B,8D,C8,8B,C9,2F
1365 DATADO,9,A9,39,9D,C8,8B,CA,4C
1370 DATA95,99,60,A2,6,A0,20,A9,A5
1375 DATA91,0,88,91,0,88,F0,8,A9,24
1380 DATA91,0,88,4C,AD,99,CA,DO,1,60
1385 DATA18,A5,00,69,A0,85,0,90,2,E6
1390 DATA1,4C,AB,99,A2,15,A9,A5,A0,0
1395 DATA91,0,48,98,18,65,2,AB,68,C4
1400 DATA3,DO,F3,CA,DO,1,60,48,A5,0
1405 DATA18,69,28,85,0,90,2,E6,1,68
1410 DATA49,81,4C,D5,99,A9,FC,85,2
1415 DATAA9,8B,85,3,A0,0,B1,2,C9,13
1420 DATADO,9,A5,4,A6,5,85,5,86,4,60
1425 DATAC5,4,DO,4,A5,5,91,2,E6,2,DO
1430 DATA2,E6,3,4C,4,9A,A0,0,84,0,84
1435 DATA2,84,3,A9,5,85,1,A5,9C,C5,0
1440 DATADO,7,A5,9D,C5,1,DO,1,60,B1
1445 DATA0,18,65,2,85,2,90,2,E6,3,E6
1450 DATA0,DO,2,E6,1,4C,30,9A
1455 CLS:CALL#9A24
1460 PRINT"CHECKSUM",DEEK(2)
1465 PRINT:PRINT"PRESS ANY KEY"
1470 A$=KEY$:GETA$:CLS
2000 REM INSTRUCTIONS
2005 FORA=1TO2:PLOT12,A,CHR$(10)+CHR$(1)+"B R O O D":
NEXT
2010 PRINT:PRINT:PRINT:PRINT
2015 PRINT"By T.W.Phoeng "CHR$(96)" june 1984"
2020 PRINT:PRINT"You're inside an incubator in which"
2025 PRINT"eggs of the munzter are stored on a"
2030 PRINT"grid."
2035 PRINT"Your task is to destroy these eggs"
2040 PRINT"before they hatch."
2045 PRINT"An easy job if there hadn't been any"
2050 PRINT"brood-gridders coming after you."
2055 PRINT"Fortunately they can not leave the"
2060 PRINT"grid but they are able to get you"
2065 PRINT"when you come near the grid."
2070 PRINT"At any time you can freeze the brood-"
2075 PRINT"gridders with your z-ray. But as this"
2080 PRINT"also speeds up the hatching of the"
2085 PRINT"eggs, you should not use this weapon"
2090 PRINT"too often."
2095 PRINT"If time runs out the eggs hatch and"
2100 PRINT"the young munzters will kill you with"
2105 PRINT"their radiation."
2110 PRINT:PRINT
2115 PRINT"PRESS ANY KEY":
2120 A$=KEY$:GETA$:CLS
2125 PRINT"CHR$(137)"CHR$(136)". . . that's you"
2130 PRINT:PRINT"CHR$(137)"CHR$(136)". . . brood grider"
2135 PRINT:PRINT"CHR$(137)"CHR$(136)". . . egg"
2140 PLOT3,4,165
2145 PRINT:PRINT"CHR$(137)"CHR$(136)". . . young
munzter"
2150 PRINT:PRINT:PRINT
2155 PRINT"MOVEMENT CONTROL : "
2160 PRINT"the cursor-keys or a joystick (PAGE"
2165 PRINT"interface, right port)"
2170 PRINT:PRINT"ON/OFF SWITCH OF Z-RAY : "
2175 PRINT"space bar or fire button"
2180 PRINT:PRINT:PRINT
2185 PRINT"JOYSTICK CONTROL (Y/N) ?"
2190 GETA$:IFA$="Y"THENB00
2195 IFA$<>"N"THEN2190
2200 PRINT:PRINT
2205 PRINT"INPUT SOUND LEVEL (0-15) : "
2210 INPUTV
2215 IFV<0ORV>15THEN2210
2220 GOTO600
```


"I'M A TOSHIBA HX10
I'VE GOT ALL THE
BEST BITS FROM EVERY
OTHER HOME COMPUTER.
AND MORE. I HAVE A
64K MEMORY, LIKE THE
COMMODORE 64. A
CASSETTE INTERFACE,
LIKE THE BBC. TWO
JOYSTICK PORTS, LIKE
THE COMMODORE 64.
A BUILT IN POWER
SUPPLY, LIKE THE
ORIC ATMOS. 16
USABLE COLOURS, LIKE
THE ACORN ELECTRON
73 FULL STROKE KEYS,
LIKE THE BBC. A
CARTRIDGE SLOT LIKE
THE COMMODORE 64.
A PRINTER INTERFACE,
LIKE THE ORIC ATMOS.
SOUND OUTPUT THROUGH
THE TV, LIKE THE
SINCLAIR SPECTRUM.
AN AUDIO/VIDEO
OUTPUT CONNECTION,
LIKE THE COMMODORE 64.
RF BUILT IN LIKE
THE BBC. AND:
A SEPARATE 16K VIDEO
MEMORY UNLIKE MOST
NON-MSX COMPUTERS.
32 SPRITES, MORE THAN
ANY OTHER NON-MSX
COMPUTER. AND I USE
MICROSOFT EXTENDED
BASIC, LIKE EVERY
OTHER MSX COMPUTER."

"WOW. WITH A
SPECIFICATION LIST
LIKE THAT.
NO WONDER YOU'VE
GOT A 64K MEMORY."

You'd expect one of the best-selling home computers in Japan to have a specification list as big as its memory.

But the Toshiba HX10 doesn't just limit itself to that.

It was developed along with other Japanese home computers to operate

on one language: MSX. You can swap programs, games, cassettes, even peripherals like disk drives, printers, and joysticks: they're all compatible with every other MSX computer.

All of which makes MSX the system of the future.

So if you want a computer that won't be obsolete in a few years, buy an MSX. If you want one of the best-selling MSX computers in Japan, buy a Toshiba HX10.

TOSHIBA **MSX**

FOR MORE INFORMATION ON THE TOSHIBA HX10 CONTACT TOSHIBA (UK) LTD., TOSHIBA HOUSE, FRIMLEY ROAD, FRIMLEY, SURREY GU16 5JJ. TEL: (0276) 681691.

COSMIC CAVERN is a machine-code game for the Commodore 64, incorporating smooth scrolling techniques with flicker-free display, and can be played with a joystick or from the keyboard. Shoot as many aliens as possible while avoiding crashing your spaceship into them or the walls of the cavern. Use a joystick to control your spaceship or:

N for left, M to move right.
Commodore key to move down.
Control key to move up.
Shift key to fire.

If you want to fire continuously, press the Shift Lock key rather than hold the fire button

or Shift key down all the time.

At regular intervals your spaceship will accelerate by a factor of one, shown on the speed indicator. At the same time a square pulsating anti-matter pod will appear in the cavern. If you shoot it the resultant shock wave slows down your spaceship by a factor of one.

However, in practice you may miss the pod and remain on speed level 2 which is more difficult to steer through. Should you go past speed level 7, you will return to speed 1 and be awarded a massive 100,000 points, but if you reach speed level 4, for example, you will see how difficult it is to steer down the cavern at

such high speed.

You are warned of the acceleration of your spaceship by the time indicator which counts down from right to left. The bullet indicator simply shows which of the seven torpedo barrels is to be fired next. The values of the various aliens are displayed on screen above the speed, bullet and time indicators.

Inevitably you will crash your spaceship, the computer will take over, showing all seven speed levels, and then stop. Press the fire button or space bar to return to the start, which will clear your score unless you attained the

CBM-64 Patrick Edmond takes you on a trip into the awesome caverns of the cosmos. As your ship speeds up and the aliens grow more hostile, can you stay in control?

```
2 GOSUB 200
4 POKE53280,0:POKE53281,0
6 PRINT"COSMIC CAVERN"
8 PRINT:PRINT"INSTRUCTIONS :";CHR$(14)
10 PRINT"PILOT YOUR SPACESHIP DOWN THE WINDING"
12 PRINT"CAVERN USING A JOYSTICK (IN PORT 2) OR"
14 PRINT"THE FOLLOWING KEYS : "
16 PRINT"/ - LEFT \ - RIGHT"
18 PRINT"- - DOWN CTRL - UP"
20 PRINT"SHIFT KEY TO FIRE,SHIFT LOCK=AUTO FIRE"
22 PRINT"WHEN THE GAME COMMENCES YOU ARE IN THE"
24 PRINT"ENTRANCE TO THE CAVERN,SO PRESS SPACE"
26 PRINT"BAR OR FIRE BUTTON TO ENTER THE CAVERN"
28 PRINT"....SHOOT THE ALIENS TO INCREASE YOUR"
30 PRINT"SCORE. AT REGULAR INTERVALS YOUR SHIP"
32 PRINT"ACCELERATES AND YOU MUST SHOOT THE "
34 PRINT"PULSATING ANTIMATTER POD WHICH APPEARS"
36 PRINT"AND THE EXPLOSION FORCE WILL SLOW DOWN"
38 PRINT"YOUR SHIP. HOWEVER, YOU CAN MISS IT AND"
40 PRINT"CARRY ON AT THE HIGHER SPEED IF YOU"
42 PRINT"WISH. PRESS A KEY TO CONTINUE":POKE198,0
44 GETA$:IFA$=""THEN44
46 PRINT"HERE ARE THREE INSTRUMENTS WHICH WILL"
48 PRINT"AID YOUR JOURNEY DOWN THE CAVERN : "
50 PRINT"1 SPEED : THIS INDICATES YOUR CURRENT"
52 PRINT"SPC(9):"SPEED BY A MARKER ON A SCALE."
54 PRINT"2 BULLET : THIS INDICATES WHICH BARREL"
56 PRINT"SPC(10):"OF THE TORPEDO GUN IS READY"
58 PRINT"SPC(11):"FOR FIRING."
60 PRINT"3 TIME : THIS INDICATES WHEN THE SHIP IS"
62 PRINT"SPC(8):"ABOUT TO ACCELERATE AND WHEN"
64 PRINT"SPC(8):"AN ANTIMATTER POD WILL APPEAR"
66 PRINT"SPC(8):"(BOTH EVENTS OCCUR"
68 PRINT"SPC(8):"SIMULTANEOUSLY)."
70 PRINT"THE TIME READOUT IS THE MOST USEFUL OF"
72 PRINT"THESE INSTRUMENTS."
74 PRINT"IF YOU REACH SPEED 7 AND ACCELERATE"
76 PRINT"AGAIN YOU WILL RETURN TO SPEED 1 AND"
78 PRINT"RECEIVE 100000 POINTS !"
80 PRINT"IF YOU CRASH,WAIT UNTIL THE SHIP STOPS"
82 PRINT"THEN PRESS SPACE BAR OR FIRE BUTTON TO"
84 PRINT"RETURN TO THE START."
86 PRINT"PRESS A KEY TO START":POKE198,0
88 GETA$:IFA$=""THEN88
90 SYS18048
200 PRINT"ENTERING DATA,PLEASE WAIT"
```



```
202 I=16384
204 READA$:IFA$=""THENRETURN
206 L=ASC(LEFT$(A$,1))-48
208 IFL>9THENL=L-7
210 R=ASC(RIGHT$(A$,1))-48
212 IFR>9THENR=R-7
214 POKEI,16*L+R:I=I+1:GOTO204
300 DATA9,3F,8D,11,D0,A9,18,8D
302 DATA18,D0,A5,F4,F0,19,C6,F3
304 DATA10,10,A9,11,8D,04,D4,A9
306 DATA08,E5,FF,0A,0A,0A,85,F3
308 DATAD0,05,A9,00,8D,04,D4,AD
310 DATA12,D0,18,C9,B0,90,F8,A9
312 DATA1F,8D,11,D0,A9,18,8D,18
314 DATAD0,A9,00,8D,8E,02,A9,00
316 DATA85,F1,85,F0,85,EF,A5,F4
318 DATAD0,03,4C,78,43,20,9F,FF
320 DATA8E,8D,02,8A,29,01,85,F1
322 DATA8A,29,02,85,F0,8A,29,04
324 DATA85,EF,AD,00,DC,29,10,49
326 DATA10,05,F1,85,F1,A5,C5,C9
328 DATA27,F0,07,AD,00,DC,29,04
330 DATAD0,0E,AD,00,D0,38,E5,FF
332 DATA8D,00,D0,B0,03,CE,10,D0
```


high score, and press fire button or spacebar again to commence journey into the cavern.

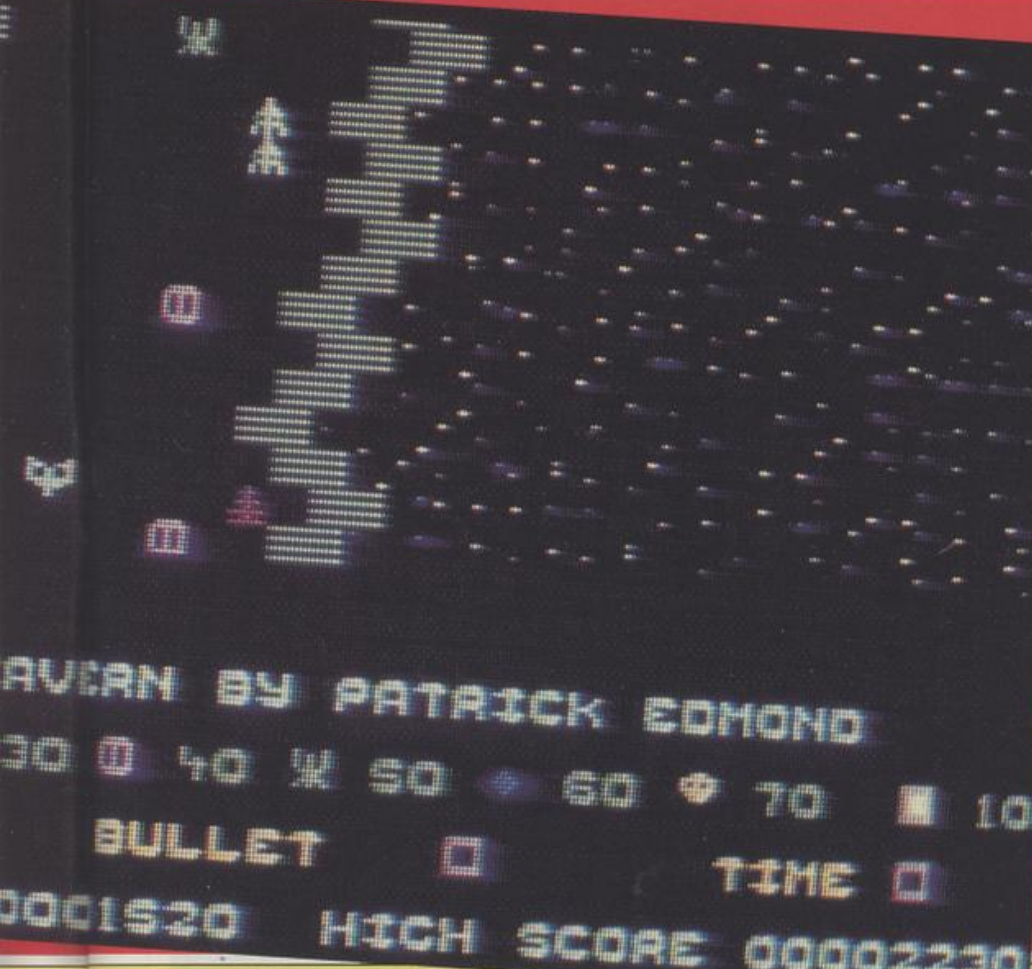
Cosmic Cavern can be typed in exactly as shown and Saved. However, if you own an assembler, type in lines 4 to 90 and add:

2 C = C + 1:IFC = 1 THEN LOAD "",1,1

and Save on cassette. Next enter the hex code of lines 900 to 904 directly into memory with your assembler beginning at 4000 hex, and Save 4000 to 4980 hex on cassette after the shortened Basic program just mentioned. Typing Cosmic Cavern in this way avoids the delay associated with the subroutine at line 200

(continued on page 103)

COSMIC CAVERN



```

426 DATA42,A0,0F,A2,27,BD,58,06
428 DATA9D,30,06,9D,30,DA,CA,10
430 DATAF4,88,F0,2C,C0,06,D0,03
432 DATA20,2F,43,AD,01,42,18,69
434 DATA28,8D,01,42,8D,04,42,90
436 DATA06,EE,02,42,EE,05,42,AD
438 DATAFE,41,18,69,28,8D,FE,41
440 DATA90,03,EE,FF,41,4C,FB,41
442 DATAAD,1B,D4,29,01,F0,0B,A5
444 DATAFD,C9,19,F0,0B,E6,FD,4C
446 DATA50,42,A5,FD,F0,02,C6,FD
448 DATAA9,00,A2,27,9D,58,06,CA
450 DATA10,FA,A6,FD,A9,0D,9D,58
452 DATA06,9D,59,06,9D,65,06,9D
454 DATA66,06,CA,30,0B,AD,1B,D4
456 DATA29,07,9D,58,06,CA,10,F5
458 DATAA5,FD,18,69,0F,AA,AD,1B
460 DATAD4,29,07,9D,58,06,E8,E0
462 DATA29,D0,F3,AD,1B,D4,29,1F
464 DATA18,C9,0A,B0,10,18,65,FD
466 DATAAA,E8,E8,AD,1B,D4,29,07
468 DATA69,10,9D,58,06,A5,F4,F0
470 DATA35,C6,F2,D0,31,A9,80,85
472 DATAF2,A5,FD,69,06,AA,A9,09
474 DATA9D,58,06,A6,FF,E8,8A,29
476 DATA07,85,FF,E0,03,D0,17,A2
478 DATA02,FE,A3,07,8D,A3,07,C9
480 DATA3C,D0,09,A9,32,9D,A3,07
482 DATACA,4C,C9,42,E6,FF,A6,FF
484 DATA8D,40,44,8D,22,D0,A5,F4
486 DATAD0,17,A5,FD,18,69,0A,0A
488 DATA0A,0A,8D,00,D0,AD,10,D0
490 DATA29,FE,90,02,09,01,8D,10
492 DATAD0,CE,23,D0,AD,11,D0,29
494 DATA7F,8D,11,D0,A9,A8,8D,12
496 DATAD0,AD,19,D0,09,81,8D,19
498 DATAD0,68,A8,68,AA,68,40,A2
500 DATA04,A0,C0,88,D0,FD,CA,D0
502 DATAF8,20,2F,43,4C,DE,42,A9
504 DATA10,05,FE,8D,11,D0,60,C9
506 DATA09,D0,0B,A5,FF,C6,FF,D0
508 DATA02,E6,FF,4C,56,43,C9,0D
510 DATAD0,0A,A9,00,9D,03,D0,95
512 DATAE1,4C,A8,41,29,EF,85,F7
514 DATAA9,00,91,F8,A9,03,8D,13
516 DATAD4,A9,05,8D,14,D4,A9,81
518 DATA8D,12,D4,A9,0F,8D,18,D4
520 DATAA9,80,8D,12,D4,4C,A8,41
522 DATAA2,80,CA,D0,FD,4C,D1,41
524 DATA10,10,00,3C,F0,00,33,30
526 DATA00,33,30,00,3F,F0,00,0F
528 DATAC0,00,03,00,00,03,00,00
530 DATA00,00,00,00,00,00,00,00
532 DATA00,00,00,00,00,00,00,00
534 DATA00,00,00,00,00,00,00,00
536 DATA00,00,00,00,00,00,00,00
538 DATA00,00,00,00,00,00,00,00
540 DATA01,00,00,02,00,00,01,00
542 DATA00,02,00,00,01,00,00,02
544 DATA00,00,01,00,00,02,00,00
546 DATA01,00,00,02,00,00,01,00
548 DATA00,02,00,00,01,00,00,00
550 DATA00,00,00,00,00,00,00,00
552 DATA00,00,00,00,00,00,00,00
554 DATA00,00,00,00,00,00,00,00
556 DATA00,00,00,00,00,00,00,00

```

(listing continued on page 103)

```

334 DATAA5,C5,C9,24,F0,07,AD,00
336 DATADC,29,08,D0,0E,AD,00,D0
338 DATA18,65,FF,8D,00,D0,90,03
340 DATAEE,10,D0,AD,01,D0,C9,36
342 DATAF0,11,A5,EF,D0,07,AD,00
344 DATADC,29,01,D0,06,CE,01,D0
346 DATACE,01,D0,AD,01,D0,C9,94
348 DATAF0,11,A5,F0,D0,07,AD,00
350 DATADC,29,02,D0,06,EE,01,D0
352 DATAEE,01,D0,C6,FA,10,08,A9
354 DATA05,85,FA,A5,F1,D0,03,4C
356 DATA60,41,C6,FB,10,04,A9,06
358 DATA85,FB,A5,FB,A8,0A,AA,AD
360 DATA01,D0,9D,03,D0,AD,00,D0
362 DATA9D,02,D0,A9,01,0A,88,10
364 DATAFC,A8,49,FF,2D,10,D0,8D
366 DATA10,D0,AD,10,D0,29,01,F0
368 DATA07,98,0D,10,D0,8D,10,D0
370 DATAA9,04,95,E1,AD,00,D0,4A
372 DATA4A,4A,38,E9,02,95,E0,B0
374 DATA02,D6,E1,AD,10,D0,29,01
376 DATAF0,0B,B5,E0,18,69,20,95
378 DATAE0,90,02,F6,E1,AD,01,D0
380 DATA38,E9,32,29,F8,A8,18,75

```

```

382 DATAE0,95,E0,90,02,F6,E1,98
384 DATA0A,18,0A,90,02,F6,E1,18
386 DATA75,E0,95,E0,90,02,F6,E1
388 DATAA5,FA,A2,06,9D,28,D0,CA
390 DATA10,FA,A2,00,B5,E1,F0,38
392 DATA85,F9,B5,E0,85,F8,A0,00
394 DATAB1,F8,F0,03,4C,37,43,A0
396 DATA28,B1,F8,D0,F7,8D,03,D0
398 DATA18,69,08,9D,03,D0,18,C9
400 DATAA0,90,0A,A9,00,9D,03,D0
402 DATA95,E1,4C,A8,41,B5,E0,18
404 DATA69,28,95,E0,90,02,F6,E1
406 DATAE8,E8,E0,0E,D0,BE,A5,F4
408 DATAF0,1B,A5,F1,D0,06,A9,20
410 DATA8D,0B,D4,4C,C3,41,A9,21
412 DATA8D,0B,D4,A5,F8,4A,4A,4A
414 DATA09,20,8D,08,D4,A9,00,85
416 DATAF9,A5,FE,38,E5,FF,29,07
418 DATA85,FE,90,03,4C,1F,43,A9
420 DATA04,8D,FF,41,8D,02,42,A9
422 DATA28,8D,FE,41,A9,00,8D,01
424 DATA42,8D,04,42,A9,D8,8D,05

```


Stay cool. Stay low. Stay alive.



RIVER RAID

1-2 Players. Running on
Commodore 64, Sinclair Spectrum
from your usual software store.

You are commanding a squadron of four ground attack aircraft...

The mission is seemingly hopeless.

Fly along the river at zero altitude, twisting and turning crazily to stay within its tortuous banks, blasting at anything and everything in sight. Especially the bridges.

Three of your jets are held in reserve while you are pitched against Battleships, Enemy Aircraft, Land Tanks, Balloons, Helicopter Gunships. All intent only on your destruction.

And destroy you they will, if you don't get them first. You'll need to keep an eye on your fuel gauge. But take comfort, you can take fuel on board from one of the special depots.

If you get hit - and nobody has yet reached the end of the river - your next reserve starts at the last bridge you blasted on your way through!

Each target you destroy adds to your points score.

Like all Activision Software, River Raid will hold you and keep you coming back for more.

Chocks away!

Lose yourself in the world of

 **ACTIVISION®**

(continued from page 101)

every time you play the game, but if you don't own an assembler I'm afraid that every time you load Cosmic Cavern you will have to endure this delay while the Basic subroutine enters the data into memory. Please check carefully that the hex code has been entered correctly before running.

The heart of the program is an interrupt routine located at 4000 hex to 4380. In Cosmic Cavern all interrupt sources, such as the timer chips, are disabled except for the raster interrupt. The raster scan is controlled by the '64 transfers the screen memory on to the telec vision from top to bottom every 1/60th of a second, and the process takes about 1/60th of a second.

The raster position can be found in locations D011 and D012 hex, and in Cosmic Cavern a latch is set so that an interrupt request is

generated when the raster scan is about half way down the screen. This is explained in the programmer's reference guide. When this interrupt occurs the routine at 4000 hex commences, the '64 is set into 25 row mode so that the score and instruments are held stationary, the spaceship is moved according to joystick or keyboard and any bullets are moved down the screen.

Finally, the cavern is shifted up the screen by one bit — since smooth scrolling is involved the cavern is only moved a fraction of a whole character up the screen — multiplied by the spaceship speed, and the scroll position is updated in register D011 hex. If this movement exceeds seven bits the screen memory is shifted up one whole character and the cavern wall blocks and stars are added on to the bottom of the existing cavern. By now the raster has completed a scan, so return to the top

of the screen; the 64 is set in 24-row mode so that the smooth scroll position, lower three bits of D011 hex, takes effect and completes the interrupt.

Speed, bullet and time

The program running under this interrupt is responsible for the speed bullet and time instruments and also waits for the spaceship to collide with an alien or cavern walls — sprite to background collision detector D01F hex — if a collision does occur this program takes over control of the spaceship producing the crash effect and then resets for another game.


A cassette is available containing two copies of Cosmic Cavern for £3.00 including postage and packing.

Send a cheque or postal order to Patrick Edmond, "Le Nid", Scarborough Road, Driffield, East Yorks, YO25 7EQ.

(listing continued from page 101)

```
558 DATA00,00,00,00,00,00,03,00
560 DATA00,00,00,00,00,00,00,00
562 DATA01,00,00,00,00,00,00,00
564 DATA00,00,00,00,00,00,00,00
566 DATA00,00,00,00,00,00,00,00
568 DATA60,00,00,00,00,00,00,00
570 DATA00,00,00,00,00,00,00,00
572 DATA00,07,06,05,03,01,0B,02
574 DATAAA,AA,BE,BE,BE,BE,AA,AA
576 DATA00,00,00,00,00,00,00,00
578 DATAFF,FF,FF,FF,FF,FF,FF,FF
580 DATAFF,FF,D7,D7,D7,D7,FF,FF
582 DATAFF,55,55,55,55,55,55,55
584 DATA00,00,00,00,00,00,00,00
586 DATA00,00,00,00,00,00,00,00
588 DATA00,00,00,00,00,00,00,00
590 DATA18,3C,7E,C3,C3,7E,66,E7
592 DATA18,3C,18,7E,18,FF,18,FF
594 DATA18,18,3C,7E,5A,7E,DB,DB
596 DATA7E,FF,DB,DB,DB,DB,FF,7E
598 DATAC3,DB,DB,DB,7E,3C,7E,DB
600 DATA00,10,38,7C,FE,7C,38,10
602 DATA3C,FF,DB,FF,7E,3C,38,10
604 DATA00,7C,FE,C6,C6,FE,C6,C6
606 DATA00,FC,FE,C6,C6,FE,C6,FC
608 DATA00,7C,FE,C6,C6,FE,C6,7C
610 DATA00,FC,FE,C6,C6,FE,C6,FC
612 DATA00,FC,FE,C6,C6,FE,C6,FC
614 DATA00,7C,FE,C6,C6,FE,C6,C6
616 DATA00,7C,FE,C6,C6,FE,C6,C6
618 DATA00,C6,C6,C6,FE,C6,C6,C6
620 DATA00,3C,FE,18,18,18,FE,3C
622 DATA00,00,00,00,00,00,66,00
624 DATA00,C0,C6,CC,F8,CC,C6,C6
626 DATA00,C0,C6,CC,F8,CC,C6,C6
628 DATA00,C6,EE,FE,D6,C6,C6,C6
630 DATA00,C6,E6,F6,DE,CE,C6,C6
632 DATA00,7C,FE,C6,C6,FE,C6,7C
634 DATA00,7C,FE,C6,C6,FE,C6,7C
636 DATA00,7C,FE,C6,C6,FE,C6,7C
638 DATA00,7C,FE,C6,FE,FC,C6,C6
640 DATA00,7C,FE,C6,7C,06,FE,7C
642 DATA00,7C,FE,18,18,18,18,18
644 DATA00,C6,C6,C6,C6,C6,FE,7C
646 DATA00,C6,C6,C6,C6,6C,7C,38
648 DATA00,C6,C6,C6,D6,D6,FE,7C
650 DATAFC,C0,FC,0D,FF,06,0C,18
652 DATA00,C6,C6,E6,7E,06,FE,7C
654 DATA30,60,C0,83,C3,DB,DB,FF
656 DATA00,7C,FE,C6,C6,C6,FE,7C
658 DATA00,18,38,18,18,18,18,3C
660 DATA00,7C,FE,06,0C,30,FE,7C
662 DATA00,7C,FE,06,1E,06,FE,7C
664 DATA00,60,60,6C,7E,0C,0C,0C
666 DATA00,7C,FE,C0,FC,06,FE,7C
668 DATA00,7C,FE,C0,FC,C6,FE,7C
670 DATA00,7C,FE,C0,FC,C6,FE,7C
672 DATA00,7C,FE,C6,FE,C6,FE,7C
674 DATA00,7C,FE,C6,FE,06,FE,7C
676 DATA11,00,33,32,00,12,00,34
678 DATA32,00,13,00,35,32,00,14
680 DATA00,36,32,00,15,00,37,32
682 DATA00,16,00,38,32,00,17,00
684 DATA39,32,00,00,09,00,33,32
686 DATA2A,27,1C,1C,1B,00,0C,0C
688 DATA0C,0C,0C,0C,0C,00,00,19
690 DATA2C,23,23,1C,2B,00,0C,0C
692 DATA0C,0C,0C,0C,0C,00,00,2B
694 DATA20,24,1C,00,0C,0C,0C,0C
696 DATA30,26,2C,29,00,2A,1A,26
698 DATA29,1C,00,32,32,32,32,32
700 DATA32,32,32,00,1F,20,1E
702 DATA1F,00,2A,1A,26,29,1C,00
704 DATA32,32,32,32,32,32,32,32
706 DATA00,00,00,00,1A,26,2A,24
708 DATA20,1A,00,1A,18,2D,1C,29
710 DATA25,00,19,30,00,27,18,2B
712 DATA29,20,1A,22,00,1C,1B,24
714 DATA26,25,1B,00,00,00,00,00
716 DATA78,A9,40,8D,15,03,A9,00
718 DATA8D,14,03,8D,20,D0,8D,21
720 DATAD0,A9,43,8D,19,03,A9,1E
722 DATA8D,18,03,A9,00,8D,0E,DD
724 DATA8D,0E,DC,8D,11,D0,A2,00
726 DATAA9,00,9D,00,04,9D,00,05
728 DATA9D,00,06,9D,00,07,9D,00
730 DATA08,9D,00,D9,9D,00,DA,9D
732 DATA00,DB,E8,00,E3,A9,00,9D
734 DATA00,D0,E8,E0,11,D0,F8,A2
736 DATA06,A9,21,9D,F9,07,CA,10
738 DATAFA,A9,36,8D,01,D0,A9,A0
740 DATA8D,00,D0,A9,FF,8D,15,D0
742 DATAA9,20,8D,F8,07,A2,80,8D
744 DATA80,43,9D,00,08,CA,10,F7
746 DATAA9,0D,8D,27,D0,A2,1F,A9
748 DATA00,95,E0,CA,10,FB,A9,00
750 DATA85,FF,A9,0A,85,FD,A9,FF
752 DATA8D,1C,D0,8D,25,D0,A9,03
754 DATA8D,26,D0,A9,07,8D,22,D0
756 DATA8D,23,D0,A9,28,85,A9,A0
758 DATA00,84,A8,98,91,A8,C8,D0
760 DATAFB,E6,A9,A5,A9,C9,40,D0
762 DATAF2,A9,34,8D,01,D4,8D,03
764 DATAD4,A9,07,8D,0C,D4,A9,61
766 DATA8D,0D,D4,8D,07,D4,8D,00
768 DATAD4,A9,81,8D,12,D4,A9,8F
770 DATA8D,18,D4,A9,FA,8D,0E,D4
772 DATA8D,0F,D4,A9,0F,8D,13,D4
774 DATA8D,14,D4,A9,00,8D,05,D4
776 DATA8D,06,D4,A9,08,8D,16,D0
778 DATAA9,80,85,F2,A9,FF,8D,91
780 DATA02,A2,00,8D,00,44,9D,00
782 DATA20,8D,00,45,9D,00,21,E8
784 DATAD0,F1,A2,27,8D,0E,45,9D
786 DATAF8,06,8D,58,46,9D,A8,06
788 DATA8D,08,46,9D,48,07,8D,30
790 DATA46,9D,98,07,A9,03,9D,A8
792 DATADA,9D,98,DB,A9,07,9D,48
794 DATA0B,A9,05,9D,F8,DA,CA,10
796 DATAD3,A9,09,8D,1C,DB,A2,00
798 DATA00,01,98,9D,F8,DA,8A,18
800 DATA69,05,AA,C8,C0,08,D0,F2
802 DATAA9,00,85,A8,AA,A9,04,85
804 DATAA9,A0,0B,A9,0B,91,A8,A0
806 DATA18,91,A8,A8,18,69,28
808 DATA85,A8,90,02,E6,A9,E8,E0
810 DATA10,D0,E6,A9,0B,A2,00,9D
812 DATA00,D8,9D,00,D9,E8,D0,F7
814 DATA9D,00,DA,E8,E0,58,D0,F8
816 DATAA9,81,8D,1A,D0,AD,1F,D0
818 DATAA9,18,8D,18,D0,A9,A8,8D
820 DATA12,D0,A9,10,8D,11,D0,AD
822 DATA19,D0,09,81,8D,19,D0,A9
824 DATAFF,85,F4,58,AD,00,DC,29
826 DATA10,F0,07,AD,01,DC,29,10
828 DATAD0,F2,A9,01,85,FF,AE,25
830 DATAD0,E8,8A,29,03,8D,25,D0
832 DATAA2,06,A5,F7,F0,18,FE,A3
834 DATA07,BD,A3,07,C9,3C,F0,05
836 DATAC6,F7,4C,50,48,A9,32,9D
838 DATAA3,07,CA,4C,56,48,A2,07
840 DATAA9,08,9D,4E,DB,CA,10,FA
842 DATAA9,0C,A6,FF,9D,4D,D8,A9
844 DATA08,A2,06,9D,5E,DB,CA,10
846 DATFA9,05,FB,09,0C,9D,5E,07
848 DATA9D,5E,DB,A5,FF,18,69,32
850 DATA8D,1E,07,A2,05,A9,08,9D
852 DATA6C,DB,CA,10,FA,A5,F2,4A
854 DATA4A,4A,4A,4A,A9,0C,9D
856 DATA6C,DB,AD,1F,D0,29,01,D0
858 DATA03,4C,46,48,A2,00,86,F4
860 DATAA9,1F,8D,05,D4,A9,8F,8D
862 DATA06,D4,8D,01,D4,8D,00,D4
864 DATAR2,40,A9,81,8D,04,D4,A9
866 DATA01,8D,15,D0,A9,21,8D,0B
868 DATAD4,A0,FF,88,D0,FD,A9,80
870 DATA8D,04,D4,A9,20,8D,0B,D4
872 DATA8A,4A,8D,08,D4,8D,01,D4
874 DATAAD,01,D0,18,CF,96,80,03
876 DATAEE,01,D0,A0,FF,88,D0,FD
878 DATACA,D0,C7,A5,FF,C9,07,F0
880 DATA05,E6,FF,4C,D0,48,A9,00
882 DATA8D,10,D4,A9,81,8D,04,D4
884 DATAA9,04,8D,01,D4,A9,80,8D
886 DATAD4,D4,A2,07,A0,FF,86,FF
888 DATA88,D0,FB,C6,FA,D0,F5,A9
890 DATA60,85,FA,CA,D0,E8,A9,00
892 DATA85,FF,A2,00,8D,A3,07,18
894 DATADD,B8,07,D0,08,E8,E0,08
896 DATAD0,F2,4C,62,49,90,08,A2
898 DATA07,BD,A3,07,9D,50,46,CA
900 DATA10,F7,AD,01,DC,29,10,F0
902 DATA07,AD,00,DC,29,10,D0,F2
904 DATA4C,80,46,00,00,00,00,00
906 DATA*
```

READY.



WOW! THIS
COMMODORE 16
STARTER PACK'S
WIZARD!

And cwikey! i

First we jolly well put everything you need to start home computing into one box.

Then we placed an obligingly low price on it all: under £140 for a computer, cassette unit, a super programming course and 4 great games programs.

Boys and girls (of all ages) will just love the Commodore 16 Starter Pack!

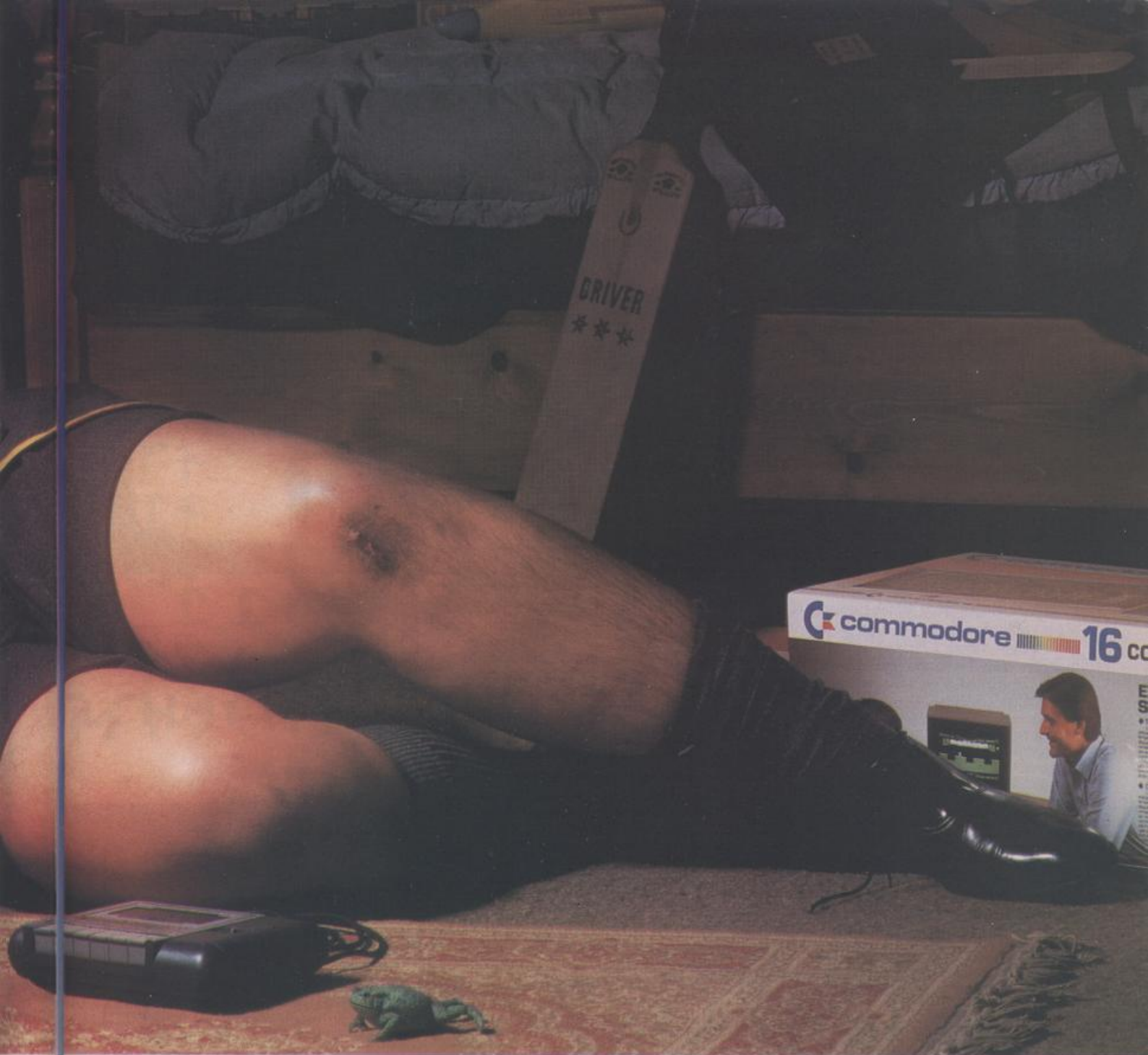
The computer has a 16K memory, real type-

writer keyboard, 121 colours and also superb sound and graphics.

It uses BASIC (this is the language in which you and the computer "talk" to each other, right-ho?)

The BASIC used by the Commodore 16 is very advanced, yet really simple to use. This is because it gives you more programming commands.

But just in case any of you fellows do have any



it's only £139.99.

difficulties, we also provide you with a Help key.

This helps to sort out programming errors by showing you exactly where you went wrong.

So you can get more out of your Commodore 16, the Starter Pack also includes "Introduction to BASIC," a guide to programming that any silly chump can follow.

And so you can get more enjoyment, there are

four jolly good and splendidly challenging games: X-Zap, Punchy, Picture Builder and Chess.

If you are thinking of starting home computing, there has never been a better time than now, with the Commodore 16 Starter Pack.

No matter what age you are, old thing.



BY APPOINTMENT TO HER MAJESTY
THE QUEEN, MANUFACTURERS OF COMPUTERS
AND HOME ENTERTAINMENT EQUIPMENT
SINCE 1977

commodore

ZOOM is an easy to use machine-code utility and allows the user to enlarge to full screen size the area of the screen enclosed within a window. This window can be varied in size from 8-256 pixels wide and from 3-192 pixels high. When in Magnify mode the magnified area can be viewed continuously as the window is moved. Since the magnified area can also itself be magnified, using the same window, infinite magnification is possible, even if of doubtful use. The routine does not magnify the colour but produces the magnification in the current permanent attribute colour.

The routine accesses various Basic variables for its parameters. This means you do not have to bother Poking any numbers, but just use a Let statement. If you call the routine without having assigned the following variables a "2 Variable not found" error will be given.

The machine code has comprehensive error checking. Zoom will not allow XPOS or YPOS to be values that make a part of the window off screen. If say, XPOS was 270, an illegal screen co-ordinate, Zoom would give XPOS a new value that ensured that the window was entirely on the screen, this value would vary with the size of the window. The width of the window can have values between 0 and 5, the depth can have values between 0 and 6. If the variables Width or Depth have values that are too big Zoom will change the value to the maximum permissible value. Likewise if either has a negative value Zoom will replace the value with 0. The width and depth numbers correspond to the following window sizes:

Width	Depth
0 256 Pixels	192 Pixels
1 128	96
2 64	48
3 32	24
4 16	12
5 8	6
6 —	3

Thus to have a window size 64 pixels by 12 pixels, Width would be 2 and depth would be 4. If you wish to see an example of Zoom error correcting, load up with the Zoom code and then run the following lines of Basic.

```
10 LET XPOS = 260: LET YPOS = -10
20 LET WIDTH = 6: LET DEPTH = -5
```

Having run the program type
RAND USR 50000

This will draw the Zoom window. In this case you will see a very tall, thin window. If you now type Print XPOS, YPOS, Width, Depth you will find that Width=5, Depth=0, XPOS=248 and YPOS=192. Since XPOS and YPOS denote the top left corner of the window, YPOS has been made 192 since the window is 192 pixels high i.e., this is the first value of YPOS above -10 that allows the window to appear/sit on the screen. XPOS has been rounded down until the window is on the screen, in this case 256-window width.

The algorithm used for Zoom takes each line of the window, places it in a buffer and keeps on doubling it in width until it is 32 bytes wide. It then puts the 32-byte buffer down on the screen — 192/(window y size) — times. The initial form of the screen is saved at 32768 and the magnified image is formed on the normal screen i.e., at 16384. To create Zoom, type in program A and then save it. Now try running it, if you have no errors, then save the code. The code can be used independently of program B, this program is provided to help you use Zoom.

Basic program commands.

- A ... Clear main screen and back-up.
- B ... Move back-up screen down to current window screen.
- L ... Load with new back-up screen.
- m ... Magnify area under window until next key press.
- M ... Continuously magnify. View can be moved around using normal direction keys.
- N ... Retrieve back-up screen.
- P ... Make magnified image current window screen.
- s ... Alter window movement step size.
- x ... Increase window width.
- X ... Decrease window width.
- y ... Increase window depth.
- Y ... Decrease window height.

Machine-code routines.

- Address
- 30000 XOR current window onto screen. Doing this twice will delete the window
- 30003 Move screen from 32768 to 16384

Program A.

```
10 DATA "C373C4210080110040101
6210040110080180E21009B110040180
621004011009B01001B0C9C09C53
68F5C5721005801000372230B78B1207
93A56C64F05000C0049130FC0578325
9C63A55C5F5A720043E201807C3FCB3
FCB3FC3C258C6F106FF"
11 DATA 12409
20 DATA "04F0028038718F878325
7C6ED4B53C6CDD7C4325AC63E408467E
B2100403A56C647C5D5E5C60C4D13A5
9C647C5D5E2113C6012000EDB0E1CD54C
4EB110EE1C64C4EB11104B3A58C64
70600C9C48C48C57C647A7C8C52113C
61133C6010010C57EE5"
21 DATA 13621
30 DATA "6189A7280F050817F5CB1
5CB14F1CB15CB1410F3CB722373230BE
1231110E2133C61113C6012000EDB0C
110C6C9EB3A58C64F1113C60500EDB03
5FA687C06202132C6CB162B10FB5D1
8F1243E07A4C07C6206FD87C60857C
9C09C5E04B53C6CDD7"
31 DATA 13675
40 DATA "C41EFF16000E80A747280
8CB3BCB13CB3910F8E5C5CDB0C4CB213
0030E012B3A56C6CDAEC4C1E13A56C63
DCDAEC4CDB8C4C9477E8977CD64C410F
8C93A55C6A7200406201807C3FCB3FC
BC3F477E8B772C6B7B20037E8A7710F3C
93C0C3AC222A5D5CE5"
41 DATA 14484
```

```
1011
/$="P"
RAND
```

- 30011 Move screen from 16384 to 32768
 - 30019 Move screen from 39680 to 16384
 - 30027 Move screen from 16384 to 39680
 - 30039 Magnify area under window
- The area 50708-50800 is used as work-space by Zoom and should be left clear.
32768-39679 Used to store screen during magnification.
39680-46591 Used to store back-up screen

```
50 DATA "E4535d5ccdb228da2e1c2
3cdB433e1225d5cc978705f73379705
f733d54857074683d77659547483d110
3C5Cddcc4cdA22d7930043e05130b280
3af1806fe05330a0e05f11033C4e0C
5f15f16002106c0197e355C611fcd4C
ddcc4cdA22d7930043e"
51 DATA 13530
60 DATA "06180C2803A71807fe07d
5B6C53E06F811fcd4Cde0C5f15f16002
10C6C197E3258C611f8Ccc4cd4Cda802
d3003012C012300301000C5E13A58C63
C5f1600E023000d57b11f3C4Cde0C9C
1C5E111C100d52330A1bD57b11f3C4C
de0C5C179F811f3C4C4"
61 DATA 13805
70 DATA "dccc4cdA22d28051100001
81d3003012C01C5E13A55C6A72005110
000180b573E0095F1600Ed523809d57
b11f3C4Cde0C5C1E1692253C6C92A5d5
ce5d535d5Ccd22dcd6B228f43637003
003C32E1C224d5Ccd43725CE1225d5C
dff2c9008040201000"
71 DATA 13307
80 DATA "C06030180C0503"
81 DATA 801
5000 LET f=50000
5010 FOR h=1 TO 8: READ a$
5011 LET c=0
5020 FOR s=1 TO LEN a$ STEP 2
5030 LET a=CODE a$(s): LET b=COD
E a$(s+1)
5040 LET c=c+b*a$
5050 IF a>98 THEN LET a=a-39
```


ZOOM

TH
IF
USF

TH
MT7

```

Y$="M" THEN
B 1400
Y$="A" THEN :
";a$: IF a$:
OMIZE USR 500
0011
INKEY$="P" THEN
039: RANDOMIZE U
INKEY$="N" THEN
019: RANDOMIZE U
f=0
THIVEY/+-"/" THEN

```

Mark Jones takes you up,
up and away ... with his
instant enlarger for the
bleary-eyed Spectrum.

Variables.

XPOS..... X co-ordinate of
window
YPOS..... Y co-ordinate of
window
WIDTH..... Width of window 0-5
DEPTH..... Depth of window 0-6

```

5050 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 "Line "h+10;" is O.K."
5120 READ tot: IF tot<>c THEN PR
INT "Error at line "h+10: STOP
5125 LET c=0
5130 NEXT h
5140 PRINT "No Errors"
5150 PRINT "Save code from addre
ss 50000, length 706 bytes,"

```

Program B. Demonstrates how little external
control the machine code needs.

```

5 LET width=1: LET depth=1
10 LET xpos=100: LET ypos=100
25 LET a=1
30 LET mod=0
40 LIST 1500: REM put somethin
g on the screen
100 GO SUB 1500
110 IF INKEY$="" THEN GO TO 110
115 IF NOT mod THEN RANDOMIZE U
SR 50000
120 GO SUB 1000
140 GO TO 100
500 REM *****
1000 LET tot=xpos+ypos

```

```

1005 LET xpos=xpos+a*(INKEY$="S
")-(INKEY$="5")
1010 LET ypos=ypos+a*(INKEY$="7
")-(INKEY$="8")
1020 IF xpos+ypos<>tot THEN RETU
RN
1025 REM *****
1030 RANDOMIZE USR 50011: REM
(save screen temporarily.)
1040 LET depth=depth+(INKEY$="Y"
)-(INKEY$="y")
1050 LET width=width+(INKEY$="X"
)-(INKEY$="x")
1070 IF INKEY$="B" THEN RANDOMIZ
E USR 50039: PAUSE 0: PAUSE 0
1075 IF INKEY$="M" THEN LET mod=
1-mod: GO SUB 1400
1080 IF INKEY$="A" THEN INPUT "C
onfirm Y/n ? "a$: IF a$="Y" THE
N CLS : RANDOMIZE USR 50027: RAN
DOMIZE USR 50011
1085 IF INKEY$="P" THEN RANDOMIZ
E USR 50039: RANDOMIZE USR 50011
1090 IF INKEY$="N" THEN RANDOMIZ
E USR 50019: RANDOMIZE USR 50011
: LET mod=0
1100 IF INKEY$="s" THEN INPUT "s
tep size ? "a$: IF a<1 OR a>255
THEN GO TO 1100
1101 REM *****
1102 REM Use one or other of
these two versions.
1103 REM *****
1104 REM Microdrive Version

```

```

")
th=width+(INKEY$="X"
")
Y$="B" THEN RANDOMIZ
E USR 50039: PAUSE 0: PAUSE 0
Y$="M" THEN LET mod=
1-mod: GO SUB 1400
Y$="A" THEN INPUT "C
onfirm Y/n ? "a$: IF a$="Y" THE
RANDOMIZE USR 50027: RAN
DOMIZE USR 50011
1105 IF INKEY$="L" THEN INPUT "s
creen to be loaded ? "a$: IF a$
<>" THEN LOAD "a":1;a$CODE 396
80: RANDOMIZE USR 50019: RANDOMI
ZE USR 50011
1106 REM *****
1107 REM Tape Version
1108 IF INKEY$="L" THEN INPUT "s
creen name ? "a$: IF a$<>"exit"
THEN LOAD "a":CODE 39680: RANDOMI
ZE USR 50019: RANDOMIZE USR 5001
1
1109 REM *****
1110 IF INKEY$="B" THEN INPUT "A
re you sure ? (Y/n) "a$: IF a$=
"Y" THEN RANDOMIZE USR 50003: RA
NDOMIZE USR 50027
1120 RANDOMIZE USR 50003: REM
(Retrieve screen.)
1125 RETURN
1399 REM *****
1400 IF mod THEN RANDOMIZE USR 5
0011: RETURN
1405 RANDOMIZE USR 50003: RETURN
1499 REM *****
1500 IF NOT mod THEN RANDOMIZE U
SR 50000: RETURN: REM
(Window Mode.)
1510 RANDOMIZE USR 50039: REM
(Magnify Mode.)
1520 RETURN
1999 REM *****
2000 CLEAR 32767: LOAD "CODE

```




ALL HANDS ON DISK. NOW.

ENCOUNTER/TOMBS OF KARNAK
(adventure games)

CHUCKIE EGG
(arcade game)

WD PRO
(word processing)

HOME BUDGET



EINSTEIN SIMPLEX
(VAT cash accounting)

ZEN
(assembler/editor)

THE CRACKER
(spreadsheet)

OH MUMMY!
(arcade game)



ALPHABET QUEST/MATHS QUEST
(educational games)

NON-VAT ACCOUNTS

DR LOGO
(language)

PASCAL
(language)



Einstein from TATUNG. Sheer genius from around £499. The complete colour micro with no hidden extras. And with no hidden software, unlike some other new computers.

Right now you can get your hands on both Einsoft and Einsoft Approved Software. An immediately available range that's every bit as versatile as Einstein itself. "Einsoft" is our own software, designed and prepared for Einstein by TATUNG.



Kuma, Crystal Research, Digital Research and Solo are some of the country's leading software houses now writing superb software packages for Einstein, and TATUNG has

complete confidence in recommending those packages which bear the "Einsoft Approved" seal.

So from today you can explore the genius of Einstein with software covering a tremendous range of applications. From word processing, database and home economics to education, languages and games. And there's plenty more coming all the time.



Einstein from TATUNG. Sheer genius at home. At work. At school.

And now at your local stockist.

TATUNG
Einsoft

DIAL 100 AND ASK FOR FREEFONE EINSTEIN FOR YOUR NEAREST STOCKIST.

BBC

Complete that unfinished symphony with Nick Lea's masterly BBC composition.

THIS PROGRAM will only run on a BBC 1.2 operating system with Basic 2 mainly because the word "OSCLI" is used. To check whether the computer you use is suitable, type:

OSCLI("FXO") (RETURN)

If no error message is produced then this program should run.

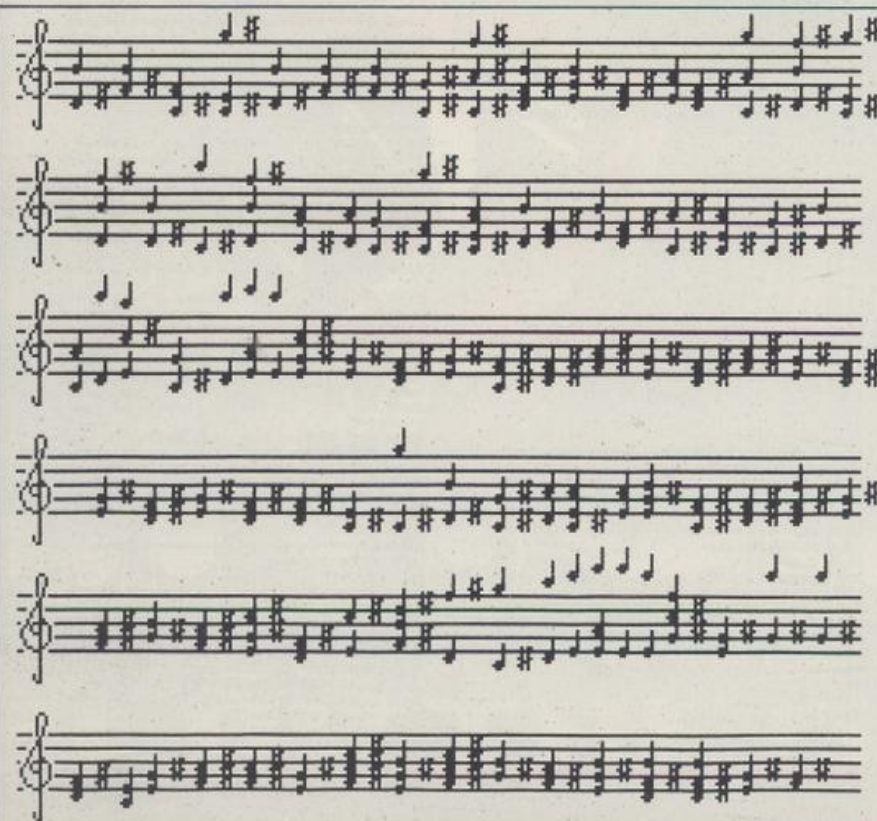
The program is a tool for use in the writing, development or simple playback of music. It uses the BBC's three pitch channels to produce a possible three-line tune with simultaneous screen and sound note output. Also included in the program are routines to save and load tunes to or from tape, making it possible to store away a masterpiece you are particularly pleased with. For the musically uninitiated, or the plain lazy, there is a harmonisation routine which generates pseudo-random harmonies to a tune entered.

In its entirety — well, in this un-REM-ed version — the program is rather long and may seem an effort to type in all in one go.

If certain procedures are left out, the program will run, until a non-existent option is selected, and if found to be useful, they can be added at a later date. The advantage of this is that it initially halves the program length.



MUSIC



The parts of the program which are optional to the main function are:

Line number	Procedure	Effect of losing it
2280	Procspeed	will not be able to change speed of playback
2A10	Procpitch	will not be able to change pitch of playback
25A0	Procsave	will not be able to save a tune to tape
2790	Proclload	will not be able to load a tune from tape
3130	Procharmonise	will not be able to use the computer harmonise

Once the program — or section of the program — has been entered in the normal fashion, it can be run. This will produce a menu sheet with nine options open to the user. They are:

1. Play tune in memory.
2. Enter or edit a tune.
3. Change playback speed.
4. Change pitch of playback.
5. Save a tune onto tape.
6. Load a tune from tape.
7. Harmonise a tune in memory.
8. Clear memory.
9. Exit program.

When first run, there is no tune in the computer's memory. One can be entered using option 2, selected by just pressing 2. Option 2 (continued on next page)

(continued from previous page)

produces an instruction sheet which sets out the keyboard of a piano on to the BBC keyboard with the form as shown in table 1.

It shows how to change the lengths of notes using Shifted function keys. Three lines of music can eventually be built up so the line about to be used is asked for. A musical staff is then printed up and the tune can be entered. Return ends the tune and displays the menu sheet again. Selecting option 1 will now play the tune just put into the memory at its correct tempo. Tunes of up to 300 notes can be used

S	D	G	H	J	2	3	5	6	7					
Z	X	C	V	B	N	M	Q	W	E	R	T	Y	U	I
= notes														
Table 1.														

and up to three can be played at once. The routines to change playback speed and pitch are self-explanatory and simply alter the global variables: Del% and Oct%.

The backing store routines — saving and loading — are done using the Beeb's BPut and BGet statements, thus a tune is treated as a

machine-code file, but don't try to run it as one.

The last section of the program, and the last main option, produces harmonies on tracks two and three from a subject tune on track one. It requires the key signature of the tune, which is selected by pressing the appropriate note, and whether it is minor or major.

Music on the Beeb. Note that the italicised "b" in line 2050 is CHR\$ 22b.

10 REM***** MUSIC ON THE BEEB**

20 REM***** By Nick Lea

30 REM*****

40 MODE 4

50 REM MAIN PROGRAM

60 PROCInitialize

70 ON ERROR GOTO 70

80 PROCOptions

90 IF OPT=1 THEN PROCplay(0)

100 IF OPT=2 THEN PROCinput

110 IF OPT=3 THEN PROCspeed

120 IF OPT=4 THEN PROCpitch

130 IF OPT=5 THEN PROCsave

140 IF OPT=6 THEN PROCload

150 IF OPT=7 THEN PROCharmonize

160 IF OPT<8 THEN 180

170 IF FNyesno("Are you sure") THEN RU

180 IF OPT<9 THEN 80

190 *FX11,30

200 CLS

210 END

220 REM*****

230 DEFPROCplay(TX)

240 PROCsave

250 FOR IX=1 TO 3

260 PX(IX)=TUNE+(IX-1)*300:BX(IX)=0

270 NEXT IX

280 REM*****MAIN LOOP****

290 FX=0

300 REPEAT

310 KX=0:ZX=TIME AND DELX

320 FOR IX=1 TO 3

330 IF BX(IX)=0 THEN PROCn

ext(IX,TX)

340 NEXT IX

350 IF KX=1 THEN PROCmovescreen

360 FOR IX=1 TO 3

370 BX(IX)=BX(IX)-1

380 NEXT IX

390 REPEAT

400 DX=TIME AND DELX

410 UNTIL DX<ZX

420 UNTIL FX=3

430 ENDPROC

440 REM*****

450 DEFPROCnext(IX,TX)

460 IF IX=TX THEN PROCgetnote

470 IF 7*PX(IX)=0 THEN FX=FX+1:GOTO 520

480 PROCsounddisplay(7*PX(IX) AND 31),(

7*PX(IX) AND 224)/(32,IX)

490 BX(IX)=LX((7*PX(IX) AND 224)/32)

500 PX(IX)=PX(IX)+1

510 KX=1

520 ENDPROC

530 REM*****

540 DEFPROCmovescreen

550 SCX=SCX+SHX:SHX=1

560 IF SCX=192 THEN PROCsave

570 ENDPROC

580 REM*****

590 REM Pitch,Note length,Channel

600 DEFPROCsounddisplay(PX,NX,CX)

610 GX=GX(PX)

620 OSCLI("FX21,"+STR\$(CX+4))

630 SOUND CX,1,PX*4+OCTX,255

640 YZ=ABS(GX)*8+903-S*(GX AND 224)

650 XZ=(SCX AND 31)*32+64

660 MOVE XZ,YZ

670 VDU 233+NX

680 IF NX>3 THEN PLOT 0,-24,-24:PLOT 2

4,0:PLOT 0,20,24

690 IF GX<0 THEN VDU 240:SHX=2

700 ENDPROC

710 REM*****

720 DEFPROCgetnote

730 IF PX(IX)=TUNE+(300*IX)-1 THENB30

740 REPEAT

750 AX=GET

760 ?key=AX

770 CALLproc

780 IF AX=127 THEN PROCdelete

790 IF AX>127 AND AX<134 THEN LX

=AX-127

800 UNTIL ?key OR AX=13 OR AX=32

810 IF AX=13 THEN FX=3:7*PX(IX)=0

820 IF 7*key<0 THEN 7*PX(IX)=32*LX+?key

830 ENDPROC

840 REM*****

850 DEFPROCdelete

860 IF PX(TX)=TUNE+(TX-1)*300 THEN 950

870 PX(TX)=PX(TX)-1

880 FOR WX=1 TO 3

890 IF WX=TX THEN 920

900 BX(WX)=BX(WX)+LX((7*PX(TX) AND 22

4) DIV 32)

910 IF BX(WX)=0 AND 7*PX(WX)=0 THEN FX=

FX-1

920 NEXT WX

930 BX(TX)=0

940 7*PX(TX)=0

950 ENDPROC

960 REM*****

970 DEFPROCInitialize

980 REM UDC for stave

990 VDU 23,225,0,0,0,0,0,0,255,0

1000 VDU 23,226,0,0,255,0,0,0,255,0

1010 REM Treble clef

1020 VDU 23,227,1,2,2,2,2,2,250,1

1030 VDU 23,228,128,64,64,64,128,128,19

1,0

1040 VDU 23,229,3,3,229,9,9,17,151,41

1050 VDU 23,230,0,0,127,0,0,128,207,32

1060 VDU 23,231,73,71,65,33,33,25,199,1

1070 VDU 23,232,32,32,47,32,64,128,63,0

1080 VDU 23,233,1,1,1,1,1,1,5,5,3

1090 REM*****NOTES*****

1100 VDU 23,235,8,8,8,8,8,56,120,48

1110 VDU 23,236,8,8,8,8,8,59,123,48

1120 VDU 23,237,8,8,8,8,8,56,120,48

1130 VDU 23,238,8,8,8,8,8,59,123,48

1140 VDU 23,239,0,0,0,0,0,48,120,48

1150 VDU 23,240,0,44,56,40,108,56,104,4

0

1170 DIM PX(3),BX(3),LX(6),GX(25),HX(12

4)

1180 DATA 1,2,3,4,6,8

1190 FORIX=1 TO 6:READ LX(IX):NEXT IX

1200 DATA 1,-1,2,-2,3,4,-4,5,-5,6,-6,7,

8,-8,9,-9,10,-11,12,-12,13,-13,14,15

1210 FOR IX=1 TO 25:READ GX(IX):NEXT I

X

1220 DATA 8,5,10,6,5,10,5,10,12,8,6,10,

1,8,1,8,10,1,8,12,3,10,1,10,3,10,3,10

1230 DATA 1,5,12,3,5,12,5,12,3,6,1,5,1,

5,1,5,5,8,3,8

1240 FOR IIX=1 TO 12:FOR IZX=1 TO 4

1250 READ HX(IIX,IZX)

1260 NEXT IZX:NEXT IIX

1270 DIM TUNE 900

1280 ?TUNE=0:?(TUNE+300)=0:?(TUNE+600)=

0

1290 OCTX=96:DELX=16:LX=2:SHX=1

1300 ENVELOPE 1,150,0,0,0,0,100,100,127

,20,-20,-20,126,20

1310 DIM key 1

1320 DIM proc 50

1330 DIM data 50

1340 FOR IX=0 TO 2 STEP 2

1350 FX=proc

1360 OPT IX

1370

1380 .loop LDX #25

1390 LDA data-1,X

1400 CNP key

1410 BEQ fnd

1420 DEX

1430 BNE loop

1440 LDA #0

1450 STA key

1460 RTS

1470 .fnd TXA

1480 STA key

1490 RTS

1500 NEXT IX

1510 \$(data)="ZXDCVGBHJNMQWERTYUI

1520 *FX11,0

1530 *OPT 1,1

1540 ENDPROC

1550 REM*****

1560 DEFPROCstave

1570 SCX=0

1580 VDU 4:CLS

1590 FOR VX=1 TO 6

1600 VDU 10,227,228:PRINT STRING\$(32,CH

R(225))

1610 VDU 229,230:PRINT STRING\$(32,CHR\$(

226))

1620 VDU 231,232:PRINT STRING\$(32,CHR\$(

226))

1630 VDU 233,13,10

1640 NEXT VX

1650 VDU 5

1660 ENDPROC

1670 REM*****

1680 DEFPROCinput

1690 CLS

1700 PRINT

1710 PRINT"Editing or Entering a tune"

1720 PRINT"

1730 PRINT:PRINT"The computer's keyboard

d is set out"

1740 PRINT"like a piano keyboard with t

he form="PRINT

1750 PRINT" 2 3 5 6 7 (HIGH OCT

AVE)"

1760 PRINT" Q W E R T Y U I:"PRINT

1770 PRINT" S D G H J"

1780 PRINT" Z X C V B N M (LOW OCTA

VE)"PRINT

1790 PRINT" (Where Z & Q are 'C's)"

1800 PRINT:PRINT"The note lengths may b

e changed by="

1810 PRINT"[shift] F0....Quaver"

1820 PRINT"[shift] F1....Crotchet"

1830 PRINT"[shift] F2....Dotted Crotche

t"

1840 PRINT"[shift] F3....Minia"

1850 PRINT"[shift] F4....Dotted Minia"

1860 PRINT"[shift] F5....Semibreva"

1870 PRINT:PRINT"[delete] will delete t

he last note"

1880 PRINT"[return] returns to the opti

ons page"

1890 PRINT"[space bar] skips over the n

ext note"

1900 PRINT:PRINT"

"

1910 PRINT:PRINT"A full tune is compose

d of up to 3 "

1920 PRINT"lines.Please type in the lin

e to be "

1930 PRINT"played or edited (1-3)>";

1940 REPEAT

1950 AX=GET:AX=AX-48

1960 UNTIL AX>0 AND AX<4

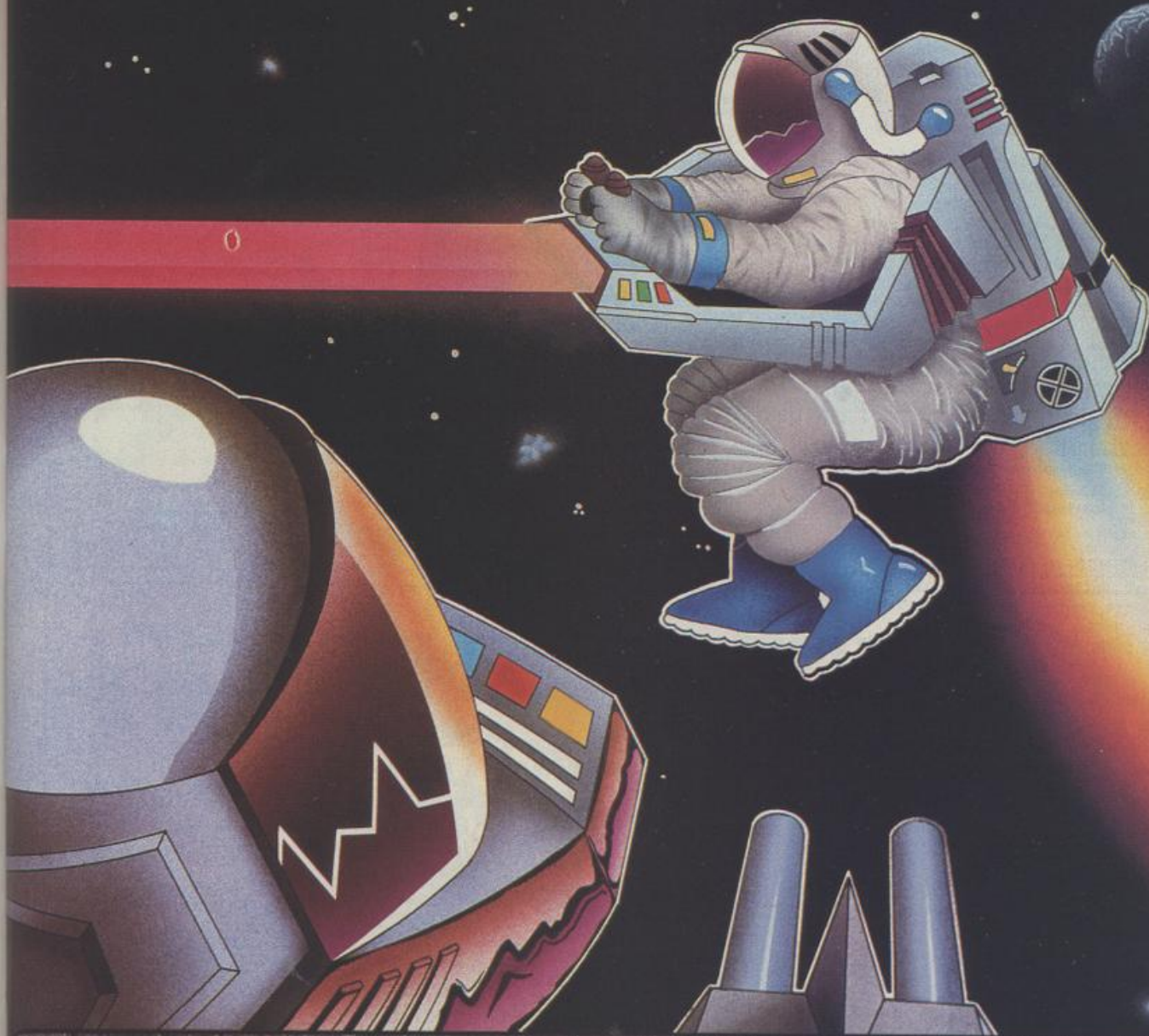
1970 PRINT STR\$(AX)

1980 PROCplay(AX)

1990 ENDPROC

BBC MODEL B 1.2 OS

TEST RACE



ULTIMATE
PLAY THE GAME

Available from W.H.Smith, John Menzies, Boots, Woolworths,
and all good software retailers.

Also available from Ultimate Play The Game,
The Green, Ashby-de-la-Zouch, Leicestershire LE6 5JU

£7.95

(continued from page 110)

```

2460 IF AX=85 THEN PRINT"Up" ELSE PRINT
"Down"
2470 INPUT"By how many semitones (number,
return)",QX
2480 QX=QX+SGN(AX-75)*4
2490 IF QX+OCTX>0 AND QX+OCTX<150 THEN
OCTX=OCTX+QX:ENDPROC
2500 PRINT"That pitch change is too lar
ge"
2510 REM small delay
2520 QX=INKEY(100)
2530 ENDPROC
2540 REM=====
2550 DEFPROCsave
2560 CLS
2570 PRINT:PRINT"      Saving a tune on
to tape"
2580 PRINT"
"
2590 IF NOT FYesno("Are you sure") THE
N ENDPROC
2600 PRINT:PRINT"Please make sure that-
"
2610 PRINT"1.....A tape recorder is
connected"
2620 PRINT"2.....The levels are corr
ectly set"
2630 PRINT"3.....A usable tape is in
side"
2640 PRINT:PRINT"Filename of tune (max
length of 10)"
2650 INPUT">",F$
2660 IF LEN(F$)>10 THEN 2640
2670 file=OPENOUT F$
2680 FOR I=1 TO 3
2690 QX=TUNE+(I-1)*300-1
2700 REPEAT
2710   QX=QX+1
2720   BPUT# file,QX
2730 UNTIL ?QX=0
2740 NEXT I
2750 CLOSE# file
2760 PRINT:PRINT"File saved.Please stop the t
ape."
2770 QX=INKEY(200)
2780 ENDPROC
2790 REM=====
2800 DEFPROCload
2810 CLS
2820 PRINT:PRINT
2830 PRINT"      Loading a tune from tape"
2840 PRINT"
"
2850 PRINT:PRINT
2860 IF NOT FYesno("Are you sure") THE
N ENDPROC
2870 PRINT:PRINT"Please make sure that-
"
2880 PRINT"1.....A tape recorder is

```

```

connected"
2890 PRINT"2.....The levels are cor
rectly set"
2900 PRINT
2910 INPUT"Filename",F$
2920 IF LEN(F$)>10 THEN PRINT"Can't be
longer than 10 characters":GOTO 2910
2930 file=OPENIN F$
2940 FOR I=1 TO 3
2950 QX=TUNE+300*(I-1)-1
2960 REPEAT
2970   QX=QX+1
2980   ?QX=BGET# file
2990 UNTIL ?QX=0
3000 NEXT I
3010 CLOSE# file
3020 PRINT:PRINT"File loaded"
3030 QX=INKEY(200)
3040 ENDPROC
3050 REM=====
3060 DEFYNyesno(A$)
3070 PRINT:PRINT A$+"(Yes/No)?"
3080 REPEAT
3090   AX=GET
3100 UNTIL AX=B9 OR 78
3110 IF AX=B9 THEN PRINT"Yes" ELSE PRIN
T"No"
3120 =(AX=B9)
3130 REM=====
3140 DEFPROCharmonize
3150 CLS
3160 PRINT:PRINT
3170 PRINT"      HARMONIZING"
3180 PRINT"      ~~~~~"
3190 PRINT:PRINT
3200 PRINT"      This harmonization routine
requires"
3210 PRINT"      that the tune to be harmo
nized is"
3220 PRINT"      is put onto LINE 1."
3230 PRINT"      The computer will then gen
erate "
3240 PRINT"      harmonies on LINES 2 & 3."
3250 PRINT:PRINT
3260 IF ?TUNE<0 THEN 3350
3270 PRINT"      There is no tune on LIN
E 1."
3280 PRINT:PRINT"      Please put one
on"
3290 PRINT"      ~~~~~"
3300 PRINT"      (Press [Space bar] to retu
rn to menu)"
3310 REPEAT
3320   AX=GET
3330 UNTIL AX=32
3340 ENDPROC
3350 PRINT"      Is the tune currently on
LINE 1"
3360 IF NOT FYesno("      to be harmoniz

```

```

ed") THEN 3280
3370 PRINT:PRINT"If the keyboard is arr
anged-"
3380 PRINT"      S D G H J"
3390 PRINT"      Z X C V B N M"
3400 PRINT:PRINT"then press the note co
rresponding to"
3410 PRINT"      the key >"
3420 REPEAT
3430   AX=GET
3440   ?key=AX
3450   CALL proc
3460 UNTIL ?key<>0
3470 SX=(?key-1) MOD 12
3480 PRINT:PRINT"The key of harmonizati
on is :SX+1;" keys "
3490 PRINT"      up the keyboard"
3500 PRINT:INPUT"Major or Minor (MAJ/MIN
)":"AS
3510 IF AS<>"MAJ" AND AS<>"MIN" THEN 35
00
3520 IF AS="MIN" THEN SX=(SX+3) MOD 12
3530 REM=====HARMONIZATION=====
3540 POINTX=TUNE
3550 BASSX=1
3560 REPEAT
3570   PITCHX=?POINTX AND 31
3580   NX=(?POINTX AND 224) DIV 32
3590   SCX=(PITCHX+12-SX) MOD 12
3600   IF SCX=0 THEN SCX=12
3610   DIFFX=12
3620   FOR IX=1 TO 4
3630     HX=ABS(HX(SCX,IX)-1-BASSX)
3640     IF HX<DIFFX THEN VX=IX:DIFF
FX=HX
3650   NEXT IX
3660   BASSX=HX(SCX,VX)
3670   H1X=BASSX+SX:IF H1X>12 THE
N H1X=H1X-12
3680   VX=VX+(RND(2)*2)-3:IF VX=0
THEN VX=2
3690   IF VX=5 THEN VX=3
3700   H2X=HX(SCX,VX)+SX
3710   IF H2X<H1X THEN H2X=H2X+12
3720   IF RND(4)=1 THEN H2X=1 ELSE
RX=0
3730   ?(POINTX+300)=32*NX+H1X
3740   ?(POINTX+600)=32*NX+RX+H2X
+(1-RX)*H1X
3750   POINTX=POINTX+1
3760 UNTIL ?POINTX=0
3770 ?(POINTX+299)=32*NX+SX+1:?(POINTX+
599)=32*NX+SX+8
3780 ?(POINTX+300)=0:?(POINTX+600)=0
3790 CLS
3800 PRINT"HARMONIZATION COMPLETE"
3810 PRINT"
"
3820 AX=INKEY(100)
3830 ENDPROC

```



ROBOTICS SPECIAL

- 16 page pull-out supplement
- * Buyer's guide to personal robots currently on the market
- * The technology of small robots

* Small robots and their big brothers
 Plus **ALFRED THE ROBOT**
 Build an educational mini robot from an inexpensive D.I.Y. kit.



Introduce your kids to another friendly teacher.

The Mr. Men and friends, have all gone back to school. They're learning a lot. So they can help youngsters, from 4 upwards, to an enjoyable start on the rudiments of reading, and the basics of arithmetic.

There are games for keen-eyed youngsters to sharpen observation, and games to help unravel the mysteries of left and right. They're ideal for home use, nursery and primary schools.



HERE & THERE WITH THE MR. MEN

Telling left from right, and working out simple routes can confuse young children. In these four games they learn by giving directions to the Mr. Men. Watching what happens on screen is fun. The games progress in difficulty as the children get more expert.

For 5 to 8 year olds. On cassette for the Spectrum 48K, BBC B and Electron. £7.95

WORD GAMES WITH THE MR. MEN

Some sorts of words can cause difficulty for children just starting to read. This double cassette pack takes an amusing look at comparatives and superlatives. It also has fun with opposites and keeps Mr. Bounce leaping about with positional adverbs. Fourteen games in all. Includes keyboard overlay and illustrated book.

For 5 years upwards. On cassette for the Spectrum 48K. £9.95

Also available: First Steps with the Mr. Men – games for pre-readers. On cassette for the BBC B, Electron, CBM64 and Spectrum 48K. £8.95

COUNT WITH OLIVER

Two games in which cheeky young Oliver learns to count and do simple sums. Choosing different toys in various colours requires single digit answers from the players.

Next greedy Oliver asks for lollipops and adds up different shapes and colours. Subtraction is achieved when Oliver devours the lollipops. He swells visibly and his fate will delight young children.

For 4 to 7 year olds. On cassette for the CBM64, Spectrum 48K, BBC B and Electron. £7.95

LOOK SHARP!

Two programs with seven games to test and train children's powers of observation in an amusing way. On Old MacDonald's farm they sort the sheep from the geese and the cows from the pigs. The games are Memory, Odd-one-out and Snap.

SORT, the second program, is a space observer's test with a variety of space scenes to scan and remember.

For 3 to 11 year olds. On cassette for the CBM64, Spectrum 48K, BBC B and Electron. £7.95

QUICK THINKING!

Two futuristic, arithmetical mind stretchers. In SumVaders aliens in numbered space ships drop numbered robots. Correctly added or subtracting the two numbers destroys the robot. If you are wrong or late the robot lands. Correct answers are displayed. Five levels of difficulty.

Robot Tables puts the player in charge of a robot making machine. Maximum robot output is only achieved by mastering multiplication tables to give the correct instructions to the machine.

For 7 years to adult. On cassette for the CBM64, Spectrum 48K, BBC B and Electron. £6.95

All CBM64 and BBC B versions are available on disk.



MIRRORSOFT

SOFTWARE FOR ALL THE FAMILY

Available from Boots, W.H. Smith, Spectrum and all good software stockists. Write for a free catalogue to: Mirrorsoft, Holborn Circus, London, EC1P 1DQ.

Settle down with two beautiful opponents~
Suzi & Melissa~for a sizzling game of...
Strip

Strip POKER

GREAT
FOR
PARTIES!

**NOW AVAILABLE FOR
SPECTRUM
£7.95**

cassette **£9.95**

Commodore 64 disk £12.95

Apart from the excellent game play of the poker the added bonus is high resolution pictures as the girls shed their clothes! A classic of its kind – must be part of any comprehensive collection of software.



**THE ULTIMATE IN AMERICAN
SOFTWARE FOR YOU ON U.S. GOLD**
U.S. Gold is stocked by all leading computer
stores.

DEALERS! For information on how to become a U.S. Gold Stockist write to: CentreSoft Ltd., Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH. Telephone: 021-520 7591. Telex: 337268. Overseas enquiries welcome.

U.S. GOLD
All American Software



CURSE OF ABU SIMBEL

Nick Stevens
unwraps a
new game
for the
Dragon 32

THE CURSE of Abu Simbel is an adventure game written for the Dragon 32. The object of the game is to find the Golden Mask of Abu Simbel — but beware of the Curse!

The game uses the standard Verb-Noun input format but with a few extras — pushing Shift and an arrow key will abbreviate the direction commands. For example, pressing Shift and up arrow will print Go North, press Enter to input.

Also, when getting an object, you can use It to refer to the object. Other features of the game are split screen scrolling, a real-time clock, a diagram of current exits and sound.

The Dragon's sound command has been re-defined for extra flexibility. The new format is Sound N,N — where N is any number between 1 and 65535. The second number now refers to number of cycles and the first is the pitch. The real-time clock is displayed at the top of the screen along with a compass and the room's exits.

First type in listing 1 and Save at the start of a blank tape. This program sets up the sound, clock and scroll routines, it also loads and runs the main program. Second type in listing 2. Do not attempt to run this program without first running listing 1, as it calls the machine-code routines set up in listing 1.

To aid debugging it would be useful to miss out lines 5 and 6 until the program is fully working. These lines disable the Break key, List and LList functions.

Now Save this program after the first by:
GOTO 9000

This will Save and autorun the program.

I will supply a copy of the program for £2.50. Please send a blank cassette and an S.A.E. to: Nick Stevens, 8 Hope Place, Musselburgh, East Lothian EH21 7QE.

Listing 1.

```
10 CLEAR500,31999:CLS:PRINT@38,"PLEASE WAIT A MOMENT."
20 PCLEAR1
30 X=32000
40 READA$:IF A$="END" THEN 60
50 POKEX,VAL("&H"+A$):X=X+1:GOTO40
60 EXEC32000
70 EXEC32141
80 PRINT@134,"LOADING MAIN PROGRAM."
90 CLOADM
100 DATA10,8E,7E,67,8E,80,33,10,BF,01,21,A6,80,A7,A0,8C,81,CA,25,F7,8E,7F,88,BF,
01,23
110 DATA8E,7D,21,BF,7F,CC,39,34,36,BD,8E,83,27,15,BF,01,44,35,36,BD,89,AA,34,36,
BD,8E,83
120 DATA8F,01,46,BD,00,A5,27,07,35,36,C6,02,7E,83,44,B6,FF,03,84,FE,B7,FF,03,B6,
FF,23,8A,0B
130 DATA87,FF,23,B6,FF,01,84,F7,B7,FF,01,10,BE,01,46,86,FD,B7,FF,20,BE,01,44,30,
1F,26,FC,7F,FF,20
140 DATA8E,01,44,30,1F,26,FC,31,3F,26,E6,B6,FF,23,84,F7,B7,FF,23,B6,FF,03,8A,01,
B7,FF,03,35,36,39
150 DATA30,CC,51,6F,84,6F,82,86,3B,A1,82,24,02,6F,84,86
160 DATA17,A1,82,24,02,6F,84,30,CC,0B,BF,01,0D,39,8E,9D
170 DATA3D,BF,01,0D,39,30,CC,2C,6C,84,86,32,A1,84,26,1E
180 DATA6F,84,6C,82,86,3C,A1,84,26,14,6F,84,6C,82,A1,84
190 DATA26,0C,6F,84,6C,82,86,18,A1,84,26,02,6F,84,7E,9D,3D,00,00,00,00
200 DATA8E,04,A0,A6,8B,20,A7,80,8C,05,DF,26,F6,39
210 DATA END
```

Listing 2.

```
5 POKE@198,6:POKE@19C,8:POKE@19D,8:POKE@19E,8:POKE@19A,8:POKE@19B,8
6 POKE@19F,8:POKE@19G,8:POKE@19H,8:POKE@19I,8:POKE@19J,8:POKE@19K,8:POKE@19L,8:POKE@19M,8:POKE@19N,8:POKE@19O,8:POKE@19P,8:POKE@19Q,8:POKE@19R,8:POKE@19S,8:POKE@19T,8:POKE@19U,8:POKE@19V,8:POKE@19W,8:POKE@19X,8:POKE@19Y,8:POKE@19Z,8:POKE@19AA,8:POKE@19AB,8:POKE@19AC,8:POKE@19AD,8:POKE@19AE,8:POKE@19AF,8:POKE@19AG,8:POKE@19AH,8:POKE@19AI,8:POKE@19AJ,8:POKE@19AK,8:POKE@19AL,8:POKE@19AM,8:POKE@19AN,8:POKE@19AO,8:POKE@19AP,8:POKE@19AQ,8:POKE@19AR,8:POKE@19AS,8:POKE@19AT,8:POKE@19AU,8:POKE@19AV,8:POKE@19AW,8:POKE@19AX,8:POKE@19AY,8:POKE@19AZ,8:POKE@19BA,8:POKE@19BB,8:POKE@19BC,8:POKE@19BD,8:POKE@19BE,8:POKE@19BF,8:POKE@19BG,8:POKE@19BH,8:POKE@19BI,8:POKE@19BJ,8:POKE@19BK,8:POKE@19BL,8:POKE@19BM,8:POKE@19BN,8:POKE@19BO,8:POKE@19BP,8:POKE@19BQ,8:POKE@19BR,8:POKE@19BS,8:POKE@19BT,8:POKE@19BU,8:POKE@19BV,8:POKE@19BW,8:POKE@19BX,8:POKE@19BY,8:POKE@19BZ,8:POKE@19CA,8:POKE@19CB,8:POKE@19CC,8:POKE@19CD,8:POKE@19CE,8:POKE@19CF,8:POKE@19CG,8:POKE@19CH,8:POKE@19CI,8:POKE@19CJ,8:POKE@19CK,8:POKE@19CL,8:POKE@19CM,8:POKE@19CN,8:POKE@19CO,8:POKE@19CP,8:POKE@19CQ,8:POKE@19CR,8:POKE@19CS,8:POKE@19CT,8:POKE@19CU,8:POKE@19CV,8:POKE@19CW,8:POKE@19CX,8:POKE@19CY,8:POKE@19CZ,8:POKE@19DA,8:POKE@19DB,8:POKE@19DC,8:POKE@19DD,8:POKE@19DE,8:POKE@19DF,8:POKE@19DG,8:POKE@19DH,8:POKE@19DI,8:POKE@19DJ,8:POKE@19DK,8:POKE@19DL,8:POKE@19DM,8:POKE@19DN,8:POKE@19DO,8:POKE@19DP,8:POKE@19DQ,8:POKE@19DR,8:POKE@19DS,8:POKE@19DT,8:POKE@19DU,8:POKE@19DV,8:POKE@19DW,8:POKE@19DX,8:POKE@19DY,8:POKE@19DZ,8:POKE@19EA,8:POKE@19EB,8:POKE@19EC,8:POKE@19ED,8:POKE@19EE,8:POKE@19EF,8:POKE@19EG,8:POKE@19EH,8:POKE@19EI,8:POKE@19EJ,8:POKE@19EK,8:POKE@19EL,8:POKE@19EM,8:POKE@19EN,8:POKE@19EO,8:POKE@19EP,8:POKE@19EQ,8:POKE@19ER,8:POKE@19ES,8:POKE@19ET,8:POKE@19EU,8:POKE@19EV,8:POKE@19EW,8:POKE@19EX,8:POKE@19EY,8:POKE@19EZ,8:POKE@19FA,8:POKE@19FB,8:POKE@19FC,8:POKE@19FD,8:POKE@19FE,8:POKE@19FF,8:POKE@19FG,8:POKE@19FH,8:POKE@19FI,8:POKE@19FJ,8:POKE@19FK,8:POKE@19FL,8:POKE@19FM,8:POKE@19FN,8:POKE@19FO,8:POKE@19FP,8:POKE@19FQ,8:POKE@19FR,8:POKE@19FS,8:POKE@19FT,8:POKE@19FU,8:POKE@19FV,8:POKE@19FW,8:POKE@19FX,8:POKE@19FY,8:POKE@19FZ,8:POKE@19GA,8:POKE@19GB,8:POKE@19GC,8:POKE@19GD,8:POKE@19GE,8:POKE@19GF,8:POKE@19GG,8:POKE@19GH,8:POKE@19GI,8:POKE@19GJ,8:POKE@19GK,8:POKE@19GL,8:POKE@19GM,8:POKE@19GN,8:POKE@19GO,8:POKE@19GP,8:POKE@19GQ,8:POKE@19GR,8:POKE@19GS,8:POKE@19GT,8:POKE@19GU,8:POKE@19GV,8:POKE@19GW,8:POKE@19GX,8:POKE@19GY,8:POKE@19GZ,8:POKE@19HA,8:POKE@19HB,8:POKE@19HC,8:POKE@19HD,8:POKE@19HE,8:POKE@19HF,8:POKE@19HG,8:POKE@19HH,8:POKE@19HI,8:POKE@19HJ,8:POKE@19HK,8:POKE@19HL,8:POKE@19HM,8:POKE@19HN,8:POKE@19HO,8:POKE@19HP,8:POKE@19HQ,8:POKE@19HR,8:POKE@19HS,8:POKE@19HT,8:POKE@19HU,8:POKE@19HV,8:POKE@19HW,8:POKE@19HX,8:POKE@19HY,8:POKE@19HZ,8:POKE@19IA,8:POKE@19IB,8:POKE@19IC,8:POKE@19ID,8:POKE@19IE,8:POKE@19IF,8:POKE@19IG,8:POKE@19IH,8:POKE@19IJ,8:POKE@19IK,8:POKE@19IL,8:POKE@19IM,8:POKE@19IN,8:POKE@19IO,8:POKE@19IP,8:POKE@19IQ,8:POKE@19IR,8:POKE@19IS,8:POKE@19IT,8:POKE@19IU,8:POKE@19IV,8:POKE@19IW,8:POKE@19IX,8:POKE@19IY,8:POKE@19IZ,8:POKE@19JA,8:POKE@19JB,8:POKE@19JC,8:POKE@19JD,8:POKE@19JE,8:POKE@19JF,8:POKE@19JG,8:POKE@19JH,8:POKE@19JI,8:POKE@19JJ,8:POKE@19JK,8:POKE@19JL,8:POKE@19JM,8:POKE@19JN,8:POKE@19JO,8:POKE@19JP,8:POKE@19JQ,8:POKE@19JR,8:POKE@19JS,8:POKE@19JT,8:POKE@19JU,8:POKE@19JV,8:POKE@19JW,8:POKE@19JX,8:POKE@19JY,8:POKE@19JZ,8:POKE@19KA,8:POKE@19KB,8:POKE@19KC,8:POKE@19KD,8:POKE@19KE,8:POKE@19KF,8:POKE@19KG,8:POKE@19KH,8:POKE@19KI,8:POKE@19KJ,8:POKE@19KK,8:POKE@19KL,8:POKE@19KM,8:POKE@19KN,8:POKE@19KO,8:POKE@19KP,8:POKE@19KQ,8:POKE@19KR,8:POKE@19KS,8:POKE@19KT,8:POKE@19KU,8:POKE@19KV,8:POKE@19KW,8:POKE@19KX,8:POKE@19KY,8:POKE@19KZ,8:POKE@19LA,8:POKE@19LB,8:POKE@19LC,8:POKE@19LD,8:POKE@19LE,8:POKE@19LF,8:POKE@19LG,8:POKE@19LH,8:POKE@19LI,8:POKE@19LJ,8:POKE@19LK,8:POKE@19LL,8:POKE@19LM,8:POKE@19LN,8:POKE@19LO,8:POKE@19LP,8:POKE@19LQ,8:POKE@19LR,8:POKE@19LS,8:POKE@19LT,8:POKE@19LU,8:POKE@19LV,8:POKE@19LW,8:POKE@19LX,8:POKE@19LY,8:POKE@19LZ,8:POKE@19MA,8:POKE@19MB,8:POKE@19MC,8:POKE@19MD,8:POKE@19ME,8:POKE@19MF,8:POKE@19MG,8:POKE@19MH,8:POKE@19MI,8:POKE@19MJ,8:POKE@19MK,8:POKE@19ML,8:POKE@19MM,8:POKE@19MN,8:POKE@19MO,8:POKE@19MP,8:POKE@19MQ,8:POKE@19MR,8:POKE@19MS,8:POKE@19MT,8:POKE@19MU,8:POKE@19MV,8:POKE@19MW,8:POKE@19MX,8:POKE@19MY,8:POKE@19MZ,8:POKE@19NA,8:POKE@19NB,8:POKE@19NC,8:POKE@19ND,8:POKE@19NE,8:POKE@19NF,8:POKE@19NG,8:POKE@19NH,8:POKE@19NI,8:POKE@19NJ,8:POKE@19NK,8:POKE@19NL,8:POKE@19NM,8:POKE@19NN,8:POKE@19NO,8:POKE@19NP,8:POKE@19NQ,8:POKE@19NR,8:POKE@19NS,8:POKE@19NT,8:POKE@19NU,8:POKE@19NV,8:POKE@19NW,8:POKE@19NX,8:POKE@19NY,8:POKE@19NZ,8:POKE@19OA,8:POKE@19OB,8:POKE@19OC,8:POKE@19OD,8:POKE@19OE,8:POKE@19OF,8:POKE@19OG,8:POKE@19OH,8:POKE@19OI,8:POKE@19OJ,8:POKE@19OK,8:POKE@19OL,8:POKE@19OM,8:POKE@19ON,8:POKE@19OO,8:POKE@19OP,8:POKE@19OQ,8:POKE@19OR,8:POKE@19OS,8:POKE@19OT,8:POKE@19OU,8:POKE@19OV,8:POKE@19OW,8:POKE@19OX,8:POKE@19OY,8:POKE@19OZ,8:POKE@19PA,8:POKE@19PB,8:POKE@19PC,8:POKE@19PD,8:POKE@19PE,8:POKE@19PF,8:POKE@19PG,8:POKE@19PH,8:POKE@19PI,8:POKE@19PJ,8:POKE@19PK,8:POKE@19PL,8:POKE@19PM,8:POKE@19PN,8:POKE@19PO,8:POKE@19PP,8:POKE@19PQ,8:POKE@19PR,8:POKE@19PS,8:POKE@19PT,8:POKE@19PU,8:POKE@19PV,8:POKE@19PW,8:POKE@19PX,8:POKE@19PY,8:POKE@19PZ,8:POKE@19QA,8:POKE@19QB,8:POKE@19QC,8:POKE@19QD,8:POKE@19QE,8:POKE@19QF,8:POKE@19QG,8:POKE@19QH,8:POKE@19QI,8:POKE@19QJ,8:POKE@19QK,8:POKE@19QL,8:POKE@19QM,8:POKE@19QN,8:POKE@19QO,8:POKE@19QP,8:POKE@19QQ,8:POKE@19QR,8:POKE@19QS,8:POKE@19QT,8:POKE@19QU,8:POKE@19QV,8:POKE@19QW,8:POKE@19QX,8:POKE@19QY,8:POKE@19QZ,8:POKE@19RA,8:POKE@19RB,8:POKE@19RC,8:POKE@19RD,8:POKE@19RE,8:POKE@19RF,8:POKE@19RG,8:POKE@19RH,8:POKE@19RI,8:POKE@19RJ,8:POKE@19RK,8:POKE@19RL,8:POKE@19RM,8:POKE@19RN,8:POKE@19RO,8:POKE@19RP,8:POKE@19RQ,8:POKE@19RR,8:POKE@19RS,8:POKE@19RT,8:POKE@19RU,8:POKE@19RV,8:POKE@19RW,8:POKE@19RX,8:POKE@19RY,8:POKE@19RZ,8:POKE@19SA,8:POKE@19SB,8:POKE@19SC,8:POKE@19SD,8:POKE@19SE,8:POKE@19SF,8:POKE@19SG,8:POKE@19SH,8:POKE@19SI,8:POKE@19SJ,8:POKE@19SK,8:POKE@19SL,8:POKE@19SM,8:POKE@19SN,8:POKE@19SO,8:POKE@19SP,8:POKE@19SQ,8:POKE@19SR,8:POKE@19SS,8:POKE@19ST,8:POKE@19SU,8:POKE@19SV,8:POKE@19SW,8:POKE@19SX,8:POKE@19SY,8:POKE@19SZ,8:POKE@19TA,8:POKE@19TB,8:POKE@19TC,8:POKE@19TD,8:POKE@19TE,8:POKE@19TF,8:POKE@19TG,8:POKE@19TH,8:POKE@19TI,8:POKE@19TJ,8:POKE@19TK,8:POKE@19TL,8:POKE@19TM,8:POKE@19TN,8:POKE@19TO,8:POKE@19TP,8:POKE@19TQ,8:POKE@19TR,8:POKE@19TS,8:POKE@19TT,8:POKE@19TU,8:POKE@19TV,8:POKE@19TW,8:POKE@19TX,8:POKE@19TY,8:POKE@19TZ,8:POKE@19UA,8:POKE@19UB,8:POKE@19UC,8:POKE@19UD,8:POKE@19UE,8:POKE@19UF,8:POKE@19UG,8:POKE@19UH,8:POKE@19UI,8:POKE@19UJ,8:POKE@19UK,8:POKE@19UL,8:POKE@19UM,8:POKE@19UN,8:POKE@19UO,8:POKE@19UP,8:POKE@19UQ,8:POKE@19UR,8:POKE@19US,8:POKE@19UT,8:POKE@19UU,8:POKE@19UV,8:POKE@19UW,8:POKE@19UX,8:POKE@19UY,8:POKE@19UZ,8:POKE@19VA,8:POKE@19VB,8:POKE@19VC,8:POKE@19VD,8:POKE@19VE,8:POKE@19VF,8:POKE@19VG,8:POKE@19VH,8:POKE@19VI,8:POKE@19VJ,8:POKE@19VK,8:POKE@19VL,8:POKE@19VM,8:POKE@19VN,8:POKE@19VO,8:POKE@19VP,8:POKE@19VQ,8:POKE@19VR,8:POKE@19VS,8:POKE@19VT,8:POKE@19VU,8:POKE@19VV,8:POKE@19VW,8:POKE@19VX,8:POKE@19VY,8:POKE@19VZ,8:POKE@19WA,8:POKE@19WB,8:POKE@19WC,8:POKE@19WD,8:POKE@19WE,8:POKE@19WF,8:POKE@19WG,8:POKE@19WH,8:POKE@19WI,8:POKE@19WJ,8:POKE@19WK,8:POKE@19WL,8:POKE@19WM,8:POKE@19WN,8:POKE@19WO,8:POKE@19WP,8:POKE@19WQ,8:POKE@19WR,8:POKE@19WS,8:POKE@19WT,8:POKE@19WU,8:POKE@19WV,8:POKE@19WW,8:POKE@19WX,8:POKE@19WY,8:POKE@19WZ,8:POKE@19XA,8:POKE@19XB,8:POKE@19XC,8:POKE@19XD,8:POKE@19XE,8:POKE@19XF,8:POKE@19XG,8:POKE@19XH,8:POKE@19XI,8:POKE@19XJ,8:POKE@19XK,8:POKE@19XL,8:POKE@19XM,8:POKE@19XN,8:POKE@19XO,8:POKE@19XP,8:POKE@19XQ,8:POKE@19XR,8:POKE@19XS,8:POKE@19XT,8:POKE@19XU,8:POKE@19XV,8:POKE@19XW,8:POKE@19XX,8:POKE@19XY,8:POKE@19XZ,8:POKE@19YA,8:POKE@19YB,8:POKE@19YC,8:POKE@19YD,8:POKE@19YE,8:POKE@19YF,8:POKE@19YG,8:POKE@19YH,8:POKE@19YI,8:POKE@19YJ,8:POKE@19YK,8:POKE@19YL,8:POKE@19YM,8:POKE@19YN,8:POKE@19YO,8:POKE@19YP,8:POKE@19YQ,8:POKE@19YR,8:POKE@19YS,8:POKE@19YT,8:POKE@19YU,8:POKE@19YV,8:POKE@19YW,8:POKE@19YX,8:POKE@19YY,8:POKE@19YZ,8:POKE@19ZA,8:POKE@19ZB,8:POKE@19ZC,8:POKE@19ZD,8:POKE@19ZE,8:POKE@19ZF,8:POKE@19ZG,8:POKE@19ZH,8:POKE@19ZI,8:POKE@19ZJ,8:POKE@19ZK,8:POKE@19ZL,8:POKE@19ZM,8:POKE@19ZN,8:POKE@19ZO,8:POKE@19ZP,8:POKE@19ZQ,8:POKE@19ZR,8:POKE@19ZS,8:POKE@19ZT,8:POKE@19ZU,8:POKE@19ZV,8:POKE@19ZW,8:POKE@19ZX,8:POKE@19ZY,8:POKE@19ZZ,8:POKE@19AA,8:POKE@19AB,8:POKE@19AC,8:POKE@19AD,8:POKE@19AE,8:POKE@19AF,8:POKE@19AG,8:POKE@19AH,8:POKE@19AI,8:POKE@19AJ,8:POKE@19AK,8:POKE@19AL,8:POKE@19AM,8:POKE@19AN,8:POKE@19AO,8:POKE@19AP,8:POKE@19AQ,8:POKE@19AR,8:POKE@19AS,8:POKE@19AT,8:POKE@19AU,8:POKE@19AV,8:POKE@19AW,8:POKE@19AX,8:POKE@19AY,8:POKE@19AZ,8:POKE@19BA,8:POKE@19BB,8:POKE@19BC,8:POKE@19BD,8:POKE@19BE,8:POKE@19BF,8:POKE@19BG,8:POKE@19BH,8:POKE@19BI,8:POKE@19BJ,8:POKE@19BK,8:POKE@19BL,8:POKE@19BM,8:POKE@19BN,8:POKE@19BO,8:POKE@19BP,8:POKE@19BQ,8:POKE@19BR,8:POKE@19BS,8:POKE@19BT,8:POKE@19BU,8:POKE@19BV,8:POKE@19BW,8:POKE@19BX,8:POKE@19BY,8:POKE@19BZ,8:POKE@19CA,8:POKE@19CB,8:POKE@19CC,8:POKE@19CD,8:POKE@19CE,8:POKE@19CF,8:POKE@19CG,8:POKE@19CH,8:POKE@19CI,8:POKE@19CJ,8:POKE@19CK,8:POKE@19CL,8:POKE@19CM,8:POKE@19CN,8:POKE@19CO,8:POKE@19CP,8:POKE@19CQ,8:POKE@19CR,8:POKE@19CS,8:POKE@19CT,8:POKE@19CU,8:POKE@19CV,8:POKE@19CW,8:POKE@19CX,8:POKE@19CY,8:POKE@19CZ,8:POKE@19DA,8:POKE@19DB,8:POKE@19DC,8:POKE@19DD,8:POKE@19DE,8:POKE@19DF,8:POKE@19DG,8:POKE@19DH,8:POKE@19DI,8:POKE@19DJ,8:POKE@19DK,8:POKE@19DL,8:POKE@19DM,8:POKE@19DN,8:POKE@19DO,8:POKE@19DP,8:POKE@19DQ,8:POKE@19DR,8:POKE@19DS,8:POKE@19DT,8:POKE@19DU,8:POKE@19DV,8:POKE@19DW,8:POKE@19DX,8:POKE@19DY,8:POKE@19DZ,8:POKE@19EA,8:POKE@19EB,8:POKE@19EC,8:POKE@19ED,8:POKE@19EE,8:POKE@19EF,8:POKE@19EG,8:POKE@19EH,8:POKE@19EI,8:POKE@19EJ,8:POKE@19EK,8:POKE@19EL,8:POKE@19EM,8:POKE@19EN,8:POKE@19EO,8:POKE@19EP,8:POKE@19EQ,8:POKE@19ER,8:POKE@19ES,8:POKE@19ET,8:POKE@19EU,8:POKE@19EV,8:POKE@19EW,8:POKE@19EX,8:POKE@19EY,8:POKE@19EZ,8:POKE@19FA,8:POKE@19FB,8:POKE@19FC,8:POKE@19FD,8:POKE@19FE,8:POKE@19FF,8:POKE@19FG,8:POKE@19FH,8:POKE@19FI,8:POKE@19FJ,8:POKE@19FK,8:POKE@19FL,8:POKE@19FM,8:POKE@19FN,8:POKE@19FO,8:POKE@19FP,8:POKE@19FQ,8:POKE@19FR,8:POKE@19FS,8:POKE@19FT,8:POKE@19FU,8:POKE@19FV,8:POKE@19FW,8:POKE@19FX,8:POKE@19FY,8:POKE@19FZ,8:POKE@19GA,8:POKE@19GB,8:POKE@19GC,8:POKE@19GD,8:POKE@19GE,8:POKE@19GF,8:POKE@19GG,8:POKE@19GH,8:POKE@19GI,8:POKE@19GJ,8:POKE@19GK,8:POKE@19GL,8:POKE@19GM,8:POKE@19GN,8:POKE@19GO,8:POKE@19GP,8:POKE@19GQ,8:POKE@19GR,8:POKE@19GS,8:POKE@19GT,8:POKE@19GU,8:POKE@19GV,8:POKE@19GW,8:POKE@19GX,8:POKE@19GY,8:POKE@19GZ,8:POKE@19HA,8:POKE@19HB,8:POKE@19HC,8:POKE@19HD,8:POKE@19HE,8:POKE@19HF,8:POKE@19HG,8:POKE@19HH,8:POKE@19HI,8:POKE@19HJ,8:POKE@19HK,8:POKE@19HL,8:POKE@19HM,8:POKE@19HN,8:POKE@19HO,8:POKE@19HP,8:POKE@19HQ,8:POKE@19HR,8:POKE@19HS,8:POKE@19HT,8:POKE@19HU,8:POKE@19HV,8:POKE@19HW,8:POKE@19HX,8:POKE@19HY,8:POKE@19HZ,8:POKE@19IA,8:POKE@19IB,8:POKE@19IC,8:POKE@19ID,8:POKE@19IE,8:POKE@19IF,8:POKE@19IG,8:POKE@19IH,8:POKE@19IJ,8:POKE@19IK,8:POKE@19IL,8:POKE@19IM,8:POKE@19IN,8:POKE@19IO,8:POKE@19IP,8:POKE@19IQ,8:POKE@19IR,8:POKE@19IS,8:POKE@19IT,8:POKE@19IU,8:POKE@19IV,8:POKE@19IW,8:POKE@19IX,8:POKE@19IY,8:POKE@19IZ,8:POKE@19JA,8:POKE@19JB,8:POKE@19JC,8:POKE@19JD,8:POKE@19JE,8:POKE@19JF,8:POKE@19JG,8:POKE@19JH,8:POKE@19JI,8:POKE@19JJ,8:POKE@19JK,8:POKE@19JL,8:POKE@19JM,8:POKE@19JN,8:POKE@19JO,8:POKE@19JP,8:POKE@19JQ,8:POKE@19JR,8:POKE@19JS,8:POKE@19JT,8:POKE@19JU,8:POKE@19JV,8:POKE@19JW,8:POKE@19JX,8:POKE@19JY,8:POKE@19JZ,8:POKE@19KA,8:POKE@19KB,8:POKE@19KC,8:POKE@19KD,8:POKE@19KE,8:POKE@19KF,8:POKE@19KG,8:POKE@19KH,8:POKE@19KI,8:POKE@19KJ,8:POKE@19KK,8:POKE@19KL,8:POKE@19KM,8:POKE@19KN,8:POKE@19KO,8:POKE@19KP,8:POKE@19KQ,8:POKE@19KR,8:POKE@19KS,8:POKE@19KT,8:POKE@19KU,8:POKE@19KV,8:POKE@19KW,8:POKE@19KX,8:POKE@19KY,8:POKE@19KZ,8:POKE@19LA,8:POKE@19LB,8:POKE@19LC,8:POKE@19LD,8:POKE@19LE,8:POKE@19LF,8:POKE@19LG,8:POKE@19LH,8:POKE@19LI,8:POKE@19LJ,8:POKE@19LK,8:POKE@19LL,8:POKE@19LM,8:POKE@19LN,8:POKE@19LO,8:POKE@19LP,8:POKE@19LQ,8:POKE@19LR,8:POKE@19LS,8:POKE@19LT,8:POKE@19LU,8:POKE@19LV,8:POKE@19LW,8:POKE@19LX,8:POKE@19LY,8:POKE@19LZ,8:POKE@19MA,8:POKE@19MB,8:POKE@19MC,8:POKE@19MD,8:POKE@19ME,8:POKE@19MF,8:POKE@19MG,8:POKE@19MH,8:POKE@19MI,8:POKE@19MJ,8:POKE@19MK,8:POKE@19ML,8:POKE@19MM,8:POKE@19MN,8:POKE@19MO,8:POKE@19MP,8:POKE@19MQ,8:POKE@19MR,8:POKE@19MS,8:POKE@19MT,8:POKE@19MU,8:POKE@19MV,8:POKE@19MW,8:POKE@19MX,8:POKE@19MY,8:POKE@19MZ,8:POKE@19NA,8:POKE@19NB,8:POKE@19NC,8:POKE@19ND,8:POKE@19NE,8:POKE@19NF,8:POKE@19NG,8:POKE@19NH,8:POKE@19NI,8:POKE@19NJ,8:POKE@19NK,8:POKE@19NL,8:POKE@19NM,8:POKE@19NN,8:POKE@19NO,8:POKE@19NP,8:POKE@19NQ,8:POKE@19NR,8:POKE@19NS,8:POKE@19NT,8:POKE@19NU,8:POKE@19NV,8:POKE@19NW,8:POKE@19NX,8:POKE@19NY,8:POKE@19NZ,8:POKE@19OA,8:POKE@19OB,8:POKE@19OC,8:POKE@19OD,8:POKE@19OE,8:POKE@19OF,8:POKE@19OG,8:POKE@19OH,8:POKE@19OI,8:POKE@19OJ,8:POKE@19OK,8:POKE@19OL,8:POKE@19OM,8:POKE@19ON,8:POKE@19OO,8:POKE@19OP,8:POKE@19OQ,8:POKE@19OR,8:POKE@19OS,8:POKE@19OT,8:POKE@19OU,8:POKE@19OV,8:POKE@19OW,8:POKE@19OX,8:POKE@19OY,8:POKE@19OZ,8:POKE@19PA,8:POKE@19PB,8:POKE@19PC,8:POKE@19PD,8:POKE@19PE,8:POKE@19PF,8:POKE@19PG,8:POKE@19PH,8:POKE@19PI,8:POKE@19PJ,8:POKE@19PK,8:POKE@19PL,8:POKE@19PM,8:POKE@19PN,8:POKE@19PO,8:POKE@19PP,8:POKE@19PQ,8:POKE@19PR,8:POKE@19PS,8:POKE@19PT,8:POKE@19PU,8:POKE@19PV,8:POKE@19PW,8:POKE@19PX,8:POKE@19PY,8:POKE@19PZ,8:POKE@19QA,8:POKE@19QB,8:POKE@19QC,8:POKE@19QD,8:POKE@19QE,8:POKE@19QF,8:POKE@19QG,8:POKE@19QH,8:POKE@19QI,8:POKE@19QJ,8:POKE@19QK,8:POKE@19QL,8:POKE@19QM,8:POKE@19QN,8:POKE@19QO,8:POKE@19QP,8:POKE@19QQ,8:POKE@19QR,8:POKE@19QS,8:POKE@19QT,8:POKE@19QU,8:POKE@19QV,8:POKE@19QW,8:POKE@19QX,8:POKE@19QY,8:POKE@19QZ,8:POKE@19RA,8:POKE@19RB,8:POKE@19RC,8:PO
```


A prophecy is about to be fulfilled. The Dead will rise again to eat the flesh of the living...

Zombie

From the authors
of ANT ATTACK,
Sandy White
and Angela.

Softsolid 3D* from SPACEMAN
*Patent pending

48K Spectrum **£6.95**

All titles available from

QUICKSILVA

Quicksilva Mail Order, P.O. Box 6, Wimborne, Dorset BA21 7PY.
Telephone (0202) 891744.

48K Spectrum games

Blood & Guts

A fantastic fight to the death within your own bloodstream!

48K Spectrum £6.95



A battle to the end with the deadliest killers in the Galaxy!

48K Spectrum
£6.95

48K Spectrum
£6.95 each

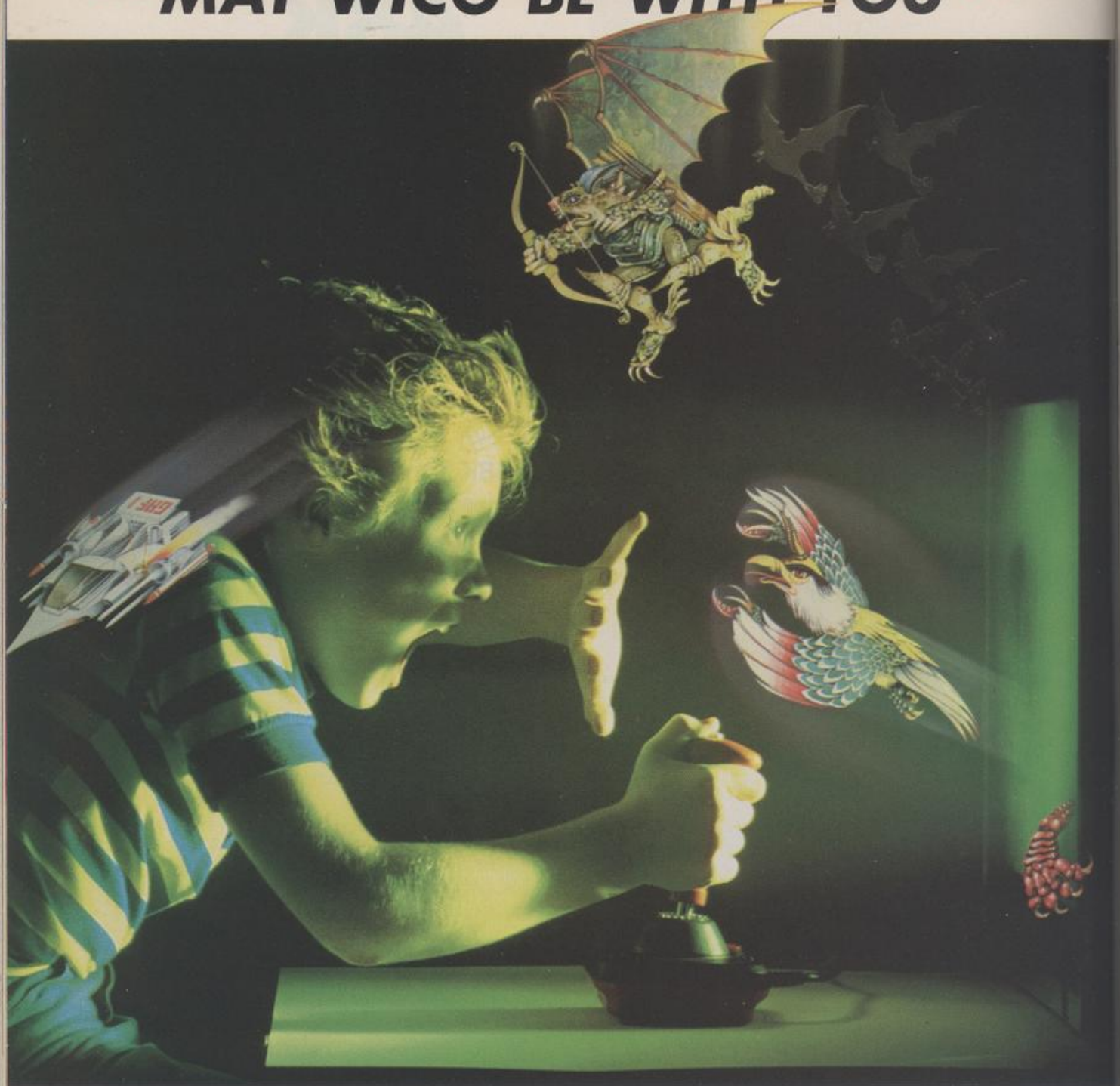
WHSMITH John Menzies

WOOLWORTH

and leading multiple retailers and specialist computer stores

WARNING: These programs are sold according to QUICKSILVA Ltd's terms of trade and conditions of sale, copies of which are available on request

•• MAY WICO BE WITH YOU ••



When you're up against all the evil in the universe, you need the finest joystick. Weak, sticky, slow controls can only lead you to your doom.

You need a Wico.[®] The controls in more than 500 modern arcade games are actually made by Wico.[®] They set the industry standard for durability and performance. And the same arcade quality goes into the Wico[®] you take home.

Wico[®] joysticks work directly with the Commodore 64,[™] Vic 20,[™] all Atari[®] Home Computers and Atari[®] Video Games.

Add an interface, and you can connect into a Sinclair Spectrum or Apple II[®] and IIe.[®] If you have a new MSX computer there's the just released MSX Grip Handle for you.

What do you get? A man-sized handle on a virtually unbreakable shaft. Tough, ultra-sensitive Wico[®] switchgear. A heavy-weight base. A year's guarantee. And more sheer

dodging, chasing and blasting power than ever before.

The Wico[®] range includes the famous Red Ball,[™] straight out of the arcades. The Three Way Deluxe with interchangeable handles. The light but rugged Boss. And check out the state-of-the-art Trackball: many owners use it for serious programming, where it gives them effortless cursor control.

Ask your dealer to let you handle a Wico.[®] Quality (you'll find) costs money.

But if you want to have less trouble fighting your controls, and more power for fighting the forces of darkness . . . only Wico[®] is worthy of your hand.



WICO[®]

THE FINEST HAND CONTROLS
IN THE KNOWN UNIVERSE



CGL HOUSE, GOLDINGS HILL, LOUGHTON, ESSEX IG10 2RR. 01-508 5600. LOOK FOR THE WICO NAME IN ALL GOOD SHOPS AND CATALOGUES.

(continued from page 115)

```
230 SOUND400,20
240 PRINT#449,"PLEASE WAIT!"
250 EXEC32226
260 READ#(FORA=1 TO 4:R#(A)=A:NEXTA
270 READ#(5)
280 FORA=6 TO 9:R#(A)=A:NEXTA
290 FORA=10 TO 68:READ#(A):NEXTA
300 SOUND400,20:EXEC32226
310 FORA=1 TO 68
320 FORB=0 TO 3
330 READ#(A,B)
340 NEXTB,A
350 SOUND400,20:EXEC32226
360 FORA=1 TO 31:READ#(A):NEXTA
370 SOUND400,20:EXEC32226
380 FORA=1 TO 22:READ#(A):NEXTA
390 SOUND400,20:EXEC32226
400 FORA=1 TO 5:EXEC32226:SOUND20,50:NEXTA
410 POKE32222,0:POKE32226,0:POKE32224,0
420 GOSUB3370
430 AB=RW(R):GOSUB3380
435 IF R=44 THEN GOTO 435
440 FORA=1 TO 22:IF NP(A)=R THEN PRINT#449,"HERE'S (S (N#(A)))-":EXEC32226:SOUND9
0,5
450 NEXTA
460 GOSUB3720
470 IF R=29 AND MU=1 THEN PRINT#449,"A MAD MUMMY BLOCKS YOUR PATH!":EXEC32226:FO
RA=10 TO 5:SOUND90,10:SOUND40,20:NEXTA
480 IF R=53 AND CR=1 THEN CC=1:PRINT#449,"THE CROCODILES START MOVING!":EXEC322
26:FORA=1 TO 5:SOUND10,50:SOUND50,10:NEXTA ELSE CC=0:CC=0
490 IF CC=1 THEN CC=0:IF CC2 THEN PRINT#449,"THE REPTILES JUST MADE A REAL
EXEC32226:PRINT#449,"OF YOU!":EXEC32226:GOTO3780
500 IF P=1 THEN PP=1:IF PP=10 THEN PRINT#449,"YOUR SKIN HAS BECOME RED AND IE
XEC32226:PRINT#449,"BLOODY! YOU MUST HAVE CAUGHT":EXEC32226:PRINT#449,"SOMETHING
IN THE TOMB!":EXEC32226:GOTO3780
510 IF PP=7 THEN PRINT#449,"YOU FEEL SICK!":EXEC32226:SOUND200,10
520 IF NP(19)=2 THEN P=0
530 IF R=43 OR R=45 OR R=67 THEN IF RND(5)=3 THEN PRINT#449,"THE FLOOR JUST COLA
PSED!":EXEC32226:R=31:FORA=1 TO 300 STEP 10:SOUND40,10:NEXTA
540 IF R=41 AND NP(5)=2 THEN PRINT#449,"THE DOOR SLAMS SHUT BEHIND YOU!":EXEC32
226:SOUND300,20:SOUND400,10
550 IF R=1 THEN MN=MN+1
560 IF MN=10 THEN N#(21)=A DEAD MONKEY!":R=0
570 IF NP(21)=2 AND RND(5)=2 AND MN=10 THEN NP(21)=1
580 IF L=1 AND R=21 AND NP(5)=2 THEN PRINT#449,"YOUR LIGHT REVEALS A":SOUND10,1
0:EXEC32226:PRINT#449,"PASSAGE LEADING SOUTH":SOUND10,10:EXEC32226:121,1:26:80
590 IF R=16 AND NP(5)=2 THEN PRINT#449,"YOU SEEM TO HAVE DROWN
ED!":EXEC32226:FORA=1 TO 20:SOUND40,10:GOTO3780:600 IF R=16 AND NP(5)=2 TH
610 GOSUB3370
620 CC=1:CC=0:W=0
630 PRINT#449,"==>"
640 SOUND500,10:SOUND400,10:SOUND300,10
650 X=1
660 PRINT#449,"POKE135,0
670 PRINT#449,"(C#(FORA=1 TO 70:AB=INKEY$:IF AB=** THEN NEXTA:PRINT#449,"(B) "
1:FORA=1 TO 70:AB=INKEY$:IF AB=** THEN NEXTA:GOTO670:680 A=ASC(AB)
700 IF AB=PS THEN W=0 NORTH:C#(B:PRINT#449,WE(STRING(18,32)):PRINT#449,"1:80
UND50,10:GOTO660
710 IF AB=9 THEN W=0 SOUTH:C#(B:PRINT#449,WE(STRING(18,32)):PRINT#449,"1:80
UND50,10:GOTO660
720 IF AB=21 THEN W=0 WEST:C#(B:PRINT#449,WE(STRING(18,32)):PRINT#449,"1:80
UND50,10:GOTO660
730 IF AB=93 THEN W=0 EAST:C#(B:PRINT#449,WE(STRING(18,32)):PRINT#449,"1:80
UND50,10:GOTO660
740 IF AB=8 AND C1 THEN 660
750 IF AB=8 THEN PRINT#449,"(B)=LEFT(W,LEN(W)-1):C=C-1:GOTO660
760 IF AB=13 THEN 630
770 IF AB=32 THEN 660
780 C=C+1:IF C=26 THEN C=26:GOTO660
790 W=WE(W,AB)
800 PRINT#449,"(A)
810 SOUND10,10
820 GOTO660
830 FORA=10 TO 20:SOUND40,20:NEXTA:GOSUB3380
840 EXEC32226
850 IF W=** OR LEN(W)=3 THEN 620
860 B=0:W=WE(W,AB)
870 IF LEN(W)=3 THEN 620 ELSE A=ASC(MID(W,1,1)):IF A=45 OR A=90 THEN W=RIGHT
(W,LEN(W)-1):GOTO670
880 A=INSTR(1,W,A)
890 IF A=0 THEN W=WE(W,A):GOTO670
900 W=LEFT(W,A-1)
910 W=RIGHT(W,LEN(W)-A)
920 FORB=1 TO 31
930 IF LEFT(W,B)=LEFT(W,31) THEN PRINT#449,"1:80
UND50,10:GOTO660
940 NEXTB
950 PRINT#449,"I DON'T UNDERSTAND!":EXEC32226:FORA=100 TO 50 STEP 1:1:NEX
TA:GOTO620
960 ON B GOTO 970,1030,1030,1170,1230,1290,1290,1380,1380,1400,1510,1550,1600,16
60,1710,1710,1830,1910,420,1950,2070,2500,2540,2540,2540,2590,2640,2690,1170,274
0,2780
970 IF W="NORTH" AND D(R,0)<0 THEN R=D(R,0):GOTO 420
980 IF W="WEST" AND D(R,1)<0 THEN R=D(R,1):GOTO 420
990 IF W="EAST" AND D(R,2)<0 THEN R=D(R,2):GOTO 420
1000 IF W="SOUTH" AND D(R,3)<0 THEN R=D(R,3):GOTO 420
1010 PRINT#449,"YOU CAN'T GO THAT WAY!":SOUND15,300
1020 EXEC32226:GOTO620
1030 IF W="IT" THEN 1130
1040 IF W="**" THEN PRINT#449,"GET WHAT?":EXEC32226:SOUND40,60:GOTO470
1050 FORA=1 TO 22
1060 O=INSTR(1,N#(A),N#)
1070 IF O=0 THEN NEXTA:PRINT#449,"YOU CAN'T!":EXEC32226:SOUND20,20:SOUND30,20:80
UND10,20:GOTO470
1080 IF NP(A)=R THEN PRINT#449,"IT'S NOT HERE!":SOUND50,10:SOUND70,10:SOUND20,1
0:GOTO 1:1:1:IF 1:5 THEN 1:5:PRINT#449,"IT'S TOO HEAVY!":SOUND50,10:SOUND25,20:80
UND70,10:EXEC32226:GOTO470
1090 NP(A)=2
1100 IF A=21 THEN 1130
1110 PRINT#449,"GOT IT!":EXEC32226:FORA=300 TO 1 STEP 20:SOUND40,5:NEXTA:GOTO470
1120 FORA=1 TO 22
1130 FORA=1 TO 22
1140 IF NP(A)=R THEN 1090
1150 NEXTA
1160 PRINT#449,"GET WHAT?":SOUND100,50:EXEC32226:GOTO470
1170 IF W="**" OR W="IT" THEN PRINT#449,"DROP WHAT?":EXEC32226:SOUND40,60:GOTO470
0
1180 FORA=1 TO 22
1190 O=INSTR(1,N#(A),N#)
1200 IF O=0 THEN NEXTA:PRINT#449,"YOU CAN'T!":EXEC32226:SOUND20,20:SOUND20,30:80
UND10,20:GOTO470
1210 IF NP(A)=2 THEN PRINT#449,"YOU HAVEN'T GOT THAT!":EXEC32226:SOUND70,10:80
UND50,10:SOUND20,10:GOTO470
1220 I=1:NP(A)=R:PRINT#449,"DROPPED IT!":EXEC32226:FORA=30 TO 60:SOUND40,15:NEX
TA:GOTO470
1230 IF W="**" THEN PRINT#449,"WHICH WAY?":SOUND90,70:EXEC32226:GOTO470
1240 IF R=10 OR R=14 OR R=21 THEN IF RND(5)<2 THEN PRINT#449,"THE SEA WASHED YO
U UP AGAIN!":EXEC32226:SOUND150,10:GOTO470
1250 IF R=10 OR R=14 OR R=21 THEN PRINT#449,"YOU SEEMED TO HAVE DROWNED!":EXEC32
226:FORA=30 TO 50:SOUND40,10:NEXTA:GOTO3770
1260 IF R=35 THEN 970
1270 IF R=58 THEN PRINT#449,"YUCK! IT'S ALL STICKY!":EXEC32226:SOUND60,40:PRINT#
449,"SOMETHING TOUCHED YOUR FOOT!":SOUND40,10:EXEC32226:NP(16)=58:1:GOTO470
1280 PRINT#449,"WHERE?":EXEC32226:SOUND10,70:GOTO470
1290 IF W="**" THEN PRINT#449,"PULL WHAT?":EXEC32226:SOUND600,5:GOTO470
1300 IF R=40 THEN GOTO 1330
1310 IF R=51 THEN GOTO 1350
1320 PRINT#449,"YOU CAN'T!":EXEC32226:SOUND50,50:GOTO470
1330 IF LEFT(W,31)=**PAN** THEN PRINT#449,"A PANNEL CREAKS OPEN!":SOUND40,80:SOUN
D50,80:SOUND40,80:EXEC32226:140,2:39:GOSUB3720:GOTO470
1340 GOTO1330
1350 IF LEFT(W,31)=**LEF** OR LEFT(W,31)=**RIG** THEN GOTO 1360 ELSE PRINT#449,"WH
ICH ONE?":SOUND10,90:EXEC32226:GOTO470
1360 IF LEFT(W,31)=**LEF** THEN PRINT#449,"A PIT IN THE FLOOR OPENS!":EXEC32226:5
EC32226:PRINT#449,"YOU FALL THROUGH INTO...":FORA=90 TO 150:SOUND40,5:NEXTA:EX
1370 PRINT#449,"A PIT OF SNAKES!":SOUND90,10:GOTO470
1380 IF LEFT(W,31)=**GAT** THEN PRINT#449,"THE GATE SLIDES SLOWLY UP!":FORA=500 TO 400 STEP 10:SOUND40,10:NE
XTA:EXEC32226:151,1:40:GOSUB3720:GOTO470
1390 IF W="**" THEN PRINT#449,"BREAK WHAT?":EXEC32226:SOUND40,60:GOTO470
1390 PRINT#449,"YOU CAN'T!":SOUND40,60:SOUND300,5:EXEC32226:GOTO470
1400 IF W="**" THEN PRINT#449,"ENT!":SOUND40,50:EXEC32226:GOTO470
1410 IF LEFT(W,31)=**DRU** THEN PRINT#449,"YOU CAN'T!":SOUND40,90:EXEC32226:GOTO
470
1420 IF NP(21)=2 THEN PRINT#449,"YOU HAVEN'T GOT IT!":SOUND50,80:EXEC32226:GOTO
470
1430 IF NP(11)=2 THEN PRINT#449,"WITH WHAT?":EXEC32226:SOUND50,75:GOTO470
1440 FORA=1 TO 5:SOUND500,15:FORX=1 TO 100:NEXTX
1450 NEXTA
1460 IF R=14 THEN PRINT#449,"HEAT BEAT!":EXEC32226:GOTO470
1470 PRINT#449,"THE BOULDER TREMBLES...":SOUND3000,10
1480 EXEC32226:PRINT#449,"AND ROLLS AWAY REVEALING A":EXEC32226:PRINT#449,"SMALL
CAVE!":EXEC32226
1490 114,31:15:GOSUB3720
1500 GOTO470
1510 IF W="**" THEN PRINT#449,"SHAKE WHAT?":EXEC32226:SOUND50,80:GOTO470
1520 IF LEFT(W,31)=**TRE** AND R=13 AND T=0 THEN PRINT#449,"BONK!":EXEC32226:FORA
=30 TO 50:SOUND40,10:NEXTA:GOTO470
1530 IF LEFT(W,31)=**SKE** AND R=41 THEN PRINT#449,"RATTLE! RATTLE!":EXEC32226:80
UND10,5:SOUND50,10:NP(15)=R:GOG
1550 IF W="**" THEN PRINT#449,"LOAD WHAT?":EXEC32226:SOUND70,70:SOUND20,90:GOTO47
0
1560 IF LEFT(W,31)=**GUN** AND NP(12)=2 AND NP(13)=2 THEN PRINT#449,"THE GUN IS
READY TO FIRE!":SOUND50,10:SOUND40,20:SOUND30,30:EXEC32226:G1:NP(13)=1:1:1:1:
1570 IF LEFT(W,31)=**GUN** AND NP(12)=2 THEN PRINT#449,"YOU HAVEN'T GOT A GUN!":
EXEC32226:SOUND50,10:GOTO470
1580 IF LEFT(W,31)=**GUN** AND NP(13)=2 THEN PRINT#449,"WHAT WITH?":SOUND50,10:
EXEC32226:GOTO470
1590 PRINT#449,"YOU CAN'T LOAD THAT!":SOUND30,10:EXEC32226:GOTO470
1600 IF W="**" THEN PRINT#449,"SHOOT WHAT?":EXEC32226:SOUND40,10:SOUND30,40:GOTO4
70
1610 IF LEFT(W,31)=**MUN** AND G=1 AND NP(12)=2 AND R=29 THEN FORA=1 TO 4:PRINT#
449,"BANG!":SOUND200,50:EXEC32226:NEXTA:PRINT#449,"THE MUMMY FALLS DEAD!":EXEC32
226:SOUND40,80:PRINT#449,"A DARK PASSAGE IS REVEALED!":EXEC32226:A=1
1620 IF A=1 THEN SOUND40,40:129,1:48:MUN=1:GOSUB3720:GOTO470
1630 IF NP(12)=2 THEN PRINT#449,"WHAT WITH?":EXEC32226:SOUND90,10:SOUND10,90:G
OTO470
1640 IF G=1 THEN PRINT#449,"THE GUN ISN'T LOADED!":SOUND40,40:EXEC32226:GOTO470
1650 PRINT#449,"BANG!":SOUND200,50:EXEC32226:PRINT#449,"YOU SHOT INTO THE AIR!":
EXEC32226:G=0:GOTO470
1660 IF W="**" THEN PRINT#449,"LIGHT WHAT?":EXEC32226:SOUND90,90:GOTO470
1670 IF LEFT(W,31)=**LAN** THEN PRINT#449,"YOU CAN'T LIGHT THAT!":SOUND30,30:SOU
ND40,40:EXEC32226:GOTO470
1680 IF NP(15)=2 THEN PRINT#449,"YOU HAVEN'T GOT THAT!":SOUND10,90:EXEC32226:100
GOTO470
1690 IF NP(14)=2 THEN PRINT#449,"WHAT WITH?":EXEC32226:SOUND210,20:GOTO470
1700 PRINT#449,"THE LANTERN SHINES BRIGHTLY!":EXEC32226:FORA=40 TO 200 STEP 10:8
UND10,10:GOTO470
1710 IF W="**" THEN PRINT#449,"OPEN WHAT?":EXEC32226:SOUND200,10:SOUND10,200:GOTO
470
1720 IF LEFT(W,31)=**DOO** AND R=30 THEN PRINT#449,"THE DOOR SQUEAKS NOISILY OPEN!
":EXEC32226:SOUND20,20:SOUND30,30:SOUND40,40:130,1:32:GOSUB3720:GOTO470
1730 IF LEFT(W,31)=**CHE** AND R=36 AND NP(7)=2 THEN PRINT#449,"THE CHEST OPENS
RELUCTANTLY!":EXEC32226:SOUND40,90:NP(13)=R:GOTO470
1740 IF LEFT(W,31)=**DOO** AND R=45 AND NP(13)=2 AND NP(17)=2 THEN THE
N PRINT#449,"THE GREAT DOOR OPENS SLOWLY!":EXEC32226:SOUND3000,5:145,2:44:GOSU
B3720:GOTO470
1750 IF (R=41 OR R=50) AND LEFT(W,31)=**DOO** THEN PRINT#449,"IT WON'T BUDDGE!":EX
EC32226:SOUND90,80:GOTO470
1760 IF (LEFT(W,31)=**GAT** OR LEFT(W,31)=**FOR** AND R=51 THEN PRINT#449,"IT'S T
O HEAVY TO OPEN!":EXEC32226:SOUND40,80:SOUND80,40:GOTO470
1770 IF R=38 AND LEFT(W,31)=**SAR** THEN PRINT#449,"WHICH ONE?":EXEC32226:SOUND
10:GOTO470
1780 IF R=38 AND LEFT(W,31)=**THR** THEN PRINT#449,"IT CREAKS OPEN!":EXEC32226:FO
RA=70 TO 90:SOUND40,5:NEXTA:PRINT#449,"REVEALING A SMALL PASSAGE!":EXEC32226:SOUN
D30,90:138,0:42:GOSUB3720:GOTO470
1790 IF R=38 AND (LEFT(W,31)=**ONE** OR LEFT(W,31)=**TWO** OR LEFT(W,31)=**FOU** OR
O:SOUND40,50:SOUND90,50:GOTO470
1800 IF R=45 THEN PRINT#449,"IT'S LOCKED!":SOUND30,100:EXEC32226:GOTO470
1810 IF LEFT(W,31)=**DOO** THEN PRINT#449,"WHAT DOOR?":EXEC32226:SOUND500,10:GOTO
470
1820 PRINT#449,"YOU CAN'T DO THAT!":SOUND150,50:EXEC32226:GOTO470
1830 IF W="**" THEN PRINT#449,"READ WHAT?":EXEC32226:SOUND100,10:SOUND150,10:GOTO
470
1840 IF R=12 AND LEFT(W,31)=**SIG** THEN PRINT#449,"IT SAYS : BEWARE THE CURSE OF
":EXEC32226:SOUND40,40:PRINT#449,"ABU STHEEL!":EXEC32226:SOUND90,40:SOUND40,80:G
OTO470
1850 IF LEFT(W,31)=**SCR** AND NP(8)=2 THEN PRINT#449,"IT SAYS : ABU WAS HERE OK
":EXEC32226:SOUND40,60:GOTO470
1860 IF R=39 OR R=14 THEN 1890
1870 PRINT#449,"YOU CAN'T!":SOUND20,20:EXEC32226:GOTO470
1880 IF R=14 AND (LEFT(W,31)=**BOU** OR LEFT(W,31)=**HIE** THEN PRINT#449,"YOU CA
N'T READ HIEROGLYPHICS!":EXEC32226:SOUND10,90:GOTO470
1890 IF LEFT(W,31)=**WAL** OR LEFT(W,31)=**WRI** THEN PRINT#449,"IT SAYS : 'GOLD-
SILVER-COPPER'":EXEC32226:SOUND10,10:GOTO470
1900 GOTO1870
1910 IF W="**" THEN 420
1920 IF LEFT(W,31)=**SCR** OR LEFT(W,31)=**WAL** OR LEFT(W,31)=**BOU** THEN 1830
1930 IF R=68 AND LEFT(W,31)=**PED** THEN PRINT#449,"THERE'S A SMALL HOLE!":EXEC32
226:SOUND10,10:GOTO470
1940 PRINT#449,"YOU SEE NOTHING SPECIAL!":EXEC32226:SOUND10,50:SOUND40,40:SOUNDB
9,70:GOTO470
1950 IF RND(2)<2 THEN PRINT#449,"NOT NOW!":EXEC32226:SOUND30,30:GOTO470
1960 IF R=5 OR R=10 THEN PRINT#449,"LOST? KEEP TRYING!":EXEC32226:SOUND
40,30:GOTO470
1970 IF R=13 THEN PRINT#449,"TRY THE FRUIT!":EXEC32226:SOUND50,70:GOTO470
1980 IF R=14 THEN PRINT#449,"WHAT ABOUT THE BOULDER?":EXEC32226:SOUND10,20:GOTO4
70
1990 IF R=21 THEN PRINT#449,"SOME LIGHT MIGHT HELP!":EXEC32226:SOUND10,30:GOTO47
0
2000 IF R=29 THEN PRINT#449,"KILL THE MUMMY!":SOUND10,20:EXEC32226:GOTO470
2010 IF R=36 OR R=45 THEN PRINT#449,"DON'T OPEN! UNLOCK IT!":EXEC32226:SOUND10,1
0:GOTO470
2020 IF R=37 AND R=42 THEN PRINT#449,"EXITS ARE NOT ALWAYS OBVIOUS!":EXEC32226:5
UND10,30:GOTO470
2030 IF R=33 THEN PRINT#449,"DO SOMETHING, QUICKLY!":EXEC32226:SOUND10,20:GOTO47
0
2040 IF R=50 THEN PRINT#449,"SOMETHING ELSE MAY HELP!":EXEC32226:SOUND10,10:GOTO
470
2050 IF R=68 THEN PRINT#449,"TRY THE PEDISTAL!":EXEC32226:SOUND10,20:GOTO470
2060 PRINT#449,"I CAN'T HELP YOU HERE!":EXEC32226:SOUND10,20:GOTO470
2070 PRINT#449,"DO YOU WISH TO SAVE YOUR?":SOUND10,10:EXEC32226:PRINT#449,"CURREN
T POSITION :":SOUND10,10
2080 POKE5494,0
2090 AB=INKEY$:IF AB=** THEN 2090
2100 IF AB="Y" THEN A=0:SOUND50,50:PRINT#449,"A=0:GOTO2130
2110 IF AB="N" THEN A=1:SOUND50,50:PRINT#449,"A=1:GOTO2130
2120 GOTO2090
```

(continued on next page)

(continued from previous page)

```

2100 IF A=INKEY$ THEN GOTO 2100
2100 IF A=CHR$(13) THEN SOUND30,90:GOTO2170
2100 IF A=CHR$(8) THEN SOUND40,10:PRINT#447,"*":GOTO2090
2100 GOTO2130
2100 EXEC32226
2100 IF A=INKEY$ THEN GOTO 2100
2100 PRINT#449,"PLEASE POSITION THE TAPE." :EXEC32226:SOUND10,10:PRINT#449,"PRESS
A KEY *":SOUND10,10:MOTOR ON:AUDIO ON
2200 AB=INKEY$:IF AB="" THEN GOTO 2200
2210 PRINT#449:EXEC32226:MOTOR OFF:AUDIO OFF
2220 PRINT#449,"PRESS RECORD." :SOUND40,80:EXEC32226:PRINT#449,"PRESS A KEY *":S
OUND10,10
2230 AB=INKEY$:IF AB="" THEN GOTO 2230
2240 PRINT#449:EXEC32226
2250 PRINT#449,"SAVING....":SOUND40,90:EXEC32226
2260 OPEN "O",#1,"DATA"
2270 PRINT#1,I,M,C,R,CC,PP,T,M,M,L,L,0
2280 FOR#1 TO25:PRINT#1,NP(A):NEXTA
2290 CLOSE#1
2300 PRINT#449,"DONE":SOUND30,50:EXEC32226
2310 GOTO420
2320 A=0:PRINT#449,"DO YOU WISH TO LOAD A GAME *?":SOUND10,10
2330 AB=INKEY$:IF AB="" THEN GOTO 2330
2340 IF AB="N" THEN PRINT#CHR$(8):AB="" :GOTO20230
2350 IF AB="Y" THEN PRINT#CHR$(8):AB="" :GOTO20230
2360 GOTO20230
2370 SOUND30,80
2380 AB=INKEY$:IF AB="" THEN GOTO 2380
2390 IF AB=CHR$(8) THEN GOTO 2320
2400 IF AB=CHR$(13) THEN GOTO 2420
2410 GOTO20230
2420 SOUND40,20:EXEC32226
2430 IF A=INKEY$ THEN PRINT#449,"VERY WELL." :EXEC32226:FOR#1 TO40:SOUND#1,NEXTA
:GOTO3780
2440 PRINT#449,"SEARCHING....":EXEC32226:SOUND10,10
2450 OPEN "I",#1,"DATA"
2460 PRINT#449,"LOADING....":EXEC32226:SOUND10,10
2470 INPUT#1,I,M,C,R,CC,PP,T,M,M,L,L,0
2480 FOR#1 TO25:INPUT#1,NP(A):NEXTA
2490 CLOSE#1:PRINT#449,"DONE":EXEC32226:SOUND20,20:GOTO420
2500 IF N#="" THEN PRINT#449,"FIT WHAT?":EXEC32226:SOUND40,10:GOTO470
2510 IF R#="" THEN PRINT#449,"YOU CAN?":EXEC32226:SOUND90,40:GOTO470
2520 IF NP(10)=2 THEN PRINT#449,"YOU CAN?":EXEC32226:SOUND90,40:GOTO470
2530 PRINT#449,"IT FITS INTO THE HOLE":EXEC32226:SOUND40,10:GOTO470
2540 PRINT#449,"WITH A CRASH THE CRYSTAL":EXEC32226:SOUND10,10:SOUND20,20:SOUND90,40
2550 IF N#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2560 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2570 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2580 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2590 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2600 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2610 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2620 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2630 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2640 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2650 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2660 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2670 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2680 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2690 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2700 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2710 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2720 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2730 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2740 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2750 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2760 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2770 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2780 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2790 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2800 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2810 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2820 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2830 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2840 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2850 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2860 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2870 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2880 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2890 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2900 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2910 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2920 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2930 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2940 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2950 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2960 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2970 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2980 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
2990 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3000 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3010 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3020 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3030 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3040 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3050 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3060 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3070 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3080 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3090 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3100 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3110 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3120 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3130 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3140 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3150 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3160 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3170 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3180 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3190 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3200 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3210 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3220 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3230 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3240 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3250 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3260 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3270 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3280 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3290 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3300 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3310 IF R#="" THEN PRINT#449,"HURH":EXEC32226:SOUND10,40:GOTO470
3320 IF R#="" THEN PRINT#449,"HURH":
```


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 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 True 16-bit micro-processor running at 4.77 MHz.

The Advance 86 runs IBM PC software.

Specification

CPU Type	True 16-bit 8086 running at 4.77 MHz.
RAM	128K or 256K with parity plus 16K video Basic
Languages Included	Basic
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 Upgradeable to Model B Provision for 8087 Arithmetic Processor
Warranty	12 months



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 £956.52 + VAT. The Advance 86 Model B offers the business micro-computer buyer an IBM compatible disk-based system with twin drives, with Perfect Writer/Speller, Calc and Filer Software (MS/DOS) included for only £1303.48 + VAT.

Advance 86 Models A & B are designed and marketed by Advanced Technology UK Ltd. Made by FERRANTI in Oldham. Delivery within 30 days from receipt of payment. 128K memory expansion £108.70 + VAT.

Advanced Technology UK Ltd.
8A Hornsey Street, London N7 8ZHB
Tel: 01-609 0061 for leaflet:

On site warranty for 12 months by National Advanced Systems (part of National Semiconductor) one of the largest companies in the U.S.A. for 86B.
*Ex VAT.

Benchmarks

The standard Benchmarks were run using Advance Basic, which is the equivalent of Microsoft GWBasic and Basica on the IBM PC.

Machine	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	Av.
Advance 86 — 8086	0.8	3.3	7.3	7.4	8.1	14.6	23.9	26.0	11.4
ACT Apricot — 8086	1.6	5.2	10.6	11.0	12.4	22.9	35.4	34.4	16.7
IBM PC — 8088	1.2	4.8	11.7	12.2	13.4	23.3	37.4	30.0	16.8

To Advance Technology UK Ltd., 8A Hornsey Street, London N7 8HB

- ☐ Please send Model 86A, Micro-Computer & Keyboard I enclose £399 including VAT
- ☐ Please send Model 86B which includes Model 86A plus Expansion Box & Software. I enclose £1499 inc. VAT.
- ☐ Please send 128K Memory Expansion £125 inc. VAT. Cheque/Barclaycard/Access No.

Name _____ Company _____
Address _____ Address _____

YC

AMSTRAD WORD PROCESSOR

Roger Hammond gives you a large range of options for printing pages, quitting, scrolling, or cataloguing the tape

Listing 1. The loader program.

```

10 MEMORY 35999
20 ZONE 6
30 FOR I=36000 TO 36266
40 PRINT I,:INPUT X%
50 POKE I,X%
60 NEXT I
70 FOR X=36000 TO 36260 STEP 10
80 PRINT X,
90 FOR I=0 TO 9
100 PRINT PEEK(X+I),
110 NEXT I
120 PRINT
130 NEXT X
140 INPUT "IS THIS CORRECT? (Y/N)";Q$
150 IF Q$="y" OR Q$="Y" THEN 190
160 IF Q$<>"N" AND Q$<>"n" THEN 140
170 INPUT "enter address and correct
    value seperated by a comma";ad,x%
180 POKE ad,x%:GOTO 70
190 INPUT "ENTER FILENAME";N$
200 SAVE N$,B,36000,267
    
```

The machine code.

36000	33	32	78	1	127	62	54	32	35	13
36010	32	250	14	0	5	32	245	201	42	189
36020	77	1	64	7	62	32	119	35	13	32
36030	251	14	0	5	32	246	201	42	189	77
36040	1	64	7	126	205	90	187	35	13	32
36050	248	14	0	5	32	243	201	17	96	134
36060	42	191	77	14	20	58	194	77	71	126
36070	18	19	35	16	250	58	193	77	71	35
36080	16	253	13	32	236	17	112	148	33	112
36090	148	14	3	58	194	77	71	126	18	35
36100	19	16	250	58	193	77	71	35	16	253
36110	13	32	236	237	91	196	77	42	196	77
36120	58	195	77	71	43	16	253	237	75	198
36130	77	237	184	235	19	33	112	148	237	75
36140	195	77	6	0	237	176	237	91	191	77
36150	33	96	134	14	20	58	194	77	71	126
36160	18	19	35	16	250	58	193	77	71	19
36170	16	253	13	32	236	201	33	112	148	6
36180	240	54	32	35	16	251	201	17	96	134
36190	42	191	77	14	20	58	194	77	71	126
36200	18	19	35	16	250	58	193	77	71	35
36210	16	253	13	32	236	237	75	198	77	237
36220	91	200	77	42	202	77	237	176	58	204
36230	77	71	54	32	43	16	251	237	91	191
36240	77	33	96	134	14	20	58	194	77	71
36250	126	18	19	35	16	250	58	193	77	71
36260	19	16	253	13	32	236	201	0	0	0

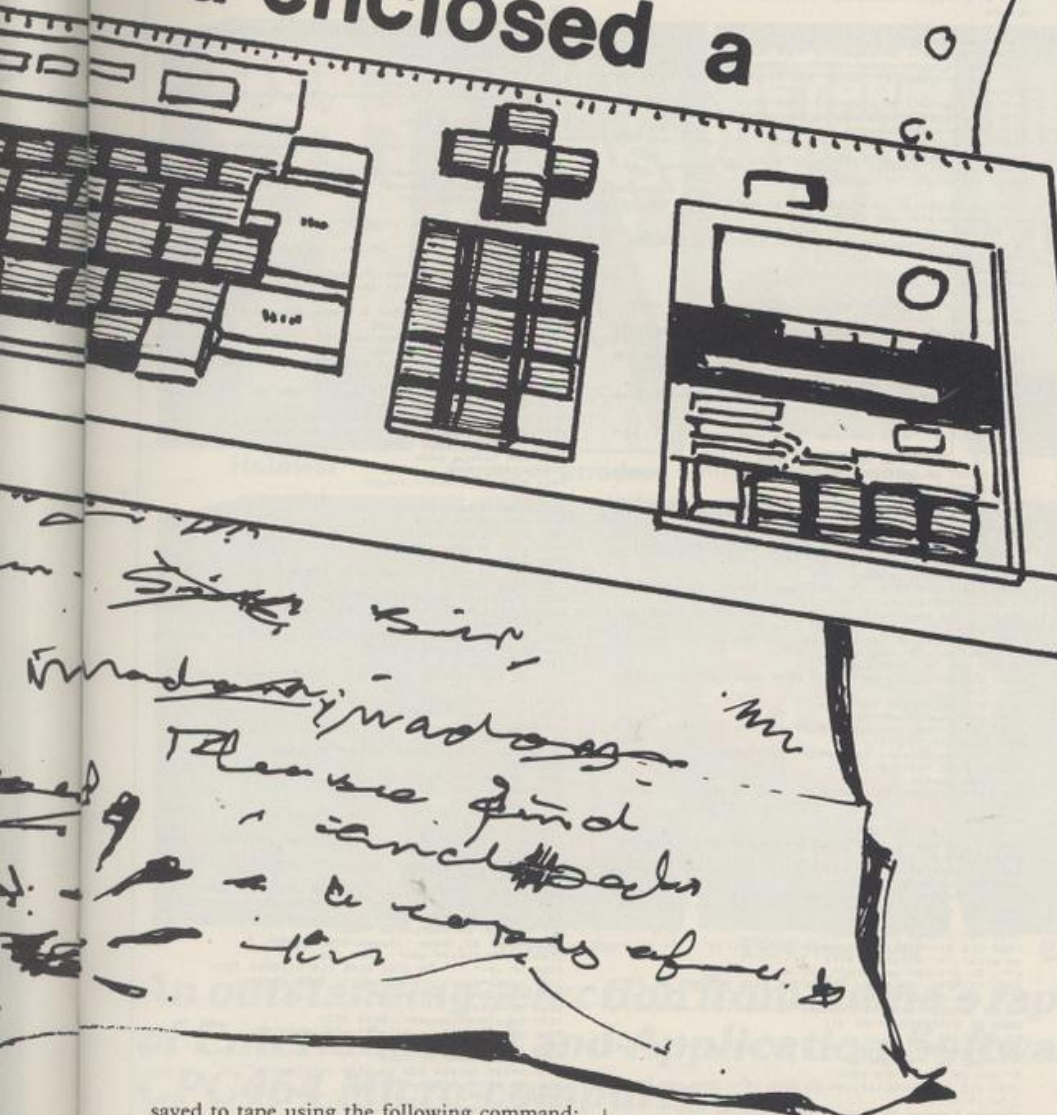


ROBWRITE is a word-processing program that allows the user to Save and Load files, use different sizes of text if his printer permits, change margins, access nine different pages of 20 lines which can easily be printed consecutively and exercise full editing functions. It has been written for an Epson RX-80 F/T but should run on most printers with little alteration.

The machine code should be entered and saved to tape first as the program will probably crash if it is not present. Listing 1 will load this if you enter the values given in the decimal dump. The machine code should be

ir/madam

e find enclosed a



saved to tape using the following command:
SAVE <FILENAME>,B,START ADDRESS,267

Do not try calling the machine code other than from the main program as it uses variables Poked from Basic.

Once the machine code is in memory and has been saved, enter the Basic program. The program will normally load the code itself when it is run but, during development, if you are sure that the code is present above Himem it may be a good idea to turn line 290 into a Rem statement or to remove the exclamation

mark from within the quotes so that the computer will warn you that it is about to attempt to load.

When you have debugged the program save it with the machine code after it, making certain that line 290 is back to its original form.

There are about two kilobytes left free in Basic for any additions you may feel like adding and the area above Himem from 36267 to 37999 is also free.

(continued on next page)

The main program.

```
10 REM*****ROBRI
11 *****
20 SPEED WRITE 1
30 OPENOUT "dummyfile"
40 MEMORY 19000
50 CLOSEOUT
60 EPHASISX=1:STRIKEX=1:TYPEX=1:SETX=1:SPACEX=6:INSE
TX=1
70 BOTTOMX=20
80 DIM TABX(80):FOR I=1 TO 80:TABX(I)=0:NEXT
90 MODE 2:ZONE 0,10:BORDER 10:INK 1,26
100 WINDOW #0,1,80,1,22:WINDOW #1,1,80,22,25:WINDOW #2
,60,70,25,25
110 PRINT"robwrite2","by Robin J.R. Hammond","....
120 PRINT"Use the following keys to control the progr
am"
130 ZONE 30
140 PRINT"ARROWS","to move the cursor"
150 PRINT"DEL","to delete text"
160 PRINT"ENTER","for carriage return"
170 PRINT"TAB","to move to the next tab position"
180 PRINT"CTRL and TAB","to set a tab position"
190 PRINT"CLR","to clear all tab stops"
200 PRINT"CTRL and :CHR$(93)","to enter delete mode"
210 PRINT"CTRL and :CHR$(91)","to enter insert mode"
220 PRINT"COPY","to display options"
230 ZONE 80
240 PRINT #1,"PLEASE WAIT"
250 LOAD "36000
260 CLS #1
270 PRINT "....PRESS ANY KEY TO CONTINUE..."
280 IF INKEY="" THEN 280
290 WIDTH 80
300 CLS:PRINT CHR$(7):PRINT "PLACE THE PRINTER ON LIN
E."
310 PRINT #0,CHR$(27):"A":CLS
320 PRINT #0,CHR$(27):"E":
330 PRINT #0,CHR$(27):"O":
340 PRINT #0,CHR$(27):"A":CHR$(SPACEX):
350 PRINT #0,CHR$(27):"P":
360 PRINT #0,CHR$(27):"C":CHR$(0):CHR$(1):
370 PRINT #0,CHR$(27):"N":CHR$(12):
380 PRINT #0,CHR$(13):
390 PRINT"Current printer settings are:...."
400 PRINT"PIGA SIZED PRINT","EMPHASIZED PRINT","DOUBLE
STRIKE OR :6/72 INCH LIN
E SPACING","11 INCH PAPER LENGTH","1 INCH DIP OVER PE
RFORMATION SETTING"
410 PRINT"....These may be changed at any time during
operation of the program
v pressing COPY and selecting the appropriate optio
n. Changing any setting w
ill however cause the paper to move up slightly."
420 PRINT"....PRESS ANY KEY TO CONTINUE..."
430 IF INKEY="" THEN 430
440 PRINT CHR$(7):CLS:PRINT #1,"Do you want standard
margins? Press Y or N"
450 Q=INKEY:IF Q="" THEN 450 ELSE IF Q="Y" OR Q="y"
Q="Y" OR Q="N" THEN GOSUB 3390 ELSE 450
460 CLS #1
470 FOR I=19901,820:FOR J=19902,84E
480 CALL 36000
490 CALL 36176
500 I=I+20:O=O+19999:left$
510 CLS:ZONE 25:GOSUB 3410
520 N=1234567890123456789012345678901234567890123456
78901234567890123456789012
34567890"
530 LOCATE 1,2:PRINT n$:
540 X=left$:Y=Y+1
550 PAGEX=1
560 PRINT CHR$(7):
570 PRINT #2,"page ":PAGEX:
580 B=INKEY$
590 PRINT CHR$(22):CHR$(1)
600 LOCATE X,Y:PRINT " "
610 PRINT CHR$(22):CHR$(0)
620 IF B="" THEN 580
630 IF B=CHR$(13) THEN 760 ELSE IF B=CHR$(127) THEN
800 ELSE IF B=CHR$(240)
HEN 870 ELSE IF B=CHR$(241) THEN 910 ELSE IF B=CHR$(
242) THEN 950 ELSE IF B=C
H$(243) THEN 990 ELSE IF B=CHR$(224) THEN 1910
640 IF B=CHR$(9) THEN 1030 ELSE IF B=CHR$(225) THEN
1110 ELSE IF B=CHR$(16)
HEN 1120 ELSE IF B=CHR$(27) THEN 1140 ELSE IF B=CHR$(
129) THEN 1450
650 IF INKEY$=1 THEN 660 ELSE INQ=INQ+1:IF INQ=POS
INQ THEN PRINT CHR$(7):G
OTO 580
660 IF X=right$-5 THEN SOUND 1,60,10,2
670 LOCATE X,Y:PRINT B$
680 FOR H,ASC(B$)
690 IF Y=bottomX AND X=rightX THEN 580
700 H=H+1
710 X=X+1
720 IF X=rightX THEN 580
730 X=leftX:Y=Y+1
740 H=leftX-rightX+79
750 GOTO 580
760 REM "..." CR
770 IF Y=bottomX THEN 580 ELSE LOCATE X,Y:PRINT CHR
$(PEEK(n))
780 H=leftX-X+80:X=leftX:Y=Y+1
790 GOTO 580
800 REM "..." DELETE
810 IF X=leftX AND Y=1 THEN 580
820 LOCATE X,Y:PRINT CHR$(PEEK(n))
830 X=X-1:Y=Y-1:IF X=leftX-1 THEN GOSUB 860
840 LOCATE X,Y:PRINT " "
850 GOTO 580
860 X=rightX:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1
870 REM cursor up
880 IF Y=1 THEN 580 ELSE LOCATE X,Y:PRINT CHR$(PEEK
(n))
890 Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1
900 GOTO 580
910 REM cursor down
920 IF Y=bottomX THEN 580 ELSE LOCATE X,Y:PRINT CHR
$(PEEK(n))
930 Y=Y+1:Y=Y+1:Y=Y+1:Y=Y+1:Y=Y+1:Y=Y+1:Y=Y+1:Y=Y+1
940 GOTO 580
950 IF X=leftX AND Y=1 THEN 580 ELSE LOCATE X,Y:PR
INT CHR$(PEEK(n))
960 IF X=rightX THEN 980
970 X=X-1:Y=Y-1:LOCATE X,Y:PRINT CHR$(PEEK(n)):GOTO
580
980 X=rightX:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1
:PRINT CHR$(PEEK(n)):GOTO
580
990 REM cursor right
1000 IF X=rightX THEN 1020 ELSE LOCATE X,Y:PRINT CH
R$(PEEK(n))
1010 X=X+1:Y=Y-1:LOCATE X,Y:PRINT CHR$(PEEK(n)):GOTO
580
1020 SOUND 1,80,20,2:IF Y=bottomX THEN 580 ELSE LOCAT
E X,Y:PRINT CHR$(PEEK(n))
1030 X=X+1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1:Y=Y-1
1040 FOR I=X+1 TO rightX
1050 IF TABX(I)=1 THEN 1080
1060 NEXT I
```

(listing continued on next page)

(continued from previous page)

the only choice

Kuma

AMSTRAD CPC464

software



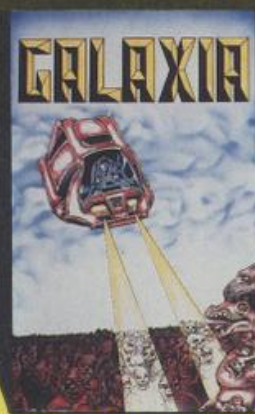
Holdfast



Gems of Stradus



Star Avengers



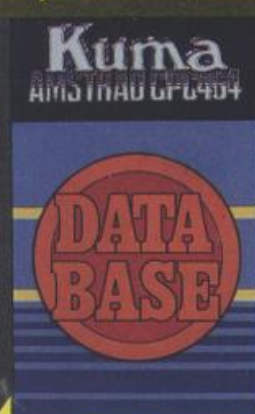
Galaxia



Music Composer



Logo



Database



ZEN Assembler



EASIVAT



Home Budget

An outstanding selection from Kuma's rapidly expanding range of Entertainment and Application Software for the Amstrad CPC464 Micro-computer.

Book:

● The Amstrad CPC 464 Explored

This superb book is designed to let every CPC464 user, at whatever level, get the most from his computer. After an introductory section on the special Basic features, the book looks in depth at the excellent sound and graphic facilities including:

- Animation ● Windows
- Character sets ● Multitasking ● 3 Voice Times
- M/C routines for Basic ● Use of Zen ● Use of O/S
- Sample programs

Available from your nearest Amstrad CPC464 Stockist.

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

Please send full catalogue on Amstrad CPC464 products.

Name

Address

Phone.....

Trade Enquiries Phone 07357-4335

After everything that's been said in praise of Amstrad's CPC464, is there anything to add?

Plenty.

The CPC464 is an enthusiast's dream come true.

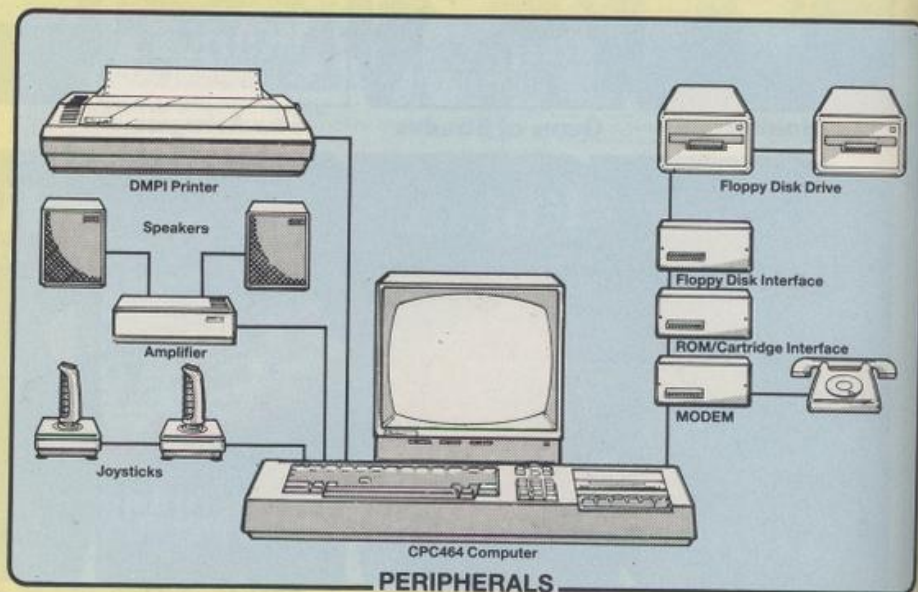
Few applications are beyond its capabilities, with its sophisticated features, complete expansion bus connector for sideways ROMs, serial interfaces, disk drives and modems.

No wonder the press is in raptures over it.

The CPC464 system.

It comes complete and ready-to-go. Here's what you get for that incredibly low price.

64K of RAM (42K available), 32K of ROM, colour monitor or green screen VDU, typewriter style keyboard,



integral cassette data recorder and a very fast extended BASIC.

The CPC464 offers you high resolution graphics, 80 column text display, up to 8 text windows plus a graphics window and a palette of 27 colours.

Not to mention a 3-voice, 7-octave stereo output you can feed through a hi-fi amplifier and speakers.

Now we think you'll agree, that's some system.

Low cost disk drive.

An inexpensive floppy disk system is available which includes CP/M* (giving you the option to access 3000 proven programs) and LOGO with its famous educational applications.



CPC464 green screen VDU (GT64)

**Computer complete with
colour monitor (CTM640)**

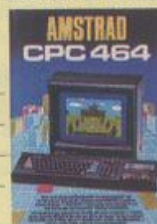


Figure 3. List of DMACTL and GRACLT options.

GRACLT Poke No.	LOCATION 53277 Action
1	enable missiles
2	enable players
3	enable players + missiles

E.G. Poke 53277, 2 enables players.

DMACTL LOCATION 559	Action
+4	enable missiles
+8	enable players
+12	enable players + missiles
+16	enable single resolution
+0 (default)	enable double resolution

E.G. Poke 559, Peek (559) + 12 + 16 enables players + missiles in single resolution.

The default for DMACTL, from power on or from system reset is 34.

Figure 4. Other player/missile registers.

Name(s)	Location(s)	Purpose
HPOSP0 (-3)	53248-51	Player horizontal Position Registers
HPOSM0 (-3)	53252-55	Missile horizontal Position registers
Size P0 (-3)	53256-59	Player size Registers
Size M	53260	Missile size Register
COLPM0 (-3)	704-707	Player/missile Colour registers

Figure 5. Priority Register.

Prior location 623
Priorities in this order
PF0, PF1, P0-3, PF2-3, background — 8
PF0-3, P0-3, background — 4
P0-1, PF0-3, P2-3, background — 2
P0-3, PF0-3, background — 1
E.G. Poke 623,2
PF = Playfield i.e. colours 0-3
P = Player 0-3

Figure 6. Collision Registers.

Location	Collision detection
53248	M0 to playfield
53249	M1 to playfield
53250	M2 to playfield
53251	M3 to playfield
53252	P0 to playfield
53253	P1 to playfield
53254	P2 to playfield
53255	P3 to playfield
53256	M0 to player
53257	M1 to player
53258	M2 to player
53259	M3 to player
53260	P0 to player
53261	P1 to player
53262	P2 to player
53263	P3 to player
53278	HITCLR — Poke with any to clear collision registers.

Figure 7.

PMSTART = START + (512 + (512*RES))
+ PLAYER (128 + (128*RES))
MSB = INT (PMSTART/256)
LSB = PMSTR - (MSB*256)
FOR T = 0 TO 6
READ A,B
POKEA,MSB;POKEB,LSB;NEXT T
DATA 1562, 1561, 1569, 1568, 1580, 1579,
1605, 1604, 1612, 1611, 1623, 1622
RETURN

Patrick Nevison helps your screen come alive with Atari animation

ANIMATION WITH most personal computers is a time consuming and tedious process. To make a finely detailed image move across the screen involves the following process:

- ☐ Look at the background ahead of the image and temporarily store the contents.
- ☐ Erase the old image — draw in the background colour.
- ☐ Draw the new image.
- ☐ Restore the background at the previous image position.
- ☐ Repeat from step 1.

An example of this type of animation is given in listing 1. There has to be an easier and faster method. Machine code is one answer but is not easy to write or debug and one error can be catastrophic. Atari owners, among others, have a solution in hardware. Sprite, or as Atari call them player/missile graphics. A player is a graphic object which is shape and colour definable, and when moved over any background — playfield — image does not erase or alter it in any way. Type in listing 2 and see the same animation but using player graphics. In fact, there is a delay loop in listing 2 to make the two comparable.

So, what do we have in Atari computers — four user-definable objects all of independent

colour, independent shape, moving rapidly anywhere in any graphics mode without disturbing anything else. Sounds too good to be true. In fact, there are a few complications. Atari Basic is now showing its age against newer structured and more capable Basics.

Specifically, as regards P/M graphics, there are no commands to deal with this type of animation in Atari Basic. Thus, all dealings with P/M are done with the immortally incomprehensible Peek and Poke. Never fear, although the details are tedious and time consuming — though well worth it for the displays they make — the principles are quite straightforward.

As Atari Basic does not recognise P/M graphics, we must cordon off an area of memory to hold all of the data, so that Basic does not corrupt the information. The high end of memory is ideal for this and location 106 contains the number of "pages" — 256 bytes to a page — free at any one time. In changing the contents of location 106 we fool the computer into thinking it has less memory than is actually there, thus providing a safe place to store all of the P/M data.

Players are all eight bits — dots, pixels, whatever — wide, but can come in two heights. They are up to 128 bits high — double resolution — or up to 256 bits high — single resolution. There are swings and roundabouts in choosing which type you will



Listing 1.

```

10 REM LIST 1
20 GRAPHICS 7+16
30 FOR T=1 TO 100
35 REM DRAW IMAGE
40 COLOR 1
50 PLOT T,30:DRAWTO T+5,30:DRAWTO T+6,31:DR
  TO T-1,31
60 DRAWTO T-1,32:DRAWTO T,32:PLOT T+2,32:DR
  TO T+3,32
70 PLOT T+5,32:DRAWTO T+6,32:DRAWTO T+6,33:DR
  AWTO T-1,33:DRAWTO T-1,34
80 PLOT T+1,34:DRAWTO T+4,34:PLOT T+6,34:DR
  AWTO T+6,35:DRAWTO T+5,35
90 PLOT T,35:DRAWTO T-1,35:DRAWTO T-1,36:DR
  AWTO T+6,36:DRAWTO T+5,37:DRAWTO T,37
100 REM ERASE IMAGE
110 COLOR 0
120 PLOT T,30:DRAWTO T+5,30:DRAWTO T+6,31:DR
  AWTO T-1,31
130 DRAWTO T-1,32:DRAWTO T,32:PLOT T+2,32:DR
  AWTO T+3,32
140 PLOT T+5,32:DRAWTO T+6,32:DRAWTO T+6,33:DR
  AWTO T-1,33:DRAWTO T-1,34
150 PLOT T+1,34:DRAWTO T+4,34:PLOT T+6,34:DR
  AWTO T+6,35:DRAWTO T+5,35
160 PLOT T,35:DRAWTO T-1,35:DRAWTO T-1,36:DR
  AWTO T+6,36:DRAWTO T+5,37:DRAWTO T,37
170 NEXT T
180 GOTO 30:REM LOOP ENDLESSLY

```

Listing 2.

```

10 REM LIST 2
20 A=PEEK(106)-4:POKE 106,A:GRAPHICS 2+16:REM
  SET ASIDE P/M AREA
30 PMSTART=A*256
40 REM CLEAR PLAYER 0 AREA
50 START=PMSTART+512
60 FOR T=START TO START+120:POKE T,0:NEXT T
70 REM DEFINE PLAYER
80 FOR T=START+30 TO START+30+7
90 READ N
100 POKE T,N
110 NEXT T
120 DATA 126,255,219,255,189,195,255,126
130 REM SET PMBASE
140 POKE 54279,A
150 REM SET DMACTL
160 POKE 559,42
170 REM SET GRACLT
180 POKE 53277,2
190 REM SET PLAYER 0 COLOUR
200 POKE 704,14
210 REM MOVE PLAYER 0
220 FOR T=70 TO 180
230 POKE 55248,T
240 REM DELAY—SLOW IT DOWN

```

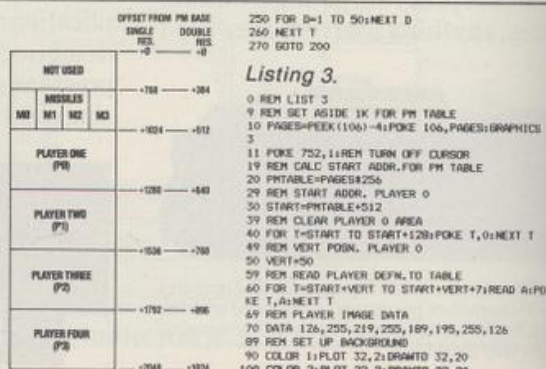


Figure 1. Player missile memory map.

Listing 3.

```

0 REM LIST 3
9 REM SET ASIDE 1K FOR PM TABLE
10 PAGES=PEEK(106)-4:POKE 106,PAGES:GRAPHICS
  3
11 POKE 752,1:REM TURN OFF CURSOR
19 REM CALC START ADDR.FOR PM TABLE
20 PMTABLE=PAGES*256
29 REM START ADDR. PLAYER 0
30 START=PMTABLE+512
39 REM CLEAR PLAYER 0 AREA
40 FOR T=START TO START+120:POKE T,0:NEXT T
49 REM VERT POSN. PLAYER 0
50 VERT=50
59 REM READ PLAYER DEFN. TO TABLE
60 FOR T=START+VERT TO START+VERT+7:READ A:P0
  KE T,A:NEXT T
69 REM PLAYER IMAGE DATA
70 DATA 126,255,219,255,189,195,255,126
89 REM SET UP BACKGROUND
90 COLOR 1:PLOT 32,2:DRAWTO 32,20
100 COLOR 2:PLOT 22,2:DRAWTO 22,20
110 COLOR 3:PLOT 12,2:DRAWTO 12,20
119 REM SET PMBASE
120 POKE 54279,PAGES
129 REM SET DMACTL
130 POKE 559,46
139 REM SET GRACLT
140 POKE 53277,2
149 REM PLAYER 0 COLOUR
150 POKE 704,14
159 REM SET HORIZONTAL POSITION
160 HPOSP0=53248
169 REM SET PRIORITY
170 POKE 623,4
179 REM MOVE PLAYER+CHECK COLLISIONS
180 FOR T=190 TO 40 STEP -1
190 POKE HPOSP0,T
200 ? "COLLISION" *PEEK(53252)
209 REM RESET USING HITCLR
210 POKE 53278,1
220 NEXT T
229 REM LOOP ENDLESSLY
230 GOTO 180

```

Listing 4.

```

0 REM LISTING 4 PM VERT MOVE ROUTINE
10 GOSUB 25150:REM INSTALL VERT MOVE ROUTINE
20 POKE 106,40:REM RESERVE RAM FOR TABLE
30 ? "V" *POKE 752,1:POKE 710,6:POKE 709,0:REM
  CLEAR SCREEN

```

(continued on page 131)

pidly
thout
od to
ions.
ains
cs.
there
e of
lings
tally
fear,
time
the
quite

P/M
a of
Basic
high
tion
256
In
fool
ory
safe

els,
two
—
—
and
will

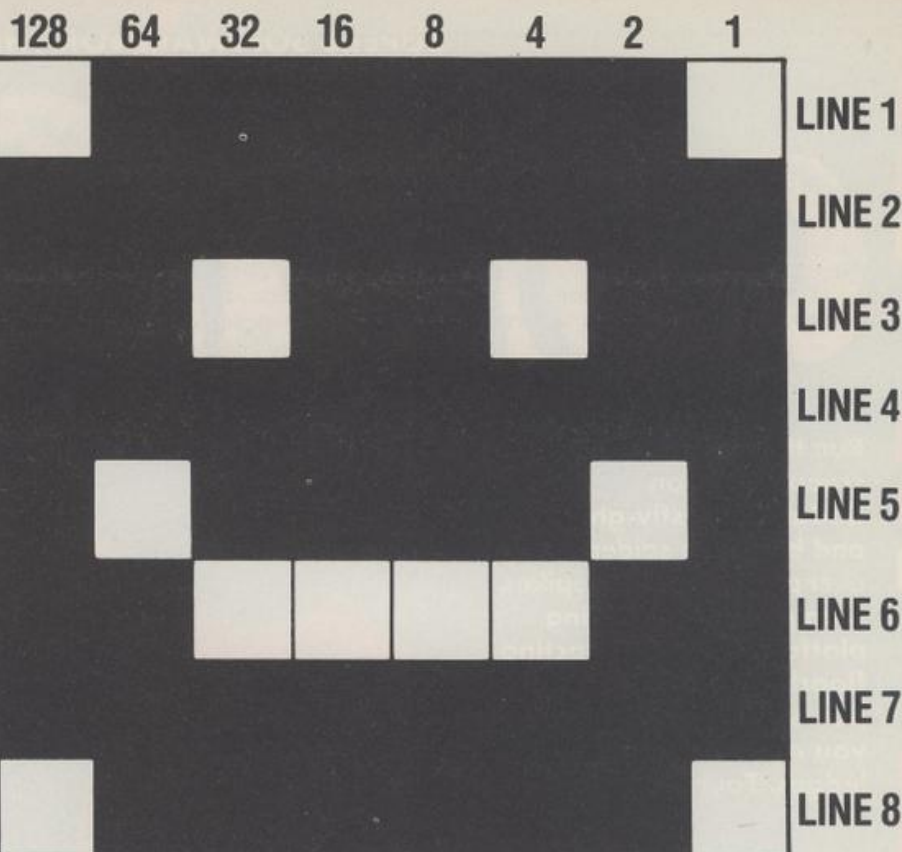
use. Double resolution uses less memory — 1K in total for all four players — and is faster to animate, but its resolution or image quality is poorer.

The single resolution players use 2K of memory, are slower to move out have a better quality image. For the sake of argument, I will discuss double resolution and point out where details differ between the two types. So, we need to set aside 1K of memory for the player missile table. This 1K is equal to four pages of memory — $4 \times 256 = 1024 = 1K$ — hence: $A = \text{PEEK}(106) - 4 : \text{POKE } 106, A (-8 \text{ for single resolution})$

will “hide” our P/M table from Basic. We then must tell the computer, actually the Antic video chip, exactly where in memory our table is located. Location 54279 is called the Player Missile Base Address Register — PMBase. Using our previously defined variable A, give the instruction,

POKE 54279,A

This is in fact just the start address of the table, and figure 1 shows how each of the players and missiles are located in the table. You will notice that the Player areas do not start until half way down the table. The first 384 bytes — 768 for single resolution — are unused, but can make a valuable place for storing machine code routines or tables of data as Basic leaves all areas above PMBase untouched.



ANIMATION

Locations 384-512 in the table are the Missile definitions. The next step after making your table secure is to clear the areas to be used. On many computers, when you turn them on much of the memory is filled with random numbers.

This will affect the Player image and so they must be cleared. You do not need to clear all of the table, just the parts you are going to use. For example, if you are only going to use the first 2 players, the instructions would read something like,

```
FOR T = A*256 + 512 TO
A*256 + 768
POKE T,0
NEXT T
```

The definition of the player's image is perhaps the most difficult part to grasp straight away, but is crucial to fully exploiting player/missile animation. Examine figure 2 which gives a simple Player definition. All players are eight bits wide and I have made this one eight bits high. The definition runs from top to bottom: Each horizontal line — eight bits wide always — has its “on” bits coloured.

These bits are then added up from left to right according to the Binary number system. So each horizontal “slice” of the definition ends up having a number to define it. Each of these bytes is then Poked into the relevant

section in the P/M table. These “bit maps” have to be positioned in each section according to the vertical position on the TV.

If you put the definition at the start of the section of the table, the image will appear at the very top of the TV screen. Place your definition in the centre of the table and it will appear in the centre of the screen, and so on.

As an example. If the beginning of Player 0 section of the table in memory is given by the variable START, and we want to place the image 10 dots from the top of the screen, we would have

```
FOR T = START + 10 TO START + 10 + 7
READ N
POKE T,N
NEXT N
DATA 126,255,219,255,189,195,255,126
```

The players can be placed, or moved about anywhere within their own section, and this is how vertical motion is achieved, but it is up to the programmer to make sure that they do not move into another player's area. Horizontal motion is very much easier. Each player has a Horizontal Position Register — HPOSPO to HPOSP3. To move Player 0 from left to right, simply increase the number in location 53248.53249-51 to cover the other players. The colours of the players and missiles are read from 704-707. The colours follow the standard Atari colour numbers:

POKE 704,COLOUR*16 + LUMINANCE

where Colour = 0 to 15 and Luminance = 0 to 15.

Each player also has a Size register (53256-59). 0 = Normal width, 1 = Double width and 3 = Quadruple width. Experiment with this to see its effect.

The missiles mentioned before behave in most respects like miniature players. They are only two bits wide. They have their own horizontal position registers, but take the colour of their associated player, and have only one size register, making all four missiles the same width.

When using PM graphics, one drawback is that the Antic video chip “steals” time from the main 6502 chip to move and display them. This means that when P/M are in use all other functions will slow down slightly. Consequently, Atari has made the use of P/M optional. Two auxiliary registers are used to switch P/M graphics on and off. Graphics Control Register — GRCTL — and Direct Memory Access Control Register — DMACTL. These must be enabled before P/M can be used. A list of the various Pokes and their effect are given in figure 3. A summary of the other P/M Registers is given in figure 4.

(continued on page 131)

SUPERB SOFTWARE FOR THE

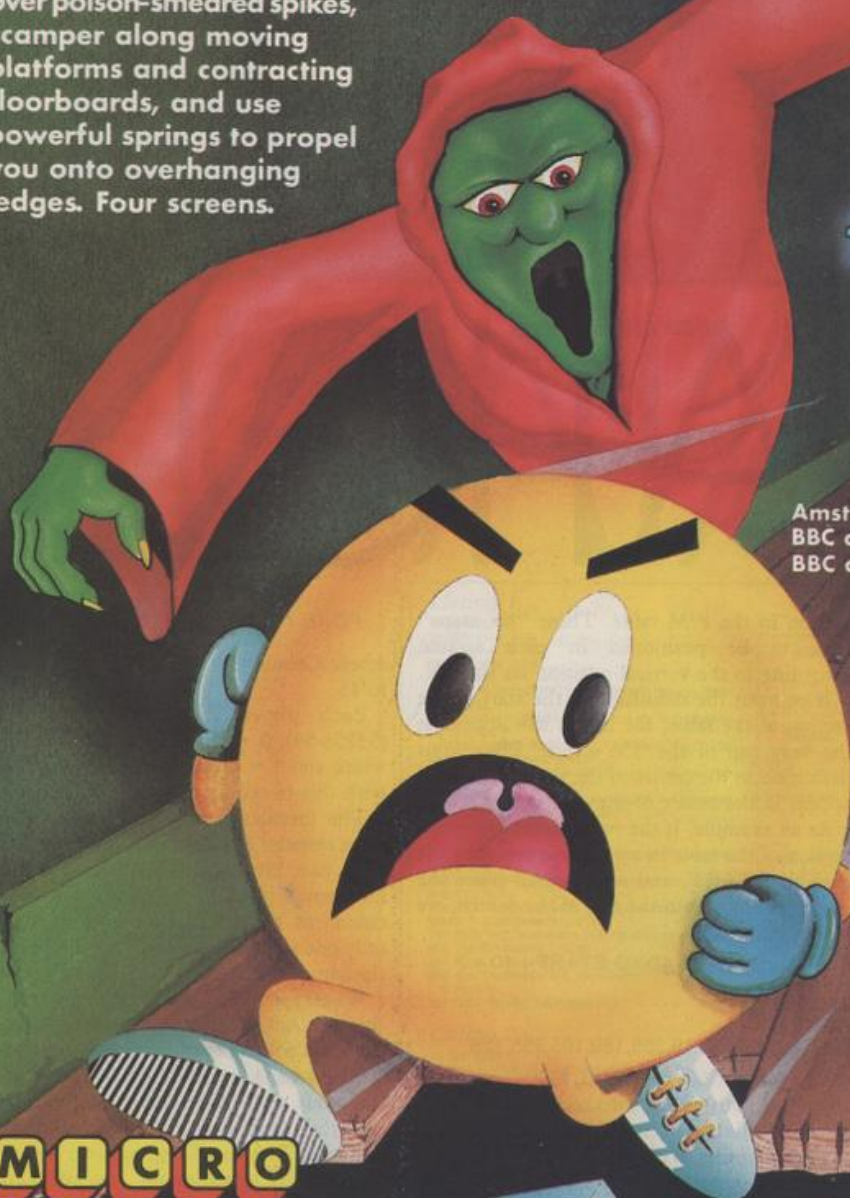
AMSTRAD

SUPER-FAST LOADING TIME
Commodore 64

electron
B.B.C. MICRO

GHOULS

Run through the creepy mansion dodging ghostly ghouls and bouncing spiders. Leap over poison-smeared spikes, scamper along moving platforms and contracting floorboards, and use powerful springs to propel you onto overhanging ledges. Four screens.



Amstrad and Commodore versions £6.95
BBC and Electron versions £7.95
BBC and Commodore Disk price £9.95



Amstrad version

**WATCH OUT
FOR OUR NEW
PACKAGING AND
CATALOGUE**



**MICRO
POWER**

MICRO POWER LTD.,
NORTHWOOD HOUSE, NORTH STREET,
LEEDS LS7 2AA TEL: (0532) 468800
SELECTIVE BRANCHES OF BOOTS, CO-OP,
MENZIES, W. H. SMITH, WOOLWORTHS AND ALL
GOOD DEALERS.
AUTHORS! WE PAY 20% ROYALTIES!

(con
O
grap
of a
is th
occur
any
color
the
app
ha
coll
L
wor
line
win
dete
is a
kno
P
ano
mis
pass
obje
attr
sett
of
regi
seve
you
F
play
win
colo
regi
com
play
long
and
to us
prog
coll
have
HIT
Ju
sets.
Ove

(lis

35 P
17
40 P
50 P
46 P
60 P
45 P
70 P
80 P
90 P
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
360
370
380
390
400
410
420
430
440
450
460
470
480
490
500
510
520
530
540
550
560
570
580
590
600
610
620
630
640
650
660
670
680
690
700
710
720
730
740
750
760
770
780
790
800
810
820
830
840
850
860
870
880
890
900
910
920
930
940
950
960
970
980
990
1000

(continued from page 129)

One of the most useful qualities that P/M graphics offers to games programmers is that of automatic "collision detection". Collision is the name given when any player or missile occupies the same position on the screen as any other Player, Missile or any of the screen colours — playfield. When a collision occurs the computer automatically sets the appropriate register and all the programmer has to do is Peek that register to see if the collision has occurred.

Listing 3 shows this collision detection at work by moving player 0 across 3 vertical lines drawn in different colours. The text window shows the state of the collision detection register. Also shown in this program is another very powerful P/M technique known as Priority.

Priority means that when a Player and another object collide — either another player, missile or playfield colour — it will appeal to pass either behind or in front of the other object. Used properly this can make a very attractive tool. A list of some of the priority settings is given in figure 5. Figure 6 gives all of the Collision Detection Registers. The register you are scanning may give one of several values, depending on which object your player has collided with.

For Example, location 53252 — PO to playfield — is the register displayed in the text window in listing 3, and depending which coloured bar the player is in contact with the register will contain a different value. A complete list of all possible collisions of players, missiles and playfield colours is too long to publish here, but experiment yourself and you will find that perhaps you only need to use a couple of registers depending on what program you are using them in. When a collision has occurred all collision registers have to be reset by Poking any number into HITCLR location 53278.

Just a word on the difference between TV sets. All TVs are subject to a thing called Overscan. This means that all TV pictures are

not centred perfectly — particularly among the cheaper makes — and is the reason why all computers designed to be used with TVs and not exclusively monitors have a border around the screen. Player Missile graphics are not restricted to the main screen area and can go beyond the border.

This means that of all the combinations of the horizontal registers only the positions 40-190 will be visible on the screen. Take care that if you are writing software that will be used by other people on differing screens, not to use the areas of screen beyond the normal borders for playfield graphics or text, for if their TV is different from yours, they may miss the images off to one side of their screen. Happily, a good use can be put to Overscanning.

If you execute any Graphics instructions after setting up your P/M graphics you will have to reset PMBase, GRACtl and DMACTL. This only takes a very short time, but can cause an annoying "flicker" from any player or Missile on the screen. This is solved by setting the Horizontal positions of the players and missiles so that they are off the visible screen area while you reset Graphics modes and the auxiliary registers.

Only one problem remains to speed P/M animation from basic vertical movement. To animate vertically we need to move the whole bit map of the player or missile higher — down the screen — or lower — up the screen — within its relevant section in the Player Missile table.

A machine-code subroutine is the only way of achieving this speed. Such a routine is listing 4. This can be integrated into your own programs, and movement is achieved by passing variables through a USR command.

Finally, listing 5 gives a player editor program. This allows you to design a player up to 20 bits high using a joystick in port 1. Colour, resolution — single or double — and width are all changeable from the function keys, allowing you to see exactly how the player will look on the screen. Data from the

image is given to include in your own program. Instructions are in the program.

Listing 4 is only equipped to deal with one player at a time. Embedded in the routine is an address which assumes that the player section of the table starts at 15872. This is equivalent to the highest place in memory that a 16K machine can place a double resolution player 0. To accommodate a different player and/or a different amount of RAM, 12 numbers have to be changed.

Add the short Basic routine below to your program and call this routine whenever you wish to change the player that you are moving vertically. Three variables need to be passed on to the routine. Start being the beginning of the entire P/M table in memory. Player being the player number you wish to use — 0, 1, 2 or 3. Res is 0 for double resolution and 1 for single. The routine can be placed anywhere in your program and called by a Gosub command, and ending the routine with a Return command — see figure 7.

There are two places to call the machine-code routine from.

To move down the screen (up in memory) call
A = USR(1536, LENGTH, HEIGHT, SPEED)

To move up the screen (down in memory) call
A = USR(1588, LENGTH, HEIGHT, SPEED)

The three variables Length, Height and Speed must be updated by the user's Basic program.

Length is the number of bytes in the player definition.

Height is the number of bytes offset from the start of the players section in the table, to the actual start of the player.

Speed is the number of points or spaces to move the player up or down in any one call. Length and Speed will probably remain constant throughout a program, though they need not. But every time a vertical move is made, the Height variable must be updated.

A = USR(1536, LENGTH, HEIGHT, SPEED): HEIGHT = HEIGHT + SPEED
or A = USR(1588, LENGTH, HEIGHT, SPEED): HEIGHT = HEIGHT - SPEED

(listing 4 continued from page 129)

```
35 POSITION 0,10:7 "INSERT JOYSTICK INTO PORT
11:7 "UP PLAYER:7 "DOWN PLAYER"
40 START=60256+POSTART+512
50 FOR T=PO TO PO+120:POKE T,0:NEXT THEN CLE
AR PLAYER:0 AREA
60 HEIGHT=0:HEIGHT=5:LENGTH=8
65 RESTORE 90
70 FOR T=PO+HEIGHT TO PO+HEIGHT+7
80 READ A:POKE T,A:NEXT THEN DEFINE PLAYER 0
90 DATA 126,255,219,255,189,195,255,126
100 POKE 54279,POSTART/256
110 POKE 53277,2
120 POKE 559,42
130 POKE 53248,100
140 POKE 704,14
150 A=STICK(0):IF A=15 THEN 150
160 IF A=13 THEN A=USR(1536,LENGTH,HEIGHT,SPE
ED):HEIGHT=HEIGHT+SPEED
170 IF A=14 THEN A=USR(1588,LENGTH,HEIGHT,SPE
ED):HEIGHT=HEIGHT-SPEED
180 POSITION 0,0:7 "HEIGHT":HEIGHT: " "GOTO
150
2150 REM DATA FOR P/M VERT MOVE ROUTINE
2151 REM EVERY OCCURRENCE OF 0,62 IS THE ADDR
ESS OF PLAYER 0 SECTION OF THE TABLE
2152 REM SINCE 624256=60*15872
2153 RESTORE 21510
2155 FOR T=1536 TO 1630:READ A:POKE T,A:NEXT
T
2160 DATA 104,104,104,133,203,104,104,133,20
4,104,104,133,203,165,204,24,101,203,133,204,
198,204
2161 DATA 164,204,189
2162 DATA 0,62
2163 DATA 133,206,169,0,153
2164 DATA 0,62
2165 DATA 165,206,166,205,200,202,208,232,15
3
2166 DATA 0,62
2167 DATA 198,204,198,203,208,227,96
2168 DATA 104,104,104,133,203,104,104,133,20
4,104,104,133,203,164,204,189
2169 DATA 0,62
2170 DATA 133,206,169,0,153
2171 DATA 0,62
2172 DATA 165,206,166,205,136,202,208,252,15
3
2173 DATA 0,62
25174 DATA 230,204,198,203,208,227,96
25175 RETURN
Listing 5.
10 REM *****
20 REM ** ATARI SPRITE EDITOR **
30 REM ** (C) 1983 PAT NEVISON **
40 REM *****
50 GOSUB 10000:REM SET UP VARIABLES
60 GOSUB 11000:REM DRAW SCREEN+BITMAP
70 POKE 53248,10
100 REM MAIN EDITOR LOOP
105 POSITION COL,0:7 "POSITION 24,ROW:7 "
110 ST=STICK(0):S=S+STICK(0)
120 IF ST=15 AND S=1 THEN 200:REM GOTO SCAN
CONSOLE KEYS
130 GOTO 300:REM JOYSTICK EDITING
200 CON=PEEK(53279):IF CON=7 OR CON=6 THEN 10
:REM NO CONSOLE KEY PRESSED
205 POSITION 2,2:7 "JUST A SECOND...":GOSUB 1
3000:REM UPDATE PMDATA
210 IF CON=3 THEN POKE 53248,180:GOSUB 20000:
REM OPTION PRESSED GOTO VIEW MENU
220 IF CON=5 THEN 1000:REM NOT SELECT
230 ? "3:7 " PLAYER DATA BYTE NUMBER"
240 FOR T=1 TO 20:7 " "ASC(PMDATA(T
,T)):" "
250 NEXT T
260 ? 7:7 " PRESS SPACE TO RETURN TO EDITOR":
270 POKE 764,255
280 IF PEEK(764)+255 THEN 280
290 GOSUB 11000:GOTO 100
300 REM JOYSTICK EDITING
310 IF ST=5 OR ST=6 OR ST=9 OR ST=10 THEN 100
315 IF ST=9 THEN 400
320 POSITION COL,0:7 " "POSITION 24,ROW:7 "
"
330 IF ST=14 THEN ROW=ROW-1:(ROW<3)
340 IF ST=13 THEN ROW=ROW-1:(ROW<20)
350 IF ST=11 THEN COL=COL-1:(COL<28)
360 IF ST=7 THEN COL=COL-1:(COL<353)
370 POSITION COL,0:7 " "POSITION 24,ROW:7 "
380 GOTO 100
400 REM FILL CURSOR
410 LOCATE COL,ROW:DOT:IF DOT=160 THEN POSITI
ON COL,ROW:7 " "GOSUB 16000:GOTO 100:REM ERA
SE DOT FROM BIT MAP
420 LOCATE COL,ROW:DOT:IF DOT=32 THEN POSITI
ON COL,ROW:7 " "GOSUB 17000:GOTO 100:REM FILL
DOT ON BIT MAP
10000 REM SET UP VARIABLES
10010 PMBASE=64:POKE 106,PMBASE:GRAPHICS 0:PO
KE 710,0:POKE 752,1
10015 POSITION 12,12:7 "INITIALISING..."
10020 DIM PMDATA(25):COL=27:ROW=2
10030 DIM PPM(180):PPM= " "PPM(159)= " "PPM(2
)=PPM
10040 GOSUB 13000:REM CHANGE PPM TO PMDATA
10050 HP=180:COLPO=54:RES=1
10060 CL=3:LM=10:SIZE=0
10070 VALDMACTL=PEEK(559)+8+(RES*16-16)
10080 GOSUB 15000:REM SET UP PM DISPLAY
10200
11000 REM CLEAR SCREEN SET UP BIT MAP
11005 ? "3:7 "POKE 710,0
11010 POKE 82,25:POKE 83,26:POSITION 25,2:7 "
0102030405060708091011121314151617181920":PO
KE 82,2:POKE 83,39
11020 POSITION 2,1:7 " "SPRITE EDITOR":7 "
"JOYSTICK CONTROLS"
11030 ? 7:7 " "UP CURSOR":7 " "DOWN CURSOR":7 "
"LEFT CURSOR":7 " "RIGHT CURSOR"
11035 ? 7:7 " "FILL/ERASE CURSOR"
11040 ? 7:7:7 " "OPTION-VIEW MENU":7:7 "SEL
ECT-LIST DATA"
11050 POSITION 27,1:7 "76543210"
11060 POKE 82,27:POKE 83,34:POSITION 27,2:7 P
"POKE 82,2:POKE 83,40
11070 RETURN
13000 REM CONVERT PPM TO PM DATA AND POKE TO
PM TABLE
13010 FOR T=0 TO 19
13020 PMDATA(T)=RES+13100:FOR N=1 TO 8
13030 READ A:IF PPM(T*8+N,180)= " " THEN PPM
COUNT=PMCOUNT+A
13040 NEXT N
13050 PMDATA(T+1,T+1)=CHR$(PMCOUNT)
13060 NEXT T
13070 RETURN
15100 DATA 128,64,32,16,8,4,2,1
15000 REM SET UP PM DISPLAY
15005 FOR T=PPMBASE+256+(SIZE*(RES-1)*512) TO
PPMBASE+256+(640+(RES-1840)):POKE T,0:NEXT T
15010 FOR T=1 TO 20
15020 POKE PMBASE+256+(576+(RES-1)*576))+T,A
SE(PMDATA(T,T))
15030 NEXT T
15040 POKE 54279,PMBASE:REM TELL ANTIC
15050 POKE 359,VALDMACTL:REM TELL DMACTL
15060 POKE 53277,2:REM TELL GRACtl
15070 POKE 704,COLPO:REM COLOUR
15080 POKE 53248,HP:REM HORIZ POS.
15090 RETURN
16000 REM ERASE POINT IN PPM
16010 PPM(COL-26+(ROW-2)*8),COL-26+(ROW-2)*
8)= " "FOR T=1 TO 10:NEXT T:RETURN
17000 REM FILL POINT IN PPM
17010 PPM(COL-26+(ROW-2)*8),COL-26+(ROW-2)*
8)= " "FOR T=1 TO 10:NEXT T:RETURN
20000 ? 7:7 "VIEW OPTION:7 "PRESS START TO
RETURN TO EDITOR"
20020 ? 7:7:7 "JOYSTICK CONTROLS:7:7 "UP C
LOUR:7:7 "DOWN COLOUR"
20030 ? 7:7 "DEC.LUMINANCE:7:7 "INC.LUMINANCE"
20040 ? 7:7:7 "OPTION-SIZE:7:7 "SELECT-RESOLUT
ION"
20050 ? 7:7:7 "CURRENT COLOUR NO. "COLPO:7
"CURRENT SIZE "SIZE:7 "CURRENT RESOLU
TION "
20055 GOSUB 15000
20060 ST=STICK(0):IF ST=15 THEN 20200
20070 IF ST=14 THEN CL=CL+1:(CL<14)
20080 IF ST=13 THEN CL=CL-1:(CL<1)
20090 IF ST=11 THEN LM=LM+1:(LM<14)
20100 IF ST=7 THEN LM=LM-1:(LM<16)
20110 CLPO=CL+LM*POKE 704,COLPO
20120 POSITION 22,17:7 "COLPO"
20130 FOR T=1 TO 50:NEXT T
20140 GOTO 20060
20200 CON=PEEK(53279):IF CON=7 THEN 20060
20210 IF CON=3 THEN 20300
20220 IF SIZE=3 THEN SIZE=0:GOTO 20290
20230 IF SIZE=1 THEN SIZE=3:GOTO 20290
20240 IF SIZE=0 THEN SIZE=1:GOTO 20290
20290 POKE 53256,SIZE:POSITION 22,18:7 "SIZE"
"FOR T=1 TO 50:NEXT T:GOTO 20060
20300 IF CON=6 THEN POKE 53248,10:GOTO 60
20310 IF CON=5 THEN 20060
20320 IF RES=1 THEN RES=2:VALDMACTL=VALDMACTL
+16:GOTO 20340
20330 VALDMACTL=VALDMACTL-16:RES=1
20340 POSITION 22,19:IF RES=1 THEN ? "DOUBLE
"
20350 IF RES=2 THEN ? "SINGLE "
20360 GOSUB 15000:GOTO 20060
```


1st London

BARGAINS GALORE

MICROMARKET

WEMBLEY CONFERENCE CENTRE NOV. 10TH & 11TH

Here's your chance to sweep up all your Microcomputer needs before Christmas, at London's first ever Micro Market.

- ★ Thousands of Hardware & Software Bargains!
- ★ Competitions and Prizes
- ★ Win a Personal Computer!
- ★ Bring & Buy Swap Shop!
- ★ Free Computer advice at our Computer Surgery

All leading makes of Micro including:

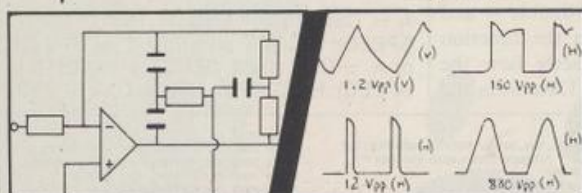
- ★ BBC
- ★ Commodore
- ★ Apple
- ★ Spectrum
- ★ QL
- ★ Oric
- ★ Printers
- ★ Peripherals
- ★ Joy Sticks
- ★ DIY Robots
- ★ Modems

OPEN 10am-6pm Sat. November 10th
10am-4pm Sun. November 11th
Adults £1.50 Under 14's 75p.
Including FREE
SHOW GUIDE

**MICROCOMPUTER BARGAINS
GALORE, LOWEST PRICES
IN TOWN, DON'T
MISS IT!!!**

Spectre

ENFIELD HOUSE
SWARDESTON
NORWICH
NORFOLK



ELECTRONICS

£ 9.95

DIGITAL CIRCUIT DESIGNER. Electronics allows you to draw your circuit diagram on screen using standard symbols for logic gates, transistors, resistors, capacitors, diodes, triacs, diodes, etc. Symbols can be rotated, wiring interconnected or crossed over as required. Once complete the computer will 'power up' your circuit - high voltage levels turn red, low levels turn green. Circuits can be de-activated, modified and re-activated until they function as required, all without touching a soldering iron! Part completed circuits may be saved for future work and displays can be sent to the printer. All components are fully interactive i.e. they can change the state of sections previously activated in the sequence - even oscillators can be seen oscillating. Warning is given of short-circuits. (57 defined graphics are employed)

LiNET



£ 14.95

LINEAR NETWORK ANALYSER. Characteristics of complete networks, including sub-circuits, are entered. The computer performs either time or frequency domain analyses, presenting the output data in any of a choice of forms, both graphical and written. The program detects the presence of a printer and, if connected, can produce detailed graphical displays by printing lengthways along the paper. Rapidly deals with highly complex networks - the instruction book provides numerous examples using transistors, I.C.s, bandpass filters, op amps, etc. An invaluable tool for both professional and amateur designers.

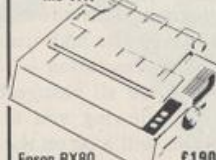
48 K SPECTRUM

DOT MATRIX

Epson RX80

£219

inc VAT



Epson

RX80 F/T

£255

inc VAT

Epson RX80	£190.43 + VAT	£219
Epson RX80 F/T	£221.74 + VAT	£255
Epson FX80	£329.57 + VAT	£379
Epson FX100	£511.30 + VAT	£588
KDC FT-5001	£203.48 + VAT	£234
Mannesmann Tally MT80	£195.65 + VAT	£225
Canon PW 1080A	£277.39 + VAT	£319
Star Delta 10	£317.39 + VAT	£365
(with Serial/Parallel 1F 8K Buffer)		
RS232 Interfaces from	£26.09 + VAT	£30
Printer Cables	£10.43 + VAT	£12

DAISYWHEEL



JUKI

6100

£375

inc VAT

JUKI 6100	£326.09 + VAT	£375
Daisy Step 2000	£216.52 + VAT	£249

PROCESSORS

BBC Model B	£320.87 + VAT	£369*
BBC B with DFS	£399.13 + VAT	£459
Amstrad CPC464	£139.13 + VAT	£160
6v power + UHF	£24.35 + VAT	£28
ISL 8083 (IBM Comp)	£1173.91 + VAT	£1350
DEC 11/23 40 MB	£6086.96 + VAT	£7000
DEC 11/73 170 MB	£10434.78 + VAT	£12000

PHONE FOR QUOTATION ON BESPOKE
ACCOUNTING SOFTWARE
INVOICING/LEDGERS/PAYROLL

*While stocks last

colour MONITORS



MicroVitec

1451/QL

£255

inc VAT

Amstrad CTM640	£146.96 + VAT	£169
Microvitec 1431	£169.57 + VAT	£195
1431 (RGB/PAL/AUDIO)	£195.65 + VAT	£225
Kaga Vision EX	£186.96 + VAT	£215
JVC 1302-1 (QL/BBC)	£169.57 + VAT	£195
Microvitec 1451/QL	£221.74 + VAT	£255
Microvitec 1451	£239.14 + VAT	£275
1451 (RGB/PAL/AUDIO)	£295.65 + VAT	£340
Kaga Vision II	£234.78 + VAT	£270
JVC 1302-2 (QL/BBC)	£220.00 + VAT	£253
Microvitec 1441	£433.91 + VAT	£499
Kaga Vision III	£321.74 + VAT	£370

mono MONITORS

Amstrad GT64	£60.00 + VAT	£69
Sanyo DM2112 (15 MHz)	£65.22 + VAT	£75
Sanyo DM8112CX (18 MHz)	£89.57 + VAT	£99
ISL 18 (18 MHz)	£53.91 + VAT	£62
ISL 20 (swivel 80 coll)	£63.48 + VAT	£73
Teco with Zoom	£91.30 + VAT	£105

microFAST
THE EXPERTS

Prices shown are for cash & carry sales and are correct at time of going to press in September





To help you create hand-crafted machine code for the QL Philip Holliday delves deep into the machine.

DISASSEMBLER

The QL Disassembler.

```

10 REMark Copyright P.A.Holliday 1984
100 MODE 4:CSIZE 1,0:CLS
110 INPUT("Start address?") !
first$:first=2*INT(convert(first$)/2)
120 INPUT("End address?") ! last$:last=convert(last$)
130 INPUT("output device?") ! o$
140 IF o$="" THEN o$="con_448x200a32x16_128"
150 OPEN#15,o$
160 INPUT("Name of file of data areas?") ! f$
170 IF f$<>"" THEN
180   OPEN_IN#14,f$:get_t
190 ELSE
200   t1=last+2:t2=t1
210 END IF
220 IF o$(1 TO 3)=="con" OR o$(1 TO 3)=="scr" THEN
CLS#15
230 address=first
240 REPEAT loop
250   IF address>last THEN EXIT loop
260   IF address=t2 THEN get_t
270   IF address >= t1 THEN
275     diss_data
280   ELSE
285     diss
290   END IF
295   address=address+2
300 END REPEAT loop
310 CLOSE#15:STOP
1000 DEFine PROCedure diss
  
```

(listing continued on next page)

FINALLY THE QL arrived. The first task seemed to be to write a disassembler so that I could both delve into the inner workings of the machine and crack some of the QDOS operating system calls, and also check hand-assembled machine-code programs entered as data for correctness by disassembling the result. There is as yet no assembler available. The result is presented here.

Next month I will present the first of a three-part series on 68000 machine code.

The 68008 instruction set is extremely regular, making the job of writing the disassembler a relatively straightforward one, both from the point of view of length of the resulting program and also from the time taken to test it. In fact the disassembler consists in the main of select statements — SuperBasic equivalent of the case or switch construct available in most structured languages — which breaks the opcode down until the actual instruction has been found, together with a set of functions which enable the whole of the instruction to be synthesised from the code.

Motorola mnemonics have been used throughout. A # character preceding a number indicates that it is immediate data; a \$ prefixing a number indicates that hex notation is being used. This disassembler presents all numbers in hex. A suffix of .B, .W or .L indicates that the instruction operates on byte (continued on next page)

68008 QL

(continued from previous page)

— 8 bits; word — 16 bits — or long word — 32 bits of data respectively.

After entering and saving the program it can be run. It prompts for the start and end addresses of the section of code to be disassembled. These addresses can be entered in

decimal, or in hex by prefixing the response with a \$. The letters A to F can be entered in upper or lower case.

Try a start address of \$168 which is where the QL initially starts execution. It will then prompt for the output device. Just hit Enter for output to the console or else the output device name, i.e., SER1 for output to a printer if you have one. The last prompt is for the name of a Microdrive file which contains pairs of addresses of start and end of blocks of text or data which should not be disassembled as instructions.

This file can be generated simply by opening it and printing addresses to it, and then closing it again. Alternatively you can use Quill to edit the contents of this file. However certain points must be borne in mind. There must be no empty lines, no header or footer and only one entry per line.

The file must be generated by using the

Quill Print command, and the installed print driver should not generate any preamble code. If you do not wish to specify a file containing text and data addresses hit Enter.

The assembly listing produced is in four fields. The address field — 5 bytes — and opcode field — 2 to 10 bytes — are both displayed in hex but without a \$ prefix. The instruction itself is next, followed by an error message which is given if an illegal or unimplemented instruction is found. Note that the error-checking in this disassembler is by no means exhaustive.

For those of you who do not have the energy to type out the program the author is prepared to copy it onto your supplied Microdrive cartridge. Please state whether the cartridge is formatted or not and include £2.00 to cover postage, packing and time. Send it to Philip Holliday, 44 Lennard Road, London SE20 7LX.

(listing continued from previous page)

```
1010 instr=PEEK_W(address):IF instr<0 THEN
instr(instr+65536)
1020
addr$=address$(address):obj$=word$(instr):er$=""
1030 instr_type=INT(instr/4096):LET
opfield=instr-instr_type*4096
1040 SELECT ON instr_type
1050 =0:op$=bit_man$
1060 =1:op$=move$(0)
1070 =2:op$=move$(2)
1080 =3:op$=move$(1)
1090 =4:op$=misc$
1100 =5:op$=add_sub$
1110 =6:op$=branch$
1120 =7:op$=moveq$
1130 =8:op$=or_div$
1140 =9:op$=sub_subx$
1150 =11:op$=cmp_eor$
1160 =12:op$=and_mul$
1170 =13:op$=add_addx$
1180 =14:op$=shift_rot$
1190 =REMAINDER:op$="":er$=er$ & "unassigned op
code"
1200 END SELECT
1210 PRINT#15,addr$ ! obj$ TO 27; op$ ! er$
1220 END Define diss
5000 Define FuNction hex$(a)
5010 RETURN CHR$(a+48+7*(a>9))
5020 END Define hex$
5030 Define FuNction address$(x)
5040 LOCAL y
5050 y=INT(x/65536)
5060 RETURN hex$(y) & word$(x-65536*y)
5070 END Define address$
5080 Define FuNction word$(x)
5090 LOCAL y,z
5100 z=x
5110 IF z<0 THEN z=z+65536
5120 y=INT(z/256)
5130 RETURN byte$(y) & byte$(z-256*y)
5140 END Define word$
5150 Define FuNction byte$(x)
5160 LOCAL x%
5170 x%=x-256*INT(x/256)
5180 RETURN hex$(x% DIV 16) & hex$(x% MOD 16)
5190 END Define byte$
5200 Define FuNction eff_addr$(eff_mod,reg,size)
5210 LOCAL x
5220 SELECT ON eff_mod
5230 =0:RETURN "D" & reg
5240 =1:RETURN "A" & reg
5250 =2:RETURN "(A" & reg & ")"
5260 =3:RETURN "(A" & reg & "+)"
5270 =4:RETURN "-(A" & reg & ")"
5280 =5:RETURN "$" & s_word$(advance) & "(A" & reg
& ")"
5290 =6:x=advance
5300 IF x < 0 THEN
5310 d_a$="A"
5320 ELSE
5330 d_a$="D"
5340 END IF
5350 IF x && 2048
5360 w_l$=".L"
5370 ELSE
```

```
5380 w_l$=".W"
5390 END IF
5400 RETURN "$" & s_byte$(x) & "(A" & reg & ", " &
d_a$ & (INT(x/4096) MOD 8) & w_l$ & ")"
5410 =7:SELECT ON reg
5420 =0:RETURN "$" & word$(advance)
5430 =1:RETURN "$" & word$(advance) &
word$(advance)
5440 =2:x=advance:RETURN "$" &
address$(address+x)
5450 =3:x=advance
5460 IF x<0
5470 d_a$="A"
5480 ELSE
5490 d_a$="D"
5500 END IF
5510 IF x && 2048
5520 w_l$=".L"
5530 ELSE
5540 w_l$=".W"
5550 END IF
5560 RETURN "$" & s_byte$(x) & "(PC," & d_a$ &
(INT(x/4096) MOD 8) & w_l$ & ")"
5570 =4:RETURN immediate$(size)
5580 =REMAINDER:er$=er$ & "eff addr
error":RETURN ""
5590 END SELECT
5600 END SELECT
5610 END Define eff_addr$
5620 Define FuNction source_ea$(size)
5630 LOCAL x,y
5640 x=opfield DIV 8 MOD 8:y=opfield MOD 8
5650 RETURN eff_addr$(x,y,size)
5660 END Define source_ea$
5670 Define FuNction dest_ea$(size)
5680 LOCAL x,y
5690 x=opfield DIV 64 MOD 8:y=opfield DIV 512
5700 RETURN eff_addr$(x,y,size)
5710 END Define dest_ea$
5720 Define FuNction size$
5730 LOCAL x
5740 x=opfield DIV 64 MOD 4
5750 SELECT ON x
5760 =0:RETURN ".B"
5770 =1:RETURN ".W"
5780 =2:RETURN ".L"
5790 =REMAINDER:er$=er$ & "error in size
field":RETURN ""
5800 END SELECT
5810 END Define size$
5820 Define FuNction condition$
5830 LOCAL x
5840 x=opfield DIV 256 MOD 16
5850 SELECT ON x
5860 =0:RETURN "T"
5870 =1:RETURN "F"
5880 =2:RETURN "HI"
5890 =3:RETURN "LS"
5900 =4:RETURN "CC"
5910 =5:RETURN "CS"
5920 =6:RETURN "NE"
5930 =7:RETURN "EQ"
5940 =8:RETURN "VC"
5950 =9:RETURN "VS"
5960 =10:RETURN "PL"
```

(continued on page 136)

What the competition hasn't been waiting for.

Latest version of Forth for the BBC
(Is not rehashed Forth 79 Code)

Unique Stack Display Utility



16k Eprom type 27128

Multi-tasking operating system
for Real-Time use.

Here's the Forth Eprom for the BBC Micro that makes all others out of date.

It's Multi-Forth 83 from David Husband who has built his reputation for Quality Forth products with his ZX81-Forth ROM, Spectrum Forth-I/O Cartridge and now New Multi-Forth 83 for the BBC Micro. This is not rehashed Forth 79 Code, but a completely new version of the Forth 83 Standard. It's unique in that it Multi-tasks, and therefore the user can have a number of Forth programs executing simultaneously and transparently of each other.

Multi-Forth 83 sits in the sideways ROM area of the BBC along with any other ROMs in use. It is compatible with the MOS, and specially vectored to enable a system to be reconfigured. It contains a Standard 6502 Assembler, a Standard Screen Editor, and a Unique Stack Display Utility.

With this Forth, David Husband has provided the BBC Micro with capabilities never before realised. And being 16K rather than 8K is twice the size of other versions. Multi-Forth 83 is supplied with an

extensive Manual (170 pages plus) and at £45+VAT it is superb value.

Order it using the coupon adding £2.30 p&p (£5 for Europe, £10 outside) or if you want more information, tick that box instead. Either way, it will put you one step ahead of the competition.

Please send me Multi-Forth 83 for BBC Micro. £45+VAT. De-luxe System inc. Disc £80+VAT. Cheques to Skywave Software Readers' A/C (or enter Visa No.)

Name _____

Address _____

Post code _____

SUBJECT TO AVAILABILITY: FOR 100.50 ONWARDS.

Send to Skywave Software, 73 Curzon Road, Bournemouth, BH1 4PW, Dorset, England. Tel: (0202) 302385

Please send me more information:

☐ Multi-Forth 83

☐ ZX81-Forth ROM

☐ Spectrum Forth-I/O Cartridge

**Skywave
SOFTWARE**

MULTI-FORTH 83 FOR THE BBC MICRO

IT TRANSFORMS THE HOME COMPUTER OUT OF ALL RECOGNITION

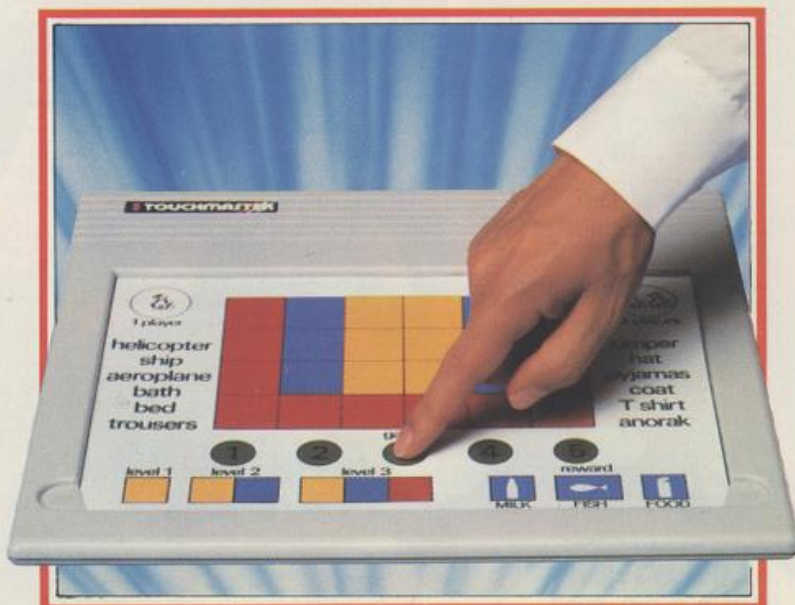
Because Touchmaster is a touch sensitive surface which effectively bypasses the keyboard, it has none of the keyboard's complications, typing skill requirements or potential errors.

To operate Touchmaster, you simply slide an overlay onto its surface, load the matching Touchware into your computer and touch the overlay.

For repeatability and resolution, no other ostensibly comparable pads can touch Touchmaster.

In fact, Touchmaster's unique technology makes it state of the art when it comes to such pads.

Other pads might fairly be described as peripherals. Touchmaster goes a lot further: it respecifies the home computer.



Now anyone can master the home computer

TOUCHMASTER

For full details, contact Touchmaster Limited, PO Box 3, Port Talbot, West Glamorgan SA13 1WH, or phone Teledata (01) 200 0200


```

5970      =1:Return "M"
5980      =12:Return "GE"
5990      =13:Return "LT"
6000      =14:Return "GT"
6010      =15:Return "LE"
6020  END Select
6030  END Define condition$
6040  Define Function displ$
6050    Local x
6060    x=opfield MOD 256
6070    IF x<0 THEN
6080      IF x>127 THEN LET x=x-256
6090      Return "*" & address$(address + x + 2)
6100    ELSE
6110      x=advance
6120      Return "*" & address$(address + x)
6130    END IF
6140  END Define displ$
6150  Define Function dat$
6160    Local x
6170    x=opfield DIV 512
6180    IF x=0 THEN x=8
6190    Return "*" & x
6200  END Define dat$
6210  Define Function displ64$
6220    Return "*" & address$(address + advance)
6230  END Define displ64$
6240  Define Function immediate$(size)
6250    Local x,y
6260    x=advance
6270    Select ON size
6280      ON size=0
6290        x=x MOD 256
6300        IF x < 128 THEN
6310          Return "*" & byte$(x)
6320        ELSE
6330          END IF
6340      ON size=1
6350        IF x>=0 THEN
6360          Return "*" & word$(x)
6370        ELSE
6380          Return "*" & word$(2*16-x)
6390        END IF
6400      ON size=2
6410        IF
6420          IF y<0 THEN
6430            x=2*16-(x + NOT y)
6440            Return "*" & word$(x) & word$(y)
6450          ELSE
6460            Return "*" & word$(x) & word$(y)
6470          END IF
6480      REMAINDER 16-x & y "size field
6490  error"RETURN ""
6500  END Select
6510  END Define Immediate$
6520  Define Function type$
6530    Local x
6540    x=opfield DIV 64 MOD 4
6550    Select ON x
6560      =0:Return "TST"
6570      =1:Return "LHU"
6580      =2:Return "CLR"
6590      =3:Return "SET"
6600  END Select
6610  END Define type$
6620  Define Function sz$
6630    IF opfield 55 64 THEN Return "L"
6640    ELSE Return "W"
6650  END IF
6660  END Define sz$
6670  Define Function advance
6680    Local x
6690    address=address+2:IF FEEL_W(address)ob$=ob,
6700    word$(x)
6710  Return x
6720  Define Function direction$
6730    IF opfield 55 256
6740    Return "L"
6750    ELSE
6760    Return "R"
6770    END IF
6780  END Define direction$
6790  Define Function shift$
6800    Local x
6810    x=opfield DIV 512 MOD 4
6820    Select ON x
6830      =0:Return "AS"
6840      =1:Return "LS"
6850      =2:Return "RX"
6860      =3:Return "RD"
6870  END Select
6880  END Define shift$
6890  Define Function convert(string$)
6900    Local x,y,z:base
6910    = IF string$(1) < "S"
6920    base=10
6930    ELSE
6940    base=(string$=string$(2 TO
6950    END IF
6960    x=0
6970    FOR y=1 TO LEN(string$)
6980      z=CODE(string$(y))
6990      Select ON z
7000        =40 TO 127:z=z-48
7010        =65 TO 70:z=z-55
7020        =97 TO 102:z=z-87
7030      REMAINDER 1:PRINT "not acceptable number"
7040    END Select
7050    x=x*base + z
7060  END FOR y
7070  Return x
7080  END Define convert$
7090  Define Procedure diss_data
7100    word=FEEL_W(address)
7110    PRINT$(15,address$(address) + word):
7120  END Define diss_data
7130  Define Procedure get_t
7140    IF NOT EOF(14)
7150    INPUT #14,t1
7160    t1=last+2
7170    END IF
7180    IF
7190    IF NOT EOF(14)
7200    INPUT #14,t2
7210    ELSE
7220    t2=last+2
7230    END IF
7240    t1=2*INT(t1/2):t2=2*INT(t2/2)
7250  END Define get_t
7260  Define Function s_word$(x)
7270    Local y
7280    IF x<0
7290      y=2*16-x
7300      Return "-" & word$(y)
7310    ELSE
7320      Return word$(x)
7330    END IF
7340  END Define s_word$
7350  Define Function s_byte$(x)

```

```

7260 LOCAL y
7370 y=x&&255
7380 IF y>127
7390 RETURN ~y& byte&(256-y)
7400 ELSE
7410 RETURN byte&(y)
7420 END IF
7430 END DEFINE a_byte&
7440 DEFINE function multipl&
7450 LOCAL a&,x,y
7460 x=address
7470 a&="1150"
7480 IF opfield=2240 AND opfield<2247 THEN
xreverse&
7490 IF x<0 THEN x=x+2*16
7500 FOR i=0 TO 15
7510 y=y/4-INT(x/4)/34
7520 SELECT ON y
7530 +="11a&+&+CHRS(60-3&(1 DIV B))&+(1 MOD B)
7540 +21IF a&(C)="" THEN a&=a&+" "
7550 +31IF a&LEN(a&)>15 THEN a&=a&+
CHRS(60-3&(1 DIV B))&+(1 MOD B)&+" "
7560 END SELECT
7570 x=INT(x/2)
7580 END FOR i
7590 RETURN a&
7600 END DEF multipl&
7610 DEFINE function reverse&(x)
7620 LOCAL i,y,z
7630 y=0
7640 IF x<0 THEN x=x+2*16
7650 FOR i=0 TO 15
7660 z=INT(x)/2
7670 y=y+(x-INT(x))*2**(16-i)
7680 END FOR i
7690 IF x>2*15 THEN x=x-2*16
7700 RETURN y
7710 END DEFINE reverse
10000 DEFINE function move&(size)
10010 LOCAL n&
10020 a&="MOVE&";IF opfield DIV 64 MOD 8=1 THEN
a&="MOVEA"
10030 SELECT ON size
10040 +0RETURN n& & "B " & source_ea&(size) &
" " & dest_ea&(size)
10050 +1RETURN n& & "W " & source_ea&(size) &
" " & dest_ea&(size)
10060 +2RETURN n& & "L " & source_ea&(size) &
" " & dest_ea&(size)
10070 END SELECT
10080 END DEFINE move&
10090 DEFINE function branch&
10100 LOCAL x
10110 x=opfield DIV 256
10120 SELECT ON x
10130 +0RETURN "BRA " & displ&
10140 +1RETURN "BGR " & displ&
10150 +2REMAINDER:RETURN "B" & condition& & " " &
displ&
10160 END SELECT
10170 END DEFINE branch&
10180 DEFINE function add_sub&
10190 LOCAL v,size
10200 size=opfield DIV 64 MOD 4
10210 x=opfield DIV 8 MOD 64
10220 SELECT ON x
10230 +0TO 231RETURN "ADDQ" & size& & " " & data&
& & source_ea&(size)
10240 +32 TO 551RETURN "SUBQ" & size& & " " & data&
& & source_ea&(size)
10250 +25,571RETURN "DB" & condition& & " " & "D"
& & opfield MOD 16 & " " & displ&
10260 +2REMAINDER:RETURN "B" & condition& & " " &
source_ea&(0)
10270 END SELECT
10280 END DEFINE add_sub&
10290 DEFINE function move&
10300 LOCAL MOVE,MODE,SI
10310 a_byte&(opfield MOD 256) &
" " & opfield DIV 8
10320 END DEFINE move&
10330 LOCAL v,y,size
10340 x=opfield DIV 256
10350 size=opfield DIV 64 MOD 4
10360 SELECT ON x
10370 +0RETURN "ORI" & size& & " " &
immediate&(size) & " " & source_ea&(size)
10380 +21RETURN "ANDI" & size& & " " &
immediate&(size) & " " & source_ea&(size)
10390 +41RETURN "SUBI" & size& & " " &
immediate&(size) & " " & source_ea&(size)
10400 +61RETURN "ADDI" & size& & " " &
immediate&(size) & " " & source_ea&(size)
10410 +81RETURN "B" & type& & " " &
immediate&(size) & " " & source_ea&(size)
10420 +101RETURN "EORI" & size& & " " &
immediate&(size) & " " & source_ea&(size)
10430 +121RETURN "CMPI" & size& & " " &
immediate&(size) & " " & source_ea&(size)
10440 +2REMAINDER:IF opfield DIV 8 MOD 8
10450 SELECT ON y
10460 +11RETURN move&
10470 +2REMAINDER:RETURN "B" & type& & " " & "D"
& & opfield DIV 512 MOD 81 & " " & source_ea&(size)
10480 END SELECT
10490 END SELECT
10500 END DEFINE bit_wand&
10510 DEFINE function move&
10520 LOCAL x
10530 x=opfield DIV 64 MOD 8
10540 SELECT ON x
10550 +42RETURN "MOVE.W" & displ& & " " & "A" &
opfield MOD 81 & " " & " " & "D" & opfield DIV 5121
10560 +62RETURN "MOVE.L" & displ& & " " & "A" &
opfield MOD 81 & " " & " " & "D" & opfield DIV 5121
10570 +82RETURN "MOVE.W" & "D" & opfield DIV 5121
5121 & " " & displ& & " " & "A" & opfield MOD 81 & " " & "D"
10580 +72RETURN "MOVE.L" & "D" & opfield DIV 5121
5121 & " " & displ& & " " & "A" & opfield MOD 81 & " " & "D"
10590 END SELECT
10600 END DEFINE move&
10610 DEFINE function bloc&
10620 LOCAL v,size,t
10630 size=opfield DIV 64 MOD 4
10640 SELECT ON opfield
10650 +0TO 1911RETURN "NEG&" & size& & " " & "S" &
source_ea&(size)
10660 +192 TO 2551RETURN "MOV.S" & "S" &
source_ea&(1)
10670 +2192 TO 7031RETURN "CLR" & size& & " " & "S"
& source_ea&(1)
10680 +1024 TO 12151RETURN "NEG" & size& & " " & "S" &
source_ea&(size)
10690 +1216 TO 12791RETURN "MOVE.W" & "S"
& source_ea&(1) & " " & "C" & "D"
10700 +1536 TO 17271RETURN "NOT" & size& & " " & "S" &
source_ea&(1) & " " & "B"
10710 +1728 TO 17911RETURN "MOVE.W" & "S" &
source_ea&(1) & " " & "B"
10720 +2048 TO 21111RETURN "NECD.B" & "S" &
source_ea&(0)
10730 +2112 TO 21191RETURN "SWAP.D" & opfield MOD 81
10740 +2120 TO 21751RETURN "FEA.L" & "S" &
source_ea&(2)
10750 +2176 TO 21831RETURN "EXT.W.D" & opfield
MOD 81
10760 +2184 TO 22391RETURN "32AR" & 32001RETURN "MOVE.W"

```

```

828 & " " & multiplies & " " & source_eax(size-1)
10770 <<2240 to 2247:RETURN "EXT.L D" & (copfield
MOD B)
10780 <<2560 to 2751:RETURN "TST" & size& " " &
source_eax(size)
10790 <<2752 to 2915:RETURN "TAS.B " &
source_eax(size)
10800 <<3200 to 3327:RETURN "RETURN "MOVEM" &
eax & " " & source_eax(size-1) & " " & ts
10810 <<3648 to 3663:RETURN "TRAP # " & byte&
(copfield MOD B)
10820 <<3664 to 3671:RETURN "LINK A" & (copfield MOD
B) & " " & word&(advance)
10830 <<3672 to 3679:RETURN "URLK A" & (copfield MOD
B)
10840 <<3680 to 3687:RETURN "MOVE USP,A" &
(copfield MOD B)
10850 <<3688 to 3695:RETURN "MOVE A" & (copfield MOD
B) & " " & USP&
10860 <<3696:RETURN "RESET"
10870 <<37:RETURN "NOP"
10880 <<3696:RETURN "STOP " & immediate&()
10890 <<3699:RETURN "RTE"
10900 <<3701:RETURN "RTS"
10910 <<3702:RETURN "TRAP#"
10920 <<3703:RETURN "RTR"
10930 <<3712 to 3775:RETURN "JSR " & source_eax&()
10940 <<3776 to 3839:RETURN "JMP " & source_eax&()
10950 <<REMAINDER: <copfield DIV 64 MOD 4
10960 <<SEL:
10970 <<6:RETURN "CHK " & source_eax&() & " " & D" &
(copfield DIV 512)
10980 <<7:RETURN "LEA " & source_eax&(2) & " " & A" &
(copfield DIV 512)
10990 <<REMAINDER: term& & "error in misc
group":RETURN " "
11000 END SELECT
11010 END SELECT
11020 END DEFINE size&
11030 DEFINE Function sub_size&
11040 RETURN "SUB" & com_add_size&
11050 END DEFINE sub_size&
11060 DEFINE Function com_add_size&
11070 RETURN "ADD" & com_add_size&
11080 END DEFINE com_add_size&
11090 DEFINE Function com_add_size&
11100 LOCAL x,y,size
11110 <xopfield DIV B MOD 64
11120 size<opfield DIV 64 MOD 4
11130 SELECT ON x
11140 <<32,40,48:RETURN "X" & size& " " & "D" &
(copfield MOD B) & " " & D" & (copfield DIV 512)
11150 <<32,41,49:RETURN "X" & size& " " & "A" &
(copfield MOD B) & " " & "A" & (copfield DIV 512) & " "
11160 <<REMAINDER: <yopfield DIV 64 MOD B
11170 SELECT ON y
11180 <<0 to 2:RETURN " " & source_eax&(size) &
"D" & (copfield DIV 512)
11190 <<3:RETURN "A.W" & source_eax&(1) & " " & A" &
(copfield DIV 512)
11200 <<4 to 6:RETURN "D" & (copfield DIV 512) & " "
& source_eax&(size)
11210 <<7:RETURN "A.L" & source_eax&(2) & " " & A" &
(copfield DIV 512)
11220 END SELECT
11230 END SELECT
11240 END DEFINE com_add_size&
11250 DEFINE Function com_cop_size&
11260 LOCAL x,y,size
11270 <xopfield DIV 64 MOD 64size& MOD 4
11280 SELECT ON x
11290 <<0 to 2:RETURN "CMV" & size& " " & " " &
source_eax&(size) & " " & D" & (copfield DIV 512)
11300 <<3:RETURN "CPMA.W" & source_eax&(1) & " " & A" &
(copfield DIV 512)
11310 <<7:RETURN "CPMA.L" & source_eax&(2) & " " & A" &
(copfield DIV 512)
11320 <<REMAINDER: <yopfield DIV B MOD 64
11330 SELECT ON y
11340 <<32,41,49:RETURN "CMV" & size& " " & "A" &
(copfield MOD B) & " " & "A" & (copfield DIV 512) & " " & A" &
11350 <<4:RETURN "CMV" & size& " " & "D" &
(copfield DIV 512) & " " & "D" &
(copfield DIV 512) & " " & source_eax&(size)
11360 END SELECT
11370 END SELECT
11380 END DEFINE com_cop_size&
11390 DEFINE Function shift_rot&
11400 LOCAL x,y,z
11410 <xopfield DIV 64 MOD 4
11420 SELECT ON x
11430 <<3:RETURN shift & directions & size& & " " &
source_eax&()
11440 <<REMAINDER: <yopfield DIV 32 MOD 2
11450 SELECT ON y
11460 <<0:RETURN "DIV 512:if z=0 THEN let z=0
11470 <<1:RETURN shift & directions & size& & " " &
& z & " " & D" & (copfield MOD B)
11480 <<2:RETURN "DIV 512
11490 <<3:RETURN shift & directions & size& & " " &
& z & " " & D" & (copfield MOD B)
11500 END SELECT
11510 END SELECT
11520 END DEFINE shift_rot&
11530 DEFINE Function op_div&
11540 LOCAL x,y,size
11550 <xopfield DIV 64 MOD B
11560 SELECT ON x
11570 <<3:RETURN "DIVU " & source_eax&() & " " & D" &
(copfield DIV 512)
11580 <<7:RETURN "DIVS " & source_eax&() & " " & D" &
(copfield DIV 512)
11590 <<REMAINDER: <yopfield DIV B MOD 64size& MOD 4
11600 SELECT ON y
11610 <<0 to 23:RETURN "OR" & size& " " & " " &
source_eax&(size) & " " & D" & (copfield DIV 512)
11620 <<24:RETURN "ABCD B" & (copfield MOD B) & " " &
D" & (copfield DIV 512)
11630 <<33:RETURN "SBCD -A" & (copfield MOD B) & " " &
" " & A" & (copfield DIV 512) & " " & " "
11640 <<REMAINDER: <yopfield RETURN "OR" & size& " " & D" &
(copfield DIV 512) & " " & source_eax&(size)
11650 END SELECT
11660 END SELECT
11670 END DEFINE op_div&
11680 DEFINE Function and_mul&
11690 LOCAL x,y,y,size
11700 <xopfield DIV 64 MOD B
11710 SELECT ON x
11720 <<3:RETURN "MULU " & source_eax&() & " " & D" &
(copfield DIV 512)
11730 <<7:RETURN "MULS " & source_eax&() & " " & D" &
(copfield DIV 512)
11740 <<REMAINDER: <yopfield DIV B MOD 64size& MOD 4
11750 SELECT ON y
11760 <<0 to 23:RETURN "AND" & size& " " & " " &
source_eax&(size) & " " & D" & (copfield DIV 512)
11770 <<24:RETURN "ABCD B" & (copfield MOD B) & " " &
D" & (copfield DIV 512)
11780 <<33:RETURN "ABCD -A" & (copfield MOD B) & " " &
" " & A" & (copfield DIV 512) & " " & " "
11790 <<40:RETURN "EXG B" & (copfield DIV 512) & " " &
D" & (copfield MOD B)
11800 <<41:RETURN "EXG A" & (copfield DIV 512) & " " &
A" & (copfield MOD B)
11810 <<42:RETURN "EXG D" & (copfield DIV 512) & " " &
A" & (copfield MOD B)
11820 <<REMAINDER: <yopfield RETURN " " & size& " " & D" &
(copfield DIV 512) & " " & source_eax&(size)
11830 END SELECT
11840 END SELECT
11850 END DEFINE and_mul&

```


SUPER-FAST LOADING TIME
commodore 64
B.B.C. MICRO

BUMBLE BEE

A FANTASTIC NEW PROGRAM
FROM BRITAIN'S LEADING SOFTWARE HOUSE!

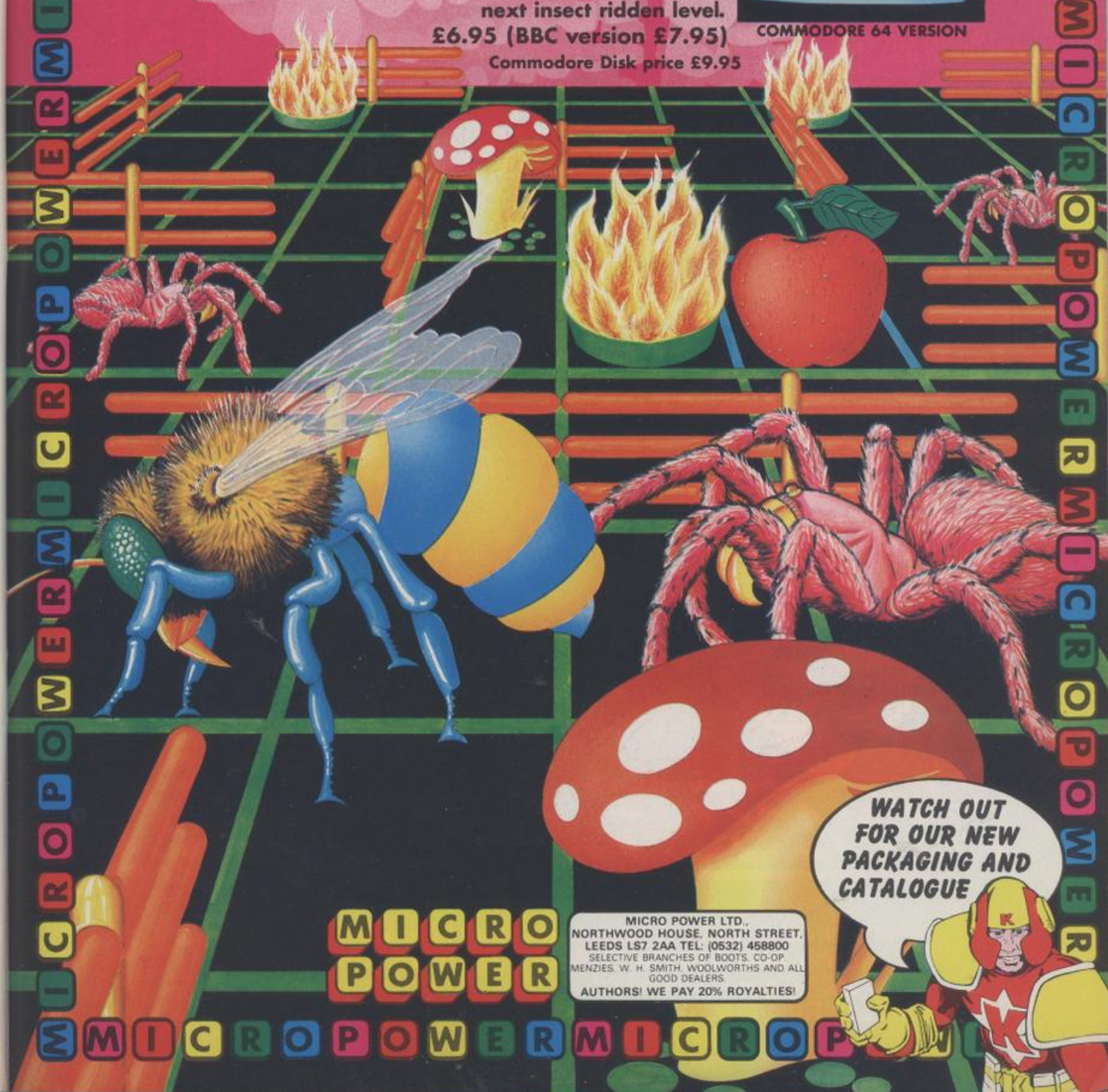
Fly the bee around
the grid avoiding the toadstools.
Spin the turnstiles to evade the spiders, or
coax them into the fireballs. Collect all the
pollen to slide back the exit doors to advance to the
next insect ridden level.

£6.95 (BBC version £7.95)

Commodore Disk price £9.95



COMMODORE 64 VERSION



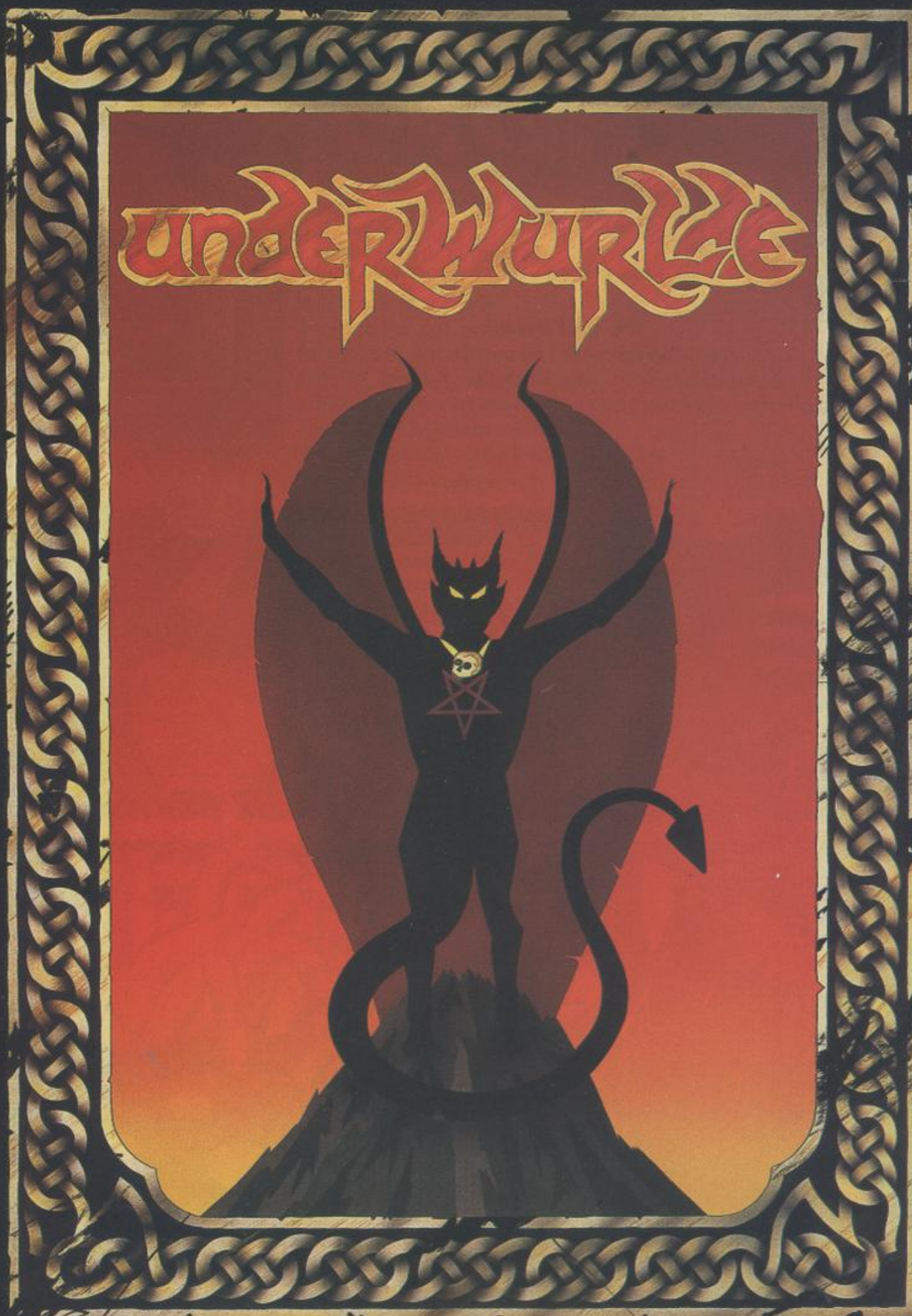
WATCH OUT
FOR OUR NEW
PACKAGING AND
CATALOGUE

MICRO
POWER

MICRO POWER LTD.,
NORTHWOOD HOUSE, NORTH STREET,
LEEDS LS7 2AA TEL: (0532) 458800
SELECTIVE BRANCHES OF BOOKS, CO-OP,
MENZIES, W. H. SMITH, WOOLWORTHS AND ALL
GOOD DEALERS.
AUTHORS! WE PAY 20% ROYALTIES!



48K SINCLAIR ZX SPECTRUM



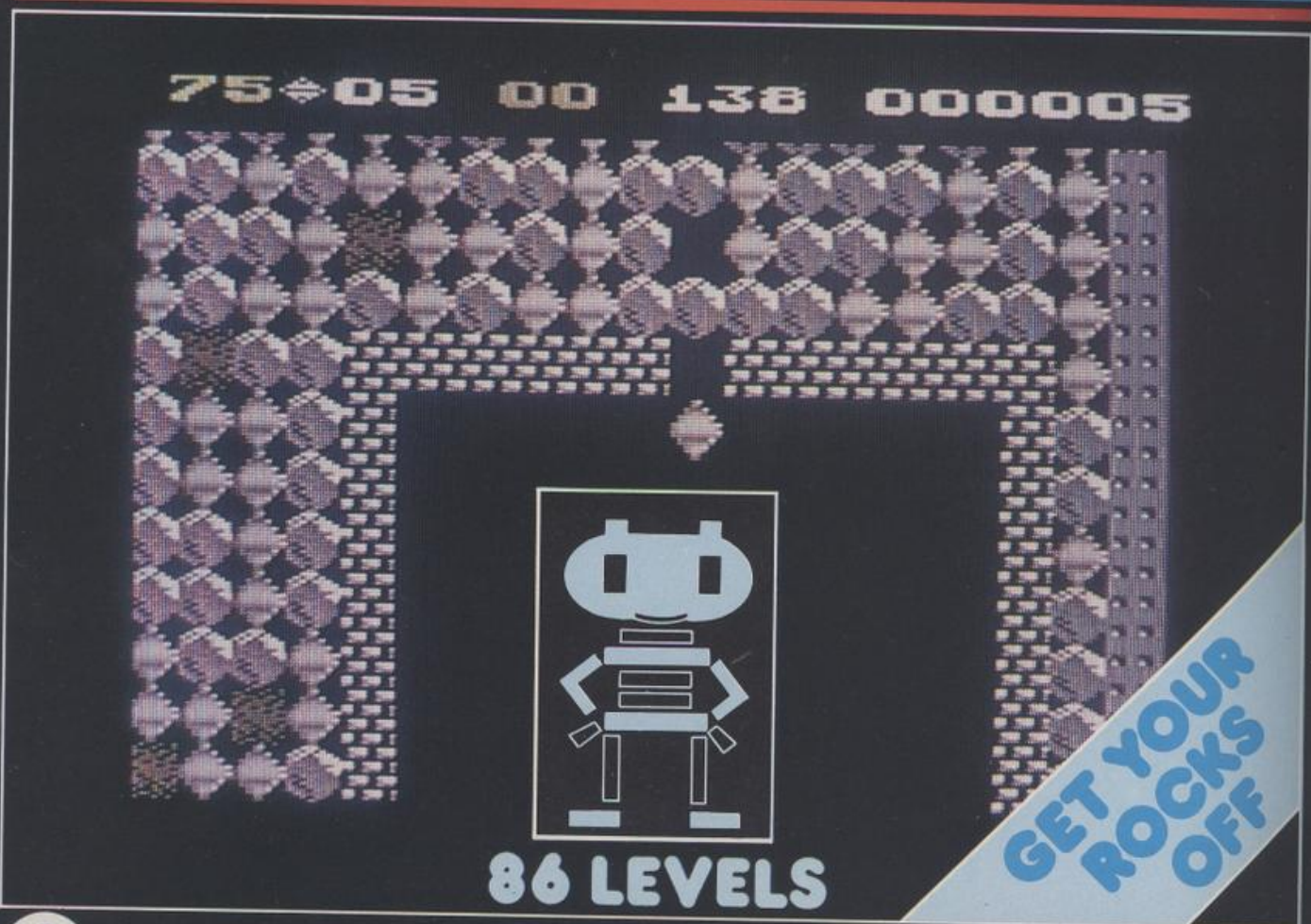
"UNDERWURLDE" recommended retail price £9.95 inc VAT
Available from W.H.SMITHS, BOOTS, J.MENZIES, WOOLWORTHS
and all good software retail outlets. Also available from
ULTIMATE PLAY THE GAME, The Green, Ashby-de-la-Zouch, Leicestershire LE6 5JU
(P&P included) Tel: 0530 411485

48K SINCLAIR ZX SPECTRUM



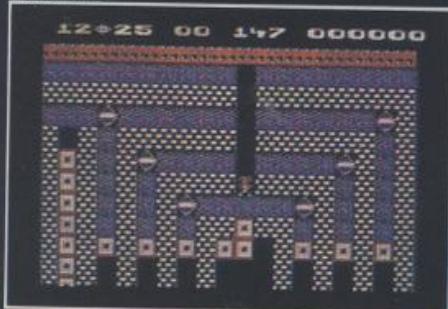
"KNIGHT LORE" recommended retail price £9.95 inc VAT
Available from W.H.SMITHS, BOOTS, J.MENZIES, WOOLWORTHS
and all good software retail outlets. Also available from
ULTIMATE PLAY THE GAME, The Green, Ashby-de-la-Zouch, Leicestershire LE6 5JU
(P&P included) Tel: 0530 411485

BIGGER, BOULDER, ^{More} BEAUTIFUL AMERICAN NO 1.



BOULDER DASH

commodore
64



CASSETTE 8.95

DISK 10.95

I wish to pay by cash/cheque/Postal Order/Access
To ACCESS—
I authorise you to debit my Access
Account with the amount of £
My ACCESS No. is

Name (as on Access card)

Cardholder's address

Signature

State Soft Ltd,
Business & Technology Centre,
Bessemer Drive, Stevenage,
Hertfordshire SG1 2DY.
Phone (0438) 316561.



Really Something Else



```
LD HL, (DISPLAY FILE)
PUSH HL
LD DE, 7
ADD HL, DE
LD (DFCC), HL
LD B, 64
XOR A
RST 10H
DJNZ ZEROACC
LD B, 4
LD A, CODE " "
RST 10H
DJNZ PTRACC
LD BC, 256
XOR A
RST 10H
DEC BC
LD A, B
OR C
JR NZ, BLANKLNS
POP HL
LD E, S1
ADD HL, DE
LD (SHIPAD), HL
CALL PTRSHIP
LD A, 255
LD (SUBCOUNT), A

LD HL, (RAND)
INC HL
LD (RAND), HL
LD A, (HL)
LD HL, SUBCOUNT
INC HL
INC HL
AND 7
INC A
INC A
LD (SUBLINE), A
ADD 7
LD (HL), A
LD B, A
LD C, 26
CALL PTRPOS
LD HL, (DFCC)
LD (SUBAD), HL
LD HL, (SUBAD)
PUSH HL
LD B, 5
LD (HL), C
INC HL
DJNZ -4
POP HL
DEC HL
LD (SUBAD), HL
LD A, (HL)

CP NEULINE
JRZ NEWSUB
LD B, 5
LD (HL), CODE " "
INC HL
DJNZ -5
DEC HL
DEC HL
DEC HL
LD (HL), CODE " "
LD A, (FRAMES)
AND 30
LD C, A
LD B, 0
CALL PTRPOS
LD HL, (DFCC)
LD D, 0
LD A, (HL)
CP " "
LD A, CODE " "
JR Z, 1
DEC A
LD (HL), A
LD B, 2
PUSH BC
LD HL, (SHIPAD)
LD A, (LAST-K)
```

Had any close encounters with machine code? Now's the time to meet it head on with Anthony Nwokoye.

ZX-81

ASSEMBLER

THIS PROGRAM WAS written for ZX-81 owners who would like to move on to machine code but who do not want to buy all the necessary assemblers, monitor, etc. It only occupies 3.75K of memory, above RAMtop, and has features you would expect to find from the top commercial products. These features are:

- The ability to assemble any Z-80 instruction — pages 181 to 187 of ZX-81 Basic Manual.
- It assembles to any part of the memory.
- It handles all labels, including those which require 16-bit address.
- It accepts decimal, hex or binary numbers.
- The ability to have messages imbedded in your code by putting the message between quotes.
- Comments and reminders may be placed

after an asterisk. You can also have multiple instruction, with each separated by a semi-colon — the whole code could be assembled from one line.

With these facilities, it would make it easier to write fast and smooth arcade-type games, and improve your machine-code techniques.

The machine code itself is stored in a Rem line 3,871 bytes long. This is obtained by first entering

1 REM 221 characters.

then edit line 1 and change it to 2 and edit 2 and change it to 3 and so on, until you have 1 to 17 lines.

Then add

18 REM 7 characters

then you POKE 16512,15

POKE 16511,28

then you enter the hex loader. Once you've entered the code and saved it to tape you can try out the assembler.

Load the program. When it has been loaded you should list it. You will see a long Rem statement followed by a mixture of weird characters. This is the machine-code assembler and the computer is only listing the first 400 bytes or so of the code. This code needs to be about RAMtop, so to do this you type:

PRINT USR 16514 ... (Newline)

and then you will see the computer New itself as it sends the code above RAMtop and clear itself.

Now that the computer is clear and the machine code is above RAMtop, you are ready to enter your mnemonics. I am going to have difficulty explaining this, so please stay awake!

Before entering your mnemonics, you need to enter a Rem line that is suitable to hold the code. The code does not have to start at 16514, it can start at, say, 22000. Before any mnemonics are entered you need a Rem line with an opening bracket, so the assembler knows where the code begins such as;

1 Rem ... necessary bytes

10 Rem (open brackets

(continued on page 143)

The Hex Loader

```
99 REM HEX LOADER
100 PRINT "START ADDRESS"
110 INPUT S
120 PRINT "FINISH ADDRESS"
130 INPUT F
140 FOR N=S TO F STEP 8
150 LET T=0
160 PRINT N; " "
170 INPUT A$
180 PRINT A$; " "
190 INPUT TOT
200 PRINT TOT
210 LET Z=0

220 FOR K=1 TO LEN A$ STEP 2
230 LET C=(CODE A$(K)-28)*16+CD
DE A$(K+1)-28
240 LET T=T+C
250 POKE N+Z,C
260 LET Z=Z+1
270 NEXT K
280 IF TOT=T THEN GO TO 310
290 PRINT "ERROR - PLEASE INPUT AGAIN"
300 GO TO 150
310 NEXT N
```


THE KEY TO PROFESSIONAL GAMES DESIGN ON THE SPECTRUM 48K

THE GAMES LANGUAGE OF THE 80'S!

Now, without any knowledge of machine code, you can write fast, smooth, professional, totally original games and market them **without paying royalties**. Even if you have already mastered machine code, we believe that the time and problems saved by writing in **White Lightning's** FORTH-based high level language could revolutionise commercial games writing for years to come.

IDEAL IDEAL is an Interrupt Driven Extendible Animation sub-Language. Once you have mastered IDEAL's easy to learn set of over 80 commands and just a little FORTH, you will be ready to produce arcade-quality games even if you don't know machine code. Up to 255 Sprites, each with its own user-defined dimensions can be moved around the screen (or memory), scrolled, spun, reflected enlarged or inverted with amazing speed and smoothness. Operations are possible between screen windows, Sprites and Sprite windows. Sprites can even stretch across several screens, so those difficult scrolling landscapes that form the basis of so many games are easy to achieve. Sinclair's own sound and graphics commands such as CIRCLE, DRAW and BEEP are fully supported, and there are some unique collision detection facilities.

MULTI-TASKING Because **White Lightning** uses interrupts, you can effectively run two programs at once. This means of course, that games like Space Invaders and Defender can be written without complex timing calculations. So while one

program smoothly scrolls the landscape, the second animates the other characters. This is undoubtedly one of **White Lightning's** most powerful features.

MARKETING AND PORTABILITY Although **White Lightning** uses an integer FORTH as its host language, programs can be written in a combination of BASIC, FORTH, IDEAL and machine language. What is more, programs written in FORTH/IDEAL will be highly portable between the Spectrum and implementations under development for other popular micros. When it comes to marketing your completed games, there's no problem either. In fact Oasis themselves will offer to market outstanding software.

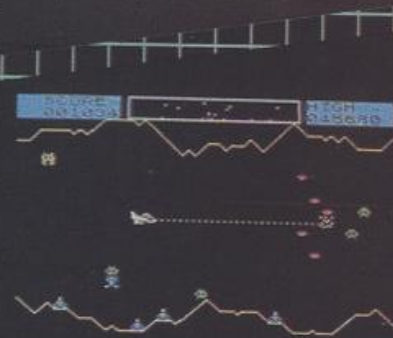
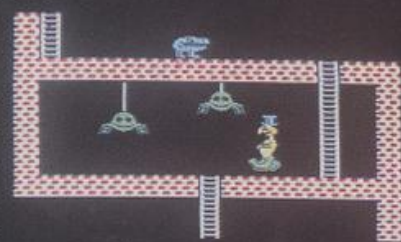
SPRITE DESIGN **White Lightning** comes complete with a separate 20K program for developing the Sprites used in the main system. Not only can you use this to design your own Sprites from scratch, it also comes complete with 168 pre-defined characters covering games like **Asteroids**, **Pac-Man**, **Assault Course**, **Defender**, **Space Invaders**, **City Bomber**, **Lunar Lander**, **Frogger**, **Centipede**, **Donkey Kong** and many, many, more. These characters are ready to use or can be enhanced. And Sprites can be saved to tape between editing sessions before being finally loaded into the main program.



The High Level
Graphics Development
System for the
SPECTRUM 48K.....

OASIS SOFTWARE

AND COMING SOON!
the power of **White Lightning** on the
COMMODORE 64!

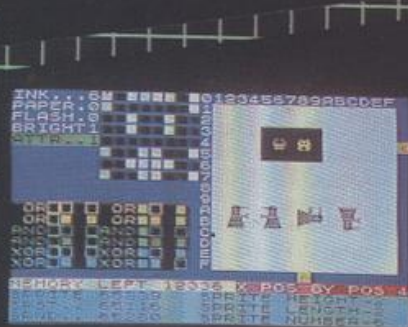
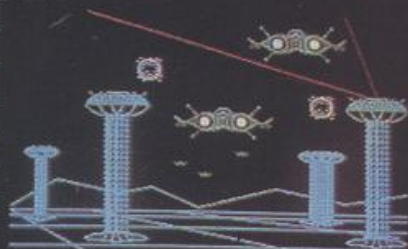


● Produces real machine code programs which run independently of **White Lightning**.

● A multi-tasking animation language AND a Sprite Development program together in one system-pack.

WHITE LIGHTNING

● Supplied with a FREE 16-minute demo, and a 130-page, easy-to-follow manual.



If your local dealer doesn't stock **White Lightning**, just send off this coupon for our rapid-despatch service.

Please send me ☐ **White Lightning System Packs** at £14.95 each. I enclose my cheque/P.O. for £

Name: _____

Address: _____

Oasis Software 9a Alexandra Parade, Weston-super-Mare, Avon, BS23 1QT Telephone: (0934) 419921. Every product carries a lifetime guarantee. All prices include extensive manual, VAT and p&p.

24 Hour

Access Tele-ordering on (0934) 419921.

YC 10

(continued from page 141)

all mnemonics are entered in Rem lines like so:

1 Rem ...

10 Rem (

20 Rem Ld A.0

to have multiple statements use a semicolon:

1 Rem ...

10 Rem (

20 Rem LD A.0; RST16; BIT 7.(HL); etc

The use of labels makes any assembler, with-

out doubt, much easier to use. They are used in instructions like JR or DJNZ, and you can even have 16-bit labels where the computer fills in the necessary two bytes. To enter a label you have to type a colon followed by an L and then the label number, and then again a colon. You have to do this before the required statement, like so:

1 Rem ...

10 Rem (

20 Rem: L1:INC HL; JR L1

The label number can be anything from 0 to 255 and must not exceed these values as the labelling system won't work correctly.

Now for the 16-bit label. In an operation like so:

1 Rem ...

10 Rem (

20 Rem :LO:SET 7.A;XORA etc ...

(continued on next page)

Assembler hex dump

168514	11AB6CED530444021	717	17474	C0047A78FE27C86D	1055	15442	1C422F1C42301C42	377	15410	3430303030303030	773908	340
168515	9440010A0E0E0C00	846	17482	702AF37F9081C077	990	15450	201C422F1C42301C42	350	15411	3030303030303030	773908	340
168516	0000000000000000	915	17490	2AF17FE7E7E7E7E7	902	15455	422C1C422C1C422C1C42	350	15412	3030303030303030	773908	340
168517	0000000000000000	915	17495	0000000000000000	772	15465	1C42301C42301C42301C42	350	15413	3030303030303030	773908	340
168518	0000000000000000	915	17505	0000000000000000	434	15474	201C42301C42301C42301C42	350	15414	3030303030303030	773908	340
168519	0000000000000000	915	17515	0000000000000000	334	15485	422C1C422C1C422C1C42	350	15415	3030303030303030	773908	340
168520	0000000000000000	915	17525	0000000000000000	334	15495	1C42301C42301C42301C42	350	15416	3030303030303030	773908	340
168521	0000000000000000	915	17535	0000000000000000	334	15505	201C42301C42301C42301C42	350	15417	3030303030303030	773908	340
168522	0000000000000000	915	17545	0000000000000000	334	15515	422C1C422C1C422C1C42	350	15418	3030303030303030	773908	340
168523	0000000000000000	915	17555	0000000000000000	334	15525	1C42301C42301C42301C42	350	15419	3030303030303030	773908	340
168524	0000000000000000	915	17565	0000000000000000	334	15535	201C42301C42301C42301C42	350	15420	3030303030303030	773908	340
168525	0000000000000000	915	17575	0000000000000000	334	15545	422C1C422C1C422C1C42	350	15421	3030303030303030	773908	340
168526	0000000000000000	915	17585	0000000000000000	334	15555	1C42301C42301C42301C42	350	15422	3030303030303030	773908	340
168527	0000000000000000	915	17595	0000000000000000	334	15565	201C42301C42301C42301C42	350	15423	3030303030303030	773908	340
168528	0000000000000000	915	17605	0000000000000000	334	15575	422C1C422C1C422C1C42	350	15424	3030303030303030	773908	340
168529	0000000000000000	915	17615	0000000000000000	334	15585	1C42301C42301C42301C42	350	15425	3030303030303030	773908	340
168530	0000000000000000	915	17625	0000000000000000	334	15595	201C42301C42301C42301C42	350	15426	3030303030303030	773908	340
168531	0000000000000000	915	17635	0000000000000000	334	15605	422C1C422C1C422C1C42	350	15427	3030303030303030	773908	340
168532	0000000000000000	915	17645	0000000000000000	334	15615	1C42301C42301C42301C42	350	15428	3030303030303030	773908	340
168533	0000000000000000	915	17655	0000000000000000	334	15625	201C42301C42301C42301C42	350	15429	3030303030303030	773908	340
168534	0000000000000000	915	17665	0000000000000000	334	15635	422C1C422C1C422C1C42	350	15430	3030303030303030	773908	340
168535	0000000000000000	915	17675	0000000000000000	334	15645	1C42301C42301C42301C42	350	15431	3030303030303030	773908	340
168536	0000000000000000	915	17685	0000000000000000	334	15655	201C42301C42301C42301C42	350	15432	3030303030303030	773908	340
168537	0000000000000000	915	17695	0000000000000000	334	15665	422C1C422C1C422C1C42	350	15433	3030303030303030	773908	340
168538	0000000000000000	915	17705	0000000000000000	334	15675	1C42301C42301C42301C42	350	15434	3030303030303030	773908	340
168539	0000000000000000	915	17715	0000000000000000	334	15685	201C42301C42301C42301C42	350	15435	3030303030303030	773908	340
168540	0000000000000000	915	17725	0000000000000000	334	15695	422C1C422C1C422C1C42	350	15436	3030303030303030	773908	340
168541	0000000000000000	915	17735	0000000000000000	334	15705	1C42301C42301C42301C42	350	15437	3030303030303030	773908	340
168542	0000000000000000	915	17745	0000000000000000	334	15715	201C42301C42301C42301C42	350	15438	3030303030303030	773908	340
168543	0000000000000000	915	17755	0000000000000000	334	15725	422C1C422C1C422C1C42	350	15439	3030303030303030	773908	340
168544	0000000000000000	915	17765	0000000000000000	334	15735	1C42301C42301C42301C42	350	15440	3030303030303030	773908	340
168545	0000000000000000	915	17775	0000000000000000	334	15745	201C42301C42301C42301C42	350	15441	3030303030303030	773908	340
168546	0000000000000000	915	17785	0000000000000000	334	15755	422C1C422C1C422C1C42	350	15442	3030303030303030	773908	340
168547	0000000000000000	915	17795	0000000000000000	334	15765	1C42301C42301C42301C42	350	15443	3030303030303030	773908	340
168548	0000000000000000	915	17805	0000000000000000	334	15775	201C42301C42301C42301C42	350	15444	3030303030303030	773908	340
168549	0000000000000000	915	17815	0000000000000000	334	15785	422C1C422C1C422C1C42	350	15445	3030303030303030	773908	340
168550	0000000000000000	915	17825	0000000000000000	334	15795	1C42301C42301C42301C42	350	15446	3030303030303030	773908	340
168551	0000000000000000	915	17835	0000000000000000	334	15805	201C42301C42301C42301C42	350	15447	3030303030303030	773908	340
168552	0000000000000000	915	17845	0000000000000000	334	15815	422C1C422C1C422C1C42	350	15448	3030303030303030	773908	340
168553	0000000000000000	915	17855	0000000000000000	334	15825	1C42301C42301C42301C42	350	15449	3030303030303030	773908	340
168554	0000000000000000	915	17865	0000000000000000	334	15835	201C42301C42301C42301C42	350	15450	3030303030303030	773908	340
168555	0000000000000000	915	17875	0000000000000000	334	15845	422C1C422C1C422C1C42	350	15451	3030303030303030	773908	340
168556	0000000000000000	915	17885	0000000000000000	334	15855	1C42301C42301C42301C42	350	15452	3030303030303030	773908	340
168557	0000000000000000	915	17895	0000000000000000	334	15865	201C42301C42301C42301C42	350	15453	3030303030303030	773908	340
168558	0000000000000000	915	17905	0000000000000000	334	15875	422C1C422C1C422C1C42	350	15454	3030303030303030	773908	340
168559	0000000000000000	915	17915	0000000000000000	334	15885	1C42301C42301C42301C42	350	15455	3030303030303030	773908	340
168560	0000000000000000	915	17925	0000000000000000	334	15895	201C42301C42301C42301C42	350	15456	3030303030303030	773908	340
168561	0000000000000000	915	17935	0000000000000000	334	15905	422C1C422C1C422C1C42	350	15457	3030303030303030	773908	340
168562	0000000000000000	915	17945	0000000000000000	334	15915	1C42301C42301C42301C42	350	15458	3030303030303030	773908	340
168563	0000000000000000	915	17955	0000000000000000	334	15925	201C42301C42301C42301C42	350	15459	3030303030303030	773908	340
168564	0000000000000000	915	17965	0000000000000000	334	15935	422C1C422C1C422C1C42	350	15460	3030303030303030	773908	340
168565	0000000000000000	915	17975	0000000000000000	334	15945	1C42301C42301C42301C42	350	15461	3030303030303030	773908	340
168566	0000000000000000	915	17985	0000000000000000	334	15955	201C42301C42301C42301C42	350	15462	3030303030303030	773908	340
168567	0000000000000000	915	17995	0000000000000000	334	15965	422C1C422C1C422C1C42	350	15463	3030303030303030	773908	340
168568	0000000000000000	915	18005	0000000000000000	334	15975	1C42301C42301C42301C42	350	15464	3030303030303030	773908	340
168569	0000000000000000	915	18015	0000000000000000	334	15985	201C42301C42301C42301C42	350	15465	3030303030303030	773908	340
168570	0000000000000000	915	18025	0000000000000000	334	15995	422C1C422C1C422C1C42	350	15466	3030303030303030	773908	340
168571	0000000000000000	915	18035	0000000000000000	334	16005	1C42301C42301C42301C42	350	15467	3030303030303030	773908	340
168572	0000000000000000	915	18045	0000000000000000	334	16015	201C42301C42301C42301C42	350	15468	3030303030303030	773908	340
168573	0000000000000000	915	18055	0000000000000000	334	16025	422C1C422C1C422C1C42	350	15469	3030303030303030	773908	340
168574	0000000000000000	915	18065	0000000000000000	334	16035	1C42301C42301C42301C42	350	15470	3030303030303030	773908	340
168575	0000000000000000	915	18075	0000000000000000	334	16045						

(continued from previous page)

30 Rem LD BC, LO — here, BC is loaded with the 16-bit address of where label 0 would be when the mnemonics are assembled.

or:

20 Rem: LO:SET 7A;XOR A etc ...

30 Rem Call LO — the address is automatically done when assembled. In all the examples I've used decimal numbers, but I could easily use hex or even binary numbers. To enter a hex number, you must put an asterisk before it like so:

LD A.*2A, or LD DE.*B2CA

For a binary number, you put a plus sign before it like so:

LD, HL, +0110101010000101, or
LD C, +10100011

One of the special features of this assembler, is that you can have messages imbedded in your code. These can also be labelled and are put between quotes. Here is an example:

1 Rem ...

10 Rem (

20 Rem "THIS IS A MESSAGE"

and label the same like so:

1 Rem ...

10 Rem (

20 Rem:LS:"THIS IS A MESSAGE"

30 Rem LD HL,LS;LD BC, etc.

To have reminders and comments in your mnemonics, so you know which part does

what, you use an asterisk. This is put before the reminder.

Like so:

1 Rem ...

10 Rem (

20 Rem *THIS IS A COMMENT

30 Rem LD HL, 2A0K; etc

40 Rem * THIS IS etc and so on.

Now when you've finished your mnemonics, you enter a Rem) close brackets. This has to be at a line, at the end of your mnemonics. This is so the assembler knows when the end of assembling has been reached. Then you type in this short program to run the assembler:

9990 LET ADD=16514

9991 POKE 32767, INT (ADD/256)

9992 POKE 32766, ADD - 256*INT (ADD/256)

9993 LET A=USR 27819

The value of Add doesn't have to be 16514, but can be any address where memory is reserved for the code, except 27819 or upwards as this holds the assembler and the label stack. Both address 32766 and 32767 will hold the address of the place the assembler should dump to.

Now for the moment of truth. Type Run. You should see the screen flicker and at the top of the screen:

LOOP ACCOMPLISHED

should have been written. This means that if you now List the program, you will see at line

number 1 the compiled machine code, and all is well.

However, if the computer prints:

I CAN'T ASSEMBLE ONE OF THE CODES then it means that you've made an error with one of the mnemonics. To help you find the error the computer displays at the bottom of the screen a 9 followed by a / sign. After this is the number logo where the mistake occurred so:

9/5

would mean a mistake has happened at loop 5.

If the computer prints:

YOU HAVE MISSED A LABEL USING JUMP it simply means that you have in the mnemonics requested a label using JR, DJNZ etc when this label doesn't exist. YOU HAVE MISSED A LABEL USING CALL would mean that you've requested a non-existent label, maybe using CALL L92, LD HL, L12 etc.

There must only be one space between the command and the next number or register in the mnemonics. For example LD (65535). A is acceptable, while LD (65635). A is not. You use a full stop or a space to separate each section. For example, LD A.B. is good, as is LD A B. All RST should have their numbers in decimal and have the numbers close to the letters like: RST48. All label numbers should be in decimal, and there should be no space at the end of the line.

Example program 1.

```
1 REM .....
.....
5 REM EXAMPLE1
10 REM (
20 REM *RANDOM PLOT*
25 REM *(THIS MUST BE LOADED
WITH ASSEMBLER ABOVE RAMTOP.)
30 REM *READY TO BE ASSEMBLED
WITH SUPER "SEMBLER AT ADDRESS
16514.
40 REM *BREAK M/C WITH SHIFT*
50 REM JR L1
60 REM :L0:RAND;LD HL,(16434)
70 REM LD DE,(16435);ADD HL,DE
80 REM LD DE,(16436);ADD HL,DE
90 REM :L1:CALL L0;AND 63
100 REM LD C,A
110 REM :L2:CALL L0;AND 63
120 REM CP 44;JR NC L2;LD B,A
130 REM CALL 2994
140 REM LD A,(16422);CP 254;RET
Z;JR L1
150 REM )
9990 LET ADD=16514
9991 POKE 32767,INT (ADD/256)
9992 POKE 32766,ADD-256*INT (ADD/256)
9993 LET A=USR 27819
```

Example program 2.

```
1 REM .....
.....
5 REM EXAMPLE2
10 REM (
20 REM *PRINT ROUTINE*
25 REM *(THIS MUST BE LOADED
WITH ASSEMBLER ABOVE RAMTOP.)
30 REM *READY TO BE ASSEMBLED
WITH SUPER "SEMBLER AT ADDRESS
16514.
```

```
40 REM LD B,52;L0:PUSH BC
50 REM LD DE,L2;PUSH DE
60 REM LD B,14;L1:LD A,(DE);A
DD A,128;LD (DE),A
70 REM INC DE;DJNZ L1
80 REM POP DE;LD BC,14
90 REM CALL 2923
100 REM POP BC;DJNZ L0;RET
110 REM :L2:"YOUR COMPUTER,"
120 REM )
9990 LET ADD=16514
9991 POKE 32767,INT (ADD/256)
9992 POKE 32766,ADD-256*INT (ADD/256)
9993 LET A=USR 27819
```

Example program 3.

```
1 REM .....
.....
5 REM EXAMPLE3
10 REM (
20 REM *CHARACTER SET*
25 REM *(THIS MUST BE LOADED
WITH ASSEMBLER ABOVE RAMTOP.)
30 REM *READY TO BE ASSEMBLED
WITH SUPER "SEMBLER AT ADDRESS
16514.
40 REM LD C,127;L0:PUSH BC
50 REM LD DE,(16396);LD C,24
60 REM :L1:LD B,32;L2:INC DE;
LD A,(DE);INC A
70 REM BIT 6,A;JR Z L3;RES 6,A
SET 7,A
80 REM :L3:LD (DE),A;DJNZ L2
90 REM INC DE;DEC C;JR NZ L1
100 REM LD DE,650;L4:DEC DE;LD
A,D;CP 255;JR NZ L4
110 REM POP BC;DEC C;JR NZ L0
120 REM RET
130 REM )
9990 LET ADD=16514
9991 POKE 32767,INT (ADD/256)
9992 POKE 32766,ADD-256*INT (ADD/256)
9993 LET A=USR 27819
```


Cobolt

Direct imports at ridiculous prices



NEW BASE-LESS JOYSTICK

£8.95

- Just tilt to operate.
- Single shot trigger.
- Auto-fire button.
- Use it single handed.
- No more wrist cramp.
- No more table suckers.
- Standard joystick connector.

All products have a full no-quibble guarantee

COMPUTER DATA RECORDER

- For most home micros.
- 3 digit tape counter.
- Low battery indicator.
- Switchable monitor.
- Input, output, Din and remote sockets.
- Mains power pack £4.95.



Also a version for Vic 20 and Commodore 64. Powered and controlled by the computer.

£19.95

£21.95

Not a modified Audio machine — A top quality computer data recorder.

Our low introductor prices include VAT and UK postage.

We have an expanding range of products — send a large SAE for the latest lists.

Trade and overseas enquiries welcome.

See us at the Christmas Computer show at Olympia. Nov 30-Dec 2.

To: Cobolt Systems Ltd.
37 Eastgate Pickering, YO18 7DU.
Tel: 0751-73315

NAME:

ADDRESS:

Please send me

I enclose: £

GAMES... GAMES... GAMES

THE VIRGIN COMPUTER GAMES SERIES

£££££'s of
Entertaining Games
for only £2.95

Each book contains more than 20 quality games programmes, each one specially written for the series and unavailable elsewhere. Moving graphic games, arcade games, reflex flexers and brain stretchers are all here and guaranteed to provide hours of entertainment.

Only £2.95 each



GAMES FOR YOUR ZX 81
MORE GAMES FOR YOUR ZX 81 (£3.50)
GAMES FOR YOUR ZX SPECTRUM
MORE GAMES FOR YOUR ZX SPECTRUM (£3.50)
GAMES FOR YOUR VIC 20
MORE GAMES FOR YOUR VIC 20
GAMES FOR YOUR BBC MICRO
MORE GAMES FOR YOUR BBC MICRO
GAMES FOR YOUR DRAGON
MORE GAMES FOR YOUR DRAGON
GAMES FOR YOUR ATARI
GAMES FOR YOUR ATARI 600XL
GAMES FOR YOUR TRS 80
GAMES FOR YOUR ORIC
MORE GAMES FOR YOUR ORIC
GAMES FOR YOUR COMMODORE 64
MORE GAMES FOR YOUR COMMODORE 64
GAMES FOR YOUR ACORN ELECTRON
GAMES FOR YOUR TI 99/4A

Available from all good bookshops, or direct from the publishers adding 12½% to the price of each book ordered to cover our postage and packing. Please make cheques/P.O.'s payable to Virgin Books and send to: Computer Books Offer 3, Virgin Books, 61-63 Portobello Road, London W11 3DD

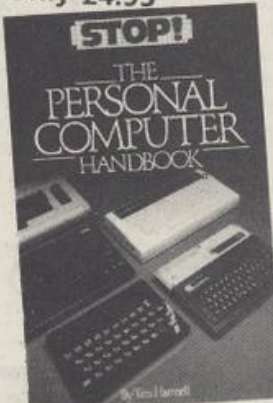
THE PERSONAL COMPUTER HANDBOOK

3rd Annual Edition

TIM HARTNELL

The complete guide to selecting and using small computers, including an explanation of how they work and what they can do for you, a detailed analysis of the available systems on the market and how to buy them, and how to get the most from your computer with an extended step-by-step guide to programming.

Only £4.95



WRITING SOFTWARE FOR PROFIT

A.J. HARDING

Most software authors begin writing programs at home and many have dreams of seeing their hardwork published. With this in mind, this book examines how to choose the right machine and the right computer software before explaining in depth the best approach to program writing and submitting your finished program.

£4.95



NOW 3RD GREAT YEAR! HIRE SPECTRUM ZX81 and COMMODORE 64 TAPES

HUGE RANGE!

ADVENTURE
GAMES
ARCADE and
SIMULATION GAMES
BUSINESS
and PRACTICAL
PROGRAMS
UTILITIES
M/C COMPILERS
EDUCATIONAL
FROM OVER
60 TOP SUPPLIERS

FREE

ILLUSTRATED
QUARTERLY
MAGAZINE WITH
TIPS, NEWS,
REVIEWS
DISCOUNT OFFERS

LIFE
MEMBERSHIP
£5.00
TAPE HIRE FROM
50P
INCLUDING VAT

OVER
3,000
DELIGHTED MEMBERS!

■ The first true software library to be set up in the world—and still the largest ■ Unrivalled tape stock, as you'd expect from our head start ■ Run by a 16-bit computer (2 million bytes of program and data on disk!) with the help of six less able but more friendly mere humans! ■ Often imitated (sometimes almost to the letter—flattery indeed!) but never equalled ■ Friendly, helpful service—at the end of a phone if needed ■ Free membership of our Discount Club: pounds off peripherals and top-of-the-chart tapes ■ Any loading problems (rare!) automatically credited ■ Shop now open (next to Post Office) for rental and discount sales of tapes and peripherals ■ Branches throughout the world ■ No complicated schemes, no commitment to quantity—rent what and when you like ■ Printed, illustrated magazine "Computerchat" packs in more than any mere typed newsletter ■ Keenest-ever rates ■ ACCESS holders can join by telephone on 0750 892732 ■ NO RIVAL can offer all this...

SPECIAL OFFER!
YOUR FIRST TWO
TAPES FREE

IF YOU USE THIS COUPON!
or send £1 for magazine & details.
Props: ALEC FRY ARPS, FRSA and
ERNA FRY, BA

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

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

ADDRESS.....

THE
ORIGINAL
SOFTWARE
LIBRARY!

Special offer from this issue: LIFE MEMBERSHIP £5

(normally £9.50). Overseas (Europe only) £10, or join local branch in W. Germany, France, Holland, Belgium, Scandinavia, South Africa, Ireland—send Int. Reply Coupon and we'll forward your enquiry.



TRIONIC

Your Local Home Computer Centre

Best Shop in Town for Software, Books, Mags, Peripherals and Accessories.

We sell and support: Amstrad, Atari, BBC, Commodore C16, CBM 64, CBM Plus 4, Electron Spectrum 48K, Sony Hit-Bit (MSX).

We are one of the Largest Stockists of Games, Business and Educational Software and Utilities for all Popular Home Computers.

Amstrad CPC464 Green Monitor	£239
Amstrad CPC464 Colour Monitor	£349
Commodore C16 Starter Pack	£139
Commodore 64	£199
Commodore 64 Trionic Pack	£249
Commodore 64 Business Pack	£629
BBC Model B Micro	£399
Acorn Electron	£199
Spectrum 48K	£129
Sony Hit Bit MSX Computer	£299

We also stock a large range of Printers, Monitors and Disk Drives to suit all applications.

OPEN 10am-8pm Mon-Sat. Tel: 01-861 0036

TRIONIC LIMITED 144 Station Road, Harrow, Middlesex

MULTITASKING

ONE OF THE most advanced features of the Amstrad micro is its ability to handle interrupts directly from Basic. In other machines such as the Spectrum, interrupts are a tool available only to the machine-code programmer. Amstrad Basic releases the power of interrupts to all in a simple but comprehensive manner.

Although Spectrum interrupts can be harnessed quite readily — at least on the 48K machine — from machine code, the Basic programmer is left out in the cold with no commands to support interrupt-driven programming. Presented here is a program which rectifies this shortcoming by equipping Spectrum Basic with a number of interrupt commands, as well as the On Error and On Break commands found in Microsoft Basic. Due to the problems associated in accessing interrupts, even from machine code, on a 16K machine, it will only operate on the larger model.

The machine code resides above RAMtop, occupying addresses 63866 to 65367. Type in listing 1 and Run it. The program automatically lowers RAMtop and proceeds to Poke the code into memory. Each of the 23 data lines holding the code in a hexadecimal form has an associated checksum. If at any time the code in a line doesn't tally with its checksum then the computer stops, displaying the line at which the discrepancy was found.

When the code is in a form that the computer will readily accept — i.e., correct — you can save the code using the command below. Don't worry about the long delay while the computer Pokes the code; it takes a couple of minutes and don't be concerned by the blank screen, the computer hasn't crashed — hopefully.

SAVE "MULTI-TASK" CODE 63866,1413

You can reload at any time with:
CLEAR 63000: LOAD "" CODE

The 10 new Basic commands provided by the program can be accessed by typing them in

Easy multitasking with
Richard Taylor's
After and Every.

WE INTERRUPT THIS PROGRAMME
TO BRING YOU THE NEWS OF
THE BIRTH OF ANOTHER
ROYAL BABY....

WHAT AGAIN!
SEEMS TO HAPPEN
EVERY FEW MINUTES!



WILDING.

SPECTRUM INTERRUPTS

in Rem statements. There's a limit of one command per Rem and, as usual, a Rem statement must be the last item on a line. To make the computer treat Rems in this new fashion it is necessary to initialise the machine code by using a Randomise USR 63866 as the first line of your program. Subsequently, Rems will be treated in the new manner with no further need

for USR calls. The full command list is as follows:

AFTER	ON ERROR GOTO
EVERY	ON BREAK STOP
DISABLE	ON BREAK GOSUB
ENABLE	IGNORE BREAK
DROP	RESUME

I'll now deal with each of the commands individually. The simplest command is Ignore Break. As you would expect this command forces a program to ignore the break key and therefore prevents you from breaking into it. As an example, type in the following short program, but only if there's nothing important in memory.

```
10 RANDOMIZE USR 63866
20 REM IGNORE BREAK
30 GOTO 30
```

Pulling out the plug is the only way out of this program. The command in line 20 is typed in letter by letter, a little more laborious than single key entry but certainly a lot less confusing. You can type in either upper or lower case but upper case tends to look a bit neater. If the first character of a Rem is an asterisk then the rest of the line is ignored. In this way you are still able to add comments to a program.

The next command, On Break Stop restores normality to the break key:

(continued on next page)

Listing 1.

```
10 REM MULTITASKING
20 REM BASIC EXTENSION
30 REM
40 REM BY Richard Taylor
50 REM
60 CLEAR 63000
70 LET A=63866
80 FOR I=0 TO 22
90 LET T=0: READ V,A$
100 IF LEN A$>2 THEN GOTO 110
110 FOR C=1 TO LEN A$ STEP 2
120 LET X=CODE A$(C)-48-7*(A$(C)-"A")
130 LET Y=CODE A$(C+1)-48-7*(A$(C+1)-"A")
140 POKE A+16*X+Y
150 LET T:=16*X+Y
160 LET A=A+1
170 NEXT C
180 IF V<>1 THEN GOTO 500
190 NEXT I
200 PRINT "Data OK - Now SAVE"
210 STOP
500 PRINT "ERROR in line ";8000
+1+10
510 STOP
5000 DATA 7555,"C321FDC31AFDC321
5001FDC321FDC321FDC321FDC321FDC321
5002FDC321FDC321FDC321FDC321FDC321
5003FDC321FDC321FDC321FDC321FDC321
5004FDC321FDC321FDC321FDC321FDC321
5005FDC321FDC321FDC321FDC321FDC321
5006FDC321FDC321FDC321FDC321FDC321
5007FDC321FDC321FDC321FDC321FDC321
5008FDC321FDC321FDC321FDC321FDC321
5009FDC321FDC321FDC321FDC321FDC321
5010FDC321FDC321FDC321FDC321FDC321
5011FDC321FDC321FDC321FDC321FDC321
5012FDC321FDC321FDC321FDC321FDC321
5013FDC321FDC321FDC321FDC321FDC321
5014FDC321FDC321FDC321FDC321FDC321
5015FDC321FDC321FDC321FDC321FDC321
5016FDC321FDC321FDC321FDC321FDC321
5017FDC321FDC321FDC321FDC321FDC321
5018FDC321FDC321FDC321FDC321FDC321
5019FDC321FDC321FDC321FDC321FDC321
5020FDC321FDC321FDC321FDC321FDC321
5021FDC321FDC321FDC321FDC321FDC321
5022FDC321FDC321FDC321FDC321FDC321
5023FDC321FDC321FDC321FDC321FDC321
5024FDC321FDC321FDC321FDC321FDC321
5025FDC321FDC321FDC321FDC321FDC321
5026FDC321FDC321FDC321FDC321FDC321
5027FDC321FDC321FDC321FDC321FDC321
5028FDC321FDC321FDC321FDC321FDC321
5029FDC321FDC321FDC321FDC321FDC321
5030FDC321FDC321FDC321FDC321FDC321
5031FDC321FDC321FDC321FDC321FDC321
5032FDC321FDC321FDC321FDC321FDC321
5033FDC321FDC321FDC321FDC321FDC321
5034FDC321FDC321FDC321FDC321FDC321
5035FDC321FDC321FDC321FDC321FDC321
5036FDC321FDC321FDC321FDC321FDC321
5037FDC321FDC321FDC321FDC321FDC321
5038FDC321FDC321FDC321FDC321FDC321
5039FDC321FDC321FDC321FDC321FDC321
5040FDC321FDC321FDC321FDC321FDC321
5041FDC321FDC321FDC321FDC321FDC321
5042FDC321FDC321FDC321FDC321FDC321
5043FDC321FDC321FDC321FDC321FDC321
5044FDC321FDC321FDC321FDC321FDC321
5045FDC321FDC321FDC321FDC321FDC321
5046FDC321FDC321FDC321FDC321FDC321
5047FDC321FDC321FDC321FDC321FDC321
5048FDC321FDC321FDC321FDC321FDC321
5049FDC321FDC321FDC321FDC321FDC321
5050FDC321FDC321FDC321FDC321FDC321
5051FDC321FDC321FDC321FDC321FDC321
5052FDC321FDC321FDC321FDC321FDC321
5053FDC321FDC321FDC321FDC321FDC321
5054FDC321FDC321FDC321FDC321FDC321
5055FDC321FDC321FDC321FDC321FDC321
5056FDC321FDC321FDC321FDC321FDC321
5057FDC321FDC321FDC321FDC321FDC321
5058FDC321FDC321FDC321FDC321FDC321
5059FDC321FDC321FDC321FDC321FDC321
5060FDC321FDC321FDC321FDC321FDC321
5061FDC321FDC321FDC321FDC321FDC321
5062FDC321FDC321FDC321FDC321FDC321
5063FDC321FDC321FDC321FDC321FDC321
5064FDC321FDC321FDC321FDC321FDC321
5065FDC321FDC321FDC321FDC321FDC321
5066FDC321FDC321FDC321FDC321FDC321
5067FDC321FDC321FDC321FDC321FDC321
5068FDC321FDC321FDC321FDC321FDC321
5069FDC321FDC321FDC321FDC321FDC321
5070FDC321FDC321FDC321FDC321FDC321
5071FDC321FDC321FDC321FDC321FDC321
5072FDC321FDC321FDC321FDC321FDC321
5073FDC321FDC321FDC321FDC321FDC321
5074FDC321FDC321FDC321FDC321FDC321
5075FDC321FDC321FDC321FDC321FDC321
5076FDC321FDC321FDC321FDC321FDC321
5077FDC321FDC321FDC321FDC321FDC321
5078FDC321FDC321FDC321FDC321FDC321
5079FDC321FDC321FDC321FDC321FDC321
5080FDC321FDC321FDC321FDC321FDC321
5081FDC321FDC321FDC321FDC321FDC321
5082FDC321FDC321FDC321FDC321FDC321
5083FDC321FDC321FDC321FDC321FDC321
5084FDC321FDC321FDC321FDC321FDC321
5085FDC321FDC321FDC321FDC321FDC321
5086FDC321FDC321FDC321FDC321FDC321
5087FDC321FDC321FDC321FDC321FDC321
5088FDC321FDC321FDC321FDC321FDC321
5089FDC321FDC321FDC321FDC321FDC321
5090FDC321FDC321FDC321FDC321FDC321
5091FDC321FDC321FDC321FDC321FDC321
5092FDC321FDC321FDC321FDC321FDC321
5093FDC321FDC321FDC321FDC321FDC321
5094FDC321FDC321FDC321FDC321FDC321
5095FDC321FDC321FDC321FDC321FDC321
5096FDC321FDC321FDC321FDC321FDC321
5097FDC321FDC321FDC321FDC321FDC321
5098FDC321FDC321FDC321FDC321FDC321
5099FDC321FDC321FDC321FDC321FDC321
5100FDC321FDC321FDC321FDC321FDC321
5101FDC321FDC321FDC321FDC321FDC321
5102FDC321FDC321FDC321FDC321FDC321
5103FDC321FDC321FDC321FDC321FDC321
5104FDC321FDC321FDC321FDC321FDC321
5105FDC321FDC321FDC321FDC321FDC321
5106FDC321FDC321FDC321FDC321FDC321
5107FDC321FDC321FDC321FDC321FDC321
5108FDC321FDC321FDC321FDC321FDC321
5109FDC321FDC321FDC321FDC321FDC321
5110FDC321FDC321FDC321FDC321FDC321
5111FDC321FDC321FDC321FDC321FDC321
5112FDC321FDC321FDC321FDC321FDC321
5113FDC321FDC321FDC321FDC321FDC321
5114FDC321FDC321FDC321FDC321FDC321
5115FDC321FDC321FDC321FDC321FDC321
5116FDC321FDC321FDC321FDC321FDC321
5117FDC321FDC321FDC321FDC321FDC321
5118FDC321FDC321FDC321FDC321FDC321
5119FDC321FDC321FDC321FDC321FDC321
5120FDC321FDC321FDC321FDC321FDC321
5121FDC321FDC321FDC321FDC321FDC321
5122FDC321FDC321FDC321FDC321FDC321
5123FDC321FDC321FDC321FDC321FDC321
5124FDC321FDC321FDC321FDC321FDC321
5125FDC321FDC321FDC321FDC321FDC321
5126FDC321FDC321FDC321FDC321FDC321
5127FDC321FDC321FDC321FDC321FDC321
5128FDC321FDC321FDC321FDC321FDC321
5129FDC321FDC321FDC321FDC321FDC321
5130FDC321FDC321FDC321FDC321FDC321
5131FDC321FDC321FDC321FDC321FDC321
5132FDC321FDC321FDC321FDC321FDC321
5133FDC321FDC321FDC321FDC321FDC321
5134FDC321FDC321FDC321FDC321FDC321
5135FDC321FDC321FDC321FDC321FDC321
5136FDC321FDC321FDC321FDC321FDC321
5137FDC321FDC321FDC321FDC321FDC321
5138FDC321FDC321FDC321FDC321FDC321
5139FDC321FDC321FDC321FDC321FDC321
5140FDC321FDC321FDC321FDC321FDC321
5141FDC321FDC321FDC321FDC321FDC321
5142FDC321FDC321FDC321FDC321FDC321
5143FDC321FDC321FDC321FDC321FDC321
5144FDC321FDC321FDC321FDC321FDC321
5145FDC321FDC321FDC321FDC321FDC321
5146FDC321FDC321FDC321FDC321FDC321
5147FDC321FDC321FDC321FDC321FDC321
5148FDC321FDC321FDC321FDC321FDC321
5149FDC321FDC321FDC321FDC321FDC321
5150FDC321FDC321FDC321FDC321FDC321
5151FDC321FDC321FDC321FDC321FDC321
5152FDC321FDC321FDC321FDC321FDC321
5153FDC321FDC321FDC321FDC321FDC321
5154FDC321FDC321FDC321FDC321FDC321
5155FDC321FDC321FDC321FDC321FDC321
5156FDC321FDC321FDC321FDC321FDC321
5157FDC321FDC321FDC321FDC321FDC321
5158FDC321FDC321FDC321FDC321FDC321
5159FDC321FDC321FDC321FDC321FDC321
5160FDC321FDC321FDC321FDC321FDC321
5161FDC321FDC321FDC321FDC321FDC321
5162FDC321FDC321FDC321FDC321FDC321
5163FDC321FDC321FDC321FDC321FDC321
5164FDC321FDC321FDC321FDC321FDC321
5165FDC321FDC321FDC321FDC321FDC321
5166FDC321FDC321FDC321FDC321FDC321
5167FDC321FDC321FDC321FDC321FDC321
5168FDC321FDC321FDC321FDC321FDC321
5169FDC321FDC321FDC321FDC321FDC321
5170FDC321FDC321FDC321FDC321FDC321
5171FDC321FDC321FDC321FDC321FDC321
5172FDC321FDC321FDC321FDC321FDC321
5173FDC321FDC321FDC321FDC321FDC321
5174FDC321FDC321FDC321FDC321FDC321
5175FDC321FDC321FDC321FDC321FDC321
5176FDC321FDC321FDC321FDC321FDC321
5177FDC321FDC321FDC321FDC321FDC321
5178FDC321FDC321FDC321FDC321FDC321
5179FDC321FDC321FDC321FDC321FDC321
5180FDC321FDC321FDC321FDC321FDC321
5181FDC321FDC321FDC321FDC321FDC321
5182FDC321FDC321FDC321FDC321FDC321
5183FDC321FDC321FDC321FDC321FDC321
5184FDC321FDC321FDC321FDC321FDC321
5185FDC321FDC321FDC321FDC321FDC321
5186FDC321FDC321FDC321FDC321FDC321
5187FDC321FDC321FDC321FDC321FDC321
5188FDC321FDC321FDC321FDC321FDC321
5189FDC321FDC321FDC321FDC321FDC321
5190FDC321FDC321FDC321FDC321FDC321
5191FDC321FDC321FDC321FDC321FDC321
5192FDC321FDC321FDC321FDC321FDC321
5193FDC321FDC321FDC321FDC321FDC321
5194FDC321FDC321FDC321FDC321FDC321
5195FDC321FDC321FDC321FDC321FDC321
5196FDC321FDC321FDC321FDC321FDC321
5197FDC321FDC321FDC321FDC321FDC321
5198FDC321FDC321FDC321FDC321FDC321
5199FDC321FDC321FDC321FDC321FDC321
5200FDC321FDC321FDC321FDC321FDC321
5201FDC321FDC321FDC321FDC321FDC321
5202FDC321FDC321FDC321FDC321FDC321
5203FDC321FDC321FDC321FDC321FDC321
5204FDC321FDC321FDC321FDC321FDC321
5205FDC321FDC321FDC321FDC321FDC321
5206FDC321FDC321FDC321FDC321FDC321
5207FDC321FDC321FDC321FDC321FDC321
5208FDC321FDC321FDC321FDC321FDC321
5209FDC321FDC321FDC321FDC321FDC321
5210FDC321FDC321FDC321FDC321FDC321
5211FDC321FDC321FDC321FDC321FDC321
5212FDC321FDC321FDC321FDC321FDC321
5213FDC321FDC321FDC321FDC321FDC321
5214FDC321FDC321FDC321FDC321FDC321
5215FDC321FDC321FDC321FDC321FDC321
5216FDC321FDC321FDC321FDC321FDC321
5217FDC321FDC321FDC321FDC321FDC321
5218FDC321FDC321FDC321FDC321FDC321
5219FDC321FDC321FDC321FDC321FDC321
5220FDC321FDC321FDC321FDC321FDC321
5221FDC321FDC321FDC321FDC321FDC321
5222FDC321FDC321FDC321FDC321FDC321
5223FDC321FDC321FDC321FDC321FDC321
5224FDC321FDC321FDC321FDC321FDC321
5225FDC321FDC321FDC321FDC321FDC321
5226FDC321FDC321FDC321FDC321FDC321
5227FDC321FDC321FDC321FDC321FDC321
5228FDC321FDC321FDC321FDC321FDC321
5229FDC321FDC321FDC321FDC321FDC321
5230FDC321FDC321FDC321FDC321FDC321
5231FDC321FDC321FDC321FDC321FDC321
5232FDC321FDC321FDC321FDC321FDC321
5233FDC321FDC321FDC321FDC321FDC321
5234FDC321FDC321FDC321FDC321FDC321
5235FDC321FDC321FDC321FDC321FDC321
5236FDC321FDC321FDC321FDC321FDC321
5237FDC321FDC321FDC321FDC321FDC321
5238FDC321FDC321FDC321FDC321FDC321
5239FDC321FDC321FDC321FDC321FDC321
5240FDC321FDC321FDC321FDC321FDC321
5241FDC321FDC321FDC321FDC321FDC321
5242FDC321FDC321FDC321FDC321FDC321
5243FDC321FDC321FDC321FDC321FDC321
5244FDC321FDC321FDC321FDC321FDC321
5245FDC321FDC321FDC321FDC321FDC321
5246FDC321FDC321FDC321FDC321FDC321
5247FDC321FDC321FDC321FDC321FDC321
5248FDC321FDC321FDC321FDC321FDC321
5249FDC321FDC321FDC321FDC321FDC321
5250FDC321FDC321FDC321FDC321FDC321
5251FDC321FDC321FDC321FDC321FDC321
5252FDC321FDC321FDC321FDC321FDC321
5253FDC321FDC321FDC321FDC321FDC321
5254FDC321FDC321FDC321FDC321FDC321
5255FDC321FDC321FDC321FDC321FDC321
5256FDC321FDC321FDC321FDC321FDC321
5257FDC321FDC321FDC321FDC321FDC321
5258FDC321FDC321FDC321FDC321FDC321
5259FDC321FDC321FDC321FDC321FDC321
5260FDC321FDC321FDC321FDC321FDC321
5261FDC321FDC321FDC321FDC321FDC321
5262FDC321FDC321FDC321FDC321FDC321
5263FDC321FDC321FDC321FDC321FDC321
5264FDC321FDC321FDC321FDC321FDC321
5265FDC321FDC321FDC321FDC321FDC321
5266FDC321FDC321FDC321FDC321FDC321
5267FDC321FDC321FDC321FDC321FDC321
5268FDC321FDC321FDC321FDC321FDC321
5269FDC321FDC321FDC321FDC321FDC321
5270FDC321FDC321FDC321FDC321FDC321
5271FDC321FDC321FDC321FDC321FDC321
5272FDC321FDC321FDC321FDC321FDC321
5273FDC321FDC321FDC321FDC321FDC321
5274FDC321FDC321FDC321FDC321FDC321
5275FDC321FDC321FDC321FDC321FDC321
5276FDC321FDC321FDC321FDC321FDC321
5277FDC321FDC321FDC321FDC321FDC321
5278FDC321FDC321FDC321FDC321FDC321
5279FDC321FDC321FDC321FDC321FDC321
5280FDC321FDC321FDC321FDC321FDC321
5281FDC321FDC321FDC321FDC321FDC321
5282FDC321FDC321FDC321FDC321FDC321
5283FDC321FDC321FDC321FDC321FDC321
5284FDC321FDC321FDC321FDC321FDC321
5285FDC321FDC321FDC321FDC321FDC321
5286FDC321FDC321FDC321FDC321FDC321
5287FDC321FDC321FDC321FDC321FDC321
5288FDC321FDC321FDC321FDC321FDC321
5289FDC321FDC321FDC321FDC321FDC321
5290FDC321FDC321FDC321FDC321FDC321
5291FDC321FDC321FDC321FDC321FDC321
5292FDC321FDC321FDC321FDC321FDC321
5293FDC321FDC321FDC321FDC321FDC321
5294FDC321FDC321FDC321FDC321FDC321
5295FDC321FDC321FDC321FDC321FDC321
5296FDC321FDC321FDC321FDC321FDC321
5297FDC321FDC321FDC321FDC321FDC321
5298FDC321FDC321FDC321FDC321FDC321
5299FDC321FDC321FDC321FDC321FDC321
5300FDC321FDC321FDC321FDC321FDC321
5301FDC321FDC321FDC321FDC321FDC321
5302FDC321FDC321FDC321FDC321FDC321
5303FDC321FDC321FDC321FDC321FDC321
5304FDC321FDC321FDC321FDC321FDC321
5305FDC321FDC321FDC321FDC321FDC321
5306FDC321FDC321FDC321FDC321FDC321
5307FDC321FDC321FDC321FDC321FDC321
5308FDC321FDC321FDC321FDC321FDC321
5309FDC321FDC321FDC321FDC321FDC321
5310FDC321FDC321FDC321FDC321FDC321
5311FDC321FDC321FDC321FDC321FDC321
5312FDC321FDC321FDC321FDC321FDC321
5313FDC321FDC321FDC321FDC321FDC321
5314FDC321FDC321FDC321FDC321FDC321
5315FDC321FDC321FDC321FDC321FDC321
5316FDC321FDC321FDC321FDC321FDC321
5317FDC321FDC321FDC321FDC321FDC321
5318FDC321FDC321FDC321FDC321FDC321
5319FDC321FDC321FDC321FDC321FDC321
5320FDC321FDC321FDC321FDC321FDC321
5321FDC321FDC321FDC321FDC321FDC321
5322FDC321FDC321FDC321FDC321FDC321
5323FDC321FDC321FDC321FDC321FDC321
5324FDC321FDC321FDC321FDC321FDC321
5325FDC321FDC321FDC321FDC321FDC321
5326FDC321FDC321FDC321FDC321FDC321
5327FDC321FDC321FDC321FDC321FDC321
5328FDC321FDC321FDC321FDC321FDC321
5329FDC321FDC321FDC321FDC321FDC321
5330FDC321FDC321FDC321FDC321FDC321
5331FDC321FDC321FDC321FDC321FDC321
5332FDC321FDC321FDC321FDC321FDC321
5333FDC321FDC321FDC321FDC321FDC321
5334FDC321FDC321FDC321FDC321FDC321
5335FDC321FDC321FDC321FDC321FDC321
5336FDC321FDC321FDC321FDC321FDC321
5337FDC321FDC321FDC321FDC321FDC321
5338FDC321FDC321FDC321FDC321FDC321
5339FDC321FDC321FDC321FDC321FDC321
5340FDC321FDC321
```


(listing continued from previous page)

```

085C2C323CD8433CD941EFE0B3802CF0A
FE0830194F878787"
0070 DATA 7455 "916F2600110FFF19
034FE0346F8C99C80C100000C9FE0930
05ED5E03F7C99F330073A02F4F0600
033H01FFC0C1FE3338F3C606718FFFFF5
05D5E5FC087846820
0050 DATA 7153 "2D0608210FFFE55E
0880C84600E7F3280A1628722873
0B33C0AD700110780E11910E2FDCB007E
004FAD700066E101D1F1C19C2323E5235E
335D5E2A09FFFE0D5E
0090 DATA 7448 "07FFB57ED521110F00
00101010000000000000000000000000
FFFE0D28300000000000000000000000
02A93F79387838
00100 DATA 7593 "6F25001111FF190CB
08C900822111FF190700C0A11910F19CB
10B3395F73277780C1070A0FFFE0D2830
12F0C89E0330724FFFE0DC2A9F798737
3791FF26001111FF
0110 DATA 7831 "1BC0B66C908082111
FF110700C868191FBC0B784E822002
0F0505FFFE0D28313CD3F9FE0D28313CD
027E7E7ED428312AF1807FE4D0C3FA021
FFFCB768E8ED4342
0120 DATA 7617 "5C32445CC99D83F9
FE0D02A9F9210F7E87E424388E4D4305
FF116BF02A30232729D0D2E001803
0D2E2C083F9FE2802CF0BE7C51143
FAC0B9FE93C03819"
0130 DATA 9570 "CD12CFE08D21AFC
757BF2C0CA9F9F7E1143FAC0B9FE9300A
1F5CD83F9FE0D02A9F9210F7E87ED42
DA1FAC0B9FE93F878787936F800110F
5E6960C0D6E19EBE1"
0140 DATA 7098 "360023360023CD0D
2875F02170FB23FFFE210FFF1110FF01
37003600C0D030FF"
0150 DATA 7930 "ED47ED5E2AB25C23
2207FF2179792208FFFE2100FFFE20BF
00FF180C4D7830C0DDE1017AFE2E2005
05D0C0D0F06C787800123BF10D05FE7D33
5CED55428C32445C"
0160 DATA 8108 "C3B5FACB5FAFC0B76
962A05FFFE2207F71800FACB764EC20313
3A3H3C3201FF733600FFFCDB7686FDCB
780C810000FFD73007225F5C22085CCD0
162138FDEE28445C"
0170 DATA 7993 "2203FF3A475C3202
0170405FF1110F000000000000000000
07878080808080808080808080808080
00000000000000000000000000000000
0180 DATA 7700 "425C2B7E32445C23
07FFC92B32445C2B7E32445C2B7E3244
FF70FEFE334280000000000000000000
140C541C3335E0C0D0C0D0C0D0C0D0C0
3A454C0FC0CB0A"
0190 DATA 8617 "2007FE05B425C3A44
50CF333CBAD080ED730D0C242A05
360A00F0CB780001B8F8E2319F08E7F3
R05009FFFE22082B36E236E236E236E2
FBE04607FB7E4A"
0200 DATA 8017 "C5010F00ED42C0138
41ED7830C9680ED4B455C3A445C77C0
CB0A7E2207F4680ED5C3A445C77C0BFF
ED4B70SCDDB00ED4B455C3A445C08FFFE04B
985C0C08FFFE232207"
0210 DATA 8489 "FFFEBC306FA237123
70CF8FB0CB0A7EFC2A4B5C0C6E193A44
5C8CB0CA702EFC18077EEFC07802B01E0
030CF8A2A5E000000000000000000000
CFAD0EB11090000ED"
0220 DATA 578 "522207FFC9"

```

ected the computer does a Go To to the line — not a Gosub although the com- does remember where the error occurred.

error handling routine should be able to competently handle any error that can occur in a program. In common with break subroutines, error routines may just consist of a Run command to restart the program if an error occurs.

```
10 DEF FN v(a)=USR 63872: RANDOMIZE
   USR 63866
20 REM ON ERROR GOTO 1000
30 LET a=b: REM *What b?
1000 PRINT "Oh dear, there's been an error!"
1010 REM RESUME
```

The use of Verify or Load commands from within a program often causes problems if there is a tape error since you are left in command mode once the error has been reported. If the program is going to be used by people other than its author, then it is necessary to print instructions on the screen of what to do in the event of a tape error to re-enter the program. This works, but is hardly state of the art in user-friendliness.

Inside the error routine, FN v(8) returns the line at which the error occurred. The self-list-routine is as follows, you might find it a time saving debugging aid:

```
DEF FN v(a) =USR 63862: RANDOMIZE
USR 63866
REM ON ERROR GOTO 9990
<Rest of program>
PRINT "Error ";CHR$ FN v(10);" at line
";FN v(8); ";;;FN v(9)
PRINT
LIST FN v(8)
I v(9) returns the statement number of the
reous command and CHR$ FN v(10)
```

The major function of the program is of course to provide interrupt handling. This is implemented in the form of the commands: After, Every, Disable, Enable and Drop. The scheme of things is basically this; there is a timer available counting at a rate of 50 units per second — the Frames rate. Using the After command you can set the timer to a specific value. Immediately, the timer starts counting down towards zero. Your program can happily continue, not having to worry about the timer any further. When the counter reaches zero the flow of your main program is temporarily diverted to a certain subroutine; just as if a

until you answer no to the "scroll?" (continued on page 150)

New

High Flyers!

from MicroProse Software



The action
is simulated.
The excitement
is REAL!



Grab your joystick
and take off with this
user friendly flight
simulator that is All
the flying challenge you can handle! Includes
outstanding 3D graphics, full cockpit instrument
ation, dual VORs, ILS, 21 different airports, landing,
scoring, and real life challenges from weather,
instrument and mechanical emergencies.

No.1
Flight
Simulation

DISK/CASSETTE

£14.95



F-15 Strike Eagle
features superb 3-D
graphics, F-15
manoeuvrability,
computer assisted targeting including a modern
fighter Heads Up Display, airborne radar, air to air
missiles, surface to air missile defence, ground
target bombing, full aerobatics, and multiple
combat scenarios.

DISK/CASSETTE

£14.95



CASSETTE
DISK

£9.95
£12.95

Defend Europe in a heart pounding,
accelerated real-time war situation!
Use your full continent scrolling
battle map to destroy, manoeuvre
and command the battle unit,
including infantry, armour,
helicopters, air forces, and tactical
nuclear weapons to stop the ever
advancing Warsaw Pact battle
units.

CASSETTE

£9.95
£12.95



**THE ULTIMATE IN AMERICAN SOFTWARE
FOR YOU ON U.S. GOLD**

U.S. Gold is stocked by all leading computer stores
including:

BOOTS WHSMITH JOHN MENZIES WILDINGS

DEALERS! For information on how to become a U.S. Gold
Stockist write to: CentreSoft Ltd., Unit 24, Tipton Trading
Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH
Telephone: 021-520 7591. Telex: 337268.
Overseas enquiries welcome.

U.S. GOLD

All American Software

(continued from page 148)

Gosub had been magically inserted in the right position in the program.

The subroutine is not terminated by a Return command but by the normally innocuous Continue. The syntax of the After command is After x, Gosub y. The Gosub has to be typed out in full. It is necessary, I'm afraid, to type in the seemingly redundant comma just before the Gosub bit.

The ability for a program to be freely interrupted in this way is often loosely termed Multitasking or parallel processing.

Here's a silly example — a listing for a computerised egg timer.

```
10 RANDOMIZE USR 63866
20 REM AFTER 9000,GOSUB 1000
30 PRINT "Start boiling the egg. I'll just
  brush up on my mental arithmetic."
40 LET a = INT (RND*1000)
50 LET b = INT (RND*1000)
60 PRINT a;" + ";b;" = ";a+b
70 FOR c = 1 TO 100: NEXT c
80 POKE 23692,255: REM *Allow
  automatic scrolling
90 GO TO 40
1000 PRINT "The egg is done"
1010 STOP
```

Line 20 sets up the time delay of 9000 1/50ths of a second — three minutes. Lines 30 to 90 just waste type by doing something completely unrelated with eggs, adding numbers together. Lines 1000 and 1010 are the subroutine called when the three minutes are up. The After command is a "single shot" command in that the subroutine is called only once, after which the timer becomes inactive. In most applications you would want a certain routine to be called at regular intervals. You could do this with the After command if you re-initialised the timer with After at the start of the subroutine.

However, a much better way is to use the Every command. Every is used in exactly the same manner as the After command. When the "interrupt service routine" — the subroutine called when the timer reaches zero — is reached the timer is automatically re-armed to its starting value ready for the next time. This program will constantly update the time at the top left-hand side of the screen even while another program is running:

```
10 RANDOMIZE USR 63866
20 LET min = 0: LET sec = 0
30 REM EVERY 50,GOSUB 9900
40 LET a = 0
50 PRINT AT 21,0;a: LET a = a + 1
60 GO TO 50
9900 LET sec = sec + 1
9910 IF sec > 59 THEN LET min = min + 1:
  LET sec = 0
9920 PRINT AT 0,0;"0" AND min < 10;min;
  "":"0" AND sec < 10;sec
9930 CONTINUE
```

The delay time in an After or Every command can be up to 65,535 units, about 21 minutes 51 seconds. If you need longer delays than this for some reason then you could use the following method. For instance a delay of one hour could be produced by setting up an interrupt service routine — or ISR if you like abbreviations — called every 10 minutes. At the start of the program you would initialise a variable — a, say — to zero.

Each time the ISR is called the value in a is incremented and when it reaches six, an hour has passed. Bear in mind, however, that the

Spectrum's clock isn't very accurate and you could end up with a quite drastic error with such a long delay.

So far I've talked about the "timer" in a singular sense. There are, in fact, eight timers. All eight are completely independent of one another in all respects. You can direct information to specific timers in an Every or After command by tapping another number in after the delay time, e.g.,

```
AFTER 100,7,GOSUB 9000
```

uses timer 7.

The timers are numbered 0 to 7. If you miss the timer number out, as in previous examples, then it defaults to timer 0.

The Disable command enables — no pun intended — you to suspend the operation of one or all of the timers. Disable used on its own disables all eight timers whereas Disable followed by a number disables only that particular timer. The inverse command is Enable which is used in a similar fashion to re-enable previously disabled timers.

```
10 RANDOMIZE USR 63866
20 REM AFTER 100,GOSUB 1000
30 REM DISABLE 0
40 GO TO 40
1000 PRINT "Time up!"
1010 STOP
```

Does nothing unless you remove the disable statement at line 30 or put in an enable command at line 35. You'd usually use the Disable/Enable commands to protect certain parts of a program from being interrupted, possibly because that part manipulates variables used by the ISR(s) and could leave the variables in temporary states that may upset the ISR(s).

The last command connected with interrupts is Drop. In an analogous way to normal Gosubs, before an ISR is called the current line and statement numbers are stored away on a stack so that normal program execution can continue quite happily when the ISR is finished. In some circumstances, however, you might not want to ever return from the ISR. For example, in a game you might wish to set a time limit to complete a certain task, say 10 seconds. You could use After 500, Gosub 8000 so that when the time is up a jump to line 8000 will be made. Obviously you wouldn't want to return from the ISR to continue that particular part of the game.

To save leaving the stack in an unbalanced state you would use the Drop command. This command simply makes the computer take the top item of its stack and throw it in its electronic dustbin. In an application such as this you can disarm the timer with an After 0, Gosub x as soon as the task's been completed otherwise you could find the computer calling the ISR at a rather inappropriate time.

When a timer counts down to zero the computer remembers that a certain line is to be called by placing its line number on yet another stack. When the statement currently being executed is finished it looks at the number it remembered and calls the appropriate ISR. Because ISR calls are not processed until the current statement is completed Input, Pause, Load, Save, Merge and Beep may hold things up. The computer, being a meticulous beast by nature, carefully piles up all the numbers of the ISR's it's got to call in preparation for such a time when it is able to process them.

Eventually the computer will run out of room and will no longer bother to store the lines. The amount of room the computer has got for stack storage is determined by how much memory you leave free between RAMtop and the start of the program at 63866. A good value for RAMtop is 63000 which leaves room for all but the most complex applications. Using the user-defined function introduced under the On Error command it is possible to interrogate any of the timers and find their current status. Use FN v(x) where x is the timer you wish to look at, numbered 0 to 7.

```
10 DEF FN v(a) = USR 63872:
  RANDOMIZE USR 63866
20 REM AFTER 1000,5,GOSUB 4000
30 PRINT AT 0,0;FN v(5);" "
40 GO TO 30
1000 STOP
```

The program displays the time remaining on timer 5 as it plunges towards zero. The function will return a zero if the timer is either inactive or disabled.

Unlike error and break handler routines, ISRs will nest to as many levels as you like although in practice the number of levels is determined by the amount of free memory available above RAMtop for the stack. One thing to avoid is to define an Every command with a time interval smaller than the time needed to execute the associated ISR. The routine will "interrupt itself" in such a circumstance as the next interrupt will have occurred before the ISR to handle the previous interrupt is finished.

Eventually the computer will get clogged up with an enormous stack of return lines which it never quite gets round to using. If this sort of situation is a possibility in your program then disable the timer right at the start of the ISR and enable it again right at the end. When writing ISRs, as with break and error handlers, it is important to remember that the routine should not do anything to unduly upset the main program by changing the value of one of the variables it is using, for instance.

The computer looks after you a bit by automatically storing the print and plot positions at the start of the ISR and restoring them to those values when the ISR is terminated. Print and plot positions are therefore "local" to the ISR. If you print and draw from within an ISR then the computer will automatically tidy any damage you might have done by changing the print/plot position.

There are a couple of points of interest to Interface 1 users. First, you should not use Open # and Close # commands in conjunction with this program. More precisely, programs using the interrupt facilities; On Error and On Break etc., don't matter. Secondly, any other Microdrive/Interface 1 commands should be immediately followed by

```
RANDOMIZE USR 63869: POKE 23728,0
```

sequences. Rem statements typed in as direct commands are treated in the normal way and cannot, therefore, contain any new commands. The Continue statement cannot be used in the normal way as when an error is actually reported (in contrast to an error handler being called) then all the new stacks are cleared and the timers are all forced inactive. Continue will not, then, resume a program without actually clearing or changing anything.

THE FINAL TOUCH

We've just added the final touch to our professional keyboard. This new Microdrive compatible keyboard offers more key functions than any other in its price range. And the stepped keys and space bar make it even easier to use. Our keyboard, constructed from high density black ABS, will take your Spectrum into the professional league. It has 52 "stepped" keys plus space bar. A separate numeric key pad consisting of 12 red keys including a single entry 'delete' plus single entry 'decimal point', facilitate fast

numeric data entry.

The 15" x 9" x 3" case will accommodate your Spectrum and other addons like interface 1, power supply etc. and forms an attractive self-contained unit.

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

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

All **dktronics** products are covered by a comprehensive guarantee.

Constructed from high density block ABS

All connections accessible at rear

52 stepped keys

Space bar

Separate numeric keypad



ONLY £45.00

Please rush me the following

..... Microdrive compatible

keyboard(s) £45.00

Please add post and packing £1.25

I enclose cheque/PO/Cash for Total £

or debit my Access/Barclaycard No.

Signature

Name

Address

No Price Increases!

And it's Available NOW!

dktronics

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

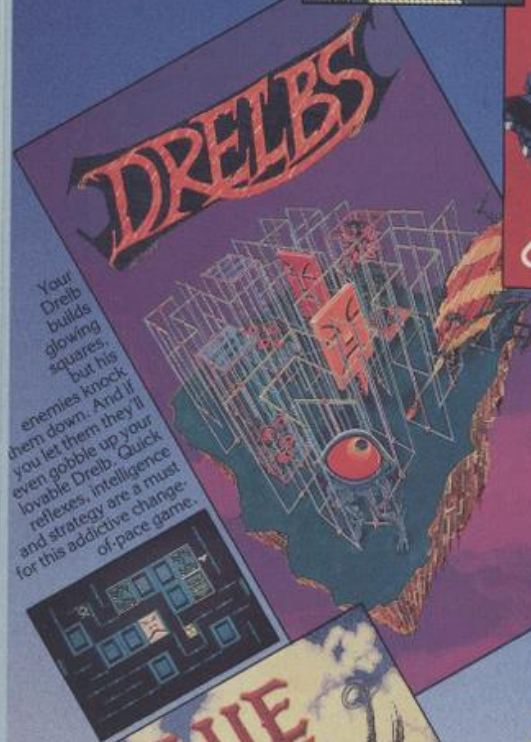
The Spectrum Connection

synsoft
presents...

The World's Greatest Games!



Selected Titles
available soon for
Spectrum



Your Dreibus builds glowing squares, but his enemies knock them down. And if you let them they'll even gobble up your reflexes, intelligence and strategy are a must for this addictive change-of-pace game.

Play one of the most challenging arcade games on your C-64 computer. ZAXXON's incredible 3-D graphics, diagonally scrolling screen and super sound are reproduced in great detail. Hang onto your joystick, keep firing and practice. You may eventually encounter the deadly Zaxxon himself!



Exciting 3-D action! The most realistic game you've ever played! Navigate through asteroid belts, destroy enemy ships, track their battle-stars through intergalactic minefields. Now can you prevent the enemy capturing your planet?

synsoft



Shoot down enemy planes, bomb targets, strafe tanks... there's constant action on the incredible 3-D scrolling screen. You must master a series of flying skills and perform them with pinpoint accuracy. One slip and you've lost it all! Happy landings, ace!



Play this multi-level extravaganza three different ways. Fire on hazards, rescue 18 trapped friends, make your way through treacherous caves! Super graphics, unnerving sounds and constant scrolling screen.

CASSETTE £9.95
DISK £14.95



THE ULTIMATE IN AMERICAN SOFTWARE FOR YOU ON U.S. GOLD

U.S. Gold is stocked by all leading computer stores including:



John Menzies

WHSMITH WILDINGS WOOLWORTH

U.S. Gold Ltd., Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH

Telephone: 021-520 7591. Telex: 337268.

BBC RETRO-FITS

Acorn's new ABC lets you upgrade all the way to a minicomputer — you can't go that far with the BBC but John Dawson tries some packages which take it into the supermicro league.

THE PRODUCTION of massive quantities of add-on or "retro-fit" equipment for the BBC Microcomputer must be having some effect on the unemployment situation in the U.K. For those of you with some money to spend, or the hope that someone else will spend it for you, here is a pre-Christmas selection of hardware and software for the BBC computer. Prices range from less than £15 up to rather more than £120.

It's actually quite difficult to keep up with all the gadgets and programs that are being developed and advertised for the BBC machine. In the course of writing this article I have found a second and third ROM extension cable mentioned in advertisements, several more ROM extension boards, two or three more versions of Forth and so on.

No frustration or disgust

Only a few of the items in this review create any new capabilities for the BBC Micro; you can, after all, save programs on to tape, exchange Eproms using the four sockets in the ordinary machine and process words using any one of a number of programs. What the devices and software discussed here do achieve is an increase in your productivity by saving time, reducing fatigue and errors and encouraging you to concentrate on the task rather than the machine. The gain is so great in some cases that a job becomes possible where before you would have given up in frustration or disgust.

Multi-Forth 83 from Skywave has been written by David Husband who produced an earlier version of the language for the ZX-81. It

is impossible to thoroughly test a piece of software like multi-Forth 83 in the course of a couple of weeks. That applies also to both the other chips — Ade and View A2.1 — discussed in this review. It is possible to give you some idea of the capabilities of the program and its underlying ideas and any gross faults.

Multi-Forth 83 comes as a 27128 16K Eprom and Skywave says that while it normally operates a return of post service, the worldwide shortage of these chips means that their initial stock is unlikely to last for very long while the price of £40 may have to change to reflect the Eprom supply situation.

A 176-page manual completes the standard package and a demonstration disc holding one program is available to round off a "de luxe" system. The manual contains a comprehensive description of the multi-Forth 83 system although you will need a separate Forth textbook if you are not familiar with the language.

Forth is a Threaded Interpretive Language and it is an intrinsic quality of TILs that they run quickly. Multi-Forth 83 is said to operate 17 times faster than BBC Basic — when it is performing one task. That seems a reasonable claim, particularly when you see the system multi-tasking and still operating quickly.

Normal programs execute a series of program instructions and stop. Multi-tasking allows you to place several complete programs into the computer's memory and the computer is then directed to hop around from one program to another so fast that it looks as though all the programs are running simultaneously.

Multi-Forth 83 will run up to 28 tasks at one time! The demonstration disc shows five tasks

operating at once and the screen output is very impressive. If you start a foreground task it is noticeable that some of the others slow down, the screen display of the clock, for example, may only be updated every two seconds, but the overall performance of multi-Forth 83 is stunning.

You can print a listing of a program at the same time that you are doing something with the keyboard, sending commands to a robot via the user port and reading the position of a joystick.

The Forth position

The 1983 standard Forth definition has a lot of useful words in addition to those in the earlier 1979 standard and David Husband has included many BBC-specific commands from the operating system. Words are available also to control Sound, Envelope, Colour and Time. The editor allows the use of the BBC cursor keys as well as the usual single-key Forth commands.

Standard Forth uses integer numbers and multi-Forth 83 keeps to this policy offering 16-bit and 32-bit number-handling words. You can, of course, write your own floating-point words but the integer and fixed-point words in multi-Forth 83 will do very well for most applications.

Multi-Forth 83 will appeal greatly to anyone who is already familiar with the use of Forth; additionally, it should be considered by owners of the BBC computer who wish to start learning about Forth. Multi-Forth 83 does not

(continued on page 157)

MUSIC MICRO PLEASE!!



ECHO I
£99.95*
ECHOSOUND
£49.95*
ECHOKIT
£4.95*

LVL's ECHO I is a high quality 3 octave keyboard of 37 full sized keys operating electronically through gold plated contacts. The keyboard which is directly connected to the user port of the computer does not require an independent power supply unit.

The ECHOSOFT Programme "Organ Master" written for either the BBC Model 'B' or the Commodore 64 supplied with the keyboard allows these computers to be used as real time synthesizers with full control of the sound envelopes. The pitch and duration of the sound envelope can be changed whilst playing, and the programme allows the user to create and allocate his own sounds to four pre-defined keys.

Additional programmes in the ECHOSOFT Series are in the course of preparation and will be released shortly.

Other products in the range available from your LVL Dealer are our:

ECHOKIT (£4.95)* - External Speaker Adaptor Kit, allows your Commodore or BBC Micro-computer to have an external sound output socket allowing the ECHOSOUND Speaker amplifier to be connected.

ECHOSOUND (£49.95)* - A high quality speaker amplifier with a 6" dual cone speaker and a full 6 watt output will fill your room with sound. The sound frequency control allows the tone of the sound output to be changed.

Both of the above have been specifically designed to operate with the ECHO Series keyboard.

The ECHO PRODUCT FAMILY breaks both the SOUND and PRICE BARRIERS, representing outstanding quality and value for money.

* Inclusive of VAT



Scientific House,
Bridge Street, Sandiacre
Nottingham NG10 5BA
Telephone (0602) 394000

AVAILABLE FROM ALL LVL DEALERS. (FOR FURTHER INFORMATION TELEPHONE 0602 394000).



MILES BETTER SOFTWARE

221 Cannock Road, Chadsmoor,
Cannock, Staffs WS11 2DD
Tel 05435 3577

US Gold Software

	Cassette	Disk
BEACH HEAD	£ 8.95	£12.00
RAID OVER MOSCOW	£ 8.95	£12.00
STRIP POKER	£ 8.95	£12.00
*FORBIDDEN FOREST	£ 8.95	£12.00
*AZTEC CHALLENGE	£ 8.00	£12.00
*SLINKY	£ 8.00	£12.00
*CAVERNS OF KHAFKA	£ 8.00	£12.00
*POOYAN	£ 9.00	£12.00
*BRUCE LEE	£12.95	£12.95
*DALLAS QUEST	—	£12.95
*O'REILLYS MINE	£ 9.00	£11.00
*SNOKIE	£ 9.00	£11.200
*FLAK	—	£12.95
MYSTIC MANSION	£ 8.00	£12.00
*SOLO FLIGHT	£12.95	£12.95
*NATO COMMANDER	£ 9.00	£12.95
*F-15 STRIKE EAGLE	£12.95	£12.95
*SPITFIRE ACE	£ 9.00	£12.95
*FORT APOCALYPSE	£ 9.00	£14.00
*DRELBS	£ 9.00	£14.00
ZAXXON	£ 9.00	£14.00
SENTINAL	£ 9.00	£14.00
*BLUE MAX	£ 9.00	£14.00

*Available for the Atari

Phone for software availability and comprehensive software lists

ADULT PARTY GAMES

SPECTRUM 16/48k

STRIP POKER

Classic adult party game for 2-10 players, who may lose a lot more than their stake! Fully featured 5-Card Poker game (basic rules supplied) with that little bit extra!

£6.95 (cassette)

Fully inclusive mail order price

RISQUÉ

New on-screen board game for 2-4 very, very good friends. Revealing after-dinner frolics, fun, dares, risks and forfeits!

£7.95 (cassette)

Fully inclusive mail order price

Send cheque/PO/MO payable to:

PR SOFTWARE

7 Ashley Road, Poole, Dorset BH14 9BS

PRAYBOURNE

FREE!
PROTECTIVE DUST COVER
WITH EACH BAG... WORTH UP TO £4.95



DRAGON BAG
(Also takes Atari 400, Atari 800XL, Texas T199, Tandy TRS 80 Home Computer). Price £17.95



BBC MODEL B BAG
(Also takes Atari 800). Price £18.95



CSM 64 / VIC 20 BAG
(Also takes Lynx, Acorn Electron, Atari 800XL). Price £14.95



SINCLAIR SPECTRUM BAG
(Also takes Orii, Sinclair ZX 801). Price £12.95

All these bags have been carefully designed and sculptured to fit each computer that they were designed for. Some of the bags will also take other computers and these are indicated as those inside the closed brackets.

We also manufacture padded bags for most home and business computer hardware.

Trade and export enquiries welcome (large discounts available)



CASSETTE/DISC DRIVE/ACCESSORY BAG

This bag will take all leads and cables, mains adaptor and plugs. It will carry all cassette and disc drive units available from most leading manufacturers. There are also 2 useful pockets to take any items such as manuals or cassettes that you are unable to squeeze into the large main bag compartment.....an ideal addition to the bags above. Price £14.95

SPECIFICATION

A strong attractive 'sports bag' type material is used inside and out. This is a nylon coated P.V.C. material which is immensely strong and waterproof. It has a wipe clean finish and all bags are available in black or royal blue. The handles are 1" polypropylene webbing which travel all the way around the bag to give added strength. Quick release non-slip nylon buckles allow access to the bag and its pockets to carry discs, manuals, plugs and leads, etc. All bags are padded with a high impact 1/2" thick foam which protects computers against bumps and bruises which would normally damage the machines. Most bags have a comfortable non-slip shoulder strap which is fully adjustable and has 'dog clip' fasteners to enable the strap to be removed if so wished. Each bag has a clear P.V.C. window on the inside to allow an address card to be inserted for identification purposes.

All prices are inclusive of V.A.T., postage and packing for U.K. deliveries (overseas add 20%)

PRAYBOURNE LIMITED, UNIT 5, MILLSBOROUGH HOUSE, IPSLEY STREET, REDDITCH, WORCESTERSHIRE, B96 7BU

Redditch (0527) 61221, 61759

I enclose my cheque/postal order: Total.....

Please send me:..... BAG/S together with my FREE! dust cover

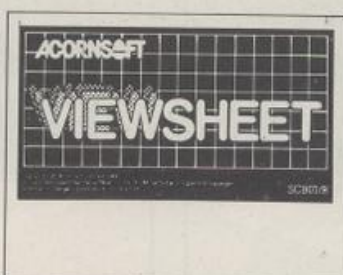
NAME.....

ADDRESS.....

Please allow 14 days for delivery (overseas 28 days)



View ROM Word processor software. Normal price £59.95.

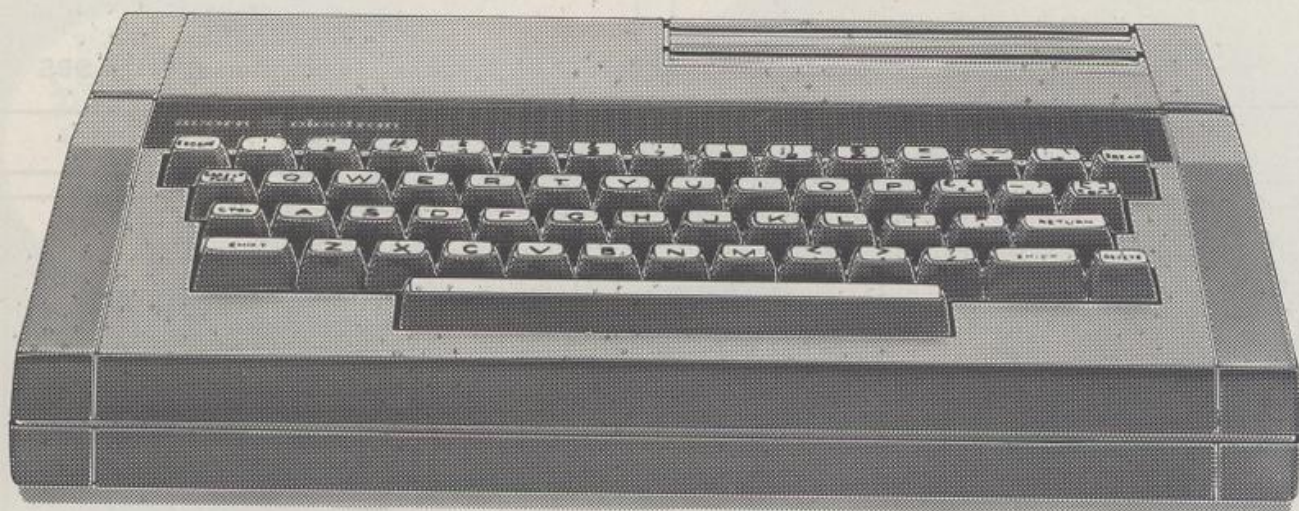


Viewsheets ROM Spreadsheet software. 255 columns by 255 rows. Normal price £59.95.



Games ROM The exciting Arcade game, Hopper. Normal price £14.95.

All you need to mix business with pleasure. For only £299.



Acorn Electron 32K Random Access Memory. With BBC Basic. Normal Price £199.00.

Electron Expansion Box - Plus 1 provides various utility capabilities which include: a Centronics Interface, a Joystick Interface and 2 ROM Sockets. Normal price £59.90.



Acorn Electron Office Package. Items if purchased separately £393.75. W.H.S. price 299.00.

The Acorn Electron Office Package at W.H. Smith provides you with an ideal opportunity to combine all the fun of computer games with practical business usage, such as word processing and spreadsheet capability. You can buy this whole package for £299.00. Separately, the same components cost you £393.75. (incl. VAT).

Find this amongst our wide range of carefully selected computer hardware and software available at most W.H. Smith computer departments.

WHSMITH



 Subject to availability. Prices correct at time of going to press. 

(continued from page 153)

have to be complex to use but it can keep pace with your developing skills for a long time to come.

The Ade chip is made by System of Sheffield. Ade stands for Assembler Debugger Editor and the 16K chip is a complete, assembly language development system for the BBC. While it is possible to use the assembler in BBC Basic as a macro assembler, it is rather clumsy for programs of any length.

If you want to add short sections of machine code to a Basic program to speed up certain critical sections then you do not need the Ade package. If, on the other hand, you want to write a complete program in machine code then the Ade macro assembler and front panel monitor will become trusted tools.

Ade will assemble a source file whose length is limited only by the disc capacity. 29 pseudo-ops give you almost all the control and facilities that you might need. One or two of the pseudo-ops that I have used in Merlin — a macro assembler for the Apple II — are absent, but they are esoteric and not really essential facilities.

The editor in Ade is based on a DEC mini-computer editor called Teco. In addition to immediate commands you may set up a deferred command line which can be a very powerful combination of editing commands.

priority Eprom socket I can move easily around various programs from Basic to View A2.1, from Commstar to Ade and so on.

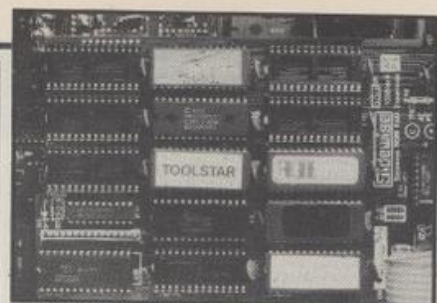
The Ade reference manual contains more than 80 pages of concentrated, well laid out information. Altogether very good value for serious assembly language programmers.

Clares' Replica II is supplied on a 40 or 80 track disc and its purpose is to take copies of cassette tape based programs on to the disc with very little fuss or bother. The Replica II program has space for up to 16 programs and neither the programs nor the copying software can be copied from disc to disc.

In other words you are allowed to make a disc copy of a cassette program. When the disc is full you will need to buy another Replica II disc if you wish to copy further programs.

Replica II costs £12 and worked well on my Acornsoft Lisp and Forth tapes as well as my Computer Concepts' Logo. You must be using Basic when you start to run the Replica program; it won't work from any other Eprom. I entered the number of sections in each cassette program and told Replica II that the cassette instructions were to Chain the program.

The transfer to disc proceeded automatically and all the programs I have loaded ran normally. Both Forth and Lisp continued to default to the cassette for file handling. Ordinary



on Wordwise then you should consider paying the extra £12 for a View A2.1 chip.

If you write professionally, when the productivity you achieve is important to you in terms of money, you will recover the additional cost in a couple of weeks or less.

View A2.1 has more facilities than Wordwise and the full screen editing makes it much easier to use. Twenty-nine formatting and editing commands are available using the red function keys and a further 23 formatting and printer commands can be embedded in the text. Although you will need the printer driver program to make the best use of your printer, there are two highlight commands in View which can be used to send control codes of your choice to a printer.

The Search, Change and Replace commands have powerful wildcard facilities. There are commands — Edit, More, Finish or Quit — to cope with documents longer than the available RAM in the BBC Micro. Working forwards through a text is easy but it is a more complicated matter to transfer a section of text backwards over the boundary between text on the disc and text in the computer.

Nevertheless View does allow you to handle long documents using an 80-column display. Wordstar, a CP/M-based word processor, is easier to use in this respect but costs six times as much as View! In some other ways View is more powerful than Wordstar and has a better ergonomic design.

On top of all the powerful text editing functions, for example, you can type in a list of names and addresses and then merge these automatically into a standard letter.

You cannot select certain categories of people from within a list, but that is no disadvantage for many purposes. View will produce all the footers, headers and two-sided headers that you might need for writing a book and can print one chapter after another from disc or tape without any intervention by you.

I think that the full screen editing is the feature of View that I like most and the one that separates it most clearly from Wordwise. Some Apple word processors costing more than £80 work in the same way that Wordwise does and the effect of the text moving around a cursor fixed on the centre line of the screen can be tiring and confusing.

Professional word processors must be easy to use for prolonged periods and View A2.1 meets this requirement. The View A2.1 instruction manuals are excellently produced and clearly written. One or two things are missing in the manuals. There is, for example, a page layout command called CO — comment — which is mentioned at the back of one manual but explained nowhere.

Despite this minor omission View A2.1 is a new piece of software that now represents better value for money than its more well

(continued on next page)

DFS assumed to cost £95						
Average 5.25 SS 40T 100K disc £130						
Phloopy costs £113.85						
	200K £170					
Discs/tapes	10	20	30	40	50	60
tapes	43.10	86.20	129.30	172.40	215.50	258.60
discs	18.00	36.00	54.00	72.00	90.00	108.00
Phloopy total	156.95	200.05	243.15	286.25	329.35	372.45
5.25 total	243.00	261.00	279.00	297.00	315.00	333.00
5.25 200K	274.00	283.00	292.00	301.00	310.00	319.00
Phloopy advantage against 100K disc	86.05	60.95	35.85	10.75	-14.35	-39.45

Table 1.

You can also define an editing macro command which will be performed whenever you press the Copy key. I like the Ade package very much even though I have spent hundreds of hours working with Merlin. The Ade editor works differently to the Merlin program but appears to be at least as powerful and, as System points out, you can use other editors such as Wordwise. I tried to edit one file using View but that was not very successful; I don't yet know why.

The third part of the Ade system is the debugger or front panel monitor and disassembler. Unlike many other BBC disassemblers, the Ade program produces machine-code listings which can be saved on to disc, loaded into the editor and reassembled after modification. The front panel commands are comprehensive.

One small but very useful feature is that Ade starts with an asterisk and whatever you type on that line is treated as a "star" command. I have always found it tedious to have to press the Shift key and the Asterisk key together before typing the name of the program I want to use and by mounting Ade in the highest

games programs caused no problems although Clares is careful to say in the instructions "Whilst Replica II has been made as wide ranging as possible there are and there always will be exceptions".

Copy protected discs and locked tapes make me cross and nervous at the same time. Clares says "Should the disc become corrupted either through a drive fault or incorrect usage Clares will undertake to re-copy the disc for a cost of £1.00 cash... If it is found upon investigation that the problem was caused by Replica II we will re-copy and refund your £1.00".

That seems a fair offer. Certainly I am delighted to have the accessory languages that I use from time to time available quickly rather than having to wait interminably while the cassette recorder grinds away. Good value.

The original View word processor was plagued by a number of bugs and never achieved the popular acclaim given to Wordwise. View A2.1 is a new, error-free version, and is a far better word processor than Wordwise for all sorts of reasons. I have been using View for the last couple of weeks and I have no doubt that if you are thinking of spending £46

(continued from previous page)
known competitor.

Toolstar is a chip containing a set of utility programs. Unlike an ordinary machine-code monitor, Toolstar is transparent to the MOS. This means that each of the routines in Toolstar "performs its function with stealth and afterwards leaves no trace of its operation".

Using no Basic program RAM, Toolstar functions can be called from within a high level program and the comprehensive manual lists a complete disc editor program written in Basic and using many Toolstar sub-programs.

You can extend the routines within Toolstar by writing your own code and calling it using the *Extend command. Eight Basic tools can be used to modify, edit or repair Basic programs and there are 10 machine-code commands which make up a formidable set of monitor tools.

Tools for industry

Toolstar has four disc filing system commands which do away with the annoying necessity for a formatting disc by providing Format and Verify functions as well as disc sector Load and Save commands. Good value for money, especially for people working with machine code.

Floppy disc drives for the BBC Micro-computer make up a high proportion of all the disc drives sold in the U.K. Despite the benefits, a floppy disc drive with the associated integrated circuits — floppy disc controller, disc filing system ROM and so on — is an expensive addition to your machine.

Table 1 shows the real costs of the Phloopy system from Phi Mag Systems Ltd compared with a floppy disc drive with the same storage capacity. The table was constructed to show how the initial cost advantage of the Phloopy systems is progressively eroded as you purchase more discs or tapes.

The break-even point occurs at 44 tapes assuming that there is no change in relative prices. However, you should not be put off by the relatively high cost of the tapes as you will have 4.4 Megabytes of programs or data stored away before the floppy disc becomes more economical.

The Phloopy drive differs from the Hobbit and Ultradrive systems which use cassettes of tape wound from one spool to another to store and retrieve information. Instead, the Phloopy uses a continuous loop of tape like the Sinclair Microdrive. However, the Phloopy is unique in that it stores in parallel format on tape.

By storing data eight bits wide with a ninth clock track, the Phloopy system offers a high packing density and short access times. The drive mechanism and data transfer are controlled by an 8049 microprocessor inside the Phloopy case while a 6821 chip acts as the interface to the main computer. Once you have passed a command to the Phloopy microprocessor, *Format, for example, you can get on and do something else with the BBC while the Phloopy carries out the command.

The Phloopy interface is not compatible with the interface for ordinary floppy disc drives. Installation should not be difficult; you are required to insert four components on to the main board while a couple of resistors must be

disconnected.

The following new commands are available in the Phloopy "LFS" — Linear Filing System?

*HELP PHLOOPY	*PHLOOPY
*DELETE	*RENAME
*DRIVE	*TITLE
*FORMAT	*UNLOCK
*LOCK	*VERIFY
*INFO	*COPY
*TRANSFER	*anothername

Additionally, all the normal Basic file handling instructions are available. The new commands are a subset of those in the floppy disc filing system but seem adequate for the tape drive.

*Transfer is a new command that will load a program from a normal cassette tape and transfer it automatically to a Phloopy tape. "*another name" means that the system will look for a machine-code file with a matching name and then load and *Run it.

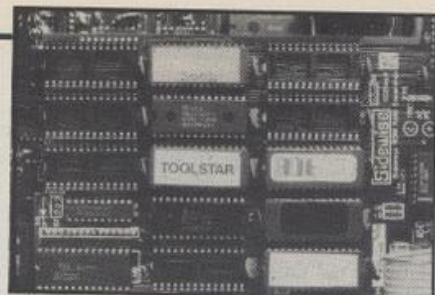
The delay while you wait for the tape to reach the start of your program is certainly longer than you will experience using floppy discs. Conversely, it is far faster to use a Phloopy than it is to store programs on ordinary cassettes. If you have a limited amount of money and reckon that you can cope with transfers of data to and from other computers using the RS-423 port — with the excellent Commstar, for example — then I think the Phloopy tape system could be a very good buy.

The Viglen ROM system makes clever use of the hole in the top cover of the BBC machine just to the left of the keyboard. Designed originally to accept a ROMpack which would load serial data for the speech processor, the hole has been used by Viglen to mount a socket which is connected directly to one of the paged EPROM sockets on the main circuit board.

One immediate advantage of the system is that you need not open the case of the computer to change ROMs but there are other benefits as well. The Viglen ROM extension contains only passive components and uses no power until

CONCLUSIONS

- There is some very sophisticated software available for the BBC Micro at some very competitive prices. The British Broadcasting Corporation's decision to renew their contract with Acorn Computer for another four years will reinforce the strength of the BBC Micro both in the U.K. and in many countries abroad.
- The BBC computer is quite expensive but the initial capital cost is a very good investment if you seriously wish to use your computer for more than one job. If you want to play games only then the BBC machine may give you what you want. If you want to use a computer for word processing, laboratory or instrument control, small scale-number-crunching, teaching normal or handicapped children, communicating with other computers — then the BBC Micro is supreme.
- The additional software and hardware described in this review do add to the BBC Micro's capabilities; whether one or another item will help you or entertain you at a price you can afford is for you to decide.



you plug a cartridge into the socket.

Consequently, you will have more power to use for other purposes from the internal power supply and less heat inside the machine's case. If you need to transfer a ROM or Eeprom from one machine to another, in a classroom, for example, the Viglen system could be very attractive.

Equally, if you want to install a special board inside the case of the BBC Micro you may find that it won't fit alongside an ordinary expansion ROM board.

A set of five empty cartridges will cost you over £27 in addition to the £19.95 for the original cable. Other single ROM extension cables are becoming available using zero-insertion force sockets to hold the EPROM.

Only you will be able to judge the relative merits for your own needs — certainly the Viglen ROM system works well and does offer good physical protection to your — expensive — paged ROMs.

There are a number of ROM extension boards made for the BBC Micro; most of them will work satisfactorily in an unexpanded machine. Whether or not a board will operate with one of the second processors or with one of the numerous double-density disc filing systems is another matter. Ideally you should see the ROM board installed and working in your machine before paying for it. Having said that, the ATPL Sidewise board from Advanced Technology Products has a good reputation.

The ATPL board expands the paged ROM facility of the BBC Micro from the original four sockets to the full 16 supported by the operating system. Links can be made or cut to allow you to install either 8K or 16K ROMs or Eeproms in the first 10 sockets; another link permits the use of 4K 2732 chips in the first three sockets.

The 15th socket is split into two and may be filled either by 8/16K ROMs or by two 8K CMOS RAM chips. The Sidewise board contains the circuitry to provide battery back-up for the CMOS RAM — a kit can be obtained from ATPL to upgrade the board. The CMOS RAM chips can be write protected and, with the additional battery, can then act like read only memory.

There are 10 integrated circuits on the ATPL board apart from the Eeproms and these are all small chips that will draw comparatively little power from the computer's power supply.

The installation instructions are not difficult to understand or carry out except that you must be careful of two power supply connectors on some later issue machines. No soldered connections are necessary; the Sidewise board simply plugs into two IC sockets — the displaced chips fit into the extension board.

My ATPL board works perfectly in my otherwise standard BBC Micro. It saves time and provides a permanent housing for the Eeprom programs that I have collected.

**SAGA 1
EMPEROR**



Sheer Elegance

SAGA 1 EMPEROR

THE KEYBOARD FOR ZX SPECTRUM COMPUTERS

- ✱ **EASY FITTING**
- ✱ **PLEASURE TO USE**
- ✱ **LONG LASTING**
- ✱ **SELLING FAST**

Saga 1 Emperor, equipped with 67 keys, has been carefully designed to incorporate the prime keyboard functions of the ZX Spectrum personal computer.

The style is easy: — for your benefit, the SAGA 1 Emperor Keyboard and housing retains the rear expansion dimensions and accessibility for compatibility with all Sinclair's own peripherals including interfaces and microdrive 1 and most other add-ons . . . including ours!

Not only this but we have ensured that the assembly of the keyboard is simple — and fast. No soldering is required, so that within just 5 minutes you can replace your current ZX Spectrum keyboard with the new SAGA 1 Emperor.

AND ALL THIS FOR JUST £54.95 (inc. VAT)

**AVAILABLE
NOW**

SOUNDBOOST

Hear that keyboard click . . . with a SAGA SOUNDBOOST

Your Spectrum's sound could be continuously adjustable from a whisper to a roar through your television. With our soundboost, no modifications need be made — just three easy push on connections. Supplied built and tested to fit in minutes with no previous experience required; we send full instructions for immediate use. Yours for Only **£9.49**



FLEXICABLE

Developed to relieve your Spectrum from the pressures of life. This neat 9 inch FLEXICABLE comes with two connectors which fit your Spectrum and your add-ons — taking the load with ease. Only **£9.49**



DEALERS CONTACT CAROL MOTE ON WOKING 69527

These products are obtainable through stockists both in the U.K. and abroad, or call us and we will deliver direct — our products are available ex-stock. Stop press just released, two NEW products added to our range:

- 1 — latest top quality dust covers available just £4.95
- 2 — Saga PC! — your very own carry case! — fits everything — keyboard, data recorder etc — Customise — further details and spec sheet available on request.

Please write to: SAGA Systems Limited
Woodham Road, Woking, Surrey
Telephone Woking (04862) 69527/22922
or Telex 859298
all prices include VAT
P&P free for Sound Boost and Flexicable.
P&P £1.25 for SAGA 1 Emperor U.K.
£4.00 for SAGA 1 Emperor Europe
Please send me

Name
Address

The following SAGA PRODUCTS

Please make CHEQUES/P.O. Payable to SAGA Systems Ltd.



STOCK CAR

A FANTASTIC NEW PROGRAM FROM
BRITAIN'S LEADING SOFTWARE HOUSE

SUPER-FAST LOADING TIME

commodore 64

electron

B.B.C. MICRO

Skid round hairpin bends,
cutting up the competition
and rebounding off the
barriers. A one or two player
racing game featuring 6
different circuits, oil
patches, selectable number
of laps and variable skid.



COMMODORE 64 VERSION

£6.95 (BBC version £7.95)

BBC and Commodore
Disk price £9.95

WATCH OUT
FOR OUR NEW
PACKAGING AND
CATALOGUE

MICRO
POWER

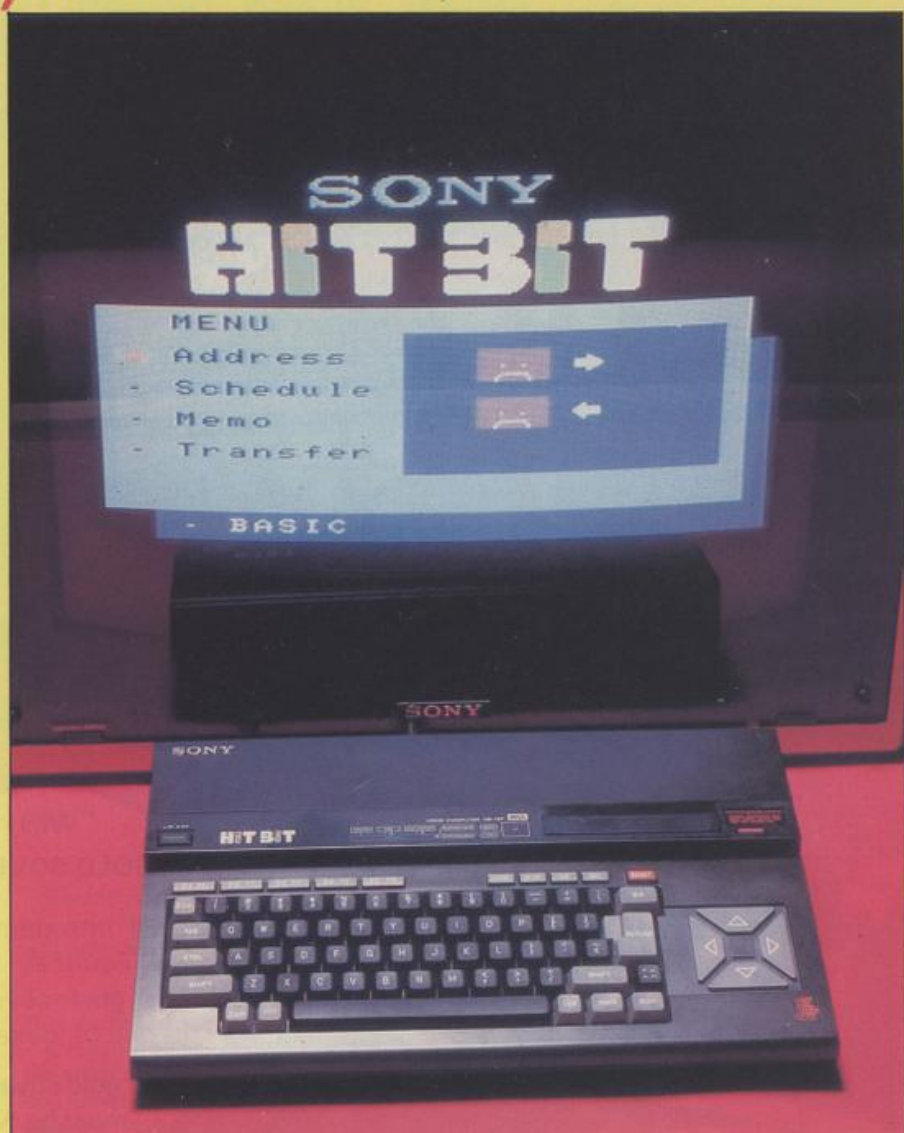
MICRO POWER LTD.,
NORTHWOOD HOUSE, NORTH STREET,
LEEDS LS7 2AA TEL: (0532) 458800
SELECTIVE BRANCHES OF BOOTS, CO-OP,
MENZIES, W. H. SMITH, WOOLWORTHS AND ALL
GOOD DEALERS.
AUTHORS! WE PAY 20% ROYALTIES!

SONY MSX HIT BIT

RULES

- The winner of the competition will be the person who numbers the Hit Bit's features correctly and, in the view of the Editor, comes up with the best idea and name for an original peripheral for the Hit Bit.
- The name of the winner will be printed in the December issue of *Your Computer*.
- All entries must arrive at the *Your Computer* offices by the last working day in November 1984.
- Each person may enter the competition only once.
- Entries to the competition cannot be acknowledged.
- No employee 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.

At last the Japanese invasion has hit the British shores. Win a 64K MSX micro — see the Sony review on page 62.



WIN THE NEW SONY COMPUTER

Put a 1 against your favourite feature of the Sony MSX Hit Bit, a 2 against your second favourite and so on until you have filled all the boxes. The whole point of MSX is supposed to be compatibility and the ability to interface your computer to other household goods and systems like the video or the hi-fi. We want you to think up a really original idea for what you could connect to a Hit Bit and what you would use it for. Invent a catchy Sony-style name for your unusual peripheral — Walkman, Hit Bit, Trinatron — you know the sort of thing. Then send this coupon to *Your Computer* Sony Hit Bit Competition, Room L221, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

- ☐ Powerful MSX Basic
- ☐ Built-in electronic diary, address book and memo pad
- ☐ MSX software compatibility
- ☐ Professional keyboard
- ☐ Nifty Sony styling

What would you connect to your Hit Bit?

What would you use it for? _____

What would you call it? _____

Name _____

Address _____

POWERSOFTWARE IS HERE...

TEN GOLD
SOVEREIGNS
MUST BE WON!



CAT WALK

Ever wished you were a cat? ...
Then unhook yourself with this
bizarre new game for 48K Spectrum



BILLY BLUEBOTTLE

An amazingly original multi level
arcade type game for 48K Spectrum



ELECTRON JOYSTICK INTERFACE

Simply the best on the market



FRANTIC FINGERS

A games control utility for the B.B.C. Micro



BOUNCING BERTIE / ESKIMO CAPERS

Introducing our special high class budget
series for 16/48K Spectrum

"WIN" A GOLD SOVEREIGN

special introductory offer
you may find
a gold sovereign
in one of these games

10 gold sovereigns
must be won



Interrupting all games programmers
... "Send us your Games!!" ...

post orders to
Powersoftware

Available from all red hot dealers or Powersoftware
12 Hagley Road, Stourbridge, West Midlands DY8 1PS
Cheques or Postal Orders made payable to Powersoftware

☐ Billy Bluebottle
☐ Cat Walk
☐ Electron Joystick Interface
☐ Frantic Fingers
☐ Bouncing Bertie / Eskimo Capers
☐ Cheque/Postal Order Total Value

Name
Address

Cat Walk, Billy Bluebottle, Bouncing Bertie, Eskimo Capers. Incorporate English, French, & German instructions.

Delivery 30 days.

Reg. in England No. 137017

SCORE 001005 LIVES --- HI 000135

RED ANTS

Carlo Delhez explains how Red Ants will make your ZX-81 top of the heap

THIS GAME MAKES full use of the capabilities of your ZX-81: it consumes the entire 16K RAM and gives fast, smooth and impressive action-graphics during the play.

The game is set in an enormous ants'-nest, measuring more than eleven times the size of the screen. The top of the maze is a long corridor — at ground level — from which lots of galleries are dug into the earth, all coming to a dead end sooner or later after being split up several times. The ants'-nest maze has no exit. Each time you start a new game, a new nest will be "dug"; this takes some five seconds.

Sixteen ants walk through the nest while laying their eggs. It's your mission to collect as many eggs as possible, while watching out for these awful ants: they do not chase you, but as the game progresses they run faster and faster, which makes avoiding them increasingly difficult.

You need imagination, patience, quick reactions, persistence and, of course, a supply of luck to play this game. But these abilities are also needed when entering the program. So, brace yourself!

The program consists of 3355 bytes machine code, stored in one large Rem, and 1786 bytes Basic. The rest of the RAM will be filled by variables.

Entering the machine code is the toughest part. First, clear your ZX-81 by typing:

```
RAND USR 0
```

Second, space needs to be reserved for the machine code. Enter a line 1 Rem followed by 128 characters — i.e., four full lines. Then, edit this line 23 times to get lines 2 up to 24 inclusive. Finally, edit line 24, change to 25 and add five characters. By now 3355 bytes should be reserved. Verify this by:

```
PRINT PEEK 16396 + 256 * PEEK
16397 - 16509
```

If a number other than 3355 is printed, you must start all over again.

Third, enter the hex-loader — program 1. Before running the hex-loader, enter subjoined Pokes as direct commands.

```
POKE 16510,0
POKE 16511,23
POKE 16512,13
POKE 16514,118
POKE 16515,118
```

These Pokes will convert the 25 Rem lines to one large Rem statement, stored in line 0. List will only show:

0 REM

List 1 will show the rest of the program. Now Run the hex-loader.

It expects two inputs — the start address and the finish address. Enter 16514 for the start. If you intend to type in the entire program in one go enter 19863. But if you prefer to type it in over several sessions enter a lower figure; save the code you have already typed and when you resume typing start up where you finished previously.

■ Enter Code; Press E. Type the starting-address in decimal. Now you can enter a string of hexadecimal numbers. If the program finds anything wrong in this input, the screen will be cleared, the address where things went wrong is displayed, and a new input asked. Enter a single Q to quit and return to the main menu.

■ Check Code; Press C. Enter the starting-address in decimal. The screen will then be filled with the hexadecimal address-contents from this address onwards. Pressing Q during the printing or after a screen-fill will return to the main menu. Pressing any other key after a screen-fill will show the contents of the next 168 addresses.

■ Save Code; Press S. The program will be Saved. It is best to repeat this several times while entering the code, in case the final version won't Load properly.

If everything has been entered correctly,

delete the hex-loader and make a few tape-copies of the code. When you have reached this stage, you are very near the finish. Just a little more patience ...

The final stage is to enter a small Basic-program. Don't make mistakes, especially don't be mistaken with addresses preceded by USR and Poke.

You will find that space-saving-techniques, like the use of Val, have been applied. These are really necessary, so do not omit them or the program won't run properly.

By now, you have reached the end. First Save the program by:

```
SAVE "RA*BACK-UP"
```

and then

```
RUN
```

The program will be Saved once again and then ... the long awaited result. If now, or at any other stage later on, a crash occurs reload the program containing both the complete Rem with machine code and the hex-loader, and re-check the code. If you cannot find an error, reload the back-up copy by

```
LOAD "RA*BACK-UP"
```

and check the Basic-program in which you should find the error.

Let's hope you did not come across a crash. Press Y to get instructions. Read them carefully. If you think the instructions scroll up too fast or too slow, break out directly after the instructions, when "press any key" occurs, and change the number Poked in line 110. A number higher than 160 will make them go slower, a number less than 160 will speed them up. Run again by

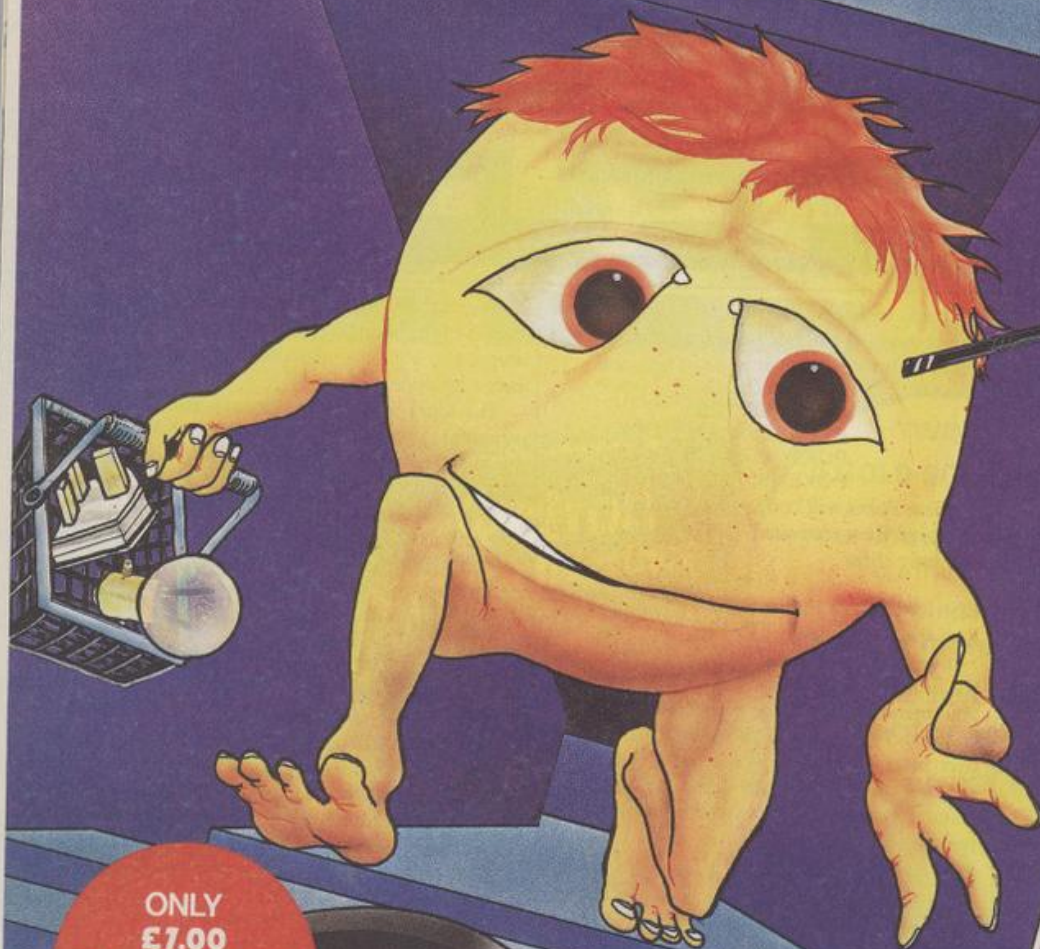
```
RUN 10
```

If you have read the instructions, you are asked to press a key after which the starting-temperature can be adjusted. To do this, press 8 to increase or 5 to decrease the temperature. If the correct temperature has been gained,

(Continued on page 165)

Trollie Wallie

INTERCEPTOR
SOFTWARE



ONLY
£7.00
ON CASSETTE
£9.00
ON DISK

SUITABLE FOR THE
commodore 64



INTERCEPTOR
MICRO'S

LINDON HOUSE

THE GREEN

TADLEY, HAMPSHIRE

TELEPHONE (07358) 71145, 3711

AVAILABLE NOW
FROM
ALL GOOD COMPUTER
RETAILERS

(Continued from page 163)

press Newline. A temperature of less than 22 degrees makes the ants move slower than you, at 22 degrees, they move at the same speed as you, and a temperature of more than 22 degrees will make them move faster than you do. At 30 degrees, the game is hardly playable. You'd better start with 0 degrees.

When the temperature has been adjusted, a message appears to say the game will start within five seconds. During this period, the ants-nest is "dug". It's advisable to press the F-key during this period and to keep it pressed. For when the game starts, there will be no action at all until you release the key. So, keep F pressed.

Now you will see the ants'-nest. Three quarters of the screen is blank; this is the outside of the maze. One quarter, in the bottom right-hand corner, shows a maze. In the top left-hand corner of this maze — the middle of the screen — you see an asterisk. That's you. A few lines underneath you, there's a nought; that's an ant. Take your finger off the key for a short moment; the ant will move and leave full stops behind it. These are the eggs. Now you can release the F-key and start walking. Use the keys: I = up; Z = left; C = right; M = down.

Begin by pressing C for some moments. You will see that you keep steady, while the maze moves to the left.

When you eat the first egg, you will see some bars running across the screen. This also happens every 1000 points. The ants will then speed up.

If you get bitten, you'll see this three times in succession and you will be repositioned in the top left-hand corner of the maze. The ants will then slow down.

After being bitten three times, a nice "Game Over" appears. Press any key to start all over again.

Finally, here are a few useful hints concerning some possible alterations.

If you do not like the key combinations for steering, or there is a need for other keys in order to use a certain joy-stick, you can easily alter the keys for movement. This is done as follows:

```
POKE 18664 )
)
POKE 18712 > ,Code of character Up
POKE 19834 )
)
POKE 18669 )
```

Hex loader.

```
99 REM HEX LOADER
100 PRINT "START ADDRESS"
110 INPUT S
120 PRINT "FINISH ADDRESS"
130 INPUT F
140 FOR N=S TO F STEP 8
150 LET T=0
160 PRINT N; " - ";
170 INPUT A$
180 PRINT A$; " = ";
190 INPUT TOT
200 PRINT TOT
210 LET Z=0
220 FOR K=1 TO LEN A$ STEP 2
230 LET C=CODE A$(K)-28)*16+CO
DE A$(K+1)-28
240 LET T=T+C
250 POKE N+Z,C
260 LET Z=Z+1
270 NEXT K
280 IF TOT=T THEN GO TO 310
290 PRINT "ERROR - PLEASE INPUT
AGAIN"
300 GO TO 150
310 NEXT N
```

```
> ,Code of character Left
POKE 19852 )
)
POKE 18681 )
)
> ,Code of character Right
POKE 19825 )
)
POKE 18695 )
)
> ,Code of character Down
POKE 19843 )
```

Basic program.

```
6 REM (S)TAN GOSUB 7:Y PR
INT LN 2:U AND RETURN COPY CODE
LN 2:LN 4:Y 7777:20
7 REM RETURN C4:Y 7777:20
I4:Y 7777:20:Y 7777:20:Y 7777:20
RN 2:Y 7777:20:Y 7777:20:Y 7777:20
9 SAVE "RED ANT"
10 LET Q=PEEK VAL "19780"
11 LET Z=0
12 RND
13 POKE VAL "18418",SIN PI
20 LET Q=USR VAL "17338"
30 PRINT AT VAL "7",SIN PI,Z
40 PRINT AT VAL "4",VAL "4"
50 PRINT AT VAL "18",VAL "6"
60 PRINT AT VAL "13",VAL "13"
70 PRINT AT VAL "14",VAL "8"
80 PRINT AT VAL "15",VAL "8"
90 PRINT AT VAL "2",VAL "PRESS ANY KEY TO GET INSTRUCTI
ONS"
100 PRINT TAB VAL "2","PRESS ANY
N" TO SKIP-OVER THEM
110 POKE VAL "17554",VAL "2"
120 LET Q=USR VAL "17338"
130 LET Q=USR VAL "17338"
140 LET Q=USR VAL "17338"
150 GOSUB 500
160 IF Q=VAL "61312" THEN GOTO
VAL "140"
170 POKE VAL "18226",VAL "160"
180 LET Q=USR VAL "18157"
190 DIM LS(VAL "30")
200 PRINT AT VAL "22",PI/PI
210 PRESS ANY KEY
220 IF INKEY$="" THEN GOTO 130
230 PRINT AT 22,LS
240 LET NO=VAL "11"
250 GOSUB 500
260 PRINT AT 10,1:"ADJUST THE I
```

Not only has the steering been changed by these Pokes, but the instructions have also been altered accordingly.

The hi-score is stored at the addresses 17046 up to 17051 inclusive. You can Poke in some hi-score or reset it to zero. Resetting to zero, however, can just as well be done by reloading the program.

If you are satisfied with the program, and you do not want to change it any more, it can be made break-proof. This means that, if you try to break while the computer executes a Basic-line, this interrupt-driven routine will respond with the execution of a RST 0, i.e., a full system-reset. To achieve this, edit line 10 and change the Peek into USR. Now Run, record on tape and try to press Break. There will not be much program left if the cursor reappears. This is a very good protection against burglary.

I am fully aware of the fact that typing this program is anything but a pleasant occupation. Therefore, I can supply you with a good-quality tape version. To obtain such a tape, send £3 to Carlo Delhez, Emmastraat 3, 4651 BV Steenberg, Holland.

```
INITIAL TEMPERATURE 0 = A BORING
GAME, 30 = A HARD GAME, USE KE
Y 8, 8 AND N/L.
150 PRINT AT 16,8:"
DEGREES "AT
17,8:"
180 PRINT AT VAL "16",VAL "10"
190 POKE 17104,VAL "5+5+USR 19
200 LET Q=USR VAL "17428"
210 LET NO=VAL "12"
220 GOSUB 500
230 LET A$="*****"
240 PRINT AT 10,1:A$ TO 30:AT
10,4:"THE GAME WILL BE STARTED"
AT 13,8:"WITHIN A MOMENT",AT 15
1,8:2 TO 1
250 LET Q=USR VAL "17428"
260 CLEAR
270 POKE VAL "17554",PI/PI
280 DIM B$(10)
290 LET Q=USR VAL "18516"
300 POKE 19787,VAL "406-PEEK 19
310 LET Q=USR VAL "19788"
320 POKE 19787,VAL "406-PEEK 19
330 LET Q=USR VAL "17720"
340 LET NO=VAL "22"
350 GOSUB 500
360 LET Z$=""
370 PRINT AT 10,1:"RED ANT"
380 PRINT AT 10,1:"ADDICTIVE M
AZE-GAME."
390 GOTO VAL "30"
400 POKE 18224,201
410 FOR K=1 TO NO
420 LET Q=USR VAL 18188
430 NEXT K
440 POKE 18224,1
450 RETURN
```

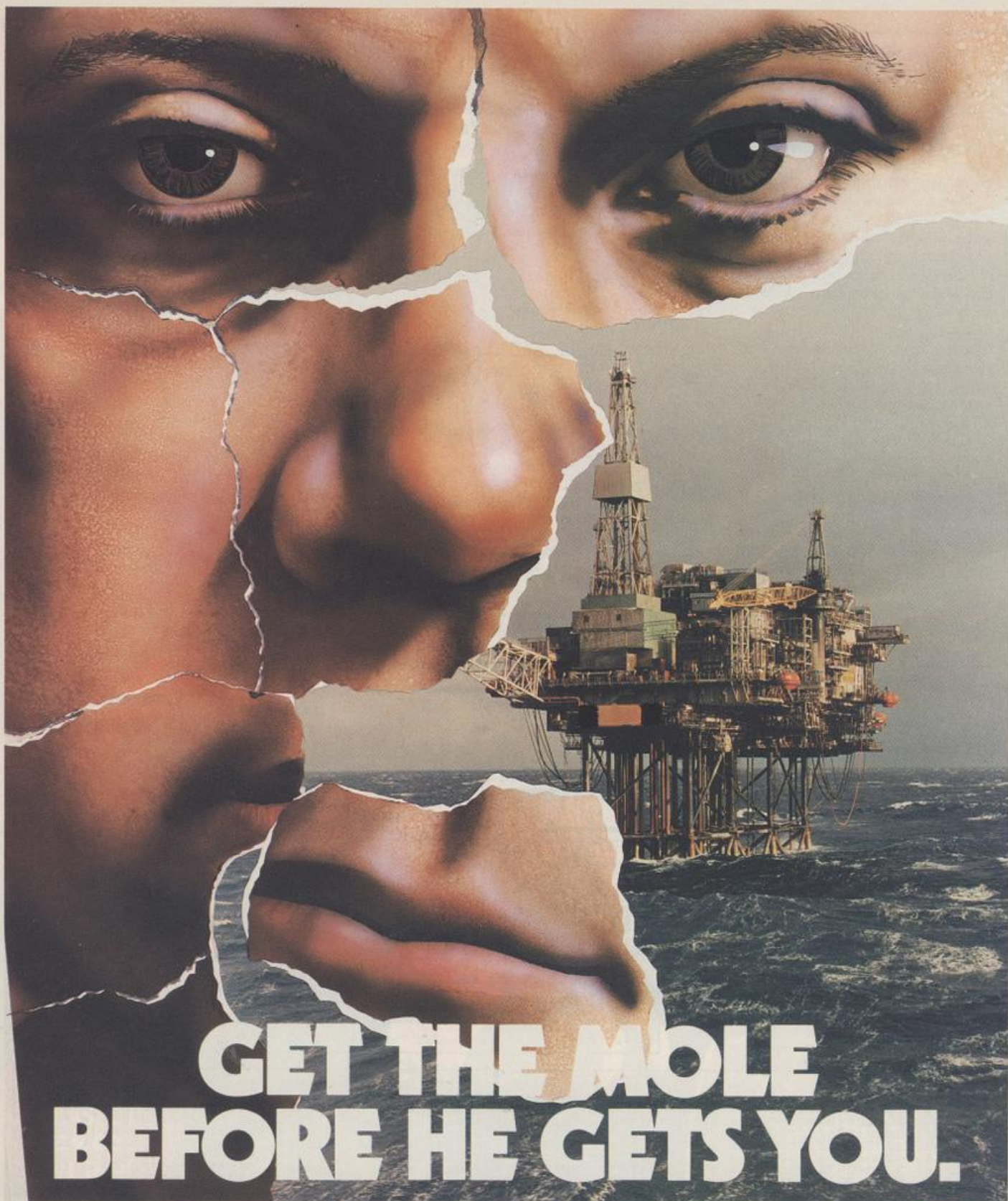
Hex dump.

```
16514: 7678CDE7433E80CD = 1134
16522: 0D40E516241E65CD = 908
16530: B540152805C0C340 = 775
16538: 18F53E88F1E5C085 = 1307
16546: 4006457711640019 = 400
16554: 772310F710CDB540 = 895
16562: C3E8A40D577231020 = 922
16570: FBD1092A7840C352 = 1167
16578: 41D53E88023102806 = 570
16586: 3600231020F4D1C9 = 804
16594: E5E2A0C4011420019 = 455
16602: E8E1092A7840C352 = 924
16610: 0419C9001009BFFF = 896
16618: FFE1013223116600 = 885
16626: 19F0382100F03521 = 704
16634: 282F3A32408785FD = 780
16642: 77338187FD8634FD = 1126
16650: 7732D80330FCED44 = 991
16658: 30F7E821E85401600 = 773
16666: 5F19E821E85401600 = 820
16674: 7EEBF8E8020CF3E00 = 1044
16682: 1233230020C30E32 = 392
16690: 10B8DC9C42CDD440 = 1120
16698: 1E653E89D5CDB540 = 993
16706: 11391B19D13CDB55 = 781
16714: 402A104011E20419 = 458
```

```
16722: 2278403617E5CDBA = 918
16730: 43E10500287E04FE = 725
16738: 8820F978FE0F303E = 918
16746: 3221402A7B4048AF = 623
16754: 47E042118D03ED52 = 854
16762: 0DD2403E15FE553E = 1098
16770: 0F914F971313120D = 459
16778: 20F813FD46212E0F = 738
16786: 60EDA03D20FE113 = 1113
16794: 01650009FD4E21F1 = 716
16802: 3D20D0AC313422A7B = 786
16810: 400600237E04FE58 = 626
16818: 20F978FE0F3037FD = 1026
16826: 77212A784011C003 = 655
16834: A7E0520615CDD240 = 892
16842: 1313081081E5EDA0 = 823
16850: 033D20FAE11AFE93 = 998
16858: 2805AF121318FE13 = 946
16866: D511650019D1FD7E = 944
16874: 2110DDC31342A7B = 718
16882: 40119C03AFDE5C2C = 830
16890: D240851513135E0E = 882
16898: 1EEDFA030D20FAE1 = 950
16906: 13D511850019D110 = 800
16914: B0E08C5CDD1843C1 = 933
16922: 10F9CDB80255147C = 966
16930: BD40444DCBD077E = 925
16938: FE262001C9FE2B28 = 863
```

```
16946: E9C3704CDB40FE25 = 1161
16954: D2B040C058187215A = 904
16962: 424F0600098E2356 = 975
16970: 2A7B403600197EFE = 608
16978: 1B2300DF1CCAC844 = 834
16986: FE00C2B040C35241 = 1043
16994: E5CDA244E1C35241 = 1031
17002: FFFF65009BFF0100 = 1020
17010: C9010099FFFFF65 = 1020
17018: 00C9382834372A0A = 460
17026: 101C101C101C10031 = 217
17034: 2E3B2A380E171717 = 208
17042: 002D0E0E101C101C = 217
17050: 101C00D040015804 = 638
17058: 09061011D542ED03 = 647
17066: 1643E81AF8E02803 = 647
17074: 1318F83E1AF8E02803 = 640
17082: 72233600123360023 = 328
17090: 0EAF5130020F010E3 = 738
17098: 3E18321533E06320 = 334
17106: 14420C9330010074 = 553
17114: 609BFF1A19BFFB8 = 918
17122: 609BFF1A19BFFB8 = 918
17130: 6301001934010001 = 416
17138: 6401000755010000 = 310
17146: 6501000156010055 = 469
17154: 6701000156010055 = 381
```

(Continued on page 167)



GET THE MOLE BEFORE HE GETS YOU.

Available for B.B.C. Model "B",
Electron, Spectrum and Commodore 64.
Espionage is available from all leading
High Street Stores and quality Computer
Games Specialists.

price **£8.95**

Retailers contact Mr. Len Fisher on
our telephone hot-line (0642) 227223.

Espionage

MODULAR RESOURCES LIMITED



A GAME OF INTRIGUE & SKILL IN THE OIL BUSINESS.

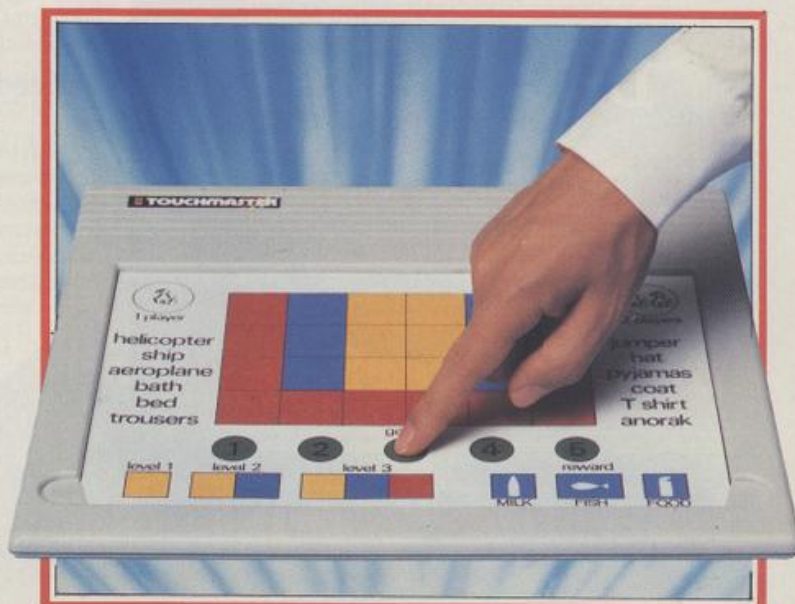
[illegible]

17602	18F077C3FE43C1D1	=	1301
17610	CD14444CD1444CD14	=	811
17618	442177C420620111S	=	337
17626	00197EFE1728072B	=	516
17634	10F833FC31045353A	=	708
17642	1442300C3214422478	=	443
17650	403600D04D4011166	=	727
17658	0019C35241217C42	=	590
17666	11060003E5111400	=	314
17674	19D1E80656C9C0FF	=	114
17682	441A4E89380A2004	=	463
17690	231314075CDBA43C9	=	974
17698	C0FF44F7E12231310	=	742
17706	FA18F1433C07A7500	=	10
17714	Q2B101E17A76760E15	=	688
17722	0A0C40111440019F5	=	497
17730	061E3800E2310FEE1	=	631
17738	0028051121001EE	=	370
17746	0A0C4011144001911	=	48
17754	86451AE154F050009	=	3004
17762	131ACBCE2200477823	=	597
17770	18F6FECDD3804CBB7	=	115
17778	18EA11131AFAFEF28	=	1077
17786	0601210091918C00D	=	493
17794	BB02C0C2BFA9C0804	=	734
17802	4487CDB0E85440546	=	690
17810	060304444372A29CD	=	424
17818	0602044287014605	=	293
17826	630044266333938CD	=	606
17834	03040440202838301	=	342
17842	47868301060304CD	=	553
17850	03860142020000036	=	344
17858	44870601433870505	=	423
17866	0004054187010585	=	563
17874	0204438002014305	=	282
17882	030106080400C0387	=	491
17890	0141020404878701	=	347
17898	42870143805050CD	=	494
17906	0306428756020105	=	365
17914	0441870833060304	=	280
17922	430505050506304CD	=	380
17930	03050505050630389	=	559
17938	0906030141878741	=	419
17946	050005458523000CD	=	418
17954	08870441102438609	=	416
17962	09084420620418683	=	421
17970	01050004543868301	=	344
17978	CD008705044465099	=	366
17986	09084408540506005	=	167
17994	CD026644310909982	=	686
18002	418306034202020541	=	343
18010	06030409030338383	=	486
18018	038309090830304C2	=	482
18026	0300CD07860909066	=	373
18034	40868301060304CD	=	561
18042	066701860802044F	=	547
18050	0303000CD058701441	=	347

[illegible]

NO HOME COMPUTER IS COMPLETE WITHOUT IT

It has a resolution of 256 x 256 points (that's what makes Touchmaster so flexible).



TOUCHMASTER

For full details, contact Touchmaster Limited,
PO Box 3, Port Talbot, West Glamorgan SA13 1WH,
or phone Teledata (01) 200 0200

ALL-IN-ONE

Spectrum Interface

Drive Unit 1

Drive Unit 2

RS232 Interface

Centronics Interface

Spectrum owners! Imagine what great use you could make of all these components. Rotronics have integrated them all into one attractively styled, compact unit. All the power and convenience of floppy disk can now be yours, but at a fraction of the cost.

A complete package

Wafadrive is extremely versatile. Five major components are housed within this one unit — the micro interface, two 128K drives, RS232 serial and Centronics parallel ports. Also included in the package are a blank wafer and Spectral Writer — a superb word processor program. The micro interface forms the nerve centre of Wafadrive, controlling all its major functions. The dual drive configuration and the ability to connect standard peripherals directly provides professional system flexibility. All this without a mass of separate components and vulnerable cables. Wafadrive transforms your Spectrum into a very powerful system.

Speed, reliability and capacity

The wafers contain an endless loop of specially developed magnetic tape driven at high speed past a read/write head. The result is fast access without data loss.

Three sizes of wafer are available with minimum formatted capacities of 16K, 64K and 128K. The 128K wafer costs £3.95.

Data transfer rate is approximately 2K per second. Access time is proportional to capacity. 16K wafers are ideal for program development, with the larger capacity wafers being more suitable for general use and archiving of completed programs and data. Mechanical longevity is assured by the use of high grade materials throughout and full interchangeability between machines is guaranteed.

Extensive software applications

Wafadrive provides intelligent file handling and rapid access to data. Program development and other applications can be performed with ease. Start word processing immediately with the specially developed software package included with Wafadrive. Or battle with a spectacular interactive games program. Whatever your mood, you'll find the sophisticated Wafadrive software challenging and rewarding. Future versions of Wafadrive will be available for most popular home micros, so software back-up will be comprehensive.

For further information contact us now for our full colour brochure.

ALL-IN-ONE PRICE
£129.95 (Inc. VAT)

Available from all Spectrum dealers, Grattan catalogue and SMT mail order.
Trade enquiries: Micro Dealer (UK) Ltd.,
29 Burrowfield, Welwyn Garden City, Herts.
Tel: (07073) 28181.



ROTRONICS
WAFADRIVE

(Continued from page 167)

18506	FF3534382E392E34	= 617	18954	2A26382A381BFFA8	= 584	19410	FF1E000000000000	= 400
18514	332A29002E330003	= 288	18955	3433382A381BFFA8	= 400	19411	FF1E000000000000	= 400
18522	2D2A003934350003	= 288	18956	39313E1A00000000	= 399	19412	1010000000000000	= 400
18530	2A283915FFD02E03	= 353	18957	39313E1A00000000	= 399	19413	1010000000000000	= 400
18538	29002E03437332A3	= 353	18958	39313E1A00000000	= 399	19414	1010000000000000	= 400
18546	00342B002E330003	= 288	18959	39313E1A00000000	= 399	19415	1010000000000000	= 400
18554	33343732343A38FF	= 600	18960	39313E1A00000000	= 399	19416	1010000000000000	= 400
18562	39333938163332A3	= 373	18961	39313E1A00000000	= 399	19417	1010000000000000	= 400
18570	391B000000000000	= 463	18962	39313E1A00000000	= 399	19418	1010000000000000	= 400
18578	2B37343200000000	= 373	18963	39313E1A00000000	= 399	19419	1010000000000000	= 400
18586	00282E033FF372A2	= 510	18964	39313E1A00000000	= 399	19420	1010000000000000	= 400
18594	2B37343200000000	= 373	18965	39313E1A00000000	= 399	19421	1010000000000000	= 400
18602	00282E033FF372A2	= 510	18966	39313E1A00000000	= 399	19422	1010000000000000	= 400
18610	00282E033FF372A2	= 510	18967	39313E1A00000000	= 399	19423	1010000000000000	= 400
18618	00282E033FF372A2	= 510	18968	39313E1A00000000	= 399	19424	1010000000000000	= 400
18626	00282E033FF372A2	= 510	18969	39313E1A00000000	= 399	19425	1010000000000000	= 400
18634	00282E033FF372A2	= 510	18970	39313E1A00000000	= 399	19426	1010000000000000	= 400
18642	00282E033FF372A2	= 510	18971	39313E1A00000000	= 399	19427	1010000000000000	= 400
18650	00282E033FF372A2	= 510	18972	39313E1A00000000	= 399	19428	1010000000000000	= 400
18658	00282E033FF372A2	= 510	18973	39313E1A00000000	= 399	19429	1010000000000000	= 400
18666	00282E033FF372A2	= 510	18974	39313E1A00000000	= 399	19430	1010000000000000	= 400
18674	00282E033FF372A2	= 510	18975	39313E1A00000000	= 399	19431	1010000000000000	= 400
18682	00282E033FF372A2	= 510	18976	39313E1A00000000	= 399	19432	1010000000000000	= 400
18690	00282E033FF372A2	= 510	18977	39313E1A00000000	= 399	19433	1010000000000000	= 400
18698	00282E033FF372A2	= 510	18978	39313E1A00000000	= 399	19434	1010000000000000	= 400
18706	00282E033FF372A2	= 510	18979	39313E1A00000000	= 399	19435	1010000000000000	= 400
18714	00282E033FF372A2	= 510	18980	39313E1A00000000	= 399	19436	1010000000000000	= 400
18722	00282E033FF372A2	= 510	18981	39313E1A00000000	= 399	19437	1010000000000000	= 400
18730	00282E033FF372A2	= 510	18982	39313E1A00000000	= 399	19438	1010000000000000	= 400
18738	00282E033FF372A2	= 510	18983	39313E1A00000000	= 399	19439	1010000000000000	= 400
18746	00282E033FF372A2	= 510	18984	39313E1A00000000	= 399	19440	1010000000000000	= 400
18754	00282E033FF372A2	= 510	18985	39313E1A00000000	= 399	19441	1010000000000000	= 400
18762	00282E033FF372A2	= 510	18986	39313E1A00000000	= 399	19442	1010000000000000	= 400
18770	00282E033FF372A2	= 510	18987	39313E1A00000000	= 399	19443	1010000000000000	= 400
18778	00282E033FF372A2	= 510	18988	39313E1A00000000	= 399	19444	1010000000000000	= 400
18786	00282E033FF372A2	= 510	18989	39313E1A00000000	= 399	19445	1010000000000000	= 400
18794	00282E033FF372A2	= 510	18990	39313E1A00000000	= 399	19446	1010000000000000	= 400
18802	00282E033FF372A2	= 510	18991	39313E1A00000000	= 399	19447	1010000000000000	= 400
18810	00282E033FF372A2	= 510	18992	39313E1A00000000	= 399	19448	1010000000000000	= 400
18818	00282E033FF372A2	= 510	18993	39313E1A00000000	= 399	19449	1010000000000000	= 400
18826	00282E033FF372A2	= 510	18994	39313E1A00000000	= 399	19450	1010000000000000	= 400
18834	00282E033FF372A2	= 510	18995	39313E1A00000000	= 399	19451	1010000000000000	= 400
18842	00282E033FF372A2	= 510	18996	39313E1A00000000	= 399	19452	1010000000000000	= 400
18850	00282E033FF372A2	= 510	18997	39313E1A00000000	= 399	19453	1010000000000000	= 400
18858	00282E033FF372A2	= 510	18998	39313E1A00000000	= 399	19454	1010000000000000	= 400
18866	00282E033FF372A2	= 510	18999	39313E1A00000000	= 399	19455	1010000000000000	= 400
18874	00282E033FF372A2	= 510	19000	39313E1A00000000	= 399	19456	1010000000000000	= 400
18882	00282E033FF372A2	= 510				19457	1010000000000000	= 400
18890	00282E033FF372A2	= 510				19458	1010000000000000	= 400
18898	00282E033FF372A2	= 510				19459	1010000000000000	= 400
18906	00282E033FF372A2	= 510				19460	1010000000000000	= 400
18914	00282E033FF372A2	= 510				19461	1010000000000000	= 400
18922	00282E033FF372A2	= 510				19462	1010000000000000	= 400
18930	00282E033FF372A2	= 510				19463	1010000000000000	= 400
18938	00282E033FF372A2	= 510				19464	1010000000000000	= 400
18946	00282E033FF372A2	= 510				19465	1010000000000000	= 400

LOOK WHAT YOU
MISSED IN BEEBUG
VOLUME TWO

BBC MICRO - USER SUPPORT -

● 10 ISSUES OF BEEBUG MAGAZINE MAILED FREE TO MEMBERS ● 30
EXCITING GAMES AND VISUAL PROGRAMS ● 43 SOFTWARE REVIEWS ● 33
HARDWARE REVIEWS ● 16 BOOK REVIEWS ● 150 HINTS AND TIPS ● 25
APPLICATION PROGRAMS ● SERIES OF ARTICLES FOR BEGINNERS ● MANY
ADVANCED TECHNICAL ARTICLES ● NEWS AND PRODUCT INFORMATION
● PLUS SPECIAL OFFERS ● BIG DISCOUNTS ON A WIDE RANGE OF
PRODUCTS ● EVENTS ● BRAIN TEASERS ● LOCAL CLUBS ● FULL
MAGAZINE INDEX

A YEARS SUBSCRIPTION WOULD HAVE BOUGHT YOU ALL THIS

Figures based on the 10 issues of BEEBUG Volume 2.

BUT IT'S NOT TOO LATE TO JOIN FOR VOLUME THREE

BEEBUG PUBLICATIONS LTD. PO BOX 109, HIGH WYCOMBE, BUCKS

PLEASE ENROL ME FOR VOLUME 3 of BEEBUG AT £11.90 (10 ISSUES)

NAME

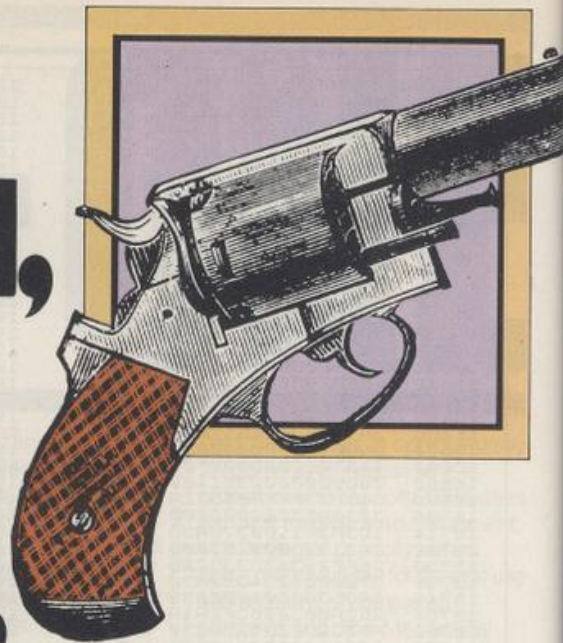
ADDRESS

AMOUNT ENCLOSED

BEEBUG HAS BEEN ESTABLISHED
FOR TWO YEARS AND NOW HAS
OVER 25,000 MEMBERS. IT OFFERS
TOTAL USER SUPPORT TO ALL BBC
MICRO USERS.

PLEASE MAKE CHEQUES MADE PAYABLE TO BEEBUG PUBLICATIONS LTD.
AND SEND TO:- DEPT 4 PO BOX 109, HIGH WYCOMBE, BUCKS.
(DISTRIBUTION AGENTS FOR BEEBUG)

Challenging, sophisticated, advanced, extra special.



Be the world's greatest sleuth — in the most advanced and challenging adventure game ever.

For the first time ever, here is an adventure game in which you can talk with intelligent characters, ask them questions and argue with their conclusions — all in everyday English sentences.

Work against time to solve the mystery as you travel about Victorian England. Villains, suspects and witnesses all live out their lives in a realistic manner, and you can never be sure of who or what you will find anywhere. You must be alert because nobody is above suspicion.

In 'Sherlock', the world of the famous private detective comes vividly to life. Time passes naturally: day turns to night, racing towards the inescapable deadline. You must ensure Sherlock has sufficient time for sleep, money to travel on public transport and other necessities. And you can rely on Dr. Watson to help you collate information, or gather clues.

'Sherlock' makes the maximum use possible of the 48K Spectrum and is the result of 15 months' work by a team led by programmer Philip Mitchell, the author of 'The Hobbit'. The text and graphics of 'Sherlock' makes it the most exciting and sophisticated adventure game yet devised.

"Never before have I experienced a game so atmospheric and realistic. I was totally captivated and caught up in this most fascinating adventure. The characters are simply amazing. They do lead their own lives. It's all so unpredictable." —G. Dempster, Scotland.

A real adventure!

- ☐ Please send me your free catalogue.
☐ Please send me Spectrum 48K Sherlock @ £14.95

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Orders to:
Melbourne House Publishers,
 39 Milton Trading Estate
 Abingdon, Oxon OX14 4TD

Correspondence to:
 Church Yard,
 Tring,
 Hertfordshire HP23 5LU

Access orders can be telephoned through on our 24-hour ansafone (0235) 83 5001.

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

YC11A

I enclose my cheque/money order for £	£
Please debit my Access Card No.	£ +p/p .80
Signature	Total
Name	£
Address	
Postcode	



COMMODORE 64
COMING SOON



Just Arrived!

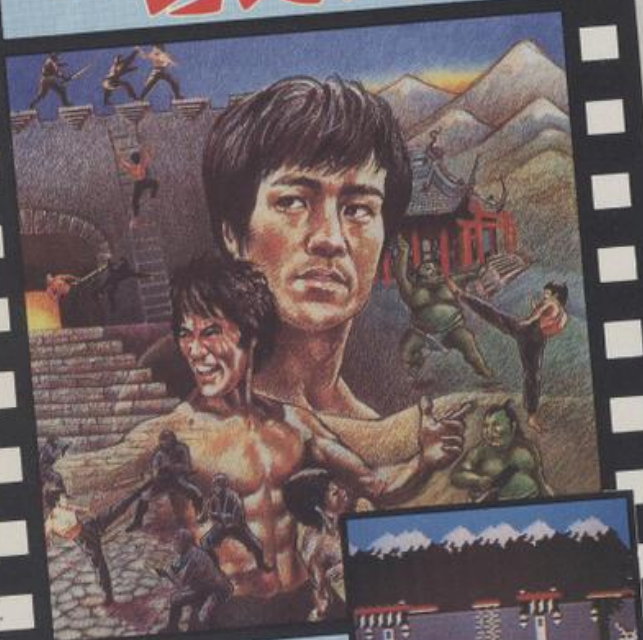
TWO OF YOUR ALL-TIME CINEMA & T.V. FAVOURITES

THE LEGENDARY

BRUCE LEE

ATARI

ATARI



Your chance to relive the deadly skills and awesome power of the legendary Bruce Lee.

- Twenty secret chambers.
- Dazzling graphics and animation.
- Unique multiple player options.

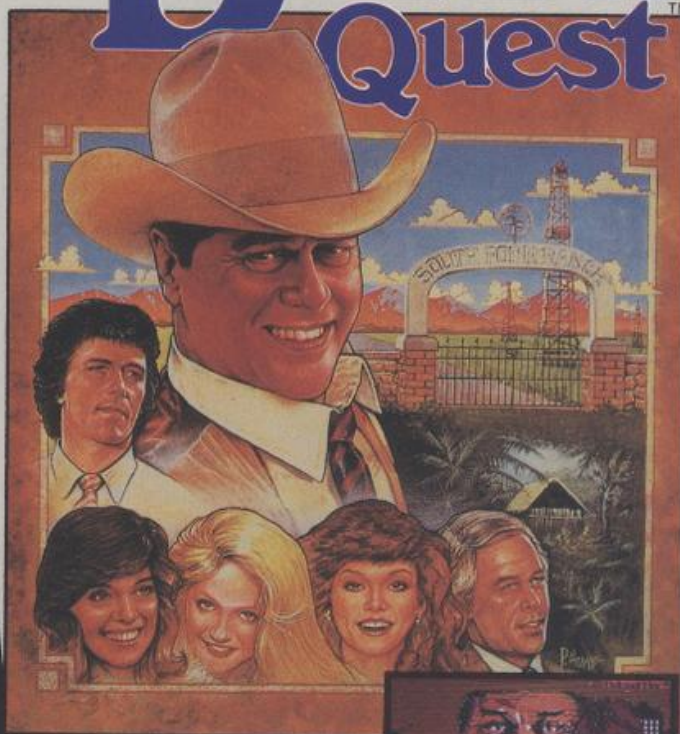
Disk and
Cassette

£14⁹⁵

ATARI

Danger, Intrigue, Suspense! You'll need all your wits and skill when you take on the ruthless J.R. and face the many hidden enemies in the search for oil that is...

The DALLAS Quest



- A unique graphic adventure.
- Choose your level of difficulty.
- Scores of colourful scenes.



Disk only £14⁹⁵

Two more quality products from Datasoft Software.

Datasoft

THE ULTIMATE IN AMERICAN SOFTWARE FOR YOU ON U.S. GOLD
U.S. Gold is stocked by all leading computer stores.

DEALERS! For information on how to become a U.S. Gold Stockist write to: CentreSoft Ltd., Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH. Telephone: 021-520 7591. Overseas enquiries welcome.

U.S. GOLD

All American Software

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".

STATIC MICRO

I am 16 years old and have had many problems with computers. My first computer was a 16K Spectrum. This worked well for a month but developed keyboard trouble and was returned for a replacement. The replacement wouldn't Save, so was sent back for a refund. With this money, I bought a TI 99/4a. This was found to have faulty colour, so was replaced. Since then, I have had four more TI 99s, all of which have developed various faults, the most serious of which was a total loss of function — couldn't even get the "power on" light to work. A friend of my mother's said he had heard that some people cannot use computers because of bodily static electricity. Is this possible, or have I just had bad luck? Incidentally, I have used a friend's computer regularly, without any trouble. I hope you will answer this, as I am still interested in computers and hope to get an Electron if I get a positive reply.

Andrew McDermott,
Halifax.

SHADES OF The Omen! Your story, Andrew, about static electricity seems to me to be as valid as the fear many parents have that using a computer connected to the TV will somehow ruin the television. Certainly, some computer components can be destroyed by static electricity but this is the first time I've heard a claim that evil powers in the operator would render the computer inoperative.

My experience with TI 99/4a's has been all positive. They seem to work reliably — albeit excruciatingly slowly — and friends of mine who have them have reported no excessive failure rate.

The fact that you can use your friend's computer without causing it to self-destruct suggests, to me, that there may be problems — if such things are possible — in the wiring of your house. Unusual electrical surges could be, at least, blowing fuses — which sounds like what happened with your fourth TI. For what it's worth, you might like to chat with an electrician about your house wiring and enquire at the same time regarding the stability of the power supply in your area. Have you tried running your friend's computer at your home?

SPECTRUM BUG?

I think I have found yet another bug in the Sinclair Spectrum ROM. I was writing a simple program in which the user

enters the three lengths of the sides of a triangle. The length of the longest side is entered first, followed by the other two. The program then prints a message showing if the triangle is a right-angled one. When I was testing the program — which I was sure was correct — I entered the numbers for the 26, 24, 10 right-angled triangle. To my surprise, the computer told me the triangle I had entered was not a right-angled one — which it is! Is it me or my Sinclair computer which is wrong? Here's the program:

```
10 INPUT "LONGEST SIDE FIRST":A
20 INPUT "NEXT SIDE":B
30 INPUT "NEXT SIDE":C
40 IF C^2 + B^2 = A^2 THEN PRINT
  "A RIGHT ANGLED TRIANGLE":
  PAUSE 1:PAUSE 0:RUN
50 PRINT "NOT A RIGHT ANGLED
  TRIANGLE":PAUSE 1:PAUSE 0:
  RUN
```

Darren Patridge,
Tiptree,
Nr Colchester.

CLAIMS LIKE THIS, Darren, are heard very frequently. The problem lies not in your Spectrum, but in the way which all computers store numbers. They are never stored exactly. Even my IBM PC will inform me that 85/100 equals 0.849999. Certain micros available on the UK market will solemnly inform you that 4/2 does not equal 2 — because the computer stores 4/2 as 2.000001.

The way to test what your computer is really doing, in this and any other program in which you wish to compare the results of calculations, is to get the computer to print out its findings, i.e., tell it to Print C^2, B^2, A^2 and compare the three. Then, instead of looking for an exact match, get the computer to look for a minimum difference. In your case, line 40 could read:

```
40 IF ABS((C^2 + B^2) - A^2) < .0001
  THEN PRINT "A RIGHT ANGLED
  ..."
```

HOW GOOD IS MSX?

I have read a lot about MSX Basic in the past few months. I understand that it is a new standard so that you can run software written for one MSX computer on another. How well is MSX going to be accepted in the UK?

Martin Barlow,
Albany.

IF I COULD PREDICT the future, Martin, I would not be writing for Your Computer. No-one knows whether or not MSX will ever get off the ground. Certainly, Microsoft in America, who invented it, are pushing for it to become the standard. More

than 30 — at last count — Japanese manufacturers have either embraced the standard — or said they will in due course. My guess is that it will gain a certain acceptance over the next two years, so that it runs parallel to the de facto standards we have here such as Sinclair Basic and BBC Basic. It has, I believe, little chance of dislodging Microsoft Basic — as in PC-DOS on the IBM PC — in the States — although Microsoft and MSX Basics are very, very close; except for the graphics and sound.

The MSX standard is built around a Z-80A processor, and specifies such things as sprite control in the graphics, single channel sound, a Centronics printer interface, Atari-type joystick ports, cassette output — 1200/2400 baud — and three graphics modes — two text 32 x 24 and 40 x 24 and one "hi-res", which is 256 x 192.

So long as you stick with one of the biggies in the UK — such as the Spectrum or the Beeb — you have little chance of buying a machine whose support dwindles to nothing in the next 18 months.

CHEAPER BEEB

At the moment, I am saving up for an Electron, but I would have preferred a BBC Model B. Could you please tell me if the BBC Model B will be coming down in price in the near future?

S G Hornby,
Warton,
Preston.

ONE NEVER knows what thoughts lurk in the minds of those at Acorn, but the chances of the Beeb coming down in price seem to me to be very, very slim.

BUSINESS PROGRAMS

I have a Vic-20 micro and cassette recorder in good working order. My problem is that I had a brain stroke two years ago which has impaired my memory and manual dexterity. I find the manual entry of a program very difficult and boring. I want a micro offering software with simple home and business accounting programs, not games. What do you advise, since I am prepared to sell my Vic-20?

K F Searle,
Watford.

FIRST OF ALL, be prepared for a grave disappointment if you try to sell your Vic-20. The money you would get for it will be very, very little compared to what you paid for it. You do not mention how much you wish to spend on a computer which makes giving you specific advice fairly difficult. I imagine that a computer which allows use of discs, rather than a cassette recorder would be easier to use and therefore suggest you could consider a BBC Micro with discs. This, however, is not cheap.

Before you do anything, I would suggest you look through the advertisements in this issue of Your

Computer and call a Commodore dealer, describe your software requirements, and see if you can get anything suitable for your Vic-20.

TAPE TO DISC

I have recently purchased a Cumana disc drive for my BBC Micro, and would like to save programs on disc from tape — Basic and machine code. I have little knowledge of machine code and assembler. Could you tell me how it could be done?

P A Jamison,
Virginia Water,
Surrey.

MANY PEOPLE, including myself, would love to know how to do this. However, we dare not risk the wrath — and the lawyers — from Acorn. One magazine printed a routine for busting the locks on cassette software from Acornsoft, so it could be transferred to disc, and got hit with a £70,000 fine for their trouble.

PRINTER ADVICE

Can you advise of a printer with a superior width of presentation to the ZX printer?

J A Jones,
10 Shalbourne Rise,
Camberley,
Surrey.

THERE ARE a number of interfaces now available to allow you to hook a "real" printer to your Spectrum. However, as far as I know, they do not offer a "superior width". However, I have printed your address in full so any manufacturer who thinks he can help can get in touch with you directly.

In an earlier issue of *Your Computer*, I gave a way of adding a line numbered zero to a Spectrum program. Mike O'Donnell of Palacefields, Runcorn, Cheshire, has sent me a method of adding line zero which he says has two advantages. One, it is easier than the method I outlined, and two, it can be removed. Here's Mike routine:

First enter your line number, as 1 REM ...
Next POKE 23756,0
Press Enter then List

To remove the line:
POKE 23756,1
Press Enter and List

Thanks for this routine, Mike, which I note you acknowledge as having been shown to you at your local computer club. I agree that it is simpler than my method, but the very fact that it can be removed makes its inclusion rather pointless. I was trying to give a way to put a copyright notice within a program which could not be removed.

POWER UP!



Your First Commodore 64 Program

R. Zaks £ 7.95

You can learn to write simple programs without any prior knowledge of mathematics or computers! Guided by colorful illustrations and step-by-step instructions, you'll be constructing programs within an hour or two.

ISBN: 0-89588-172-1, 7"x11", 182 pp, illustrated

also available for VIC-20, APPLE II, ATARI, IBM, TI99/4A



Your Second Commodore 64 Program

G. Lippman £ 8.95

The many colorful illustrations in this book make it a delight for children and fun for adults who are mastering BASIC programming. A sequel to **Your First Commodore 64 Program**, the book follows the same thorough, detailed approach and brings you to the next level of programming skill. With these BASIC language techniques, you'll soon be creating your own applications!

ISBN: 0-89588-152-7, 7"x11", 240 pp, illustrated

also available for APPLE II



ATARI BASIC Programs in Minutes

St. R. Trost £ 8.95

You can use this practical set of programs without any prior knowledge of BASIC! Application examples are taken from a wide variety of fields, including business, home management, and real estate. Just type them in and they're ready to run!

ISBN: 0-89588-143-8, 6"x9", 170 pp, illustrated



Power Up! Kids' Guide to the Commodore 64

M. DeJonghe/C. Earhart £ 7.95

Colorful illustrations and a friendly robot highlight this guide to the Commodore 64 for kids 8-11.

The hands-on approach features short, easy lessons, and the spiral binding makes it ideal for use right at the computer. The engaging exercises are full of surprises and discoveries. By the end of the book, kids will be programming their own guessing games, "all-purpose" thank-you notes, multi-colored pictures, and simple animation. The authors are elementary school teachers with several years of computer experience.

ISBN: 0-89588-188-8, 9"x7", 192 pp, illustrated



Graphics Guide to the Commodore 64

Charles Platt £ 9.95

This easy-to-understand book is the first to answer the need for a Commodore-specific graphics guide. It will appeal to anyone who wants to master the Commodore 64's powerful graphics features. You'll learn to move images across the screen, build your own character sets, and create impressive headlines and detailed pictures on the screen. A full color collection of screen displays is included, as well as instructions on how to create your own video games.

ISBN: 0-89588-138-1, 7"x9", 261 pp, illustrated



Programming the 6809

Zaks/Labiak £ 11.95

Get more out of your 6809 microprocessor — this book is chock full of programming tricks to show you how. Start with the basics of assembly language programming, and go on to understand registers and buses, subroutines, the 6809 instruction set, addressing modes, I/O techniques and devices, data structures, and useful applications. Give your 6809 processor 16-bit performance with 8-bit economy. No prior programming knowledge is required.

ISBN: 0-89588-078-4, 6"x9", 362 pp, illustrated



The Commodore 64/VIC-20 BASIC Handbook

D. Hergert £ 9.95

In this dictionary-style handbook, you'll find clear descriptions and examples of each word in the Commodore 64/VIC-20 BASIC vocabulary. The proper syntax of every keyword and function is explained carefully and thoroughly in easy-to-understand English. Short example programs illustrate the correct use of each command, and special notes provide insight into subtleties and extra features of Commodore 64/VIC-20 BASIC.

ISBN: 0-89588-116-0, 6"x9", 185 pp, illustrated

SYBEX COMPUTER BOOKS KEEP YOU UP ON HOW TO GET THE MOST OUT OF YOUR COMPUTER.

SYBEX Computer Books are available through most leading bookshop and your local computer store. Ask for them! Our books are also available from **COMPUTER BOOKSHOP**, Birmingham, **W.H. SMITH**, **JOHN MENZIES** and **BOOTS**. In case of difficulty contact us directly, enclosing your check or money order (include 80p for postage and packing).



SYBEX Ltd.

Unit 4, Bourne Industrial Estate
Crayford, Kent DA1 4BU
Tel: Crayford (0322) 57717

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.

Karate!

Alexis and
Mario Chiotis,
Finchley,
London N12.



KARATE IS A two-player game based on the Japanese form of martial art, for the Commodore 64.

Using the multicolour sprite facility on the 64, we have created many of the elements of the real thing for example punching, kicking etc., without the pain. To play you will need two joysticks and quite a bit of skill.

When the program is run you will be allowed to choose the colour of your Karate suit. This is done using F1 and F3. To continue, press F7. You will then be asked how long the fight will last, and also the names of the players.

The next scene is where the fighting takes place. The two men stand on their lines, bow, and are then ready to fight. By using the combination of joystick movements, shown on the chart, some complicated and exciting fights can be achieved.

After a little practice, you will soon master these techniques and produce some startling effects.

Finally, the winner will be displayed showing off his skills by attacking a brick wall.

If you would like a copy of Karate, just send £3.50 including post and packaging to: Karate Offer, 7 Torrington Grove, Finchley, London N12 9NA.

Joystick port one (controls player 2).

North: Jumps in the air and kicks.

North-west: Does a high kick towards opponent's chest.

West: Moves player two forward.

Fire: Kicks towards opponent's stomach.

West and Fire: Blocks oncoming punches and high kicks.

South-West: Sweeps opponent's legs away. South: Ducks. Can also be used to pull opponent's legs away.

East: Steps back.

East and Fire: Punches.

Joystick Port two (controls player 1).

North: Jumps and does a high kick.

North-east: Does a high kick towards opponent's chest.

East: Moves player 1 forward.

East and Fire: Blocks oncoming punches and high kicks.

South-east: Sweeps opponent's legs away.

South: Ducks. Can also be used to pull opponent's legs away.

West: Steps back.

West and Fire: Punches.

Variables.

C1: Colour of player one's karate suit.

C2: Colour of player two's karate suit.

J1: Peek of joystick port one.

J2: Peek of joystick port two.

P1: Player 1 score.

P2: Player 2 score.

S1: Sprite 1, i.e., 2040.

S2: Sprite 2, i.e., 2041.

T\$: Time.

```

1 00000000
2 CLR C1:1:2:1:PRINT "C1:00000000:00000000"
3 00000000
4 00000000
5 00000000
6 00000000
7 00000000
8 00000000
9 00000000
10 00000000
11 00000000
12 00000000
13 00000000
14 00000000
15 00000000
16 00000000
17 00000000
18 00000000
19 00000000
20 00000000
21 00000000
22 00000000
23 00000000
24 00000000
25 00000000
26 00000000
27 00000000
28 00000000
29 00000000
30 00000000
31 00000000
32 00000000
33 00000000
34 00000000
35 00000000
36 00000000
37 00000000
38 00000000
39 00000000
40 00000000
41 00000000
42 00000000
43 00000000
44 00000000
45 00000000
46 00000000
47 00000000
48 00000000
49 00000000
50 00000000
51 00000000
52 00000000
53 00000000
54 00000000
55 00000000
56 00000000
57 00000000
58 00000000
59 00000000
60 00000000
61 00000000
62 00000000
63 00000000
64 00000000
65 00000000
66 00000000
67 00000000
68 00000000
69 00000000
70 00000000
71 00000000
72 00000000
73 00000000
74 00000000
75 00000000
76 00000000
77 00000000
78 00000000
79 00000000
80 00000000
81 00000000
82 00000000
83 00000000
84 00000000
85 00000000
86 00000000
87 00000000
88 00000000
89 00000000
90 00000000
91 00000000
92 00000000
93 00000000
94 00000000
95 00000000
96 00000000
97 00000000
98 00000000
99 00000000
100 00000000

```

```

580 IF S2<193AND S1<204 THEN S2=193
581 IF S1<193AND S2<197 OR (S1<193AND S2<201) THEN S2=197
582 IF S2<193AND S1<197 OR (S2<193AND S1<201) THEN S1=197
583 IF S1<193 AND S2<197 THEN S1=197
584 IF S1<193 AND S2<201 THEN S1=201
585 IF S2<197 AND S1<193 THEN S2=197
586 IF S2<201 AND S1<197 THEN S2=201
587 IF S1<197 AND S2<193 THEN S1=193
588 IF S1<201 AND S2<197 THEN S1=201
589 IF S2<197 AND S1<201 THEN S2=197
590 IF S2<201 AND S1<197 THEN S2=201
591 IF S1<197 AND S2<193 THEN S1=193
592 IF S1<201 AND S2<197 THEN S1=201
593 IF S2<197 AND S1<201 THEN S2=197
594 IF S2<201 AND S1<197 THEN S2=201
595 IF S1<197 AND S2<193 THEN S1=193
596 IF S1<201 AND S2<197 THEN S1=201
597 IF S2<197 AND S1<201 THEN S2=197
598 IF S2<201 AND S1<197 THEN S2=201
599 IF S1<197 AND S2<193 THEN S1=193
600 IF S1<201 AND S2<197 THEN S1=201
601 IF S2<197 AND S1<201 THEN S2=197
602 IF S2<201 AND S1<197 THEN S2=201
603 IF S1<197 AND S2<193 THEN S1=193
604 IF S1<201 AND S2<197 THEN S1=201
605 IF S2<197 AND S1<201 THEN S2=197
606 IF S2<201 AND S1<197 THEN S2=201
607 IF S1<197 AND S2<193 THEN S1=193
608 IF S1<201 AND S2<197 THEN S1=201
609 IF S2<197 AND S1<201 THEN S2=197
610 IF S2<201 AND S1<197 THEN S2=201
611 IF S1<197 AND S2<193 THEN S1=193
612 IF S1<201 AND S2<197 THEN S1=201
613 IF S2<197 AND S1<201 THEN S2=197
614 IF S2<201 AND S1<197 THEN S2=201
615 IF S1<197 AND S2<193 THEN S1=193
616 IF S1<201 AND S2<197 THEN S1=201
617 IF S2<197 AND S1<201 THEN S2=197
618 IF S2<201 AND S1<197 THEN S2=201
619 IF S1<197 AND S2<193 THEN S1=193
620 IF S1<201 AND S2<197 THEN S1=201
621 IF S2<197 AND S1<201 THEN S2=197
622 IF S2<201 AND S1<197 THEN S2=201
623 IF S1<197 AND S2<193 THEN S1=193
624 IF S1<201 AND S2<197 THEN S1=201
625 IF S2<197 AND S1<201 THEN S2=197
626 IF S2<201 AND S1<197 THEN S2=201
627 IF S1<197 AND S2<193 THEN S1=193
628 IF S1<201 AND S2<197 THEN S1=201
629 IF S2<197 AND S1<201 THEN S2=197
630 IF S2<201 AND S1<197 THEN S2=201
631 IF S1<197 AND S2<193 THEN S1=193
632 IF S1<201 AND S2<197 THEN S1=201
633 IF S2<197 AND S1<201 THEN S2=197
634 IF S2<201 AND S1<197 THEN S2=201
635 IF S1<197 AND S2<193 THEN S1=193
636 IF S1<201 AND S2<197 THEN S1=201
637 IF S2<197 AND S1<201 THEN S2=197
638 IF S2<201 AND S1<197 THEN S2=201
639 IF S1<197 AND S2<193 THEN S1=193
640 IF S1<201 AND S2<197 THEN S1=201
641 IF S2<197 AND S1<201 THEN S2=197
642 IF S2<201 AND S1<197 THEN S2=201
643 IF S1<197 AND S2<193 THEN S1=193
644 IF S1<201 AND S2<197 THEN S1=201
645 IF S2<197 AND S1<201 THEN S2=197
646 IF S2<201 AND S1<197 THEN S2=201
647 IF S1<197 AND S2<193 THEN S1=193
648 IF S1<201 AND S2<197 THEN S1=201
649 IF S2<197 AND S1<201 THEN S2=197
650 IF S2<201 AND S1<197 THEN S2=201
651 IF S1<197 AND S2<193 THEN S1=193
652 IF S1<201 AND S2<197 THEN S1=201
653 IF S2<197 AND S1<201 THEN S2=197
654 IF S2<201 AND S1<197 THEN S2=201
655 IF S1<197 AND S2<193 THEN S1=193
656 IF S1<201 AND S2<197 THEN S1=201
657 IF S2<197 AND S1<201 THEN S2=197
658 IF S2<201 AND S1<197 THEN S2=201
659 IF S1<197 AND S2<193 THEN S1=193
660 IF S1<201 AND S2<197 THEN S1=201
661 IF S2<197 AND S1<201 THEN S2=197
662 IF S2<201 AND S1<197 THEN S2=201
663 IF S1<197 AND S2<193 THEN S1=193
664 IF S1<201 AND S2<197 THEN S1=201
665 IF S2<197 AND S1<201 THEN S2=197
666 IF S2<201 AND S1<197 THEN S2=201
667 IF S1<197 AND S2<193 THEN S1=193
668 IF S1<201 AND S2<197 THEN S1=201
669 IF S2<197 AND S1<201 THEN S2=197
670 IF S2<201 AND S1<197 THEN S2=201
671 IF S1<197 AND S2<193 THEN S1=193
672 IF S1<201 AND S2<197 THEN S1=201
673 IF S2<197 AND S1<201 THEN S2=197
674 IF S2<201 AND S1<197 THEN S2=201
675 IF S1<197 AND S2<193 THEN S1=193
676 IF S1<201 AND S2<197 THEN S1=201
677 IF S2<197 AND S1<201 THEN S2=197
678 IF S2<201 AND S1<197 THEN S2=201
679 IF S1<197 AND S2<193 THEN S1=193
680 IF S1<201 AND S2<197 THEN S1=201
681 IF S2<197 AND S1<201 THEN S2=197
682 IF S2<201 AND S1<197 THEN S2=201
683 IF S1<197 AND S2<193 THEN S1=193
684 IF S1<201 AND S2<197 THEN S1=201
685 IF S2<197 AND S1<201 THEN S2=197
686 IF S2<201 AND S1<197 THEN S2=201
687 IF S1<197 AND S2<193 THEN S1=193
688 IF S1<201 AND S2<197 THEN S1=201
689 IF S2<197 AND S1<201 THEN S2=197
690 IF S2<201 AND S1<197 THEN S2=201
691 IF S1<197 AND S2<193 THEN S1=193
692 IF S1<201 AND S2<197 THEN S1=201
693 IF S2<197 AND S1<201 THEN S2=197
694 IF S2<201 AND S1<197 THEN S2=201
695 IF S1<197 AND S2<193 THEN S1=193
696 IF S1<201 AND S2<197 THEN S1=201
697 IF S2<197 AND S1<201 THEN S2=197
698 IF S2<201 AND S1<197 THEN S2=201
699 IF S1<197 AND S2<193 THEN S1=193
700 IF S1<201 AND S2<197 THEN S1=201
701 IF S2<197 AND S1<201 THEN S2=197
702 IF S2<201 AND S1<197 THEN S2=201
703 IF S1<197 AND S2<193 THEN S1=193
704 IF S1<201 AND S2<197 THEN S1=201
705 IF S2<197 AND S1<201 THEN S2=197
706 IF S2<201 AND S1<197 THEN S2=201
707 IF S1<197 AND S2<193 THEN S1=193
708 IF S1<201 AND S2<197 THEN S1=201
709 IF S2<197 AND S1<201 THEN S2=197
710 IF S2<201 AND S1<197 THEN S2=201
711 IF S1<197 AND S2<193 THEN S1=193
712 IF S1<201 AND S2<197 THEN S1=201
713 IF S2<197 AND S1<201 THEN S2=197
714 IF S2<201 AND S1<197 THEN S2=201
715 IF S1<197 AND S2<193 THEN S1=193
716 IF S1<201 AND S2<197 THEN S1=201
717 IF S2<197 AND S1<201 THEN S2=197
718 IF S2<201 AND S1<197 THEN S2=201
719 IF S1<197 AND S2<193 THEN S1=193
720 IF S1<201 AND S2<197 THEN S1=201
721 IF S2<197 AND S1<201 THEN S2=197
722 IF S2<201 AND S1<197 THEN S2=201
723 IF S1<197 AND S2<193 THEN S1=193
724 IF S1<201 AND S2<197 THEN S1=201
725 IF S2<197 AND S1<201 THEN S2=197
726 IF S2<201 AND S1<197 THEN S2=201
727 IF S1<197 AND S2<193 THEN S1=193
728 IF S1<201 AND S2<197 THEN S1=201
729 IF S2<197 AND S1<201 THEN S2=197
730 IF S2<201 AND S1<197 THEN S2=201
731 IF S1<197 AND S2<193 THEN S1=193
732 IF S1<201 AND S2<197 THEN S1=201
733 IF S2<197 AND S1<201 THEN S2=197
734 IF S2<201 AND S1<197 THEN S2=201
735 IF S1<197 AND S2<193 THEN S1=193
736 IF S1<201 AND S2<197 THEN S1=201
737 IF S2<197 AND S1<201 THEN S2=197
738 IF S2<201 AND S1<197 THEN S2=201
739 IF S1<197 AND S2<193 THEN S1=193
740 IF S1<201 AND S2<197 THEN S1=201
741 IF S2<197 AND S1<201 THEN S2=197
742 IF S2<201 AND S1<197 THEN S2=201
743 IF S1<197 AND S2<193 THEN S1=193
744 IF S1<201 AND S2<197 THEN S1=201
745 IF S2<197 AND S1<201 THEN S2=197
746 IF S2<201 AND S1<197 THEN S2=201
747 IF S1<197 AND S2<193 THEN S1=193
748 IF S1<201 AND S2<197 THEN S1=201
749 IF S2<197 AND S1<201 THEN S2=197
750 IF S2<201 AND S1<197 THEN S2=201
751 IF S1<197 AND S2<193 THEN S1=193
752 IF S1<201 AND S2<197 THEN S1=201
753 IF S2<197 AND S1<201 THEN S2=197
754 IF S2<201 AND S1<197 THEN S2=201
755 IF S1<197 AND S2<193 THEN S1=193
756 IF S1<201 AND S2<197 THEN S1=201
757 IF S2<197 AND S1<201 THEN S2=197
758 IF S2<201 AND S1<197 THEN S2=201
759 IF S1<197 AND S2<193 THEN S1=193
760 IF S1<201 AND S2<197 THEN S1=201
761 IF S2<197 AND S1<201 THEN S2=197
762 IF S2<201 AND S1<197 THEN S2=201
763 IF S1<197 AND S2<193 THEN S1=193
764 IF S1<201 AND S2<197 THEN S1=201
765 IF S2<197 AND S1<201 THEN S2=197
766 IF S2<201 AND S1<197 THEN S2=201
767 IF S1<197 AND S2<193 THEN S1=193
768 IF S1<201 AND S2<197 THEN S1=201
769 IF S2<197 AND S1<201 THEN S2=197
770 IF S2<201 AND S1<197 THEN S2=201
771 IF S1<197 AND S2<193 THEN S1=193
772 IF S1<201 AND S2<197 THEN S1=201
773 IF S2<197 AND S1<201 THEN S2=197
774 IF S2<201 AND S1<197 THEN S2=201
775 IF S1<197 AND S2<193 THEN S1=193
776 IF S1<201 AND S2<197 THEN S1=201
777 IF S2<197 AND S1<201 THEN S2=197
778 IF S2<201 AND S1<197 THEN S2=201
779 IF S1<197 AND S2<193 THEN S1=193
780 IF S1<201 AND S2<197 THEN S1=201
781 IF S2<197 AND S1<201 THEN S2=197
782 IF S2<201 AND S1<197 THEN S2=201
783 IF S1<197 AND S2<193 THEN S1=193
784 IF S1<201 AND S2<197 THEN S1=201
785 IF S2<197 AND S1<201 THEN S2=197
786 IF S2<201 AND S1<197 THEN S2=201
787 IF S1<197 AND S2<193 THEN S1=193
788 IF S1<201 AND S2<197 THEN S1=201
789 IF S2<197 AND S1<201 THEN S2=197
790 IF S2<201 AND S1<197 THEN S2=201
791 IF S1<197 AND S2<193 THEN S1=193
792 IF S1<201 AND S2<197 THEN S1=201
793 IF S2<197 AND S1<201 THEN S2=197
794 IF S2<201 AND S1<197 THEN S2=201
795 IF S1<197 AND S2<193 THEN S1=193
796 IF S1<201 AND S2<197 THEN S1=201
797 IF S2<197 AND S1<201 THEN S2=197
798 IF S2<201 AND S1<197 THEN S2=201
799 IF S1<197 AND S2<193 THEN S1=193
800 IF S1<201 AND S2<197 THEN S1=201
801 IF S2<197 AND S1<201 THEN S2=197
802 IF S2<201 AND S1<197 THEN S2=201
803 IF S1<197 AND S2<193 THEN S1=193
804 IF S1<201 AND S2<197 THEN S1=201
805 IF S2<197 AND S1<201 THEN S2=197
806 IF S2<201 AND S1<197 THEN S2=201
807 IF S1<197 AND S2<193 THEN S1=193
808 IF S1<201 AND S2<197 THEN S1=201
809 IF S2<197 AND S1<201 THEN S2=197
810 IF S2<201 AND S1<197 THEN S2=201
811 IF S1<197 AND S2<193 THEN S1=193
812 IF S1<201 AND S2<197 THEN S1=201
813 IF S2<197 AND S1<201 THEN S2=197
814 IF S2<201 AND S1<197 THEN S2=201
815 IF S1<197 AND S2<193 THEN S1=193
816 IF S1<201 AND S2<197 THEN S1=201
817 IF S2<197 AND S1<201 THEN S2=197
818 IF S2<201 AND S1<197 THEN S2=201
819 IF S1<197 AND S2<193 THEN S1=193
820 IF S1<201 AND S2<197 THEN S1=201
821 IF S2<197 AND S1<201 THEN S2=197
822 IF S2<201 AND S1<197 THEN S2=201
823 IF S1<197 AND S2<193 THEN S1=193
824 IF S1<201 AND S2<197 THEN S1=201
825 IF S2<197 AND S1<201 THEN S2=197
826 IF S2<201 AND S1<197 THEN S2=201
827 IF S1<197 AND S2<193 THEN S1=193
828 IF S1<201 AND S2<197 THEN S1=201
829 IF S2<197 AND S1<201 THEN S2=197
830 IF S2<201 AND S1<197 THEN S2=201
831 IF S1<197 AND S2<193 THEN S1=193
832 IF S1<201 AND S2<197 THEN S1=201
833 IF S2<197 AND S1<201 THEN S2=197
834 IF S2<201 AND S1<197 THEN S2=201
835 IF S1<197 AND S2<193 THEN S1=193
836 IF S1<201 AND S2<197 THEN S1=201
837 IF S2<197 AND S1<201 THEN S2=197
838 IF S2<201 AND S1<197 THEN S2=201
839 IF S1<197 AND S2<193 THEN S1=193
840 IF S1<201 AND S2<197 THEN S1=201
841 IF S2<197 AND S1<201 THEN S2=197
842 IF S2<201 AND S1<197 THEN S2=201
843 IF S1<197 AND S2<193 THEN S1=193
844 IF S1<201 AND S2<197 THEN S1=201
845 IF S2<197 AND S1<201 THEN S2=197
846 IF S2<201 AND S1<197 THEN S2=201
847 IF S1<197 AND S2<193 THEN S1=193
848 IF S1<201 AND S2<197 THEN S1=201
849 IF S2<197 AND S1<201 THEN S2=197
850 IF S2<201 AND S1<197 THEN S2=201
851 IF S1<197 AND S2<193 THEN S1=193
852 IF S1<201 AND S2<197 THEN S1=201
853 IF S2<197 AND S1<201 THEN S2=197
854 IF S2<201 AND S1<197 THEN S2=201
855 IF S1<197 AND S2<193 THEN S1=193
856 IF S1<201 AND S2<197 THEN S1=201
857 IF S2<197 AND S1<201 THEN S2=197
858 IF S2<201 AND S1<197 THEN S2=201
859 IF S1<197 AND S2<193 THEN S1=193
860 IF S1<201 AND S2<197 THEN S1=201
861 IF S2<197 AND S1<201 THEN S2=197
862 IF S2<201 AND S1<197 THEN S2=201
863 IF S1<197 AND S2<193 THEN S1=193
864 IF S1<201 AND S2<197 THEN S1=201
865 IF S2<197 AND S1<201 THEN S2=197
866 IF S2<201 AND S1<197 THEN S2=201
867 IF S1<197 AND S2<193 THEN S1=193
868 IF S1<201 AND S2<197 THEN S1=201
869 IF S2<197 AND S1<201 THEN S2=197
870 IF S2<201 AND S1<197 THEN S2=201
871 IF S1<197 AND S2<193 THEN S1=193
872 IF S1<201 AND S2<197 THEN S1=201
873 IF S2<197 AND S1<201 THEN S2=197
874 IF S2<201 AND S1<197 THEN S2=201
875 IF S1<197 AND S2<193 THEN S1=193
876 IF S1<201 AND S2<197 THEN S1=201
877 IF S2<197 AND S1<201 THEN S2=197
878 IF S2<201 AND S1<197 THEN S2=201
879 IF S1<197 AND S2<193 THEN S1=193
880 IF S1<201 AND S2<197 THEN S1=201
881 IF S2<197 AND S1<201 THEN S2=197
882 IF S2<201 AND S1<197 THEN S2=201
883 IF S1<197 AND S2<193 THEN S1=193
884 IF S1<201 AND S2<197 THEN S1=201
885 IF S2<197 AND S1<201 THEN S2=197
886 IF S2<201 AND S1<197 THEN S2=201
887 IF S1<197 AND S2<193 THEN S1=193
888 IF S1<201 AND S2<197 THEN S1=201
889 IF S2<197 AND S1<201 THEN S2=197
890 IF S2<201 AND S1<197 THEN S2=201
891 IF S1<197 AND S2<193 THEN S1=193
892 IF S1<201 AND S2<197 THEN S1=201
893 IF S2<197 AND S1<201 THEN S2=197
894 IF S2<201 AND S1<197 THEN S2=201
895 IF S1<197 AND S2<193 THEN S1=193
896 IF S1<201 AND S2<197 THEN S1=201
897 IF S2<197 AND S1<201 THEN S2=197
898 IF S2<201 AND S1<197 THEN S2=201
899 IF S1<197 AND S2<193 THEN S1=193
900 IF S1<201 AND S2<197 THEN S1=201
901 IF S2<197 AND S1<201 THEN S2=197
902 IF S2<201 AND S1<197 THEN S2=201
903 IF S1<197 AND S2<193 THEN S1=193
904 IF S1<201 AND S2<197 THEN S1=201
905 IF S2<197 AND S1<201 THEN S2=197
906 IF S2<201 AND S1<197 THEN S2=201
907 IF S1<197 AND S2<193 THEN S1=193
908 IF S1<201 AND S2<197 THEN S1=201
909 IF S2<197 AND S1<201 THEN S2=197
910 IF S2<201 AND S1<197 THEN S2=201
911 IF S1<197 AND S2<193 THEN S1=193
912 IF S1<201 AND S2<197
```


[illegible][illegible]

Barry O'Reilly,
Kells,
County Meath,
Ireland.

SPECTRUM

HAVING JUST GRADUATED from college with an arts degree, you find the permissive world totally engrossed in watching junior blasting the bug-eyed-bouncers before they eat his cat and kill his grandmother, or vice versa. There seems no place for conscientious objectors like you, so despondently you don the disguise of an inconspicuous paint-brush and venture out to make your fortune in the menial post of exterior decorator.

For those of you who have never had the experience of being a paint-brush I shall try to

describe the feeling. You are situated on the wall of a house and may move anywhere you wish, painting as you go. Inevitably there are a collection of hazards to be avoided and, equally inevitably, bonuses to be collected.

Death can also be found in the form of a dry paint brush. To avoid this, paint-pots are placed about the wall, running over these will replenish the linear scale at the bottom of the screen. About one minute of diligent swishing is enough to complete a wall and then be prepared for . . . Oh it's all in the program anyhow.

Key in the program as listed even though the numbering appears unbearably erratic. Then save it under your favourite file name using the suffix Line 8000 so as to display the instructions on loading.

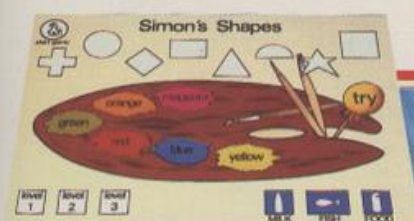
```

BONUS STAGE" TAB 0
4010 PRINT AT 3,16, INK 6;"L"
NK 4;"=";250; AT 12,8, PAPER 0;
INK 2, FLASH 1;"PRESS ANY KEY
4020 PAUSE 200 BORDER 2: PAPER
0:CLS
4030 FOR n=28 TO 228 STEP 40: PL
OT n,16, DRAW 0,143: NEXT n
4040 FOR n=28 TO 140 STEP 16
4050 GO TO 4060+10*(RND(.5)
4060 PLOT 28,n: DRAW 40,0: PLOT
108,n: DRAW 40,0: PLOT 188,n: DR
AW 40,0: GO TO 4080
4070 PLOT 68,n: DRAW 40,0: PLOT
148,n: DRAW 40,0
4080 NEXT n
4090 PRINT AT 20,INT (RND*6)+5+3
,INK 6;"L"
4100 LET y=3: LET x=1: INK 6
4110 FOR n=1 TO 5+RND*35: PRINT
AT x,y;"C": BEEP .067: IF INKEY
$<="" THEN GO TO 4135
4120 PRINT AT x,y;" " LET y=y+5
IF y>28 THEN LET y=3
4130 NEXT n
4135 PAPER 1
4140 LET r5=POINT (y*8-8,(21-
8+4)): LET r6=POINT (y*8+8,(21-
8+4)): LET r6=POINT (y*8+4,(21-x
)*8-4)
4150 BEEP .005,x+y: PRINT AT x,y
:PAPER 1;" " IF r5 AND r6 THEN
LET dy=-1: LET cs="A"
4160 IF r6 AND r8 THEN LET dy=1:
LET cs="C"
4170 IF r6 AND NOT r5 AND NOT r8
THEN LET x=x+1: LET dy=0: LET c
s="D"
4180 LET y=y+dy: PRINT AT x,y;cs
IF x<19 THEN GO TO 4140
4200 PRINT AT x,y;" "
4210 IF ATTR (20,y)<>6 THEN GO TO
0,4250
4220 PRINT AT 19,y: PAPER 1;" "
FLASH 1,AT 20,y, INK 6;"D": AT 1
1,14, INK 4,250: LET s=s+50: F
OR n=10 TO 30: BEEP .005,n: NEXT
n: FOR n=30 TO 0 STEP -1: BEEP
.01,n: NEXT n
4230 FLASH 0: FOR n=0 TO 3: FOR
w=144 TO 147: PRINT AT 20,y, INK
6;CHR$(w): BEEP .01,n*(w-144): N
EXT w: NEXT n
4240 PAUSE 0: GO TO 1100
4250 PRINT AT 20,y;"D": BEEP .1
3: BEEP 2,0: BEEP .3,-4: BEEP
4,-9: BEEP .5,-12: GO TO 1100
5500 RETURN
7000 GO TO 600
7100 LET s=s+4: GO TO 200
8000 PAPER 0: INK 0: BORDER 2: C
LS
9010 PRINT INK 2;AT 1,11: FLASH
1;" " AT 2,11;" " FLASH
0;"PAINTER" FLASH 1;" " AT 3,1
1;" "
9020 PRINT TAB 4; INK 1;"© 1984
Barry P.O'Reilly"
9030 FOR n=0 TO 31: PRINT INK 4;
-" " NEXT n
9040 PRINT "An unemployed Leo
nardo, your only hope of work
s at Mrs. Pritchewood's read
rick house which she has deci
ed to coat with a sprightly b
ue paint."
9050 PRINT "An easy job for o
of your calibre one would
think, but it's not quite so
simple."
9060 PRINT "You must avoid at
(continued on page 181)

```

(continued on page 181)

FORGET SOFTWARE THINK TOUCHWARE



Simon's Shapes



Simon Says



MultiSound Synthesiser



Dick's Diamonds



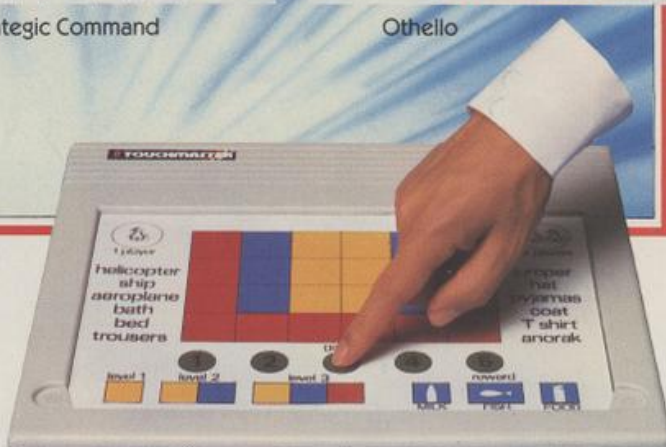
Strategic Command



Othello



Graphics Editor



Simply Simon

An expanding range of totally new Touchware is now available for Touchmaster (software houses throughout the UK and Europe are continuously adding to it). Due to the enhanced concept behind both Touchmaster and its Touchware, they combine to expand your use of the computer - dramatically and easily.

Experience the expanding range of Touchware - Arcade Games, Graphics packages, early education programs, Synthesiser, Board Games.

They all take on a new dimension with Touchmaster - some examples are shown above.

But they only hint at what you can do when you come to write your own programs with Touchmaster.

Complete and post the coupon for more details. Or telephone Teledata on 01-200 0200.

Now anyone can master the home computer
TOUCHMASTER



Touchmaster Limited, PO Box 3,
Port Talbot, West Glamorgan SA13 1WH.

More details on Touchmaster and Touchware please.

Name _____

Address _____

Post Code _____

YC 11

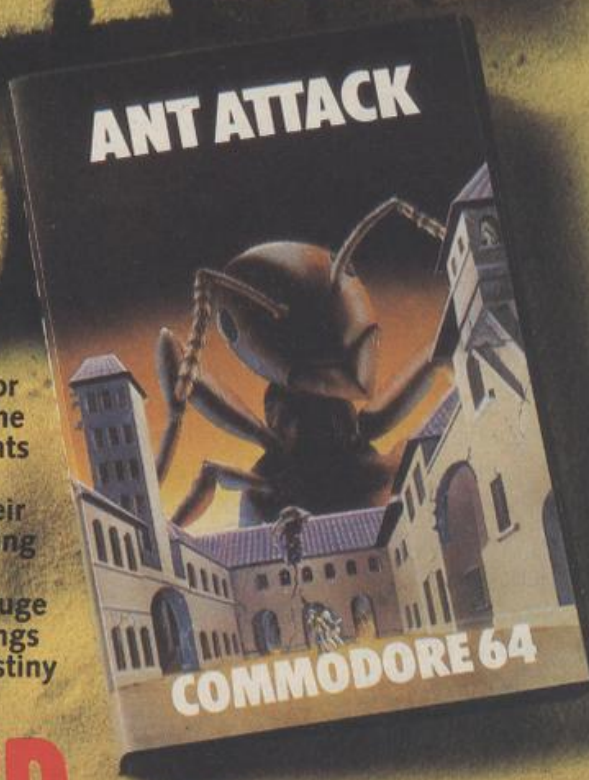
**They came from out of the desert to
the lost city of Antescher and discovered
the HORROR of the ANTS...**

ANT ATTACK 3D

The Walled City of Antescher has rested for a thousand, thousand years in the midst of the Great Desert inhabited by only the deadly Ants who have made it their home.

Then one day He and She arrive to play their games through the wind-swept streets, ousting the Ants from their exclusive occupation.

But the City seems to have a presence, a huge brooding entity which hangs over the buildings and in some mysterious way controls the destiny of those below ...



ANT ATTACK 3D

Turbo load Commodore 64

£8.95

available from

QUICKSILVA

Quicksilva Mail Order, P.O. Box 6, Wimborne, Dorset BA21 7PY. Tel. (0202) 891744

Selected titles available at:

WHSMITH



WOOLWORTH

John Menzies

and leading multiple retailers and specialist computer stores.

SEE-SAW

COMMODORE 64

Turbo load

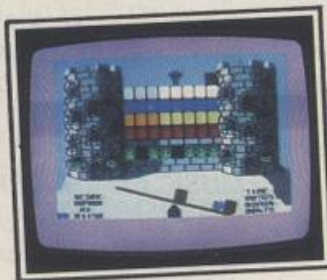
£7.95



COMMODORE 64
Turbo load £7.95 each



A GAME OF STRATEGY THAT WILL TEST
YOUR MIND TO THE LIMIT!

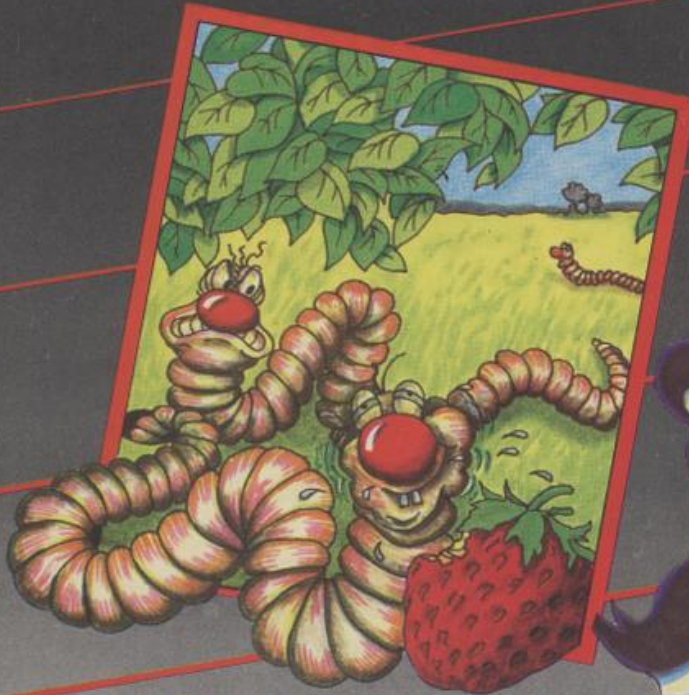


The Evil Castle Lord has trapped the members of the brotherhood in his castle. Only you, the Grand Master, can rescue them, but to do this you must vault the castle walls and unlock their cells...

QUICKSILVA

All titles available from Quicksilver Mail Order, PO Box 6, Wimborne Dorset BA21 7PY. Tel (0202) 891744.

For The First Time Ever In England



PINGO

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

ZX Spectrum 48k

5.95

JANGLER

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

ZX Spectrum 48k

5.95

- ★ fully editable
- ★ synthesizer coming shortly

ZX Spectrum 48k

6.95

SPACE MISSILE COMMAND

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

ZX Spectrum 48k

5.95

MUSIC COMPOSER

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

Available from your software dealer

profissoft

Dealer enquiries contact telex
Germany 94966 profis d.

PROFISOFT GMBH, SUTTHAUSER STRASSE 50/52, 4500 OSNABRUECK, WEST GERMANY

(continued from page 176)

```

1 that seek to thwart your eff
orts: The pestilent bees, th
e skulking soap-bubbles and o
f course no handiwork on dear
old Mrs. Pritchettwood's win
dows.
8070 GO SUB 9500
8080 IF INKEY$="" THEN GO TO 80
90: REM Press any key.
8085 GO TO 8080
8090 PAPER 0: INK 0: FOR n=6 TO
21: PRINT AT n,1: PAPER 0:
NEXT
n
8100 PRINT AT 5,1: "The kind old
lady offers £1 for each squa
re and £5 if you manage to cov
er a crack."
8110 PRINT "Extra cash can be
earned at the bonus stage by
teaching the gold paint pot."
8120 PRINT "Collecting paint

```

```

Pots will replenish your bru
sh during the game, but be t
hrifty, the supply is limi
ted.
8130 PRINT "Fingers ready: 3-
LEFT 4-RIGHT TAB 17;"8-UP U-D.
OUN"
8140 GO SUB 9500
8500 RESTORE 903: FOR n=USR "a"
TO USR "n"
8510 READ s: POKE n,s: NEXT n
8520 PAUSE 0: RUN
9000 DATA 95,175,112,191,127,175
,112,150
9010 DATA 170,85,-1,125,24,s,s,s
9020 DATA 5,14,13,-2,-3,14,13,6
9030 DATA 24,s,s,s,125,-1,170,85
9040 DATA 127,s,s,0,-9,s,s,0
9050 DATA 35,24,219,-1,198,126,6
,189
9060 DATA 32,82,37,2,32,82,37,2
9070 DATA -1,127,97,s,s,127,s,97
9080 DATA -1,-2,134,s,s,-2,s,134
9090 DATA 97,s,s,s,s,s,127,-1

```

```

9100 DATA 134,s,s,s,s,s,-2,-1
9110 DATA 50,55,125,70,90,70,94,
125
9120 DATA 95,80,158,36,82,135,14
8,35,s
9140 DATA 5,13,14,-3,-2,13,14,5
9500 FLASH 1: INK 7: PRINT AT 0,
0:
" #1: FLASH 1: AT 0,0: PAPER 0
":
": FOR n=1 TO 21: PRINT AT n,0
": AT n,31: "I": NEXT n: FLASH
0
9510 IF INKEY$="" THEN GO TO 95
10
9520 FOR n=22721 TO 23231: IF n/
32<>INT (n/32) AND (n+1)/32<>INT
((n+1)/32) THEN POKE n,135: BEE
P .001,30: POKE n,5
9530 IF INKEY$="" THEN RETURN
REM Dismiss instructions by
pressing any key
9540 NEXT n
9550 RETURN

```

Chicks

Stuart Smalley,
Selby,
North Yorkshire.



CHICKS IS FOR a model B BBC computer and involves directing a man about the screen by the use of the Z, X — left, right — and, ; / for up, down. The idea is to herd a flock of chicks into a chicken coop. The chicks always move

away from the man but the man has moves at three times their speed.

The game can be speeded up by changing the multipland on line 140 or even by deleting the whole line.

```

10REM (C) STUART SMALLEY.1984
20SZ=0
30DIM chicksx%(8),chicksy%(8)
40MODE 7
50PROCdifficulty
60MODE1
70PROCinitialise
80REPEAT
90PROCmove man
100COLOUR1
110PRINTTAB (coopx%-1,coopy%-1)CHR$130+CHR$131+CHR$13
2
120COLOUR3
130PRINTTAB (coopx%-1,coopy%)CHR$133+CHR$134+CHR$135
140FORdelay%=1 TO (7-flock%)*30:NEXT
150PROCmove man
160PROCchicks
170PROCmove man
180UNTIL FALSE
1000DEFPROCmove man
1010X=X+(INKEY(-98) AND X>0)-(INKEY(-67) AND X<39
)
1020Y=Y+(INKEY(-73) AND Y>0)-(INKEY(-105) AND Y<2
9)
1030COLOUR1
1040PRINTTAB(X,Y)CHR$128
1050IF oldx<>X OR oldy<>Y THEN PRINTTAB(oldx,old
Y) " "
1060oldx=X:oldy=Y
1070ENDPROC
2000DEFPROCchicks
2010SOUND1,1,200,1
2020FORI=1 TO flock%
2030AX=chicksx%(I):BY=chicksy%(I)
2040PROCmove chicks
2050PRINTTAB(A,B) " "
2060COLOUR2
2070PRINTTAB(chicksx%(I),chicksy%(I))chick$
2080IFchicksx%(I)=coopx% AND chicksy%(I)=coopy% THE
N PROCcooped
2090NEXT
2100ENDPROC
3000DEFPROCmove chicks
3010IF X>chicksx%(I) THEN chicksx%(I)=chicksx%(I)
-1:chick$=CHR$129 ELSE IF X<chicksx%(I) THEN chicksx
%(I)=chicksx%(I)+1:chick$=CHR$136
3020IF Y>chicksy%(I) THEN chicksy%(I)=chicksy%(I)
-1 ELSE IF Y<chicksy%(I) THEN chicksy%(I)=chicksy%(
I)+1
3030IF chicksx%(I)<1 THEN chicksx%(I)=RND(4) ELSE I
F chicksx%(I)>37 THEN chicksx%(I)=33+RND(4)
3040IF chicksy%(I)<1 THEN chicksy%(I)=RND(4) ELSE I
F chicksy%(I)>28 THEN chicksy%(I)=24+RND(4)
3050ENDPROC
4000DEFPROCcooped
4010flock%=flock%-1
4020IF flock%=0 THEN PROCsuccess:ENDPROC ELSE FOR sou
nd%=50 TO 150 STEP 20:SOUND 1,-15,sound%,1:SOUND 2,-15
,sound%,1:SOUND 3,-15,sound%,1:NEXT
4030FOR J=I TO flock%
4040chicksx%(J)=chicksx%(J+1)
4050chicksy%(J)=chicksy%(J+1)
4060NEXT
4070I=J%

```

```

4080ENDPROC
5000DEFPROCsuccess
5010time%=TIME DIV 100
5020score%=25*difficulty%-time%
5030difficulty%=difficulty%+1
5040IF difficulty%>7 THEN difficulty%=7
5050CLS
5060PRINTTAB(5,8)"CONGRATULATIONS!!"
5070PRINTTAB(0,12)"You captured all the chicks"
5080IF score%>0 THEN PRINT"in ";time%;" seconds" ELSE
PRINT"But took too long!"
5090PRINT""You scored ";score%
5100flock%=difficulty%
5110IF score%>8 THEN SZ=score%:PRINT""You have the
highest score!"
5120PROCfanfare
5130PROCinitialise
5140PRINT""PRESS <space> CONTINUE"
5150REPEAT UNTIL INKEY(-99)
5160CLS
5170ENDPROC
6000DEFPROCdifficulty
6010FORI=0 TO 9
6020FORJ=0 TO 39 STEP 2
6030PRINTTAB(J,I)CHR$(128+RND(7))+CHR$157
6040NEXT
6050SOUND1,-15,I*10,1
6060NEXT
6070PRINTTAB(13,2)CHR$132+CHR$157+CHR$141+CHR$135+"CH
ICKS"
6080PRINTTAB(13,3)CHR$132+CHR$157+CHR$141+CHR$135+"CH
ICKS"
6090PRINTTAB(5,6)CHR$134+CHR$157+CHR$132+"(C) STUART
SMALLEY, 1984"
6100PRINTTAB(0,11)"All the baby chicks have escaped a
nd your job is to return them to the coop."
6110PRINT""To do this you control a man who moves by
pressing:-"
6120PRINT""'=UP ''='DOWN 'Z'=LEFT 'X'=RIGHT"
6130PRINT""The chicks always move away from you."
6140PRINT""PRESS KEYS 1-5 FOR LEVEL OF DIFFICULTY"
6150REPEAT A$=GET$:UNTILINSTR("12345",A$)
6160difficulty%=VAL(A$)+2
6170ENDPROC
7000DEFPROCfanfare
7010FOR I=1 TO 3
7020FOR sound%=10 TO 150 STEP 15
7030SOUND &201,-15,sound%,1
7040SOUND &202,-15,sound%,1
7050SOUND &203,-15,sound%,1
7060NEXT
7070NEXT
7080FOR sound%=150 TO 10 STEP -15
7090SOUND &201,-15,sound%,1
7100SOUND &202,-15,sound%,1
7110SOUND &203,-15,sound%,1
7120NEXT
7130ENDPROC
8000DEFPROCinitialise
8010FORI=1 TO 8
8020chicksx%(I)=RND(30)
8030chicksy%(I)=RND(30)
8040NEXT

```

(continued on page 183)



**We're as enthusiastic
about computers as you are.**

Practical Computing

Microsoft
**Computer
Fair**
£1 off admission: voucher inside

If you use computers at work or at home, Practical Computing magazine is essential reading. Every month it takes a long hard look at the most important issues in computing. It's informative, very useful and immensely readable.

It reviews both hardware and software, discusses the latest innovations and helps you get the most out of all the popular computers.

It's always entertaining, never dull. And it's at your newsagent now.

**Practical
Computing**
At work. At home

(continued from page 181)

```
8050VDU23,128,24,60,24,60,126,219,24,54
8060VDU23,129,56,120,24,14,31,31,14,17
8070VDU23,130,0,0,0,0,1,3,7,15
8080VDU23,131,16,56,124,254,255,255,255
8090VDU23,132,0,0,0,0,0,128,192,224
8100VDU23,133,7,7,7,7,7,7,7,7
8110VDU23,134,255,255,199,131,131,131,131
8120VDU23,135,192,192,192,192,192,192,192
8130VDU23,136,28,30,24,112,248,248,112,144
```

```
8140VDU23;8202;0;0;0;0;
8150ENVELOPE 1,1,5,5,-10,30,30,30,50,0,0,1,100,100
8160flock%=difficulty%
8170chick%=CHR#129
8180oldx%=10:oldy%=10
8190X%=10:Y%=10
8200coopx%=RND(20)+10:coopy%=RND(15)+10
8210TIME=0
8220ENDPROC
```

```
1 LET HI=0
2 LET LE=10
3 LET L=1
4 LET SCORE=0
5 LET BALLS=7
6 GOSUB 1000
7 GOTO 1000
8 FAST
9 LET A=7
10 FOR N=9 TO 42
11 FOR F=0 TO (20+SQR (N/16))-1
12
13
14 PLOT N+10,F
15 NEXT F
16 NEXT N
17 FOR F=0 TO 17
18 FOR N=53 TO 63
19 PLOT N,F
20 NEXT N
21 NEXT F
22 FOR N=0 TO 19
23 PLOT N,0
24 NEXT N
25 SLOW
26 LET Z=INT (RND*3)+25
27 LET U=9
28 RETURN
29
30
31 FOR F=0 TO 63
32 PLOT F,0
33 NEXT F
34 FOR N=0 TO 33
35 FOR F=0 TO (22+20*SIN (N/32
+PI))-30
36 PLOT N+16,F
37 NEXT F
38 NEXT N
39 LET U=18
40 LET Z=INT (RND*5)+23
41 UNPLOT 32,12
42 SLOW
43 RETURN
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
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
```

```
132 PRINT AT 10,20,"
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
```

Castles of Carmain

John Wood,
Wednesbury,
West Midlands.

ZX-81

THIS IS A PROGRAM for the 16K ZX-81 called the Castles of Carmain. All the castles must be destroyed by typing in the angle of elevation, followed by the velocity of the cannon ball.

The castles appear randomly on each game but are always possible to hit. The cave is also drawn randomly.

```
1450 GOTO 1000
2000 IF SCORE>HI THEN LET HI=SCORE
3000 PRINT AT 2,0;"NO CANNONBALL
4000 LEFT TO REPLAY";HI SCORE=
5000
6000 IF INKEY$="" THEN GOTO 2010
7000 IF INKEY$="R" THEN GOTO 2
8000 STOP
9000 SAVE "CASTLES"
10000 RUN
11000 CLS
12000 FOR F=0 TO 21
13000 PRINT TAB F;"WELL DONE"
14000 NEXT F
15000 PRINT AT 0,20;"
16000
17000
18000
19000
20000
21000
22000
23000
24000
25000
26000
27000
28000
29000
30000
31000
32000
33000
34000
35000
36000
37000
38000
39000
40000
41000
42000
43000
44000
45000
46000
47000
48000
49000
50000
51000
52000
53000
54000
55000
56000
57000
58000
59000
60000
61000
62000
63000
64000
65000
66000
67000
68000
69000
70000
71000
72000
73000
74000
75000
76000
77000
78000
79000
80000
81000
82000
83000
84000
85000
86000
87000
88000
89000
90000
91000
92000
93000
94000
95000
96000
97000
98000
99000
100000
```

Subhunt

Mark Stewart,
Balerno,
Edinburgh.

ORIC

SUBHUNT IS WRITTEN in machine code and it runs on the Oric-1 or Atmos 16K or 48K. The

Atmos version has no sound.

The first program enables you to type in the code — program 2. Program 3 is the Basic controller program.

You have to guide a frogman through enemy waters to plant mines on the hulls of ships. The enemy has laid mines which you

have to avoid and have filled the waters with mutant jellyfish and cloned sharks. Use A for up, Z for down and space bar to plant a mine.

48K owners must add:
4 POKE 8960,76:DOKE 8961, #A300
I can supply it on cassette for £3. Send a cheque to Mark Stewart, 12 Whitelea Road.

Program 1.

```
2000
2100 CLS
2200 INPUT"ENTER START ADDRESS ":ST
2300 PRINT"ENTER 'STOP' TO END."
2400 PRINT
2500 PRINTHEX$(ST);".?":INPUTA$
2600 IF A$="STOP" THEN STOP
2700 V=VAL(A$):POKEST,V
2800 ST=ST+1
2900 GOTO 2000
```

Program 2.

```
10000
10001
10002
10003
10004
10005
10006
10007
10008
10009
10010
10011
10012
10013
10014
10015
10016
10017
10018
10019
10020
10021
10022
10023
10024
10025
10026
10027
10028
10029
10030
10031
10032
10033
10034
10035
10036
10037
10038
10039
10040
10041
10042
10043
10044
10045
10046
10047
10048
10049
10050
10051
10052
10053
10054
10055
10056
10057
10058
10059
10060
10061
10062
10063
10064
10065
10066
10067
10068
10069
10070
10071
10072
10073
10074
10075
10076
10077
10078
10079
10080
10081
10082
10083
10084
10085
10086
10087
10088
10089
10090
10091
10092
10093
10094
10095
10096
10097
10098
10099
10100
```

```
2000
20001
20002
20003
20004
20005
20006
20007
20008
20009
20010
20011
20012
20013
20014
20015
20016
20017
20018
20019
20020
20021
20022
20023
20024
20025
20026
20027
20028
20029
20030
20031
20032
20033
20034
20035
20036
20037
20038
20039
20040
20041
20042
20043
20044
20045
20046
20047
20048
20049
20050
20051
20052
20053
20054
20055
20056
20057
20058
20059
20060
20061
20062
20063
20064
20065
20066
20067
20068
20069
20070
20071
20072
20073
20074
20075
20076
20077
20078
20079
20080
20081
20082
20083
20084
20085
20086
20087
20088
20089
20090
20091
20092
20093
20094
20095
20096
20097
20098
20099
20100
```

(continued on next page)



THE ROTRONICS DR2301 COMPUTER/ AUDIO CASSETTE RECORDER

The Rotronics DR2301 has all the facilities you would expect of a quality audio recorder and also works perfectly with the VIC 20 and CBM 64 computers without any fiddly separate boxes or adaptors. Simply connect the DR2301 directly with your Commodore computer via

the lead supplied and you are ready to start. The built-in interface circuitry ensures that SAVEing and LOADing is completely reliable – even when using commercially produced software. The DR2301 also allows the

computer to sense when the PLAY key has been depressed.

Additional features are auto-stop, tape counter, in-built microphone and foldaway carrying handle. The DR2301 is also compatible with the ZX81, Spectrum

and many other popular home computers.

The DR2301 will take its power from the computer (Commodore only), mains adaptor (supplied) or internal batteries. Each unit carries a full 12 month guarantee.



Superb micro accessories from Rotronics

THE ROTRONICS PORTABLE CASE

Here is the ideal portable work station for home, school or work. Specially made for most home micro-computers, it contains your ZX81, Spectrum, VIC20 or CBM64 within a smart executive style case with removable lid for convenience in use.

The individually tailored foam insert securely protects your micro and cassette recorder (C2N or DR2301) during transit. Additional storage space in the lid holds manuals and up to twenty cassettes. A scalpel is provided to modify the insert for expansion units and an alternative

insert can be supplied if you change your hardware in the future. The case is also available with uncut foam inserts.

All components remain fully operational within the case via inter-connections routed between the double layers of foam, so there are no unsightly leads.

The case has been designed for easy use with each component positioned for convenient operation.

The overall dimensions are 138mm x 725mm x 363mm.

ONLY £34.49 (p+p £2.50)



ORDER FORM

Please send (enter as appropriate)

- ☐ Rotronics Computer/Audio Cassette Recorder(s) at £36.95 each (inc. p+p).
☐ Rotronics Portable Case at £36.99 each (inc. £2.50 p+p) for ZX81/Spectrum/VIC 20 with C2N/DR2301*/CBM 64 with C2N/DR2301*/Uncut Foam*

Trade Enquiries Welcome

All prices inclusive of VAT

TOTAL £

☐ I enclose a cheque/PO* for £ made payable to SMT

☐ Debit my Access/Barclaycard* account no.

(*delete as applicable)

Signature

Name

Address

YC 11/84

Send to (no stamp required):

**SMT, FREEPOST, Greens Norton,
Towcester, Northants, NN12 8BR**

Please allow 28 days for delivery.



VIC 20 and CBM 64 are registered trademarks of Commodore Business Machines.

EUREK

A 100k BBC-drive for £99 + VAT

We've done it! We've built a mass storage system for your BBC Micro with the power and convenience of a floppy disk drive, but at a fraction the price. Get to know PHLOOPY, the remarkable new 100k drive that costs only £99 plus VAT, and a further £26 plus VAT for the interface to your BBC, operating system and connecting cables.

How PHLOOPY does it

PHLOOPY does not use disks to store data, but a 12-foot loop of professional-quality quarter-inch magnetic tape contained in a robust cartridge. The drive has only one moving part, the motor which drives the tape loop – hence the low price and high reliability. As the loop is driven round, each file of data it contains passes across the magnetic head which reads it or writes to it. Other people have produced tape loop micro-drives, but they've not been very reliable. They lacked PHLOOPY's special secret.



PHLOOPY's special secret



The heart of the invention is a brilliantly designed "byte-wide" magnetic head, made by Phi Magnetronics who build multi-track heads for professional use. PHLOOPY's head records and reads nine tracks across the width of a quarter-inch tape. That means the tape loop can be much shorter, so the typical time to access a file is reduced to a mere 3 seconds. If you're used to waiting for a cassette tape to trundle programs into your BBC, you'll be amazed at PHLOOPY's performance.

Getting it right every time

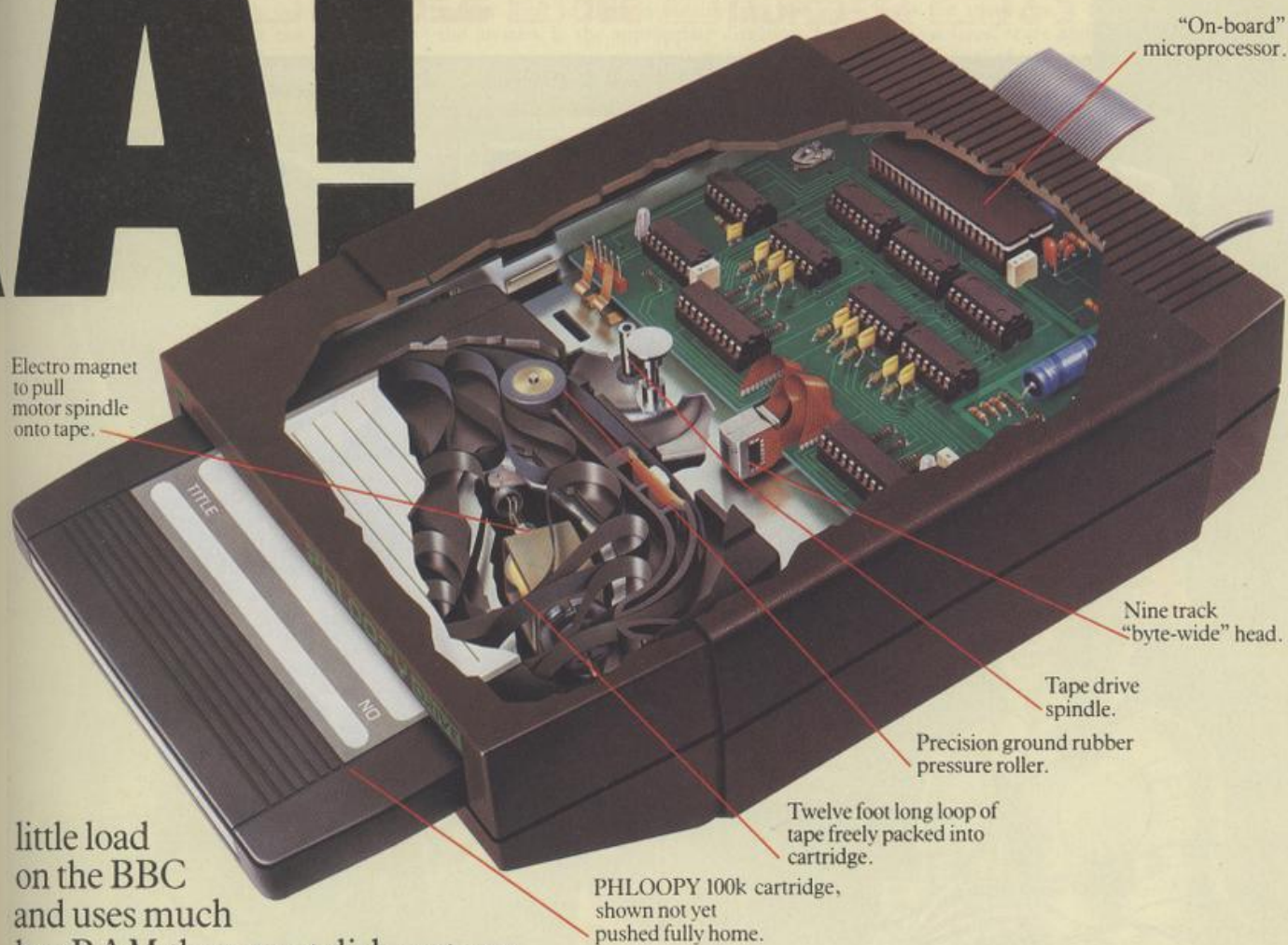
In addition, we've included a feature we know you will appreciate. PHLOOPY has full error detection and correction, so you can be certain you will get back what was originally written onto the tape.

Talking to your PHLOOPY

PHLOOPY's own software, contained in ROM, responds to standard BBC filing system and Basic commands. Most programs written to run on disk or cassette should run on PHLOOPY without problem.

And because PHLOOPY contains its own intelligent microprocessor – a second computer which does most of the hard work – PHLOOPY puts very

WAAH



little load on the BBC and uses much less RAM than most disk systems.

Installing PHLOOPY on your BBC

You'll be amazed how simple it is to install PHLOOPY. Just plug in the interface cut two resistors (clearly marked in the instructions) and the job is done. If you should have problems our engineers are waiting to help you.

Making a PHLOOPY Library

PHLOOPY cartridges hold a full 100k of data or programs. Two of them come free with the drive and extra ones cost £3.75 each plus VAT. They are moulded of high impact polymers for protection and store easily on a bookshelf. Many programs will be available to purchase on PHLOOPY.



Phi Mag Systems Ltd.

PO Box 21, Falmouth,
Cornwall TR11 3TD.

Telephone: (0326) 76040.

Order Form

- Please send me further details about the PHLOOPY 100k data storage system for the BBC Model B.
- Please send me _____ (qty) PHLOOPY starter pack(s) for my BBC Model B microcomputer, including PHLOOPY drive, BBC interface, leads, connections, operating system in firmware, manual, and two PHLOOPY 100k cartridges, at £147.75 each including VAT, postage and packing. Amount £ _____
- Please send me _____ (qty) packs of 5 PHLOOPY cartridges at £19.75 including VAT, postage and packing. Amount £ _____

I enclose a cheque/PO for £ _____ OR Please debit my Access card: Number: _____

Your order will be acknowledged within 10 days, giving a delivery date.

Name _____

Address _____

Town: _____ Post code _____

Send this coupon to:
Phi Mag Systems Ltd, PO Box 21, Falmouth,
Cornwall TR11 3TD. Telephone: Falmouth (0326) 76040.
14 day money-back option.

THE BEST SOFTWARE IN AGES

C-64 ☐ SPECTRUM ☐ BBC ☐ ELECTRON ☐



FANTASIA DIAMOND

Delve deep into the age of fantasy with a host of intriguing characters that may help or hinder your exploration of this dream world.

Retrieve the magnificent Fantasia Diamond recently stolen and rescue Boris the master spy from the imposing fortress and its evil guardian. Talk to the Robot, Violinist and other characters to illicit their help. An enthralling and sophisticated graphic adventure by Kim Topley for the Spectrum 48K, Commodore 64, BBC Model B* and Acorn Electron*.

SRP £7.95



HEATHROW ATC

Your challenge in the age of technology is to direct the incoming aircraft at the world's busiest international airport, Heathrow. Monitor the stack displays of altitude, heading, velocity and aircraft type. Scan the radar for blips and trails. Develop your skills to tackle emergencies, rogue aircraft, radio and instrument failure. A highly acclaimed simulation of one of today's most demanding jobs, by Mike Male for any Spectrum, Commodore 64, BBC Model B and Acorn Electron.



SRP £7.95

HEWSON CONSULTANTS

56B Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX



3D LUNATTACK

Do battle with the Seiddab in a futuristic age. Pilot your Z5 Hoverfighter over the craters and around the mountains of the luna landscape. Equipped with the latest iridium lasers, duodec missiles, radar, navigation and shields penetrate the Seiddab defences and head towards their command base. Destroy the Seiddab Dab Tanks, Aerial Mines, missile silos and Hoverfighters, you must not fail in your mission to drive the Seiddab from their luna base. A stunning 3D Graphic Presentation by Steve Turner for the Spectrum 48K and Commodore 64.

SRP £7.95

*No graphics on these versions.

Selected items available from Centresoft Dealers and all leading computer software retailers.

WHSMITH

Rumbelows

John Menzies

TIGER TRADER

spectrum

LASKYS

HMV

As part of our continuing development of innovative software, we are always happy to evaluate software sent to us with a view to publication.

scenery gets slightly more difficult.

(continued from page 184)

to drop them into the volcano on the right. You have three men which can be lost by hitting the scenery, running out of time on each bombing run, being hit by either the bird or helicopter or by being struck by lightning. To make it more difficult, with each run, the

Also the controls of the glider are difficult to master. Left or right is obtained by moving the joystick in the appropriate direction, but to go up or down you have to hit a thermal and they may not be where you want them. You get 100 points for each bomb that lands

on target which is done by pressing the fire button. When all your men have been lost press the space bar to continue. The screen displays lives, score and time for each run.

If the task of typing in the program is too daunting it can be obtained from me for £4 at 3 Greenfield House, Greenfield Road, Colne.

Program 1.

```

1 POKE788,194:POKE37158,2:REM###(C) 1983###
2 REM###ITRN 5.WRGE
3 REM###BY L.W.BETTERIDGE***
4 PRINT"?:POKE36879,127:PRINT"#####DON'T TOUCH TAPE.
5 POKE36879,15:POKE36875,191:FORI=1TO50:NEXT:POKE36875,0
6 FORI=1TO3000:NEXT
7 POKE36879,25:PRINT"#####
8 POKE36879,15
9 PRINT"
10 PRINT"
11 PRINT"
12 PRINT"
13 PRINT"
14 PRINT"
15 PRINT"
16 PRINT"
17 PRINT"
18 PRINT"
19 POKE36875,0
20 DATA15,1,228,5,225,1,225,1,5,215,5,228,1,5,225,5,228,1,5,225,5,209,5,5,2
21,5
22 DATA223,5,219,1,219,1,223,1,221,5,219,5,215,1,215,1,219,1,217,5,215,1,209
23,5
24 DATA225,1,225,1,225,3,195,1,207,1,215,5,195,1,5,201,5,203,1,5,215,5,195,1,
25,5
26 DATA201,5,207,4,5,-1,-1
27 DATA200,1:IF#=-1THEN
28 DATA200,0:GRIN OR LOSE HEIGHTUSE THE THERMALS FROM THE SCENERY BELOW.
29 PRINT"#####DIRECTION USE JOYSTICK TO DROP BOMBSUSE FIRE BUTTON.
30 PRINT"#####L=0:J=1
31 GET# IF#=-1THEN3
32 PRINT"#####L=0:J=1
33 GET# IF#=-1THEN3
34 PRINT"#####L=0:J=1:FORI=1TO1000:NEXT
35 DATA192,240,252,255,255,255,255,255
36 DATA0,0,0,0,192,240,252,255
37 DATA0,32,63,56,56,68,4,6
38 DATA32,32,224,32,32,32,40,56
39 DATA0,0,0,0,3,15,63,255
40 DATA3,15,63,255,255,255,255,255
41 DATA4,4,7,4,4,4,20,28
42 DATA12,4,252,28,28,68,32,96
43 DATA1,3,7,15,31,63,127,255
44 DATA128,192,224,240,248,252,254,255
45 DATA4,5,7,1,1,3,2,2
46 DATA32,160,224,128,128,224,64,64
47 DATA106,90,86,96,86,117,117,254
48 DATA169,165,85,85,149,149,181,189
49 DATA0,0,0,0,0,15,63,255
50 DATA0,0,0,0,0,240,252,255
51 DATA1,7,127,255,63,15,3,1
52 DATA128,224,254,255,252,240,192,128
53 DATA3,15,7,15,63,127,63,7
54 DATA192,240,224,240,252,254,252,224
55 DATA4,0,16,32,120,16,32,124
56 DATA06,207,207,56,56,24,15,14
57 DATA0,0,32,127,0,0,0,0
58 DATA3,15,47,127,0,0,0,0
59 DATA0,0,219,146,210,82,219,0
60 DATA0,0,187,170,187,170,171,0
61 DATA238,170,167,234,234,170,247,247
62 DATA60,182,90,90,126,129,255,129
63 DATA255,255,51,51,255,51,51,255
64 DATA62,62,28,28,28,28,28,0
65 DATA0,0,117,37,37,37,37,0
66 DATA0,0,87,244,183,20,23,0
67 DATA0,0,0,0,0,0,0,0
68 DATA255,255,255,255,255,255,255,255
69 DATA0,0,0,0,24,0,0,0
70 DATA56,56,56,56,56,56,56,56
71 DATA1,3,11,15,63,127,127,255
72 DATA128,128,196,240,252,252,254,255
73 DATA1,3,7,15,31,63,127,255
74 DATA128,192,224,240,248,252,254,255
75 DATA252,149,150,170,170,170,170,170
76 DATA191,175,251,251,250,238,238,239
77 DATA254,250,251,251,251,238,238,239
78 DATA4,16,15,137,162,160,32,0
79 DATA128,136,132,129,133,146,144,106
80 DATA0,0,171,250,219,138,139,0
81 DATA0,0,162,50,170,38,162,0
82 DATA0,0,0,0,0,0,0,0
83 DATA62,67,69,73,83,99,62,0
84 DATA4,4,4,12,12,12,0,0
85 DATA126,1,1,6,24,96,127,0
86 DATA126,2,2,30,3,3,127,0
87 DATA32,36,100,127,4,4,4,0
88 DATA63,32,32,30,1,33,30,0
89 DATA63,32,32,63,97,97,127,0
90 DATA126,2,2,3,3,3,0,0
91 DATA126,66,66,126,67,67,127,0
92 DATA126,66,126,3,3,3,0,-1
93 POKE36879,0
94 POKE36865,21
95 POKE36864,6
96 POKE36866,30
97 POKE36867,66
98 PRINT"?:FORI=1TO50:POKEI,32:NEXT
99 FORI=6144TO6555:POKEI,PEEK(I+26624):NEXT:I=6144
100 REMDATA:IF#=-1THEN103
101 POKEI,0:IF#=-1:0TO100
102 POKE36879,PEEK(36879)+150R(60)
103 POKE36869,254
104 POKE56,24:POKE52,24
105 POKE36866,PEEK(36866)+120:120
106 POKE36869,242
107 DATA128,165,0,141,20,3,169,***,141,21,3,88,96,169,0,141,19,145,14,3,145,17
108,145
109 DATA141,31,74,74,133,144,173,17,145,41,32,74,5,144,133,144
110 DATA173,32,145,41,128,74,74,74,5,144,73,31,133,144,169,255,141,34,145,76,
111,234
112 DATA234
113 S=673:FORI=0TO63:READ#
114 IF#=-1:THENPOKEI,4,5,13,256:POKEI+5,5,5,13,255:NEXT
115 POKE45,VAL(CR)
116 POKE36875,15:POKE36875,191:FORI=1TO50:NEXT:POKE36875,0:POKE36879,104
117 PRINT"#####LOADING TIME:PRINT"?:FORI=1TO3000:NEXT
118 POKEI,99,3:POKE632,147:POKE633,131

```

Program 2.

[illegible]

REWRITE HISTORY THIS WEEKEND!

All action strategy games from SSI-

-the world's No.1 war game company

At last here is your chance to see how you shape up as a General in a real battle! The pages of history record the triumphs and failures as Eisenhower, Montgomery, Rommel and Von Rundstedt battled in Europe and North Africa. But with a clear thinking strategist like yourself in command perhaps the historians would have had a different story to write!

U.S. Gold is proud to present four of the best strategy games by Strategic Simulations Incorporated:

KNIGHTS OF THE DESERT pitches the British Forces of Montgomery against the might of Rommel and his Panzer Divisions in the classic North African campaign of 1941.

BATTLE FOR NORMANDY commences on 'D-Day' June 6th 1944 and relives the Allied Forces attempt to smash Hitler's Atlantic Wall.

TIGERS IN THE SNOW reconstructs the legendary Battle of the Bulge as in December 1944 the Panzer Divisions of Von Rundstedt try one last gamble in a desperate attempt to halt Eisenhower's advancing Allied lines.

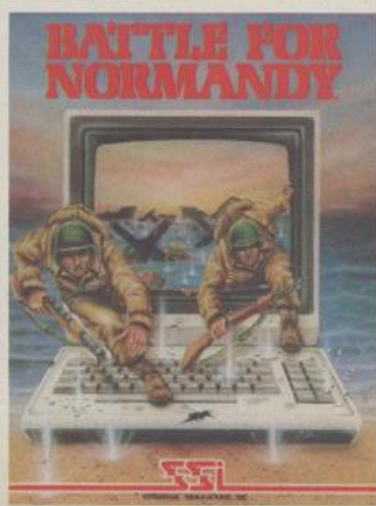
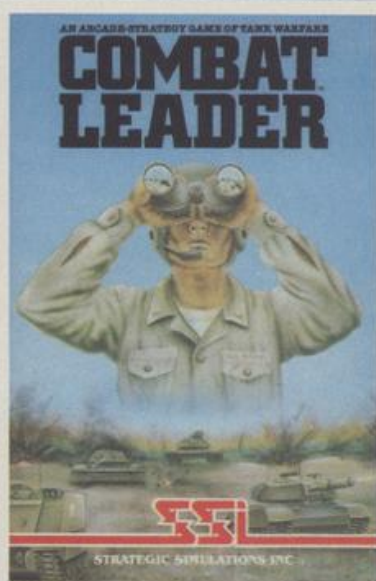
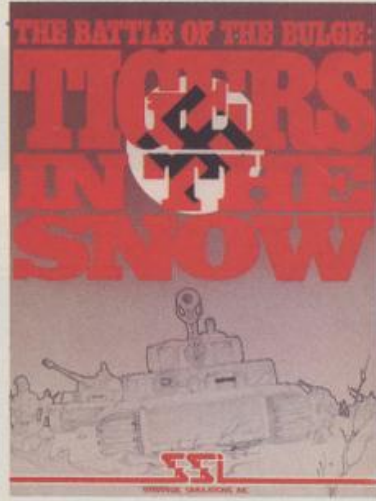
Who will be the victor and who the vanquished?

Only you have the answers!

And if you're looking for strategy with arcade action then **COMBAT LEADER** will test all your wits, depth of thought and reflexes in this toughest of battle challenges!



Spectrum versions available soon!



THE ULTIMATE IN AMERICAN SOFTWARE FOR YOU ON U.S. GOLD

U.S. Gold is stocked by all leading computer stores including:
BOOTS WHSMITH JOHN MENZIES WILDINGS WOOLWORTH

DEALERS! For information on how to become a U.S. Gold Stockist write to: CentreSoft Ltd., Unit 10, The Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Telephone: 021-359 3020.

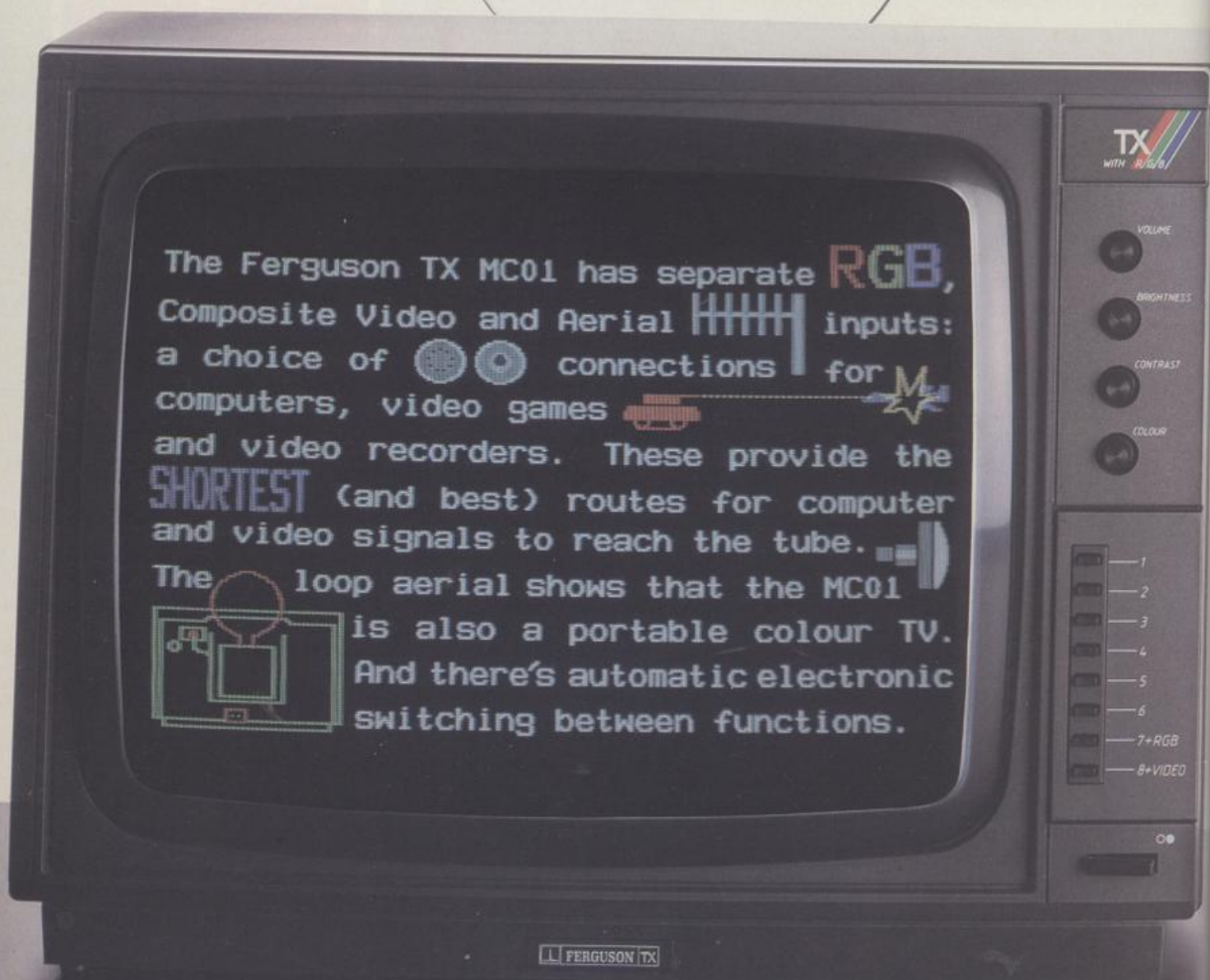


STRATEGIC SIMULATIONS INC.

£14.95

disk & cassette

Is this new F another First read th



Ferguson just r monitor? he small print.

A glance at the screen of our new MCOL will tell you how far it is from being just a monitor. Or just a 14" portable colour TV.

One advantage of our double act is worth repeating, if only because it's another Ferguson first:

Electronic switching lets you change functions automatically from monitor to video recorder to TV.

You can plug in any combination; leave them permanently connected; and wave goodbye to spaghetti junction round the back.

Convenience is matched by performance. Computer graphics and picture quality are far better through our RGB and Composite Video inputs than through the aerial socket of an ordinary TV.

Computer audio output sounds better through the speaker of the MCOL. (And if the beeps are too loud, you can turn down the volume.)

The full potential of the MCOL will be revealed by your Ferguson Dealer; as will the optional Battery Converter which makes it totally portable; and the matching computer-dedicated cassette recorder 3T31.

If total dedication is what you're after, he'll tell you about our outstanding new 12" monochrome monitor MM02, which is particularly suited to text applications.

But if you need a monitor for a home computer, it makes sense to get one that's also a colour TV. Especially when it only costs around £229.

And if you want a portable colour TV, why not get one that's also a monitor? In the Ferguson Monitor Colour TV, you get the state of two arts in one.



FERGUSON

TX

MICROPOWERMICROPOWERMICROPOWER



LOOKING FOR A HOME COMPUTER? ALL ROADS LEAD TO MICRO POWER

ONLY £275
£199

MEMOTECH MTX500 MEMOTECH MTX512

An excellent choice for both the beginner and the Spectrum owner wishing to upgrade.

Features: Z80A processor, SN76489A sound chip (the same as in the BBC Micro), 256 x 192 graphics resolution, 16 colours, 32 sprites two Atari-type joystick ports, composite video socket, number pad. Sophisticated utilities to aid programming include built-in Assembler/Disassembler and monitor.

ONLY £345
£275

COMMODORE 64 PLUS COMPATIBLE CASSETTE RECORDER

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.

SPECIAL PRICE
~~£268.95~~
£219.95

AMSTRAD CPC464 WITH BLACK AND WHITE MONITOR AMSTRAD CPC464 WITH COLOUR MONITOR

Features: built-in cassette recorder, 64K of memory, 27 colours, 80 column text mode, 640 x 200 graphics resolution, joysticks port, separate number pad.

£239

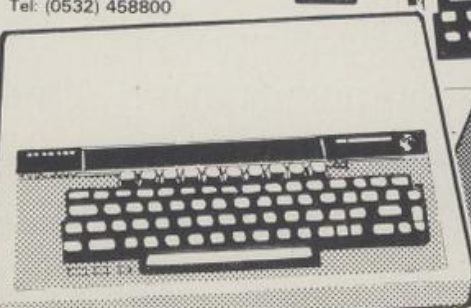
£349

We also stock a wide range of monitors, disk drives, printers, joysticks, light pens, books, software and much more! Please send for our complete list.

MAIL ORDER ADDRESS:
DEPT. PCT11
MICRO POWER LTD.
SHEEPSHAR HOUSE
SHEEPSHAR STREET SOUTH
LEEDS LS7 1AD
Tel: (0532) 434006

SHOWROOM ADDRESS:
MICRO POWER LTD.
NORTHWOOD HOUSE
NORTH STREET
LEEDS LS7 2AA
Tel: (0532) 458800

**MICRO
POWER**



BBC MODEL B PLUS CASSETTE RECORDER AND 5 MICRO POWER OR SELECTED ACORN SOFTWARE TAPES

SPECIAL OFFER!
£399

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.

ACORN ELECTRON PLUS CASSETTE RECORDER OR 5 MICRO POWER TAPES

SPECIAL OFFER!
£199

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".

SINCLAIR SPECTRUM 48K PLUS FREE 6-PACK SOFTWARE

£129.95

PRICES CORRECT AT TIME
OF GOING TO PRESS. ALL
PRICES INCLUSIVE OF VAT.
HIRE PURCHASE
AVAILABLE. PLEASE
CONTACT US FOR FURTHER
DETAILS. CARRIAGE FREE
FOR BBC AND MEMOTECH.
ALL OTHER COMPUTERS
£5.00. U.K. MAINLAND
ONLY.
AMPLE FREE PARKING!



MICROPOWERMICROPOWERMICROPOWER


```

PEN 2:PRINT TAB(16) "ROULETTE"
1910 PEN 3:PRINT:PRINT "Instructions:";PRINT;PEN 1
1:PRINT " This is a version of the famous casino game
ROULETTE" in which you w
111 play against the "AMSTRAD CPC-464" &H$$(16)="+.Yo
will be given $50 to begin with."
1920 PRINT;PRINT " You can borrow up to $500 when you
have less than $50, there is no house limit on g
ambling but the bank wi
11 break an $50 million."
1930 PRINT:PRINT;PRINT " Press any key for instruct
ions" on how to gamble."
1940 IF INKEY="" THEN 1940
1950 CLS;PEN 2:PRINT TAB(16) "ROULETTE"
1960 PEN 3:PRINT:PRINT "Instructions.":PRINT:PRINT
"em plain;PRINT:PRINT bet on any of the 37 numbe
(including 0)
the odds are 35-1."
1970 PEN 3:PRINT:PRINT "a cheval";PEN 1:PRINT bet on t
he either horizontally or vertically adjacent nu
mber the odds are 17-1."
1980 PEN 3:PRINT:PRINT "a cheval deins";PEN 1:PRINT b
et on a row of three numbers;PEN 1:PRINT "
You must"
1990 PRINT "enter the first of the three numbers. od

```

```

ods are 11-11:"PRINT:OPEN 3:PRINT"en carre":PEN 1:PRINT"
four numbers arranged on
the table in the shape of a square e.g. 7,8,10,11.
The odds are 8-1:"PEN 2
1990 LOCATE 1,25:PRINT" press any key to continue
a." IF INKEY="" THEN 1990
2000 CLOSE:PRINT TAB(16)"ROULETTE":PEN 3:PRINT:PR
NT:PRINT"Instructions."
2010 PRINT:PRINT"transversal six":PEN 1:PRINT" bet on
two adjacent rows, and you must input the first & low
est number in the two r
ows, the odds are 5-1:"PEN 3:PRINT:PRINT"a column:"PEN
1
2020 PRINT" bet on one of one three colours of twelve nu
mbers, the odds are 2-1:"PRINT:PEN 3:PRINT"a dozen:"PEN
1:PRINT" bet on one of
three sets of twelve numbers (1-12,13-24,25-36) b
et on a single number:"PEN 3:PRINT"low high:"PEN 1
2030 PRINT" bet on either low numbers (1-18) or h
igh (19-36) the odds are 1-1:"PEN 2:LOCATE 1,25:PRINT"
PRESS ANY KEY TO C
OK:"TRUE"
2040 IF INKEY="" THEN 2040
2050 CLOSE:PRINT TAB(16)"ROULETTE":PEN 3:PRINT:PR
NT:PRINT"Instructions."
2060 PRINT:PRINT"red or yellow:"PEN 1:PRINT" bet on a

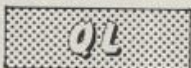
```

```

2070 If you red or yellow numbers the odds are 1-1:PRINT:PEN
3:PRINT:odd or even:=PE
N 1$PRINT* bet on odd numbers or even numbers the odds
are 1-1:PRINT:PEN 3:PRINT*Ironedon:IPEN 1
2070 PRINT* If you have bet on odd,even,red,yellow, hi
gh or low and the ball lands on 0 then the bet is
lost. If the ball lands on 00 then the bet is
thrown again, if it again lands on 0 then the bank
takes half the bet.*
2080 RESTORE
2090 READ A:IF A=1 THEN 2110
2100 SOUND 1,A,23,15:GOTO 2090
2110 PEN 2:LOCATE 1,25:PRINT*
PLAY*
2120 IF INKEY$="" THEN 2120 ELSE 100
2130 IF eo=50 THEN 220
2140 CLS 83:PRINT83,* borrowing money:PRINT83:PRINT
83,* you can borrow up to:83:INPUT 83,*how much do you
wish to borrow*:PRINT83:IF A
=bor OR eo=0 THEN 2140
2150 eo=eo+bor:bor=bor-83:bor=GOTO 490
2160 CLS:MODE 0:PRINT:PRINT* You have broken the bank.
Would you like to start again (Y/N)
2170 a$=UPPER(INKEY$):IF a$>"Y" AND a$<"N" THEN 217
2180 IF a$<"Y" THEN DIME

```

Victor Card,
Horley,
Surrey.



not. The limitations imposed by the vertical play of this game makes it necessary for the player to think ahead, or risk being outmanoeuvred by the micro.

At each turn, the counter is placed above the required column using the cursor keys. Pressing the spacebar will drop the counter into the column selected until it comes to rest upon another counter or comes to rest upon the bottom of the grid. You should be careful not to press too long on the spacebar, however, since the QL has automatic repeat on all keys and a very effective keyboard buffer which can mean that you inadvertently play several goes ahead if you delay on the keys.

Although written in Basic, the program has been designed to make full use of the

advanced graphics facilities of the QL and a reasonable fast and powerful game ensues. The human player always plays the green counters, and the computer always plays red. These colours have been selected to give effective displays on both colour and monochrome televisions and monitors. There are three optional skill levels and the previous loser always takes first go. The computer visually displays a winning line when one is achieved and keeps a running tally of the game score.

If typing in a program of this length proves too daunting a task then I can supply a copy on Microdrive cartridge for a cost of £7.50 including postage and packing. Please send all enquiries to Victor Card, 5 Cartersmead Close, Horley, Surrey RH6 9LG.

```

100 initialise
110 REPEAT again
120 goes:=0:CLS:CLS E2:=DIM b(5,6)
130 FOR i:=10 TO 130 STEP 20
140   FOR j:=10 TO 110 STEP 20
150     INK i:FILL i:CIRCLE j,1,j
160   NEXT j
170 NEXT i
180 REPEAT game
190 IF colour=4 THEN
200   colour=2
210 ELSE
220   colour=4
230 END IF
240 IF colour=4 THEN
250   humansgo
260 ELSE
270   Gloop
280 END IF
290 check fours row,colour
300 IF winner=colour THEN
310   show winner:EXIT game
320 END IF
330 goes:=goes+1
340 IF goes>42 THEN
350   INK E8,7:AT E8,1.5:PRINT E8,'stale mate':EXIT game
360 END IF
370 END REPEAT game
380 update scores:offer new game
390 END REPEAT again
400 REMARK *****
410 DEFINE Procedure initialise
420 REMARK *****
430 MODE B:PAPER i:CLS:INK 7:colour:=0
440 DIM column,score(6):DIM name$(8)
450 WINDOW 260,160,180,50:SCALE 120,-3,0
460 PAPER 0:CLS: BORDER 2,4
470 PAPER 0:i:CLS 0:CSIZE E0,2,1
480 WINDOW E2,190,160,50,50
490 PRINT "hello i a Q\\"\`what's your name"
500 INPUT name$
510 CLS:AT 1,4:PRINT "Let's play"
520 RESTORE
530 FOR i:=1 TO 7
540   READ x,v:z
550   AT x,v:PRINT "Q" i:AT x,z:PRINT "L"
560 NEXT i
570 INK 6:FLASH 1
580 AT 0,6:PRINT "udrup :AT 8,13:PRINT "ets"
590 DATA 5,8,9,6,7,10,7,6,11,8,5,12,9,6,11,10,7,10,11,
9,9
600 FLASH 0:FOR i:=1 TO 5000:NEXT i:CLS
610 REPEAT querv
620 AT 0,1:PRINT "skill level (1-3)"
630 skill:=INKEY$
640 IF skill#="1" OR skill#="2" OR skill#="3" THEN EXIT querv
650 END REPEAT querv
660 OPEN E8,scr 260,30a180,20:SCALE E8,120,-3,0
670 PAPER E8:i:CLS B
680 QL_score:=0:your_score:=0:colour=2
690 END DEFINE initialise
700 REMARK *****
710 DEFINE Procedure humansgo
720 REMARK *****
730 AT E2,0:PRINT E2, use keys i-\:CHR$(180)) and
i:CHR$(189)) to move \v:space bar \ to play
740 v:=B0:=50:col:=0
750 INK E8,colour:FILL E8,1:CIRCLE E8,v,50
760 REPEAT v:=0
770   IF INKEY$=(1)
780     IF v=0 THEN col:=col+1:IF col=6 THEN

```

```

790 drop EXIT yourgo
800 END IF
810 CLS EB
820 n=i+106*(CODE(a$)+200)-106*(CODE(a$)+192)
830 IF n=80 THEN n=80
840 IF n=716 THEN n=716
850 col=(x-80)/106
860 INK EB;colour;FILL EB;1/CIRCLE EB,x,y,50
870 END REPEAT yourgo
880 END DEFINE humansgo
890 REMARK *****
900 DEFINE PROCEDURE droo
910 REMARK *****
920 CLS B;row=0
930 REPEAT until rest
940 INK colour;FILL i1/CIRCLE i0*col*20,110-row*20,9
950 IF row=5 THEN
960 b=row,col=100
970 END DEFINE droo
980 END IF
990 IF b(row+1,col)=0 THEN
1000 b(row,col)=colour
1010 END DEFINE droo
1020 END IF
1030 FOR i=1 TO 100:NEXT i
1040 INK i;FILL i/CIRCLE i0*col*20,110-row*20,9
1050 row=row+1
1060 END REPEAT until rest
1070 END DEFINE droo
1080 REMARK *****
1090 DEFINE PROCEDURE Qsago
1100 REMARK *****
1110 n=80+y*50;col=0;CLS E2
1120 find_best_sovr
1130 Repeat svgo
1140 FOR i=1 TO 100:NEXT i
1150 CLS E8
1160 IF (x-80)/106=col THEN
1170 drop=END DEFINE Qsago
1180 END IF
1190 x=x+106
1200 INK EB;colour;FILL EB;1/CIRCLE EB,x,y,50
1210 END REPEAT svgo
1220 END DEFINE Qsago
1230 REMARK *****
1240 DEFINE PROCEDURE check_fours(row,mark)
1250 REMARK *****
1260 winner=0
1270 search row,mark,0,1
1280 IF winner<0 THEN
1290 rowmark=0;colmark=1
1300 END DEFINE check_fours
1310 END IF
1320 search row,mark,-1,-1
1330 IF winner<0 THEN
1340 rowmark=-1;colmark=1
1350 END DEFINE check_fours
1360 END IF
1370 search row,mark,1,-1
1380 IF winner<0 THEN
1390 rowmark=1;colmark=1
1400 END DEFINE check_fours
1410 END IF
1420 search row,mark,1,0
1430 IF winner<0 THEN
1440 rowmark=1;colmark=0
1450 END IF
1460 END DEFINE check_fours
1470 REMARK *****
1480 DEFINE PROCEDURE search(row,mark,deltax1,deltay1)
1490 REMARK *****
1500 count=1;pointax1=
1510 search row,mark,deltax1,deltay1

```

```

1520 search1 row,mark,-deltax1,-deltay1
1530 IF count>=4 THEN winner=colour
1540 END DEFINE search1
1550 REMARK *****
1560 DEFINE PROCEDURE search1(row,mark,deltax,deltay)
1570 REMARK *****
1580 newrow=rownewcol=colstart=0
1590 REPEAT look
1600 newrow=newrow+deltax
1610 IF newrow<0 OR newrow>5 THEN EXIT look
1620 newcol=newcol+deltay
1630 IF newcol<0 OR newcol>6 THEN EXIT look
1640 IF b(newrow,newcol)=colour THEN
1650 points=points+1
1660 IF start=0 THEN count=count+1
1670 END IF
1680 IF b(newrow,newcol)<>colour THEN
1690 start=1
1700 IF b(newrow,newcol)<>mark THEN EXIT look
1710 points=points+1
1720 END IF
1730 END REPEAT look
1740 IF mark=0 AND points>=4 AND column_score(col)=1 T
HEN column_score(col)=column_score(col)+count-1
1750 END DEFINE search1
1760 REMARK *****
1770 DEFINE PROCEDURE show_winner
1780 REMARK *****
1790 endrow=endcol=newcol
1800 newrow=rownewcol=col
1810 REPEAT endpoint
1820 newrow=newrow+rowmark
1830 IF newrow<0 OR newrow>5 THEN EXIT endpoint
1840 newcol=newcol+colmark
1850 IF newcol<0 OR newcol>6 THEN EXIT endpoint
1860 IF b(newrow,newcol)=winner THEN EXIT endpoint
1870 endrow=newrowendcol=newcol
1880 END REPEAT endpoint
1890 FOR i=1 TO 20
1900 INK i:flash_counters
1910 INK winner:flash_counters
1920 NEXT i
1930 END DEFINE show_winner
1940 REMARK *****
1950 DEFINE PROCEDURE flash_counters
1960 REMARK *****
1970 FOR i=0 TO count-1
1980 newrow=endrow+rowmark=i
1990 newcol=endcol+colmark=i
2000 x=10+20*newcol+y=110+20*newrow
2010 FLIP LCIRCLE x,y,9
2020 END FOR
2030 END DEFINE flash_counters
2040 REMARK *****
2050 DEFINE PROCEDURE find_best_move
2060 REMARK *****
2070 col=i
2080 FOR i=0 TO 6:column_score(i)=2:NEXT i
2090 REPEAT for_all_cols
2100 col=col+1
2110 IF col>6 THEN EXIT for_all_cols
2120 x=80+10*colrow=i
2130 CLS EB:INK EB:colour=fill EB,LCIRCLE EB,x,y,50
2140 REPEAT for_all_rows
2150 IF row=i THEN EXIT for_all_rows
2160 IF b(row,i,col)<0 THEN EXIT for_all_rows
2170 row=row+1
2180 END REPEAT for_all_rows
2190 IF row=i THEN
2200 column_score(col)=i
2210 NEXT for_all_cols

```

(continued on page 197)



AFGHAN ATTACK

**A 96K PURE TEXT MACHINE CODE ADVENTURE FOR
THE 48K SPECTRUM (IN TWO PARTS)**

A large build up of Soviet troops is forming on the South Eastern Pakistan border, with probable hostile intentions. Troops and supplies travel the fragile Eastern Kabul road through unoccupied territory. Your role is to disrupt these troop movements, harass supplies and prevent the Soviets from attaining their objectives. You have British Paratroopers; ground to air missiles for attacking their airfield and destroying helicopters; plus rebel guerrillas to lay ambush on troops and convoys.

Please send me copy(ies) of 'AFGHAN ATTACK'
at £9.95 each. I enclose a cheque/P.O. made payable
to 'Southern Software' to the value of

Name

Address

.....
SOUTHERN SOFTWARE, 6 The Hillway, Fareham, Hants. PO16 8BL

(continued from page 195)

```

2220 END IF
2230 b(row,col)=colour
2240 IF skill<7 THEN
2250 check_fours row,0
2260 ELSE
2270 check_fours row,colour
2280 END IF
2290 IF winner=colour THEN
2300 b(row,col)=0
2310 CLS @b:column_score(col)=100
2320 END DEFINE find_best_move
2330 END IF
2340 row=row-1
2350 IF row<1 THEN
2360 b(row,col)=colour
2370 check_fours row,colour
2380 IF winner=colour AND skill=3 AND colmark<>0
THEN column_score(col)=1
2390 b(row,col)=0
2400 can_human_win row,4
2410 IF winner=4 THEN column_score(col)=0
2420 END IF
2430 can_human_win row,0

```

```

2440 IF winner=4 THEN column_score(col)=99
2450 colour=2:b(row,col)=0
2460 IF col=6 THEN EXIT FOR all_cols
2470 END REPEAT FOR all_cols
2480 score=100
2490 FOR i=0 TO 6
2500 IF column_score(i)=max THEN n=i+1
2510 IF column_score(i)=max THEN
2520 col=i:score=column_score(i):n=0
2530 END IF
2540 NEXT i
2550 IF n=0 THEN END DEFINE find_best_move
2560 where=RND(n)
2570 FOR i=0 TO 6
2580 IF column_score(i)=max THEN
2590 where=where+1
2600 IF where=7 THEN col=i
2610 END IF
2620 NEXT i
2630 END DEFINE find_best_move
2640 REMARK *****
2650 DEFINE PROCEDURE can_human_win(row,mark)
2660 REMARK *****
2670 colour=4:b(row,col)=colour

```

```

2680 check_fours row,mark
2690 b(row,col)=0
2700 END DEFINE can_human_win
2710 REMARK *****
2720 DEFINE PROCEDURE update_score
2730 REMARK *****
2740 IF winner=2 THEN GL_score=GL_score+1
2750 IF winner=4 THEN your_score=your_score+1
2760 CLS @PRINT CO. "SCORE GL "GL_score"name:
"your_score"
2770 END DEFINE update_score
2780 REMARK *****
2790 DEFINE PROCEDURE offer_new_game
2800 REMARK *****
2810 REPEAT question
2820 CLS @
2830 AT E2.8.0:PRINT E2."do you want to play another game?"
yes or no?
2840 @=INKEY(1)
2850 IF @="Y" OR @="y" THEN EXIT question
2860 IF @="N" OR @="n" THEN STOP
2870 END REPEAT question
2880 CLS @
2890 END DEFINE offer_new_game

```

Hard Lines

Nigel Bates,
Bradford,
West Yorkshire.



THIS PROGRAM has been written on a 48K ZX Spectrum but will run on both 16K and 48K machines. The machine code is stored in data statements from line 30 to line 110 and is Poked into memory by line 10 and line 100, the machine code is used to move and display the scores and the ink jet.

The rest of the program is in Basic and controls the number of lives, screen number, screens, bonus and high scores. It makes full use of the 16K of memory, colour, sound, high resolution graphics and includes four different screens.

Program notes.

lines	10-110	Pokes machine code into memory
998-1000	Initialises game	
1000-1020	Initialises go and calls the machine code	
1020-1160	Selects bonus	
2000-2070	Sub routine to draw screens	
2100-2499	Data for screens	

Variables.

h\$	Highscore	(6 digits)
a\$	Score	(6 digits)
b\$	Bonus	(4 digits)
c\$	Messages	
l	Lives	
s	Level or Screen	

Other variables have miscellaneous uses — a,b,x,y and n\$.

Just type in the program as listed and run. To save use

SAVE "Hard Lines"

The program uses either the Sinclair Interface 2 or the keys: 6 Left; 7 Right; 8 Down; 9 Up; 0 Accelerate.

Guide the ink jet around the maze to try and reach the centre without hitting either the walls of the maze or your trail. You have a limited ink supply and are timed, if you can reach the centre before your time reaches 600 then you are awarded a bonus of 1,000 points plus a 500 point bonus for reaching the centre dot. If you complete a maze you are confronted with a new maze, there are four different screens and then it returns to the first screen.

```

1 LET h$="000000"
5 BORDER 0: PAPER 0: INK 7: B
RIGHT 1
10 RESTORE 1: FOR a=32255 TO 32
450: READ n: POKE a,n: NEXT a
20 LET c$=""
30 DATA 30,23,1,6,174,62,248,2
11,254,33,255,125,62,239,219,254
230,30,254,30,32,1,123,95,203,1
03,32,1,13,203,98,32,1,12,203,57
1,32,1,4,203,79,32,1,6,66,62,0,21
1,32,1,62,239,219,254
30 DATA 203,71,32,7,53,32,1,52
3,21,40,4,52,21,32,241,203,71,32,
5,53,32,1,52,21,32,241,203,71,32,
120,254,0,32,21,32,241,203,71,32,
34 DATA 6,191,197,120,205,177,
34,71,4,62,1,15,16,253,193,86,16
20,119,185,200,197,1,48,5,58,120,
92,33,255,127,190,40,15,119,40,6
62,62,215,62,1,215,62,31,215,62,31
0,127,1,48,5,33,247,127,62,62,31
120,215,62,0,215,62,11,215,205,0
127
35 DATA 193,33,254,125,53,32,2
34,5,197,43,70,14,0,229,120,20
117,34,54,125,225,193,52,62,17
190,200
39 DATA 62,251,219,254,203,95,
194,5,126,201
100 RESTORE 110: FOR a=32512 TO
32535: READ n: POKE a,n: NEXT a
110 DATA 126,214,10,32,5,43,5
35,24,2,198,10,119,129,215,62,3
215,62,8,215,43,16,233,201
998 POKE 32253,0: FOR a=32750 -
0 32767: POKE a,a-s: NEXT a
999 LET l=INT PI: LET s=l/L
1000 INK RND+4:INT PI: CLS: PLO
3,1
1001 FOR a=l TO 21: PRINT "■":
NEXT a: GO SUB 2000
1002 FOR a=32750 TO 32766: POKE
a,a-s: NEXT a: POKE 32253,a-s: P
LOT 128,88: DRAW 2,a-s: DRAW a-s
-2: DRAW -2,a-s: DRAW a-s,2
1010 PRINT AT s-s,2: INK 6: PAPER
a:1: "HARD LINES" BY NIGEL BATES
s:1: AT s-s,s-s: PAPER 2: "SCORE:
HIGH SCORE: "PAPER 1
INK 7:h$: "LIVES: "AT 1,12: "LE
VEL: "AT 1,22: "TIME: "AT 0,0:
LET bc=USR 32256
1020 LET b=INT (bc/256): LET c=b
c-b*256
1030 LET a$="000000": FOR a=1 TO
6: LET a$(a)=CHR$ (PEEK (32753+
a)+48): NEXT a
1050 IF b=88 OR b=83 OR b=87) A
ND (c=128 OR c=129 OR c=130) THE
N PRINT AT 5,b/b: PAPER 1: INK 7
"GRAAT!! NOW TRY THE NEXT LEVEL"
LET s=s+1: LET a$=STR$ (VAL a
+500): LET b$="0500": LET c$="
EXTRA BONUS IF PEEK 32764<5 T
HEN LET a$=STR$ (VAL a$+1000): L
ET b$="1500": LET c$=c$+CHR$ 22+

```

```

CHR$ 14+CHR$ 14+"FANTASTIC"
1070 IF c$="" THEN LET l=-1: L
T c$=" NO BONUS "CHR$ 20+CHR$
14+CHR$ 12+CHR$ 17+CHR$ 20+CHR$
D LINES "LET b$="0000"
1080 IF PEEK 32253=175 THEN LET
c$=" OUT OF INK"
1085 IF VAL a$>VAL h$ THEN LET h
$=a$
1090 IF l<5 THEN PRINT AT 13,1
2: INK 6: PAPER 5: CLS: LET c$=
GAME OVER: FOR a=9 TO 25 STEP 2:
PRINT AT 10,a: INK 2: PAPER 6:
c$=((l-7)/2) FOR b=1 TO 30:
NEXT b: NEXT a: INPUT "Another
game? (y/n)": c$: IF c$="y" THEN
GO TO 5
1095 IF l<5 THEN STOP
1100 PRINT AT 10,12: INK 5: PAPER
a:0: "BONUS: "b$: AT 11,12: INK 7:
PAPER 3: "SCORE: "a$: AT 10,12: P
LASH 1: PAPER 1: c$:
1101 IF LEN a$<6 THEN LET a$="0
+102 IF LEN a$<6 THEN LET h$="0
+103 GO TO 1101
1105 GO TO 1100
1105 FOR a=1 TO 6: POKE 32753+a,
VAL a$(a): NEXT a
1110 LET c$=""
1120 IF VAL b$>0 THEN BEEP a/s: B
EEP b/b: VAL b$=0: WHEN a/s=-24:
1130 IF VAL b$>0 THEN BEEP a/s: B
EEP b/b: FOR b=5 TO 10: BEEP
TO 10: NEXT b: NEXT a
1140 IF VAL b$>1500 THEN FOR a=0
TO 20: POKE 32753+a+3: FOR b=0
TO 10: BEEP b/b: NEXT b: NEXT a
TO 0 STEP -1: BEEP ...: b: NEXT a
1160 GO TO 1000
2000 IF s>4 THEN LET s=s/s
2001 RESTORE 2000+100*s
2010 READ n$ x,y
2020 IF n$="p" THEN PRINT x,y
2030 IF n$="d" THEN DRAW x,y
2040 IF n$="o" THEN OVER x,y
2050 IF n$="c" THEN READ : CIRC
LE x,y,r
2060 IF n$="x" THEN GO TO 2010
2065 IF s=2 THEN PRINT AT 10,15:
OVER 0:
2070 OVER 0: RETURN
2100 DATA "p"16,16,"d"223,0,"d
"0,143,"d"100,0,"d"0,-143,"d
"191,0,"d"0,79,"d"150,0,"d"0,
-79
2110 DATA "p"64,64,"d"127,0,"d
"0,47,"d"102,0,"d"0,-47,"d"
76,76,"d"102,0,"d"0,-102,"d"
-60,"d"0,-223,16,"d"0,-60,60,"d
0,-143,"d"239,100,"d"0,-223,95,"d
0,-143,"d"15,0,"d"60,79,"d"76,89,"d
0,"d"0,-3,"d"199,60,"d"3,-3,"d

```

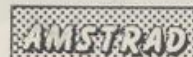
```

9 DATA "p"16,16,"d"223,0,"d"
200 DATA "p"16,16,"d"223,0,"d"
201 DATA "p"16,16,"d"223,0,"d"
202 DATA "p"16,16,"d"223,0,"d"
203 DATA "p"16,16,"d"223,0,"d"
204 DATA "p"16,16,"d"223,0,"d"
205 DATA "p"16,16,"d"223,0,"d"
206 DATA "p"16,16,"d"223,0,"d"
207 DATA "p"16,16,"d"223,0,"d"
208 DATA "p"16,16,"d"223,0,"d"
209 DATA "p"16,16,"d"223,0,"d"
210 DATA "p"16,16,"d"223,0,"d"
211 DATA "p"16,16,"d"223,0,"d"
212 DATA "p"16,16,"d"223,0,"d"
213 DATA "p"16,16,"d"223,0,"d"
214 DATA "p"16,16,"d"223,0,"d"
215 DATA "p"16,16,"d"223,0,"d"
216 DATA "p"16,16,"d"223,0,"d"
217 DATA "p"16,16,"d"223,0,"d"
218 DATA "p"16,16,"d"223,0,"d"
219 DATA "p"16,16,"d"223,0,"d"
220 DATA "p"16,16,"d"223,0,"d"
221 DATA "p"16,16,"d"223,0,"d"
222 DATA "p"16,16,"d"223,0,"d"
223 DATA "p"16,16,"d"223,0,"d"
224 DATA "p"16,16,"d"223,0,"d"
225 DATA "p"16,16,"d"223,0,"d"
226 DATA "p"16,16,"d"223,0,"d"
227 DATA "p"16,16,"d"223,0,"d"
228 DATA "p"16,16,"d"223,0,"d"
229 DATA "p"16,16,"d"223,0,"d"
230 DATA "p"16,16,"d"223,0,"d"
231 DATA "p"16,16,"d"223,0,"d"
232 DATA "p"16,16,"d"223,0,"d"
233 DATA "p"16,16,"d"223,0,"d"
234 DATA "p"16,16,"d"223,0,"d"
235 DATA "p"16,16,"d"223,0,"d"
236 DATA "p"16,16,"d"223,0,"d"
237 DATA "p"16,16,"d"223,0,"d"
238 DATA "p"16,16,"d"223,0,"d"
239 DATA "p"16,16,"d"223,0,"d"
240 DATA "p"16,16,"d"223,0,"d"
241 DATA "p"16,16,"d"223,0,"d"
242 DATA "p"16,16,"d"223,0,"d"
243 DATA "p"16,16,"d"223,0,"d"
244 DATA "p"16,16,"d"223,0,"d"
245 DATA "p"16,16,"d"223,0,"d"
246 DATA "p"16,16,"d"223,0,"d"
247 DATA "p"16,16,"d"223,0,"d"
248 DATA "p"16,16,"d"223,0,"d"
249 DATA "p"16,16,"d"223,0,"d"

```

Character definer

J Gardiner,
Wymondham,
Norfolk.



THIS PROGRAM is a comprehensive character definer. It is very user-friendly and allows redefinition of characters on the Amstrad CPC-464 micro.

As well as the standard "pixel-by-pixel"
(continued on page 201)

100%



Be a great writer getting yourself to paper.

It takes only two minutes and £59.80 to transform your BBC Micro into the heart of a word processor with VIEW from Acornsoft.

The VIEW word processing system is programmed into a single chip, a 16K plug-in ROM. Once it's installed into your BBC Micro – a simple job for your local dealer – you just switch on and VIEW is operating. (You can switch to other programs, like BASIC, with a single command.)

VIEW is a professional system, yet it's surprisingly straightforward to use.

And it's so outstanding it's won the 1984 British Microcomputing Award for Home Software.

All you do is type out your text on the keyboard, and view it on the screen.

VIEW can search, change and replace particular words whenever they occur in your text. It can swap paragraphs. Automatically alter page numbers. Even count words.

The possibilities are endless, because you can check, edit and change as much or as little as you like until you're satisfied. Then, with a single command, your final version will appear on the screen.

If you want to go even further, the simple addition of ViewIndex, just £14.95, means you can select and index words, complete with page or section numbers.

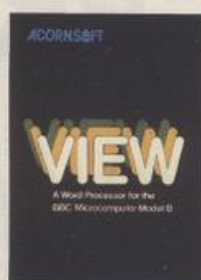
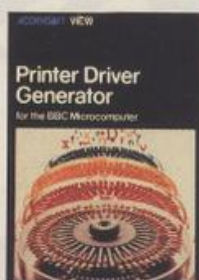
And of course, when you're ready, any printer that will operate with your BBC Micro will operate with VIEW. But if you want to use the printer's special facilities, such as bold printing or underlining, Acornsoft's Printer Driver Generator (£9.95 on cassette, £11.50 on disc) enables you to do so.

For the more specialised user who wants to take advantage of the extra power offered by the 6502 Second Processor, Hi-VIEW (£59.80) provides 47K of text space in any of the BBC Micro's screen modes.

So whether you're composing a 300 page business document, a letter to the gas board, or a bit of Victorian nonsense, you can polish it to your heart's content, wasting precious little time. And even less paper.

You can get VIEW products from your Acorn dealer. Just phone 01-200 0200 for your local stockist.

Alternatively, you can send off for the View Family brochure and order through the post by contacting Acornsoft, c/o Vector Marketing, Denington Industrial Estate, Wellingborough, Northants NN8 2RL. Tel: 0933 79300.



ACORNSOFT

The text on the screen is in Mode 6.

NOT FOR PEOPLE WITH HIGH BLOOD PRESSURE!

Watch out for them—these four new games could be dangerous to your health. And, as they're from A'n'F, they're second to none, calling for a level of skill that's bound to set the adrenalin racing.



SPECTRUM 48k CYLON ATTACK—Now with better than ever isometric perspective graphics (3D). **£5.75**

BBC 32k SNARL-UP—Sheer bumper to bumper frustration and only five chances to hit the fast lane. **£6.90**

COMMODORE 64 GUMSHOE—One bleepin' obstacle after another stops you reaching a girl who needs you—desperately. **£7.90**

SPECTRUM 48k ALPHA-BETH—The brain teaser that makes it doubly difficult for you to give the right answer. **£5.75**



A&F Software, Unit 8, Canal Side Industrial Estate,
Woodbine Street East, Rochdale, Lancs OL16 5LB.
Telephone: 0706 341111

(continued from page 197)

definition procedure, it also enables the user to:

- Rotate the character to the right by 90 degrees.
- Flip all the character's bits to produce the "inverse" character.
- Produce a mirror image — in the vertical plane — of the current character.
- Save the defined character's data map to tape.
- Read in previously saved data maps.

Definition takes place on an eight-by-eight grid, over which the user moves a cursor using the cursor keys. Pixels of the character can be "toggled" on and off using the Copy key.

Pressing R rotates the character by 90 degrees to the right; F inverts all the bits; M produces a vertical mirror image of the character and D allows the reading in of a

saved data map for further adaption. Pressing C when the character is complete produces a print out of the data map in both decimal and hexadecimal. At this point the user is given the option of saving the data map to tape, and then whether he wants to rerun the program.

Conversion of this program to run on other micros may prove to be difficult. This is due to the fact that it uses a pair of windows on the screen and also that it uses a transparent mode of character printing. Windows are a feature found on only a handful of other home micros and the "transparent" printing is — to my own knowledge — unique to the Amstrad.

A stripped-down version of this program can be produced, but it would involve redesigning the screen layout and completely changing the screen-handling routines. Also the Symbol command would have to be replaced with Pokes to define a character.

The program allows you to dump the characters you have just defined to tape as a binary file called Char.

If you want to load these into your games program, or back into the editor for further editing then follow the procedure shown in lines 70 and 75.

SYMBOL AFTER 128
LOAD "CHAR"

Although Himem will normally be the same, problems could be caused by the user attaching add-ons to the machine which will alter Himem.

In this case, if you say add a disc drive to your system and still want to use characters you defined before getting it;

SYMBOL AFTER 128: CLOW = HIMEM + 1
LOAD "CHAR", CLOW

will put the characters into the correct position in memory.

```
10 REM ***** CHARACTER DEFINER *****
20 REM ***** BY *****
30 REM ***** J. & A. GARDNER 1984 *****
40 REM *****
50 REM *****
60 REM *****
70 SYMBOL AFTER 256: CLOW = HIMEM
75 SYMBOL AFTER 128: CLOW = HIMEM + 1
80 INK 0,0 : INK 1,24 : INK 2,8 : BORDER 1
90 DIM a(8,8),r(8,8),z(8)
100 MODE 1
110 x=12 : y=4 : z=0
120 WINDOW #1,1,40,1,15 : WINDOW #2,0,40,16,25
130 WINDOW SWAP 0,1
140 GOSUB 690
150 LOCATE 1,4
160 FOR x=1 TO 8 : PRINT TAB(10);x : NEXT x
170 PRINT TAB(12);"12345678"
180 LOCATE 23,4 : PRINT "Character"
190 PLOT 410,324,2
200 DRAW 26,0 : DRAW 0,26
210 DRAW -26,0 : DRAW 0,-26
220 PRINT2,"Use cursor keys to move"
230 PRINT2,"F" to flip all the bits"
240 PRINT2,"R" to rotate right 90:CHR$(129)
250 PRINT 82,"M" for vertical mirror image"
260 PRINT2,"D" to read in a saved data map"
270 PRINT2,"COPY" to reset point"
280 WINDOW SWAP 0,2
290 PEN 3 : PRINT : PRINT TAB(3);"PRESS 'C' WHEN COMPL
ETED" : PEN 1
300 WINDOW SWAP 2,0
310 REM ***** MAIN LOOP *****
320 a=LOMER$(INKEY$)
330 x=x+1 : y=y+1
340 GOSUB 550
350 IF a=" " THEN 320 ELSE a=ASC(a$)
360 IF a="2" THEN GOSUB 480
370 IF a="4" THEN GOSUB 1150
380 IF a="r" THEN GOSUB 1210
390 IF a="R" THEN GOSUB 1520
400 IF a="d" THEN GOSUB 1360 : GOTO 220
410 v=y+(a-240)/(-a+241)
420 w=x+(a-242)/(-a+243)
430 IF a/239 AND a/244 THEN GOSUB 620
440 IF a="c" THEN GOTO 770
450 GOSUB 690
460 GOTO 320
470 REM ***** RESET POINT *****
480 v=x-1 : w=y-3
490 a(x,v)=ABS(a(x,v)-1)
500 i=ABS(a(x,v)-1)
510 IF i=1 THEN ch=143 ELSE ch=32
520 LOCATE x,y
530 PRINT CHR$(ch)
540 RETURN
550 REM ***** PRINT CURSOR *****
560 PRINT CHR$(22)+CHR$(1) REM SET TRANSPARENT M
ODE
570 LOCATE x,y
580 PEN 2 : PRINT CHR$(202)
590 PEN 1
600 PRINT CHR$(22)+CHR$(6) REM TURN OFF TRANSPARE
```

```
NT MODE
510 RETURN
520 IF v<12 THEN x=x+1 ELSE IF v=19 THEN x=19
530 IF v<4 THEN y=y+1 ELSE IF v=11 THEN y=11
540 LOCATE x,y : PEN 0
550 PRINT CHR$(32)
560 IF a="f" THEN v=v+1 THEN LOCATE x,y : PEN 1 : PRI
NT CHR$(143)
570 RETURN
580 REM ***** PLOT DEFINED CHARACTER *****
590 DEF FNbit(b)=a(1,b)+128*a(2,b)+64*a(3,b)+32*a(4,b)
+16*a(5,b)+8*a(6,b)+4*a(7,b)+2*a(8,b)
600 FOR x=1 TO 8
610 z(x)=FNbit(a(x,y))
620 NEXT x
630 REM *****
640 SYMBOL 255,z(1),z(2),z(3),z(4),z(5),z(6),z(7),z(8)
650 PEN 1 : LOCATE 27,6
660 PRINT CHR$(255)
670 RETURN
680 CLS #2
690 WINDOW SWAP 1,0
700 WINDOW SWAP 0,2
800 PRINT : PRINT
810 PRINT "Character is "CHR$(255)""
820 PRINT : PRINT "Is this correct?"
830 x=" " : WHILE x=" " : x=LOMER$(INKEY$) : WEND
840 IF x="n" THEN WINDOW SWAP 2,0 : WINDOW SWAP 0,1 :
CLS #2 : GOTO 220
850 IF x="y" THEN MODE 1 : GOTO 870
860 GOTO 830
870 PRINT : PRINT "Data map is " : PRINT TAB(6);"dec.", "h
ex"
880 PRINT
890 FOR q=1 TO 8 : PRINT TAB(5);z(q);TAB(10);HEX$(z(q)) :
NEXT q
900 PRINT:PRINT "Do you wish to save the data map ? (y/
n)?"
910 x=" " : WHILE x=" " : x=LOMER$(INKEY$) : WEND
920 IF x="y" THEN 1030
930 IF x="n" THEN PRINT : INPUT "Please input a file n
ame:"file$ ELSE 910
940 PRINT : PRINT "Please insert a cassette"
950 PRINT : PRINT "Press PLAY/RECORD and press any key"
960 x=" " : WHILE x=" " : x=INKEY$ : WEND
970 file$=" "+file$ : OPENOUT file$
980 FOR x=1 TO 8
990 PRINT #9;z(x)
1000 NEXT x
1010 CLOSEOUT
1020 PRINT : PRINT "Data saved as "file$":(file$,2)
" : file$
1030 PRINT:PRINT "Enter number of character to redefine
"
1040 PRINT:PRINT "ASCII code 128-256."
1050 PRINT : PRINT "Enter 0 if no definition required."
1060 INPUT num
1070 IF (num<128 OR num>254) AND num>0 THEN 1030
1080 IF num=0 THEN 1100
1090 SYMBOL num,z(1),z(2),z(3),z(4),z(5),z(6),z(7),z(8)
1100 PRINT:PRINT "Character "num" is now "CHR$(num)""
1095 GOSUB 3000
```

```
1100 PRINT : PRINT "Do you wish to run again ? (y/n)?"
1110 x=" " : WHILE x=" " : x=LOMER$(INKEY$) : WEND
1120 IF x="y" THEN RUN 60
1130 MODE 1 : END
1140 REM ***** FLIP ROUTINE *****
1150 FOR x=1 TO 8
1160 FOR y=1 TO 8
1170 a(x,y)=ABS(NOT(a(x,y)))
1180 NEXT y
1190 GOSUB 1290
1200 RETURN
1210 REM ***** ROTATE *****
1220 FOR q=1 TO 8
1230 FOR q=1 TO 8
1240 r(9-q,q)=a(p,q)
1250 NEXT q,p
1260 FOR p=1 TO 8 : FOR q=1 TO 8
1270 a(q,p)=r(p,q)
1280 NEXT q,p
1290 FOR j=1 TO 8
1300 FOR k=1 TO 8
1310 LOCATE 11+j,3+k
1320 IF a(j,k)=1 THEN PRINT CHR$(143) ELSE PRINT CHR$(
32)
1330 NEXT k,j
1340 RETURN
1350 REM ***** READ IN DATA *****
1360 WINDOW SWAP 0,2 : CLS : PRINT : PRINT
1370 OPENIN " "
1380 FOR k=1 TO 8
1390 INPUT #9,z(k)
1400 NEXT k
1410 CLOSEIN
1420 WINDOW SWAP 2,0
1430 FOR x=1 TO 8
1440 a(x)=BIN$(z(x),8)
1450 FOR y=1 TO 8
1460 a(x,y)=VAL(MID$(a(x),y,1))
1470 NEXT y
1480 GOSUB 1290
1490 CLS #2
1500 RETURN
1510 REM ***** MIRROR IMAGE *****
1520 FOR x=1 TO 4
1530 FOR k=1 TO 8
1540 r(x,k)=a(5-x,k)
1550 NEXT k
1560 x=5-x
1570 FOR y=5 TO 8
1580 FOR k=1 TO 8
1590 a(x,y)=r(x,y)
1600 a(5-x,y)=r(x,y)
1610 NEXT y
1620 x=5-x
1630 NEXT x
1640 GOSUB 1290
1650 RETURN
1700 PRINT:PRINT "Do you wish to save the character set ? (y/
n)?"
1710 x=" " : WHILE x=" " : x=LOMER$(INKEY$) : WEND
1720 IF x="y" THEN 1740
1730 SAVE "CHAR",CLOW,CLOW,CLOW
1740 PRINT:PRINT "Saved as file "CHAR""
1750 RETURN
```

Autopause

Ian Cash

ORIC

A USEFUL FEATURE on many games is a pause control, allowing the player to take a breather from zapping all those aliens. However, not all games have this ability, and this is where my program helps.

It was written on a 48K model, but should work with any Oric using the V1.0 operating system and should not be too difficult to convert for other Orics. As the program relies on interrupts it will not work with games which do not use them — but this is a minority I'm sure. The only other drawback is a small delay in keyboard response when typing in direct mode, but as this does not apply to games I'm sure it will not be noticed.

Any key may be used as the pause control — including Ctrl and Shift keys — by simply changing line 60 according to table 1. The game will pause as long as this key is pressed and continue on release.

After typing in the program and checking carefully, Run it, and then Cload the game. The routine can be disabled by

POKE #230, 64

Table 1. For Ctrl, LShift and RShift, the first number on line 60 should be changed to # 09.

The last number should be chosen from the list of keyboard values to replace the 130 for whichever key you wish to use as the pause control.

Naturally this should not be a key already used in the program.

Table 1 continued

```
5 REM Oric Autopause by I.Cash
10 FORA=#231TO#248:READ D:POKEA,D:NEXTA
20 FORA=#271TO#288:READ D:POKEA,D:NEXTA
30 POKE#230,234 'enablePoke #230,64 to stop.
40 DATA #0E,#42,#02,#8A
50 DATA #0E,#0B,#4B,#AD
60 DATA #0B,#02,#C9,130 'See text.
70 DATA #D0,#5E,#4C,#7A
80 DATA #02,#FF,#FF,#FF
90 DATA #FF,#4C,#46,#02
100 DATA #AD,#43,#02,#F0
110 DATA #35,#BD,#00,#01
120 DATA #BD,#44,#02,#A9
130 DATA #46,#9D,#00,#01
140 DATA #0B,#BD,#00,#01
150 DATA #BD,#45,#02,#A9
160 DATA #02,#9D,#00,#01
170 DATA #A9,#00,#BD,#43
180 DATA #02,#F0,#17,#AD
190 DATA #43,#02,#D0,#12
200 DATA #AD,#44,#02,#9D
210 DATA #00,#01,#0B,#AD
220 DATA #45,#02,#9D,#00
230 DATA #01,#A9,#FF,#BD
240 DATA #43,#02,#AE,#42
250 DATA #02,#6B,#40
```


The Unsurpassable Experience.

synsoft

The Official

SEGA

ZAXXON



Now you can play one of the most challenging arcade games on your Commodore 64 home computer. ZAXXON's incredible 3-D graphics, diagonally scrolling screen and supersound are reproduced in great detail. Everything you love about the arcade game is here - and much more. ZAXXON is now more difficult than ever before! So hang onto your joystick and keep firing. Then practice. You may eventually encounter the deadly ZAXXON himself.



synsoft

THE ULTIMATE IN AMERICAN SOFTWARE FOR YOU ON U.S. GOLD
U.S. Gold is stocked by all leading computer stores including:



John Menzies

WHSMITH WILDINGS WOOLWORTH

CASSETTE

£9.95

DISK

£14.95

U.S. Gold Ltd., Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH

Telephone: 021-520 7591. Telex: 337268.

PSION ORGANISER RESULTS

THREE PSION ORGANISERS plus a choice of software were up for grabs in our September competition. To enter you needed to place eight of the machine's features in order of importance. As a tiebreaker we wanted you to suggest an original use for the database facility.

As usual our panel of judges made heavy weather of the business of picking the winning list. All agreed that the crucial features of the Organiser were its portability and data storage capacity: on the other features there was fierce disagreement.

"Speedy data access" was a particularly tricky one. It is obviously a vital feature, but can't it be taken for granted? Surely this is what computers are supposed to be good at. And what about "rugged construction"? For most applications the device would not have to be very robust. But perhaps Psion should consider bringing out a range of outdoor models — the Safari Organiser or an

underwater version.

The panel's final choice was the following one:

1. Pocket-sized.
2. Permanent data storage.
3. Battery powered.
4. Re-usable datapacks.
5. Speedy data access.
6. Software library.
7. Own program language.
8. Rugged construction.

The three entries which matched or came closest to this list were from: Matthew Langham, Dhauner STR. 184, 6570 Kirn, West Germany; R Shaw, 3, Heathfield Cottage, Lodge Lane, Nailsea, Avon; M Gottlieb, 22 Gibbs Green, Edgware, Middlesex.

M Gottlieb's database suggestion — for

storing lecture notes — was a little dull. M Shaw was more original with a plan for keeping records of 100 cows.

We were not sure whether Matthew Langham was joking when he wrote: "I would store some Pretty Special information on Natterjacks in my Organiser". A natterjack, if you are wondering, is a small toad which runs instead of hopping.

Other database ideas ranged from the humorous to the highly practical. Dutch schoolboy Nouter Falk thought he would use the datapacks to cheat in exams, passing the machine off as a calculator. Good thinking, Nouter, you will be out of there in no time.

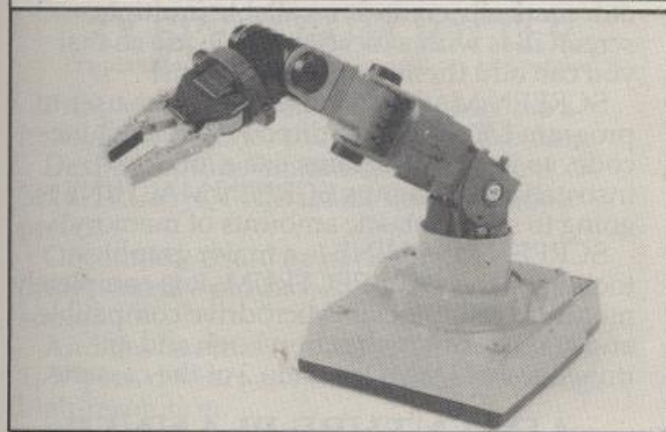
But watch out for schoolmaster J Davenport whose idea is to use the Organiser for "filling subjectively observed day to day behaviour characteristics of pupils at the moment of observation".

Daniel Langton refused to give anything away. "Private and confidential" he wrote coyly. Come off it Mr Langton, stamp collections are out in the open these days. Unless of course you are thinking along the same lines as D Oliver who suggested "Red-hot phone numbers".

On the practical level, anti-tank helicopter pilot Captain Husband thought to store daily changing battlefield codes and grid references, while fireman D Dempster argued the need for a computerised A to Z index. Even more sensible was P Metherall's idea of entering milk delivery details for his milk round.

Lastly, Russell Cooper seems to be in some confusion with his notion of using the Organiser to compose music.

Make things happen with Memoco.



Memoco Electron Robotic Arm

12 Axis of movement. Arm raise and lower. 360 degree rotation left or right. 90 degree Elbow movement left or right. 90 degree wrist movement either side of centre. 360 degree wrist rotation in either direction. Claw open and close.

Fitted with motor control circuit. Switched from 5 volt TTL. Controlled by computer. Separate motor driver power supply.

Digital Version **£89.95** BBC B Interface card **£49.00**
With position feedback **£119.95** Spectrum interface card **£49.00**

Commodore 64 interface card **£49.00**



200 in 1 Electronic Lab Kit.

An ideal Introduction To Electronics. Includes all parts to make 200 projects. Such as Radio: Rain Detector: Burglar Alarm. Covers projects using Transistors: Integrated Circuits: Seven Segment Displays Light Sensitive Circuits and many more. All components built into fitted workcase. With cover. Comprehensive Manual. Completely safe. Normal Price £34.00 **£24.95** Our price



Range Doubler Multitester. 43 Ranges.

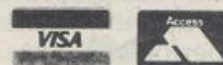
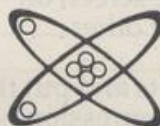
50,000 Ohms per Volt DC. 10,000 Ohms per Volt AC. 4.25" Colour coded mirrored display. Giving accurate reading without parallax error. Normal Price £27.00 **£15.45** Our Price

Computer Compatible Tape Recorders

Commodore 64 and Vic 20 £28.75	Acorn Electron £30.00
BBC B. £22.95	ZX81 and Spectrum £22.95

ALL ABOVE DEVICES SUPPLIED WITH LEADS

MEMOCO ELECTRON



15 WINDSOR STREET,
MELTON MOWBRAY, LEICS.
TELEPHONE: (0664) 63544

PAINTBOX

Superb Graphics — without expensive hardware!

PAINTBOX is a must for every owner of a 48K Spectrum.

It will give you the ability to produce stunning graphics on your micro — simply

With PAINTBOX there's no need for expensive hardware — why pay up to £150 for hardware when you can produce incredible picture and graphics with one cassette-based software package?

If you haven't seen PAINTBOX demonstrated you're in for a pleasant surprise!

For instance, PAINTBOX will enable you to draw practically anything on your screen and save it either as SCREEN\$ or as a machine code memory file to use in your BASIC or MC programs.

You wield enormous power over the graphics capability of your SPECTRUM — including the definition, storage and use of up to 84 UDG's — 4 times more than normal! A brief description of facilities are as follows:

UDG DRAWING BOARD for defining up to 4 Banks of UDG's including ROTATE, MIRROR, INVERSE etc.

UDG EDITOR for storing up to 84 UDG's for use in screen planning or in your other programs.

PRECISION PLOTTER. A high-resolution drawing board which allows you to draw anything on the screen. Facilities like CIRCLE, FILL, ARC, PLOT, DRAW, ERASE, OVER, DRAW RADIALY, INK, BRIGHT etc are included and easy to use!

SCREEN PLANNER gives you the best of both worlds! The combined use of PRECISION PLOTTER and your Banks of UDG's for highly detailed and precise screen graphics.

The program is complete with DEMO on side two of the cassette and a 28 page instruction booklet.

PAINTBOX can be used with Joysticks and is Sinclair Microdrive compatible.

SCREEN MACHINE

Instant Machine Code for graphics and text

SCREEN MACHINE is a completely professional graphics utility to use with Paintbox (or any other graphics hardware or software).

It will allow you to manipulate your screen graphics and text in ways which will make your programs better and more memory efficient. For instance:

If you have produced a screen-full of superb graphics you can enlarge, reduce, recolour, flip screen, relocate your graphics to another part of the screen, superimpose one screen on another and perform all sorts of other wonders!

Then you can take your results and put them through a series of memory compression routines to allow you to save enormous

HERE'S SIX WAYS TO



amounts of memory. Such items like compressing with or without attributes, saving thirds of the screen and multiple combinations of both are possible.

Never has machine code storage of graphics been simpler because SCREEN MACHINE automatically creates re-callable multiple screen files with a location catalogue so that you can add them to your programs!

SCREEN MACHINE also allows the user to program UDG's or text directly into machine code, so if your programs use a lot of text instructions or menus SCREEN MACHINE is going to save fantastic amounts of memory!

SCREEN MACHINE is a major graphics toolkit for the 48K SPECTRUM. It is completely menu-driven, Sinclair Microdrive compatible, and comes with instruction book and an unbelievable DEMO on side 2 of the cassette.

ADVENTURE PLANNER

A must for the adventure game fan

If you're an Adventure Game nut, Print 'n' Plotter's new ADVENTURE PLANNER is exactly what you have been looking for!

It's a 50 page, BIG SIZE (16 3/4" x 11 3/4") pad with a complete 'mapping' system with over 150 locations on each sheet... created to help you solve Adventure Games.

It's the best way to beat the 'system' and is obviously for use with any make of computer.

ADVENTURE PLANNER will also assist you in planning Adventure Games for programming — a helpful pad to keep by your computer at all times.

[illegible]

For pre-planning graphics, text, tabulation or anything to produce 'on screen', a Print 'n' Plotter JOTTER won't be beaten.

So if you want ZX PRINTER PAPER that gives good, clear print . . . and you want it a little cheaper . . . send today for quick delivery!

Address:

Print'n'plotter Products

Y10

DOWNSWAY

**THE ULTIMATE
in computer
hardware**

**VIC 20
SPECTRUM
ORIC1/ATMOS
COMMODORE 64**

Operates with Turbo-Loaded Programs

NEW! CBM 64 / VIC 20 CASSETTE INTERFACE

COMMODORE 64 CENTRONICS PRINTER INTERFACE

NEW! ORIC1/ATMOS PROGRAMMABLE JOYSTICK INTERFACE

VIC 20 16K SWITCHABLE CARTRIDGE

For full details and FREE 'Can of Worms' poster, send a large S.A.E. to:
DOWNSWAY ELECTRONICS (U.K.) LTD., Depot Road, Epsom, Surrey KT17 4RJ
 Tel: Epsom (03727) 27222. Tlx: 877837 Merit G. Access/Visa cards welcome.

Mah Jong

48 K SPECTRUM

THE FASCINATING AND TIMELESS ORIENTAL GAME OF THE FOUR WINDS CAN BE USED AS A GAME AND OR TUTOR WITH SAVE GAME FEATURE. SUPERB GRAPHICS. EXPERIENCE THE CHALLENGE OF FAST AND COMPETITIVE PLAY. A COMPREHENSIVE INSTRUCTION BOOK IS INCLUDED WITH EACH PACKAGE. THIS IS THE MOST COMPREHENSIVE VERSION WE HAVE EVER SEEN FOR A MICRO COMPUTER.

£ 9.95

YAHTZEE

16-48 K SPECTRUM

AN EXCITING GAME OF CHANCE FOR 1-4 PLAYERS.

£ 5.95

PENTOMINOES

16-48 K SPECTRUM

THE JIGSAW WITH A SUBTLE DIFFERENCE !!

£ 5.95

Spectre

ENFIELD HOUSE, SWARDESTON NORWICH, NORFOLK.

ALSO AVAILABLE

48K DIGITAL CIRCUIT DESIGNER £ 9.95
 48K A.C. NETWORK ANALYSER £ 14.95
 48K MULTI FUNCTION MATHS AID £ 6.95
 48K PERSONAL DIETARY ADVISOR £ 6.95
 48K INVESTMENT MONITOR £ 9.95

**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, Amstrad, 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**

ADD ONS ADD ONS

ZX81 SPECTRUM



The Fuller FDS. Now better than ever! All the features you'll ever need from a Spectrum keyboard all in one smart, durable unit. Space bar, cursor control keys, single key delete, caps shift, symbol shift, F1 mode, separate full stop and comma keys, beautifully made, handsome to look at and a delight to use. £49.95 plus £2.00 p.p.

PROFESSIONAL CASED KEYBOARD TYPE FD42. Models for the ZX81 and SPECTRUM

(PLEASE STATE WHICH)
The Fuller FD42 has long been our most popular seller. Its sturdy, attractive but very tough injection moulded ABS case houses the computer and converts it into a professional unit with 42 full size long-life computer-style full-travel keys. Keys are indelibly etched with ZX81 or Spectrum legends. No skills or soldering needed and full access is maintained to the user ports etc for add-ons. Power supply can be fitted inside. Has integral LED for power ON/OFF indication. In all a thoroughly worthwhile accessory to your computer. £29.95 plus £2.00 postage and handling.



The famous Panda Expandable RAM pack for the ZX81. Massive 16K add-on memory which can easily be expanded to a GIANT 32K with an optional plug-in MODULE. Rugged no-wobble design injection moulded case with integral LED power on indicator. No additional power supply needed, just plug on and go. British designed and built. Thousands in use. Prices: PANDA 16K £19.95. MODULE £14.50. GIANT 32K £34.00.

SPECTRUM UPGRADES 16K to 48K

THE KIT — Fit it yourself, a beautifully packed and presented kit with complete (Really complete in the detail you need if you've never seen inside your computer) instructions. No soldering — no wire bending — no fiddly bits. Thousands in use. Everything you need to upgrade your issue 2 Spectrum from 16K to a full blown 48K. The really economical upgrade — in stock for swift despatch. £24.00

THE PACK — A sturdily packages 16K to 48K upgrade pack that simply plugs on to the user port and works immediately. Throughport so any other accessories may be fitted as before. No need to open the case, no unscrewing, no soldering, no need to invalidate your guarantee. Designed and built in Britain. Guaranteed. Supplied in handsome carton suitable for gift wrapping. £39.95

NEW!! Upgrade your ISSUE 3 Spectrum from 16K-48K. This kit is supplied with full parts and very comprehensive instructions as to how to upgrade your ISSUE 3. Due to the change in design of the issue 3 this has not been possible with previously available kits. Not for the complete amateur as it requires two simple soldered connections to be made, anyone who has soldered before or who has a friend can fit this quite easily though. £26.50

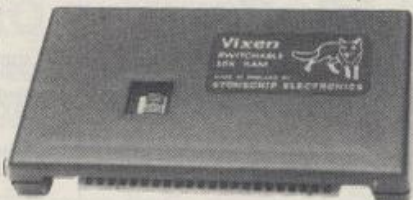
VIC 20

THE VIXEN SWITCHABLE RAM £34.95

16K RAM CARTRIDGE

The Vixen 16K switchable Ram cartridge is unique approach to expanding your VIC 20. Being switchable from either 16K to 8K + 3K programs already in use based on the unexpanded Vic 20 are not obsolete. Supplied in attractive custom made case it simply plugs into the rear of the computer or motherboard.

No additional power needed. High quality gold plated contacts ensure long trouble free life. Switches are recessed to avoid accidental operation. Designed and built in Britain. Guaranteed one year.

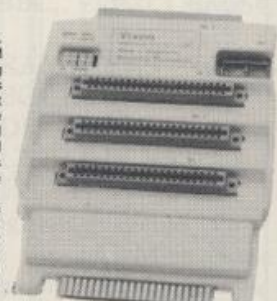


THE VIXEN MOTHERBOARD £31.95

THE EXPANDABLE EXPANSION SYSTEM. Providing 4 additional cartridge slots PLUS ROM socket. The slots are switchable enabling cartridges to be left in place and selected as needed by switching thus avoiding constant handling and the danger of breakage. Having one socket at the rear enables further expansion. Used in conjunction with one or more Vixen Rams full expansion can be achieved. ROM socket enables ROMs and Eproms to be fitted for future software programs, toolkits etc.

A range of ROM based software will soon be available from the manufacturers. Industry standard Eproms, 2716, 2732 etc are readily available and easily programmed and copied.

A sound investment for the serious user and serious games player which will not become obsolete.



PRODUCTS ARE STOCKED AND USUALLY DESPATCHED WITHIN 10 DAYS.

I wish to order the following: (Please state which computer)

TOTAL £

All prices include VAT and post and packaging. All items include a full year guarantee. Products are stocked and usually despatched within 10 days. Overseas customers add £4 post and packing. Cheques/Postal Order, etc., payable to TREMIVER LTD.

Please debit my Access/Barclaycard/Diners Club Int/as below Round the clock



7 days a week
Telephone orders.
0256 66116

Card No.

Signature

Name

Address

YC6

TREMIVER LTD.

93A PACK LANE, BASINGSTOKE, HANTS.
Tel. (0256) 66116

PRICES THAT'LL KNOCK YOU OFF YOUR FEET!

DAISY WHEELS

Alphacom 32 Printer	£59.99
Brother HR15	£325.00
Brother HR25	£555.00
Brother HR35	£699.00
Daisy Step 2000 (20CPS)	£225.00
Diablo 630 (API)	£1310.00
EP 44 Personal Elec. Printer	£195.00
Juki 6100	£315.00
Queen-Daisy Daisy Wheel Printer	£225.00
Qume 11/40 (RD)	£1175.00
Qume 9/4S (RD)	£1535.00
Qume Letter Pro 20	£750.00
Richo RP1300	£875.00
Richo RP1600	£1175.00
Smith Corona TP1 Daisy Wheel Printer	£175.00

PERIPHERALS

Commodore 1701 Colour Monitor	£175.00
Sanyo 2112 Green Screen 15MHz	£65.00
Sanyo 3125 Col. Med. Res. 400PIS	£175.00
Sanyo 3115 Col. V. Hi Res. 800PI	£399.00
Commodore 1541 Disk Drive	£156.52
Oric Disk Drives	£229.00
Sinclair Microdrives	£50.00
Keyboard	£130.00
Sinclair Interface '1'	£50.00
Commodore C2N Cassette	£35.00
All leading software names available	P.O.A.
Tailormade software written by our inhouse software team	P.O.A.

Keyboards, cable, interfaces, tractor feeds, sheet feeds, disks, software, up grades, listing paper, ribbons, daisy wheels available for most products.

- * Guarantees available
- * Wholesale prices!
- * Export facilities arranged
- * Superb stock of computers and peripherals
- * Express delivery

RING 01-947 8562

Official suppliers to the U.K. government departments, British Telecom and many multi-national organisations.

COMPUTERS

Apricot 256K 2x315 D/D + Monitor	£1399.00
Apricot 256K 2x720 D/D + Monitor	£1549.00
Apricot 256K 10MB HD.D + Monitor	£2225.00
BBC Model B	£320.00
Commodore 64	£152.18
Commodore VIC20 Starter pack	£108.89
Commodore SX 64 (Portable)	£609.00
Commodore 8000 Systems Series	£1200.00
Epson QX10 + RX80 + cable	£1599.00
Epson Portable PX	£649.00
Epson Portable PX + RAM	£799.00
Oric Atmos 48K	£145.00
Sanyo MBC555 2x160K D/D + Monitor	£899.00
Sinclair Spectrum 48K	£100.00
Sirius 1 128K 1.2MB	£1650.00
Sirius 1 256K 1.2 + 10.6MB	£2950.00
Televideo	P.O.A.

IBM: Telephone for a quotation on your configurations

All prices excluding V.A.T.



DOT MATRIX

Admate 80	£175.00
Anadex DP 9000	£799.00
Brother HRS	£130.00
Canon PW1080A (NLO)	£275.00
Commodore MTS 801	£175.00
Epson RX80T	£190.00
Epson RX80 F/T	£215.00
Epson FX80	£320.00
Epson RX100 F/T Printer	£325.00
Epson FX100 F/T	£425.00
Mannesmann Tally MT80	£199.00
Mannesmann Tally MT160	£449.00
Mannesmann Tally MT180	£580.00
MP165 (NLO)	£275.00
OKI Microline 82A Printer	£249.00
OKI Microline 83A	£389.00
OKI Microline 92 (P)	£365.00
OKI Microline 84 (P)	£629.00
Radix 10 (NLO)	£445.00
Seikosha GP100A	£179.00
Seikosha GP100VC	£175.00
Shimwa CP80 F/T Para	£169.00
Star Gemini 10X	£189.00
Star Delta 10	£319.00
TEC 1550 (P)	£459.00

WORLDWIDE COMPUTERS LTD

Spa House, 11-17 Worple Road, Wimbledon, London SW19 4JS Tel: 01-947 8562 Telex: WOWICO 8955888

SOFTWARE FOR YOUR MICRO

HUGE SAVINGS ON POPULAR GAMES

SPECTRUM 48K

LORDS OF MIDNIGHT	4.75
AQUARIUS	4.75
SPECTRES	4.75
CAVENFIGHTER	4.75
MANIC MINER	4.75
BIRDS AND THE BEES	4.75
ARCTURUS	4.75
THE TRAIN GAME	4.75
WHEELIE	4.75
LES FLICS	4.75
1994	4.75
MOON BUGGY	4.75
SHEER PANIC	4.75
STAR WARRIOR	4.75
FIREBIRDS	4.75
REPULSAR	4.75
MEGAPEDE	4.75
OSTRON	4.75
ROBON	4.75
MONSTERS IN HELL	4.75
MICROBOT	4.75
POTTY PLANTER	4.75
CRASH	4.75
MUSHROOM ALLEY	4.75
PENGY	4.75

COMMODORE 64

MANIC MINER	5.50
BOZOS NIGHT OUT	5.50
CRAZY BALLOONS	5.50
DINKY DOO	5.50
ARCADIA	5.50
STAR COMMANDO	5.50
SUPER GRIDDER	5.50
TALES OF ARABIAN NIGHT	5.50
HOUSE OF USER	5.50
SUPER SKRAMBLE	5.50
PLUMB CRAZY	5.50
UGH	5.50
ZOIDS	5.50
SCUBA DIVE	5.50
BANANA DRAMA	5.50

VIC 20

PINBALL WIZARD	4.95
GRIDDER	4.95
ASTEROIDS	4.95
WACKY WAITERS	4.95
ARCADIA	4.95
PANIC	4.95

Orders £12 or over P&P free. Orders under £12 P&P £0.20.

Please make cheques or postal orders payable to:

**SARASOFT, 29 CHESTERFIELD DRIVE,
BURTON JOYCE, NOTTINGHAM.**

Further titles available, send S.A.E. for details

MAIL ORDER PROTECTION SCHEME

If you order goods from Mail Order advertisements in this magazine and pay by post in advance of delivery, *Your Computer* will consider you for compensation if the Advertiser should become insolvent or bankrupt, provided that:

- (1) You have not received the goods or had your money returned; and
- (2) You write to the Publisher of *Your Computer* summarising the situation not earlier than 28 days from the day you sent your order and not later than two months from that day.

Please do not wait until the last moment to inform us. When you write, we will tell you how to make your claims and what evidence of payment is required.

We guarantee to meet claims from readers made in accordance with the above procedure as soon as possible after the Advertiser has been declared bankrupt or insolvent.

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine not, for example, payment made in response to catalogues etc., received as a result of answering such advertisements. Classified advertisements are excluded.

Micro Markets – Specialists in the new MSX System



MSX represents one of the most important advances in micro computing technology by introducing a compatible standard to micro computers. And Micro Markets, at the forefront of this new technology are pleased to be able to offer computers, peripherals and a full range of software for the new MSX Systems. MSX will offer the user a compatible programming language and therefore compatible software for all the MSX computers in the form of cassette, cartridge and disk. Visit your nearest Micro Market store soon.

Toshiba HX-10 Computer including starter Pack Software £279.95

A powerful home computer designed to satisfy the first time user, enthusiast and businessman alike. Featuring MSX Basic operating language, a powerful 64K memory and 73 Key fullstroke keyboard, the HX-10 will produce high resolution graphics including graphs and charts in up to 16 colours and full 8 octave music generation. The HX-10 is totally expandable and like the software, MSX hardware is also standardised enabling users to add a wide range of peripherals. Comes complete with starter pack of software.

Toshiba KT-22 Data Recorder £29.95

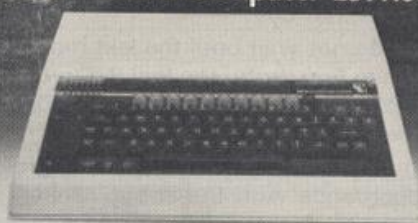
For the storage and playback of data on your MSX computer this compact, quality unit from Toshiba is ideal. With top-mounted controls tape counter and sound level sensor which stops the tape when there is no sound.

A selection from our extensive range of MSX software

Coco in the Castle	£6.95	Les Flics	£7.95
Driller Tanks	£8.95	Hustler	£6.95
Binary Land	£8.95	Fuse Wars	£4.95
Fire Rescue	£7.95	Devil Diver	£4.95
Eric the Floaters	£5.95	Maziacs	£4.95
Dog Fighter	£6.95	Footloose	£4.95
Holdfast	£5.95	Peter Plumber	£4.95
Spooks and Ladders	£6.95	Popeye	£4.95
Hyper Viper	£7.95	Ant Attack	£7.95
Zen Machine Code		Boogaboo	£7.95
Prog System	£19.95	Fred	£7.95
WDPRO		Snowman	£7.95
Word Processor	£29.95	Games Designer	£9.95
Database	£19.95	French	£7.95
Starting with the MSX	£5.95	German	£7.95
The MSX Red Book	£8.95	Spanish	£7.95
Maxima	£7.95	Buzz-Off	£7.95
Champ Assembler Monitor		Hot Shoe	£5.95
Package	£9.95	Oh Mummy	£5.95
Time Bandits	£7.95	Blagger	£7.95

Micro Markets offer a full range of leading brand computers

BBC Model B Computer £399.00



Accepted as the standard in schools and colleges for learning computing. The BBC Model B features the powerful BBC Basic programming language, 32K memory, 73 key full stroke keyboard, 16 colour high resolution graphics and sound synthesizer. It has several interface parts for easy connection to many peripherals and there is a large range of business, home and games software available.

Acorn Electron Computer £199.95



Built by the same company as the BBC computer and therefore uses the same widely used programming language. The ideal machine for learning about computers, the Electron features full stroke keyboard, 32K memory, full colour graphics and sound generation. It comes complete with 2 manuals: 'The User Guide' and 'Start Programming with the Electron'.

MICRO MARKETS

Amstrad CPC 464

The complete system at an amazing price from Micro Markets

Amstrad's long awaited entry into the micro computer market is a low cost computer that provides the user with everything to just plug-in and get going, with applications ranging from arcade games to business and accounting. Its impressive features include: integral RGB colour monitor or Green Tube VDU, built-in 'speed load' data recorder, 64K memory, 74 key full stroke keyboard, high resolution graphics, 10 octave sound generation and a comprehensive range of software for business, educational and games from Amsoft.

With Green Screen

Monitor £239.00

With Full Colour Monitor £349.00



Oric Atmos Computer — Phone for latest Low Price

Unlike other micros, the Atmos has a powerful ROM memory which leaves most of the valuable RAM memory for user programming. There are full colour high resolution graphics and special sound effects for games programmers which can be heard through the powerful built-in speaker. Other features include full featured keyboard with sculptured keys and a range of exciting software.



Sinclair Spectrum 48K £129.95

With FREE Software 6 pack (worth £56.70)

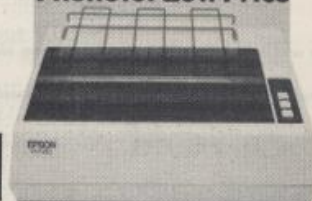
This very popular 48K colour computer offers excellent value for money. Featuring full colour high resolution graphics, 10 octave sound range and 44 key keyboard. There is a full range of peripherals and a massive selection of software.



Interface 1 and ZX Microdrive. £99.95 per pair

For fast access to large amounts of data each microdrive is capable of holding up to 100K of memory on a single microfloppy disk. The Interface 1 will control up to 8 microdrives and also adds file handling and communication facilities to the Spectrum.

Epson RX80FT Dot Matrix Printer Phone for Low Price



Cumana CSX100 Disk Drive £149.00



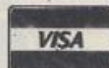
LONDON
Manor Park E12
Kimberly Hi-Fi
698 Romford Road. Tel: 01-478 5137
London N13
SPL Sound Vision
359 Green Lanes, Palmers Green,
Tel: 01-882 5888
London W2
Kimberly Hi-Fi
376 Edgware Road. Tel: 01-724 0454
London SE18
Sevenoaks Hi-Fi & Video
162 Powis Street, Woolwich.
Tel: 01-855 8016
AVON
Bristol
Radford Hi-Fi
53-54 Gloucester Road.
Tel: 0272 428248
Absolute Sound
25 Queens Road, Clifton.
Tel: 0272 249975
BERKSHIRE
Maidenhead
Hi-Fi Markets
18 King Street.
Tel: 0628 73420

BUCKINGHAMSHIRE
Milton Keynes
JCV Hi-Fi & Video
1 Viscount Way, Dukas Drive,
Bletchley. Tel: 0908 367341
CLEVELAND
Middlesbrough
Mckenna and Brown
190 Linthorpe Road.
Tel: 0642 246644
ESSEX
Chelmsford
Rush Hi-Fi & Video Centre
5-6 Cornhill. Tel: 0245 57593/64393
Hornchurch
Waters & Stanton Electronics
12 North Street. Tel: 04024 44765
GLOUCESTERSHIRE
Cheltenham
Absolute Sound & Video
42 Albion Street. Tel: 0242 583960
HAMPSHIRE
Aldershot
Bryants Hi-Fi
81 High Street. Tel: 0252 20728
Andover
Andover Audio
105 High Street. Tel: 0264 58251

HERTFORDSHIRE
Watford
Hi-Fi Markets
68 High Street. Tel: 0923 26169
KENT
Beckenham
Sevenoaks Hi-Fi & Video
51 Beckenham Road. Tel: 01-658 3450
Bexley Heath
Kimberly Hi-Fi
193 The Broadway. Tel: 01-304 3272
Chatham
Sevenoaks Hi-Fi & Video
4 Railway Street. Tel: 0634 46859
Sevenoaks
Sevenoaks Hi-Fi & Video
111 London Road. Tel: 0732 459555
Tunbridge Wells
Sevenoaks Hi-Fi & Video
34 Mount Ephraim. Tel: 0892 33474
LANCASHIRE
Bolton
Cleartone Hi-Fi & Video
156/158 Blackburn Road.
Tel: 0204 22636
Preston
Norman Audio
51 Fishergate. Tel: 0772 53057

LEICESTERSHIRE
Leicester
Mays Hi-Fi
27 Churchgate. Tel: 0533 58662
OXFORDSHIRE
Oxford
Absolute Sound & Video
256 Banbury Road, Summertown.
Tel: 0865 53072
Absolute Sound & Video
19 Old High Street, Headington.
Tel: 0865 65961
SURREY
Croydon
Vision Store
96-98 North End. Tel: 01-681 7539
Kingston upon Thames
Vision Store
3 Eden Walk Precinct. Tel: 01-546 8974
SUSSEX
Brighton
Sevenoaks Hi-Fi
55 Preston Street. Tel: 0273 733338
Haywards Heath
Hi-Fi & Video Markets
13 South Road. Tel: 0444 450333
WARWICKSHIRE
Warwick

JCV Hi-Fi & Video
Wharf Street. Tel: 0926 493796
WILTSHIRE
Swindon
Absolute Sound & Video
60 Fleet Street. Tel: 0793 38222
NORTHERN IRELAND
Belfast
Audio Times
85 Royal Avenue. Tel: 0232 229907



Head Office: Cousteau House,
Greycaine Road, Watford, WD2 4SB.
Tel: 0923 27737

All prices quoted in the Micro Markets advertisement are correct at time of going to press (19/9/84) but may be subject to change without notice due to fluctuations in Manufacturers' prices. All Prices include VAT @ 15%. Not all the products featured in Micro Markets advertisement are available at all branches. Please check before travelling.

MICRO MARKETS

Available exclusively from **DEAN ELECTRONICS** the well proven **ALPHACOM 32** Thermal Printer. Includes full interfacing to the **ZX 81** or **SPECTRUM**. Uses the standard Sinclair print commands (COPY, LLIST, PRINT). Quiet, maintenance-free, high-speed operation. Paper £7.00 per box of 5 rolls, each 25m long.

Alphacom 32

This thermal printer, now available in the UK, is the standard printer which has sold in tens of thousands for use with the American version of the ZX81.



DEAN ELECTRONICS LIMITED

Glendale Park Fernbank Road

Ascot Berkshire SL5 8JB

Tel. 0344 885661 Telex 849242

Or from W H Smith, John Menzies, Greens, Laskys, Spectrum Group, Prism, Currys.

£79.95
inc VAT

ADD £2 P&P



Also available –
Alphacom 42 compatible with Commodore 20/64, BBC Centronics, Atari at **£99.95** (+£2p/p) includes selected interface.

Please send me Printer(s) at £81.95 and boxes of paper (5 rolls per box) at £9 per box – all inclusive of post and packing.

Total £ cheque/PO enclosed or debit my Access/Barclay card account No.

Name and address

on-off
re-set

switch
for
spectrum



- No more crashing from worn power supply socket
- Does not affect expansion port and use of interfaces
- Just pushes into position does not affect spectrum or power supply lead.
- No need to remove once in position.
- Ergonomically designed – no more fumbling with power supply leads.
- Positive rocker action prevents accidental operation.
- Ideal for re-setting rom cartridge games – saves time when changing microdrive cartridges.

£4.95

I enclose a cheque/postal order for £ payable to
TEC Publications, 24 Victoria Road, Bromsgrove, Worcs.

Name C

Address

Dealer Enquiries Welcome. Telephone (0527) 74567

ORIC AND SINCLAIR COMPUTERS



Oric 1 computer 48K £95 (£92) £102. Oric Atmos computer 48K £171 (£168) £168. Oric colour printer £134 (£123) £140. Oric disc drive £304 (£278) 288. New Sinclair QL Computer £406 (£385) £410. Sinclair Spectrum 48K (with 6 free programs while Sinclair's offer lasts) £131 (£131) £143. Microdrive £51 (£50) £60. RS232 interface 1 £51 (£50) £60. Limited period special offer: Microdrive + Interface 1 + 4 Blank microdrive cartridges £8 (£8) £9. Interface 2 £20.45 (£20) £24. 32K memory upgrade kit for 16K Spectrum (issue 2 and 3 only) £31 (£28) £30. Fuller Master unit for the Spectrum including speech synthesizer, sound synthesizer, amplifier and joystick port £56 (£56) £62. Fuller FDS full sized keyboard for the Spectrum with proper space bar £52 (£52) £62. Spectrum printer interfaces with cables: Centronics £51 (£47) £52. RS232 £35 (£33) £38. ZX printer has been replaced by the Alphacom 32 £71 (£67) £77. 5 printer rolls (State whether Sinclair or Alphacom) £13 (£16) £21. ZX81 computer £45 (£44) £54. 16K ram packs for ZX81 £28 (£25) £30.

COMMODORE COMPUTERS

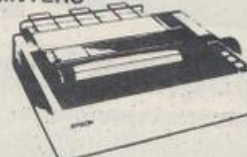
Commodore 64 £204 (£184) £204. Vic 20 £104 (£97) £117. Vic 20 starter pack £150 (£143) £173. Converter to allow most ordinary mono cassette recorders to be used with the Vic 20 and the Commodore 64 £9.78 (£9) £11. Bargain package: cassette converter + compatible cassette recorder £37 (£38) £44. Commodore cassette recorder £43 (£44) £50. Printer interfaces for

Vic 20 and the Commodore 64: Centronics £45 (£41) £46. RS232 £45 (£41) £46. Disc drive £233 (£209) £234. 1520 printer/plotter £165 (£149) £159. 1525 Printer £235 (£220) £245. 1526 Printer £350 (£330) £360. Light pen £29 (£29) £33. Vic 20 Accessories: Super expander high res cartridge £33 (£29) £34. Programmers aid cartridge £33 (£29) £34. Extra memory ram packs 8K £19 (£17) £20. 3K £6 (£7) £9.

ACORN COMPUTERS

Electron £203 (£209) £229. Electron joystick and printer interface £61 (£62) £69. BBC Model B £404 (£357) £387. BBC Light Pen £29 (£29) £33. 14" Colour Monitor £228 (£299) £319. Kenda double density disk interface system £139 (£125) £135. Disc drives 5.25" 40 track: single £200 (£184) £204. dual £356 (£325) £355.

PRINTERS



Brother HR5 £185 (£171) £190. Shinwa CTI CP80 £225 (£218) £248. Cannon PW1080A £332 (£299) £329. Epson RX80 £277 (£251) £282. Epson RX80F/T £314 (£286) £316. Epson FX80 £399 (£358) £388. Combined matrix printers and electric typewriters: Brother EP22 £173 (£166) £186. Brother EP44 £258 (£235) £260. Smith Corona TP1 Daisy wheel printer £252 (£225) £255. MCP40 Oric Colour printer/plotter £134 (£123) £140. Interfaces to run the above printers from Vic and the Commodore 64 £45 (£41) £46. We can supply interfaces to run the above printers from Sharp computers £58 (£52) £55.

SWANLEY ELECTRONICS

The Computer Export Specialists.

Dept YC, 32 Goldsel Rd., Swanley, Kent BR8 8EZ England.

Tel: SWANLEY (0322) 64851.

Official orders welcome. UK prices are shown first and include post and VAT. The second price in brackets is for export customers in Europe and includes insured airmail postage. The third price is for export customers outside Europe (including Australia etc) and includes insured airmail postage.

The Sinclair

QL

and you



Exploring the Sinclair QL — An Introduction to SuperBASIC Andrew Nelson, £4.95

The QL has a rich, new programming vocabulary, and this great book gives you the chance to master the host of new words Sinclair has added. Sure, you can use the QL more or less just like a Spectrum, but if you do, you are missing the extraordinary power which lies behind the radical concepts of SuperBASIC. Command by command, statement by statement, Andrew Nelson takes you through the richness of QL SuperBASIC in *Exploring the Sinclair QL — An Introduction to SuperBASIC*. Just £4.95 and available from most book and computer shops. In case of difficulty, you can order it directly from Interface Publications, using the coupon below. (Trade only: Interface Publications are distributed exclusively in the UK and Eire by W H S Distributors. Export orders handled by Interface Publications.)

Interface Publications, Department QYC,
9-11 Kensington High Street, London W8 5NP.

Please send me the following books.
I enclose a total of £ _____

- | | |
|--|-------|
| <input type="checkbox"/> Exploring the Sinclair QL — An Introduction to SuperBASIC — Andrew Nelson, ISBN 0 907563 84 8 | £4.95 |
| <input type="checkbox"/> 49 Explosive Games for your ZX Spectrum — Tim Hartnell, ISBN 0 907563 53 8 | £4.95 |
| <input type="checkbox"/> Delving Deeper into your VIC 20 — Philip Campbell, ISBN 0 907563 62 7 | £4.95 |
| <input type="checkbox"/> Creating Adventure Games on your Dragon 32 — Clive Gifford, ISBN 0 907563 57 0 | £4.95 |
| <input type="checkbox"/> Dynamic Games for your VIC 20 — Mathew Boek, ISBN 0 907563 34 1 | £4.95 |
| <input type="checkbox"/> Creating Adventure Programs on your Computer — Andrew Nelson, ISBN 0 907563 36 8 | £4.95 |
| <input type="checkbox"/> Putting your VIC 20 to Work — Tom Lau, ISBN 0 907563 46 5 | £4.95 |
| <input type="checkbox"/> The Easy Way to Program your New Computer — Tim Hartnell, ISBN 0 907563 60 0 | £3.95 |
| <input type="checkbox"/> Creating Adventures on your ZX Spectrum — Peter Shaw & James Mortleman, ISBN 0 907563 58 9 | £4.95 |
| <input type="checkbox"/> Practical Uses for the Microcomputer in the Home — David Hole, ISBN 0 907563 59 7 | £4.95 |
| <input type="checkbox"/> Mastering Machine Code on your Commodore 64 — Mark Greenshields, ISBN 0 907563 69 4 | £7.95 |
| <input type="checkbox"/> Making the Most of your TI 99/4A — Scott Vincent, ISBN 0 907563 66 X | £4.95 |
| <input type="checkbox"/> Dynamic Games for your Electron — Neal Cavalier-Smith, ISBN 0 907563 67 8 | £4.95 |
| <input type="checkbox"/> The 3-D Animated Apple — Phil Cohen, ISBN 0 907563 78 3 | £4.95 |
| <input type="checkbox"/> The Art of Structured Programming — Peter Juliff, ISBN 0 907563 79 1 | £5.95 |
| <input type="checkbox"/> Dynamic Games for your TRS-80 — Gail Duns & Tim Hartnell, ISBN 0 907563 63 5 | £3.95 |

Name

Address

QYC

INTERFACE
PUBLICATIONS



— — — — — We're the experts! — — — — —

Don't blame the equipment- it's most likely the mains!

In a perfect world, with a perfect power supply you'd have a right to expect perfect results from your computer, word processor, VDU or other electronically controlled equipment. Sadly, this is not always the case, due to mains borne interference. Even a dedicated line is only a partial solution because interference is generated by other equipment being used around you, typewriters, copiers, fluorescent lights and even the office 'fridge.

Galatrek do have an answer —




Apricot Series 1
Registered Products

the Ferro-Resonant Line Conditioner.

Simply plug it into the mains and your unit into the socket provided. Spikes, transients and other mains borne interference are now trapped in its circuits and voltage surges or dips are also catered for, as the output is highly stabilised. It also protects itself and the equipment against overload and gives system isolation. If you specify when ordering, it can be used as a step down or step up voltage supply.

You've nearly arrived at your perfect world — for as little as £145 + VAT.

The Galatrek Filter Plug, whilst only rated to carry 2 amperes of current, is designed to protect micros, minis and word processors from interference and surges. The transverse and common mode attenuation circuits are very effective for these low powered units. Easily fitted, it simply replaces your existing 3 pin plug.

Price £19.95 + VAT.



Send for details or cash with order.

Master Distributor and Dealer applications invited.



Galatrek International Ltd.

Scotland Street, Llanrwst, Gwynedd, LL26 0AL, North Wales.
Telephone: Llanrwst (0492) 640311 Telex: 617114 A/B GALAHU

COMMODORE 64

BRING YOUR 64 TO LIFE WITH.....

LIGHTNING LOAD

- ★ CONVERTS ALMOST ALL YOUR FAVOURITE SOFTWARE & GAMES INTO A SUPERFAST LOADING VERSION
- ★ YOUR CASSETTE PROGRAMS WILL INDEPENDENTLY LOAD FASTER THAN THE COMMODORE DISC DRIVE!!
- ★ LIGHTNING LOAD HAS SOPHISTICATED FEATURES WHICH LEAVE OUR COMPETITORS LIGHT YEARS BEHIND
- ★ COLOUR & SOUND ARE USED IN SPECTACULAR & UNIQUE WAYS TO ENHANCE THE PROGRAM
- ★ 100% MACHINE CODE, FLEXIBLE MENU SYSTEM ALLOWS SAVING OF MORE THAN 48K CONTINUOUS RAM
- ★ THIS AMAZING PROGRAM IS NOW ON SPECIAL OFFER £7.95 NOW £6.95 incl P&P

COPYCAT

THE ULTIMATE BACK-UP TAPE COPIER

- ★ MAKES BACK-UP COPIES OF ALMOST ALL SOFTWARE
 - ★ SPECTACULAR MULTICOLOURED LOAD AND SAVE
 - ★ WIZARD AUDIO SOUND EFFECTS
 - ★ CASSETTE MAGIC SENSE
 - ★ 100% MACHINE CODE TAPE COPIER WITH FULL INSTRUCTIONS
 - ★ CAN YOU FIND A BETTER COPIER? — WE CAN'T!
 - ★ SUPERB VALUE AT £5.95 incl. P&P
- DISPATCH OF THESE PROFESSIONAL PROGRAMS WITHIN 24 HOURS!
CHEQUES/P.O.'s TO:

WIZARD SOFTWARE (Dept. YC)
59 THE MARLES, EXMOUTH, DEVON EX8 4NE

MAIL ORDER PROTECTION SCHEME

If you order goods from Mail Order advertisements in this magazine and pay by post in advance of delivery, *Your Computer* will consider you for compensation if the Advertiser should become insolvent or bankrupt, provided that:

- (1) You have not received the goods or had your money returned; and
- (2) You write to the Publisher of *Your Computer* summarising the situation not earlier than 28 days from the day you sent your order and not later than two months from that day.

Please do not wait until the last moment to inform us. When you write, we will tell you how to make your claims and what evidence of payment is required.

We guarantee to meet claims from readers made in accordance with the above procedure as soon as possible after the Advertiser has been declared bankrupt or insolvent.

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine not, for example, payment made in response to catalogues etc., received as a result of answering such advertisements. Classified advertisements are excluded.

LTS

Have an adventure of your own



Mathemagic Land

A highly original mathematical adventure for 10 to 15 year olds with 3 levels of difficulty and ever changing problems. Can be used again and again. A stimulating and absorbing game. BBC(B) tape or disc, SPECTRUM and COMMODORE versions planned. £8.95

The first educational adventure generators of their kind. Each program comes complete with two adventures which will provide hours of constructive use and stimulus for other activities. Plus the facility to create your own adventures including your own characters and locations. Adventures can be saved on to tape or disc for later use. No programming necessary. Easy to use.

Your Adventure

A first level adventure generator for 7 to 13 year olds. Including colour graphics, map, planning sheet and full instructions. BBC(B) tape or disc, RHL 380Z/480Z disc, SPECTRUM 48K and COMMODORE 64 tape. £10.95

Space Adventure



Space Adventure

A second level adventure generator for 8 to 14 year olds allowing the creation of more complicated adventures. Includes colour graphics, animated reward, planning sheet and full instructions. BBC(B) tape or disc, SPECTRUM 48K and COMMODORE tape. £11.95

Your Adventure



Developed by experienced teachers through the Government's Microelectronics Education Programme.

Discounts for schools. Official education orders accepted. Overseas prices on application.

All prices include VAT. Postage £1.00 for 1 program, £1.50 for 2, £2.00 for 3 or more.

LTS publish a wide range of programs for English, Maths, Basic Skills, Problem Solving, etc., many sponsored by the Government's Microelectronics Education Programme.

Full catalogue available. S.A.E. please.

Learning and Training Systems Ltd.

Haydon House, Alcester Road, Studley, Warwickshire B80 7AP
Tel: (0386) 792617

HISOFT

ULTRAKIT £9.45

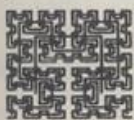
The most powerful toolkit yet for ZX BASIC. All the features you will ever need: AUTO insert, full RENUMBER, block DELETE, CLOCK, ALARM, error trapping, break trapping. Full TRACE with single-step and much, much more. Makes ZX BASIC easy-to-use and powerful.

DEVPAC £14

An excellent assembler, an advanced line-editor, a comprehensive disassembler and a superb 'front panel' debugger all in one package. Used by many leading software houses to write their games. "Buy it!" Adam Denning 1984.

PASCAL £25

A powerful and almost full implementation of Pascal - not a Tiny Pascal. A valuable educational and development tool, programs typically run 40 times faster than a BASIC equivalent. Spectrum version includes Turtle Graphics package. "I haven't seen any other compiler that could match Hisoft's Pascal"



HISOFT

180 High Street North
Dunstable, Beds. LU6 1AT
Tel: (0582) 696421



HISOFT



for the ZX Spectrum

Hisoft is pleased to announce a new compiler for this popular and effective systems programming language. Not a tiny-C but an extensive, easy-to-use implementation of the language. Allows direct execution of compiled statements. Supplied with function library. Available direct from Hisoft for £25, or write for further details.

All prices, UK delivered, relate to 48K ZX Spectrum versions. Our software is available for many other Z80 machines e.g. Amstrad CPC 464, MSX, Memotech, SHARP MZ700, New-Brain, CP/M etc. Please write for details.

SINCLAIR
ORIC, COMMODORE
ACORN, MEMOTECH, ETC

MICRO

We export Microcomputers
and Peripherals to all Countries
Any make. Any Quantities
BIG DISCOUNTS

send for comprehensive price list to:

Dept K
MICRO-X LTD
765-767 HARROW ROAD, LONDON NW10 5NY
TELEPHONE 01-968 6622 TELEX 915866 MICROX G.

EXPORT

The problems of looking after your Micro...



As well as providing the solution however do present more than a Like how do you prevent stop it from getting kicked divert the dog from

to many a problem, Micro's few of their own. it gathering dust when not in use, when Mum's cleaning the lounge, showing it his affections, or even ensure it at least "arrives" safely when Dad decides to take it down to the local. We at P.A.S. realising these needs, have now developed a range of three superbly made protective cases designed specifically for Micro's. Each case is constructed from Solid Resin Fibreboard has a fully protective foam lining a carrying handle internal retaining strap, a double snap-fastening lid and a price that defies even Micro logic.

Please help, I am a long suffering Micro owner and wish to purchase case/s (tick appropriate box)

☐ HC-1 ☐ HC-2 ☐ HC-3

I enclose cheque/P.O. to the value of

NAME

ADDRESS

Please allow 21 days for delivery. Trade enquiries welcome.

Prices apply to U.K. only.

PAS
PAS COMPUTER PRODUCTS LIMITED
UNIT 18, CENTRAL TRADING ESTATE,
STAINES, MIDDLESEX TW18 4UX.
Telephone Staines (STD 0784) 62781

CASE HC/1 Takes Micro's - ZX81, ZX Spectrum, Oric 1, CGL M5. CASE HC/2 Takes Micro's - VIC20, BBC 'B', Commodore 64, Texas TI/99, Oric 1, Dragon 32, Colour Genie, Sharp MZ700, Acorn Electron, Lynx, Tandy Colour, Atari 600XL, Acorn Atom. CASE HC/3 Can be adapted to take any of the above computers and various accessories such as Tape Recorder, printer etc.

**What's New For Christmas?
See For Yourself**

The Christmas **ZX MICROFAIR**



**GO ON A SHOPPING SPREE FOR ALL YOUR
NEW SPECTRUM AND QL GOODIES!**
— MANY AT SPECIAL SHOW PRICES —



TWO FANTASTIC DAYS
17th and 18th NOVEMBER 1984
AT ALEXANDRA PALACE, WOOD GREEN, LONDON N22.

ADMISSION ONLY £1.50(Adults) £1.00(Kids)

Come along on Saturday or Sunday 17th and 18th November to the Show that shows you everything for Sinclair Computer enthusiasts!

Why spend weeks looking for Christmas presents . . . one day at the Christmas ZX MICROFAIR will take care of everything!

And you'll have a fantastic day out . . . meeting friendly people . . . having fun . . . full of Christmas cheer!

Send now for reduced price advance tickets — and don't forget to note the date!

**SEND FOR REDUCED PRICE ADVANCE TICKETS
NOW AND BE FIRST IN THE QUEUE!**

Post to: Mike Johnston, ZX MICROFAIR, Dept YC, 71 Park Lane,
Tottenham, London N17 0HG. Tel: 01-801 9172.

Please send me ADVANCE TICKETS for the Special Christmas ZX MICROFAIR.

I require the following:— Adult tickets @ £1.25. Children's tickets @ £0.80p
for Saturday/Sunday (Delete as applicable)

I enclose cheque/P.O. made payable to ZX MICROFAIR for the full amount (please include cheque card
number on the back of cheques) and I also enclose a STAMPED SELF-ADDRESSED ENVELOPE for
return post.

Name:.....

Address:.....

EXHIBITORS!

JOIN THE RUSH . . . CALL
MIKE JOHNSTON
OR MOIRA ON
01-801 9172 FOR FULL DETAILS
OF STAND AVAILABILITY . . .
DO IT NOW!

14th
ZX MICROFAIR
ALEXANDRA PALACE,
WOOD GREEN, LONDON N22
SATURDAY AND SUNDAY
17th and 18th NOVEMBER 1984
Saturday 10.00 am to 6.00 pm
Sunday 10.00 am to 5.00 pm

Cash & Carry COMPUTERS

**TOP
SHOWROOM
SERVICE**

**ROCK
BOTTOM
PRICES**

**PERSONAL CALLERS WELCOME AT OUR EXTENSIVE SHOWROOMS
MOST EQUIPMENT ON DEMONSTRATION**

The UK's Best Printer Prices

Only a sample of our massive range of printers
shown here — phone for further details

DAISYWHEEL LETTER QUALITY

Smith Corona TP1 (P or S)	£189.00 + VAT =	£217.35
Juki 6100 (P)	£335.00 + VAT =	£385.25
Brother HR15 (P)	£335.00 + VAT =	£385.25
Daisytype 2000	£239.95 + VAT =	£275.94

PRINTER/TYPEWRITERS

Brother EP22 Dot Matrix (S)	£119.00 + VAT =	£136.85
Brother EP44 (S)	£189.00 + VAT =	£217.35
Modems available for Easylink and Telecom Gold		
Juki 2200 Daisywheel (P or S)	£239.95 + VAT =	£275.94

DOT MATRIX PRINTERS

Brother HR5 (P or S)	£129.00 + VAT =	£148.35
Canon 1080A NLQ (P)	£289.00 + VAT =	£322.35
Canon 1156A NLQ (P)	£349.00 + VAT =	£401.35
EPSON RX80 (P)	£195.00 + VAT =	£224.25
EPSON RX80 F T (P)	£225.00 + VAT =	£258.75
EPSON FX80 (P)	£324.00 + VAT =	£372.60
EPSON RX100 F T (P)	£339.96 + VAT =	£390.95
EPSON FX100 F T (P)	£439.00 + VAT =	£504.85
Seikosha GP100A (P)	£129.90 + VAT =	£149.39
Seikosha GP50A (P)	£79.90 + VAT =	£91.89
Seikosha GP50S (Spectrum)	£79.90 + VAT =	£91.89
Seikosha GP500A (P)	£139.90 + VAT =	£160.89
Seikosha GP550A (P)	£179.90 + VAT =	£206.89
Seikosha GP700A Colour (P)	£279.90 + VAT =	£321.89
Shinwa CT80 (P)	£175.00 + VAT =	£201.25

(P)=Parallel-Centronics (S)=Serial RS232

Smith Corona range of printers Now in Stock — Phone or write for details

INSTANT CREDIT Up to 36 months to pay

All items over £150 available on our easy credit terms.
Written details available on request.

SUPERDISKS

LONDON'S LOWEST PRICES ON FLOPPY DISKS

Prices per box of ten ex VAT

	SSDD 40TR	DSDD 40TR	SS96TP1 80TR	DS96TP1 80TR
BASF 5 1/4"	£10.95	£18.20	£19.80	£22.50
3M 5 1/4"	£13.55	£19.50	£20.05	£24.00
VERBATIM 5 1/4"	£15.50	£23.50	£22.50	£30.50
DYSAN 5 1/4"	£16.80	£24.90	£24.90	£32.00
TDK 5 1/4"	£17.50	£25.50	—	£33.00
BASF 3 1/2"	£34.90	—	—	—

Add 70p for P&P per box of 10 disks

CASH & CARRY COMPUTERS

53-59 High Street,
Croydon, Surrey CR0 1BD.

12" MONITORS — GREEN SCREEN

Sanyo 2112 Med Res.	£65.00 + VAT =	£74.75
Sanyo 8112 High Res.	£88.00 + VAT =	£101.20

14" MONITORS — COLOUR

Commodore 1701 Composite/Sound	£173.00 + VAT =	£198.95
Fidelity CM14 RGB/Comp/Sound	£179.00 + VAT =	£205.85
Microvitec 1431MS Norm Res RGB	£173.00 + VAT =	£198.95
Microvitec 1431MZ for ZX Spectrum	£199.00 + VAT =	£228.85
Microvitec 1451MS Med Res RGB	£269.00 + VAT =	£309.35
Microvitec 1451DO for Sinclair QL	£234.74 + VAT =	£269.95
Microvitec 1441MS High Res RGB	£173.00 + VAT =	£198.95
Sanyo 3125 Norm Res RGB	£285.00 + VAT =	£327.75
Sanyo 3117 Med Res RGB	£285.00 + VAT =	£327.75
Sanyo 3115 High Res RGB	£399.00 + VAT =	£458.85

Commodore

Plus 4 NEW 84K Computer	£219.95 + VAT =	£252.94
C18 Starter pack inc. cassette deck	£104.30 + VAT =	£119.95
C2N Cassette	£32.81 + VAT =	£37.50
DPS1101 Daisywheel Printer (by Juki)	£309.95 + VAT =	£356.44
801 Tractor Printer	£165.17 + VAT =	£189.95
802 Friction Tractor Printer	£260.83 + VAT =	£299.95
1520 Colour Printer Plotter	£60.83 + VAT =	£69.95
1701 Colour Monitor	£173.00 + VAT =	£198.95

Amstrad

Amstrad CPC484 Green Monitor	£192.00 + VAT =	£220.80
Amstrad CPC484 Colour Monitor	£289.00 + VAT =	£332.35

SANYO MBC 555 Business Computer

128K including Wordstar, Calcstar, Infostar	£795.00 + VAT =	£914.25
---	-----------------	---------

BBC

BBC Model B	£339.09 + VAT =	£389.95
Model B inc. Disk I F	£399.96 + VAT =	£459.95
Cumana 1x100K DD CSX100	£399.96 + VAT =	£459.95
Cumana 1x200K DD CSX200	£191.26 + VAT =	£219.95
Cumana 2x100K DD inc. PSU	£321.70 + VAT =	£369.95
Cumana 2x200K DD inc. PSU	£347.78 + VAT =	£399.95
Cumana 2x400K DD inc. PSU	£434.74 + VAT =	£499.95

All above Cumana Disk Drives include Cable, Manual + form disk

Sinclair

Spectrum 48K + 6 Free Games (worth £56)	£106.91 + VAT =	£122.95
Microdrive	£41.30 + VAT =	£47.50
Interface I	£41.30 + VAT =	£47.50
16K - 48K Upgrade	£21.70 + VAT =	£24.95

BUSINESS SOFTWARE

We have a wide range of business software at our normal discount prices.
All prices ex VAT. Add 70p for P&P per order.

Wordstar	£195
Open Access	£360
Lotus 123	£295
Symphony	£490
Multimate	£240
D Base II	£280
DMS Delta	£395
Friday	£135
Framework	£345

Please state computer format required when ordering.

Mail Order + Export + Trade Hot Line Phone 01-686 6362

Delivery by Securicor (3 day) please add £5.00 + VAT per item.
Delivery by T.N.T. (overnight) please add £9.50 + VAT per item.

Send off the coupon or order by phone quoting your Access,
Barclaycard No. Phone 01-686 6362. Immediate
despatch on receipt of order or cheque clearance.

Or you can Telex your order on: 946240 Attn 19001335

We accept official orders from PLC's, Government Departments
and Educational establishments.

These prices correct until superseded by next advertisement.

To: Cash & Carry Computers, 53-59 High Street, Croydon, Surrey CR0 1BD

Please supply

I enclose my cheque for £_____ including delivery by Securicor/T.N.T.*

or charge my Access/Barclaycard No. _____

Name _____ Signature _____

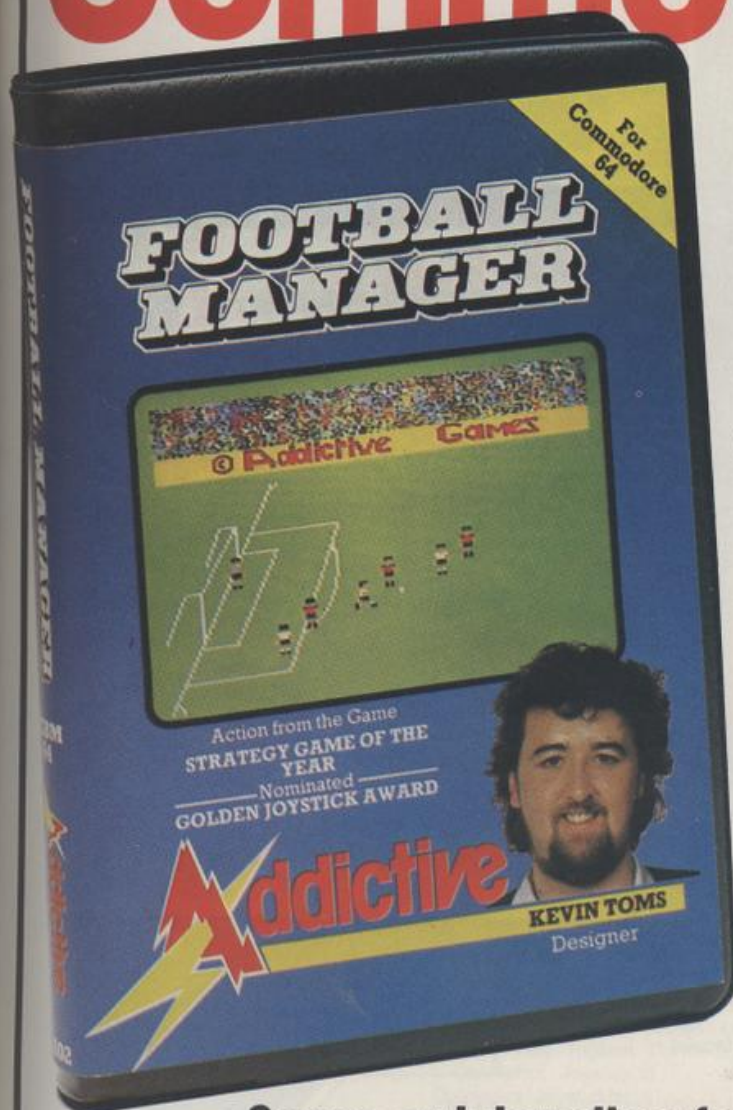
Address _____

*Please Delete

YC 11

IT'S HERE!

FOR THE Commodore 64



"Absorbing and realistic – Highly recommended"

– Sunday Times, February 1984

"Completely fantastic – I want one!"

– Charlie Nicholas, Arsenal striker in Big K, April 1984

"Having chosen your players the match highlights are then displayed in very good animated 3-D Graphics. ... There are many other excellent features in this game in fact the attention to detail is outstanding (5 out of 5)."

Popular Computing Weekly –
16 August 1984

£7.95

Some outstanding 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 • Financial manipulations • 4 divisions and customising feature • You can even be sacked!

Available from computer software stockists nationwide, including



&

WHSMITH
John Menzies

Prices: BBC Model B £7.95
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

7A Richmond Hill, BOURNEMOUTH, BH2 6HE

**ALSO FOR
BBC 32K
SPECTRUM 48K
& ZX81 16K**

NOT JUST A PRETTY ^{Inter}FACE!

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

Features include:-

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



ONLY
£22.95

NOT JUST A PRETTY ^{Inter}FACE!

The Spectrum dual port joystick interface is a highly versatile and price competitive joystick interface offering two joystick ports. The first port simulates 6,7,8,9, & 0 keys. The second port simulates in (31) command. The ports will accept any Atari

- style joystick. It will run any software. That is:-
- Using keys 6,7,8,9 & 0.
 - Having redefinable key functions.
 - Using in (31) (i.e. Kempston).



ONLY
£13.00

NOT JUST A PRETTY ^{Inter}FACE!

The new **dktronics** Parallel Centronics Interface will link your Spectrum to any printer with a standard centronics input. As the choice is vast, you can select the printer exactly suited to your needs.

Features of the interface include:

- Runs all parallel centronics type printers
- Controlling software fully relocatable
- Interfaces with any software using the

printer channel e.g. Tasword Dev pack etc.

- LPRINT recognised. High res screen dumps
- All control codes allowed through to printer
- Fully microdrive compatible
- Supplied with full instructions and controlling software

All **dktronics** products are covered by a comprehensive guarantee.



ONLY
£39.95

NOT JUST A PRETTY ^{Inter}FACE!

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

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

partially completed screens onto and from a tape and with a 48K Spectrum retain screens in memory and animate.

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

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



ONLY
£19.95

Please rush me the following:

..... Programmable Interface(s) £
..... Dual Port Interface(s) £
..... Parallel Centronics Interface(s) £
..... Light Pen and Interface(s) £

Please add post and packing £ 1.25

I enclose cheque/PO/Cash for Total £
or debit my Access/Barclaycard No.

Signature

Name

Address

Or send S.A.E. for the New D.K.Tronics Spectrum Catalogue

YC/11/84

dktronics

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

The Spectrum Connection

We've just added the final touch to our professional keyboard. This new Microdrive compatible keyboard offers more key functions than any other in its price range. And the stepped keys and space bar make it even easier to use. Our keyboard, constructed from high density black ABS, will take your Spectrum into the professional league. It has 52 "stepped" keys plus space bar. A separate numeric key pad consisting of 12 red keys including a single entry "delete" plus single entry "decimal point", facilitate fast

numeric data entry. The 15" x 9" x 3" case will accommodate your Spectrum and other add-ons like interface 1, power supply etc. and forms an attractive self-contained unit. All connections, power, Mic, Ear, T.V., network RS232 and expansion port are accessible at the rear. A few minutes, a screwdriver and the simple instructions supplied are all you need to fit your Spectrum. All **adronics** products are covered by a comprehensive guarantee.

All connections accessible at rear



**MICRO DRIVE
EXTENSION LEAD**

This is an 8" version of the micro 16 way drive lead. Sinclair's lead is only 4" long and for many applications this may not be long enough. It enables you to space the micro drive much further away from interface 1.



56 WAY RIBBON CONNECTOR

This is an extension cable that enables Spectrum peripherals to be distanced from the computer. It is supplied 9' in length and will allow male or female connections to be made to the computer. The connector has special lugs to enable easy fitting/removal from the computer's extension port.



Quickshot Joystick I

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

Quickshot Joystick II

Incorporating all the features of 'Quickshot I' plus

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



Three Channel Sound Synthesiser interface incorporates a BEEP audio amplifier and a 3 channel sound synthesiser.

The BEEP amplifier improves the sound quality and output of the BEEP enormously. The 3 channel sound synthesiser adds a totally new dimension to sound on your Spectrum. It allows you to program your own music with harmonies, explosions, zaps, chimes, whistles and an infinite range of other sounds over a full 8 octaves. Based around the popular AY-3-8912 sound chip it gives you complete control

(from basic or M/C) over 3 channels of tone and/or white noise, plus envelope and volume control. It comes with its own pod mounted (4") speaker with 1 metre of cable so that it can be positioned anywhere.

Once this is fitted to the expansion port your programmes will never sound the same again!



Please rush me the following:

Microdrive Compatible Keyboard(s).....	£
Microdrive Extension Lead(s).....	£
56 Way Ribbon Connector(s).....	£
Quickshot Joystick(s) I.....	£
Quickshot Joystick(s) II.....	£
Three Channel Sound Synthesiser.....	£

Please add post and packing £ 1.25

I enclose cheque/PO/Cash for Total £
or debit my Access/Barclaycard No.

Signature _____

Name _____

Address

Or send S.A.E. for the New D.K.Tronics Spectrum Catalogue

YC/11/84

dk'tronics

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

The Spectrum Connection

HATS OFF TO ME



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

COMMODORE 64 BOOKS

- | | |
|--|-------|
| <input type="checkbox"/> Commodore 64 Games Book 2 | £6.95 |
| <input type="checkbox"/> Supercharge Your Commodore 64 | £5.95 |
| <input type="checkbox"/> Commodore 64 Software Projects | £6.95 |
| <input type="checkbox"/> Complete Commodore BASIC Course | £9.95 |
| <input type="checkbox"/> Commodore 64 Machine Language for the Absolute Beginner | £6.95 |

I enclose my cheque/money order for £

Please debit my Access Card No.

Signature

Name

Address

Expiry Date

Postcode

YC11b

SPECTRUM BOOKS

BOOKS

- | | |
|---|-------|
| <input type="checkbox"/> Spectrum Software Projects | £6.95 |
| <input type="checkbox"/> Complete Spectrum BASIC Course | £9.95 |
| <input type="checkbox"/> Micronet Book | £6.95 |

GENERAL BOOKS

- | | |
|---|-------|
| <input type="checkbox"/> Z80 Reference Guide | £9.95 |
| <input type="checkbox"/> A Guide to Playing The Hobbit | £3.95 |
| <input type="checkbox"/> Computer and Video Games Book of Adventure | £5.95 |
| <input type="checkbox"/> Learning With Adventure Programs | £5.95 |

BBC BOOKS

- | | |
|--|-------|
| <input type="checkbox"/> Building Blocks for BBC Games | £5.95 |
| <input type="checkbox"/> BBC Software Projects | £6.95 |
| <input type="checkbox"/> Guide to BBC ROMs | £9.95 |
| <input type="checkbox"/> BBC BASIC for Beginners | £7.95 |
| <input type="checkbox"/> Complete BBC BASIC Course | £9.95 |
| <input type="checkbox"/> BBC Hardware Projects | £9.95 |

Orders to:
Melbourne House Publishers
39 Milton Trading Estate
Abingdon, Oxon OX14 4TD

Correspondence to:
Church Yard
Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software
is unconditionally guaranteed
against malfunction.

Trade enquiries welcome.

£
£ + p/p .80
Total
£

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

Access orders can be
telephoned through on our
24-hour ansafone (0235) 83 5001.



ELBOURNE HOUSE!



Commodore 64 Games Book 2. Just when you thought it was safe to go back to your micro... here's 30 more exciting new and original games for your Commodore 64. Every game has been specifically designed so you learn programming skills as you go. There's arcade games, strategy games and games you can modify and develop yourself. With CHEXSUM, typing in is easier, and mistakes are quickly located. A must for all Commodore owners.

Spectrum Software Projects is a special book which will enable you to create useful programs and learn more about programming.

Software Projects gives you program ideas, discusses the overall set-up and an outline of the various procedures. You write the programs, and Software Projects tells you how to test it or offers hints and clues on how to do it. Create six useful programs, ranging from information management to business programs and games.

Z80 Reference Guide is an essential book for anyone involved in Z80 machine language programming. The well laid out format of this book will make it clearer to understand the capabilities of the Z80 instruction set.

All opcodes are HEX and decimal, making machine language programs for basic programmers easier to implement. The Z80 Reference Guide is an indispensable book if you are interested in learning machine language programming skills.

Building Blocks For BBC Games is the book for all BBC enthusiasts! Using a unique modular method you can create and build exciting, original games and programs. The ready-made building block system has all the procedures you need. Step-by-step you write a BASIC program with the minimum of effort. Then you can expand your programs with even more procedures and innovations into complex and exciting routines. Simply written, easy to follow, BBC Building Blocks will enable you to learn more about your micro than you believed possible.

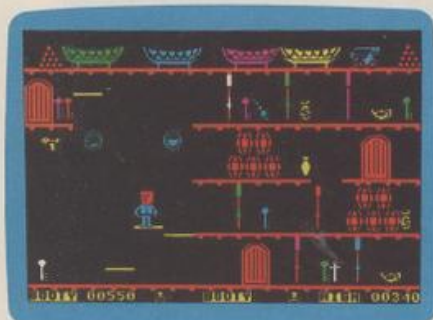
The Complete Commodore BASIC Course is a comprehensive book which will immediately become an indispensable learning tool for all your Commodore programming. All is revealed in our easy, step-by-step guide with programs and "test yourself" exercises. The appendices explain the major pitfalls that you may encounter in each problem. Even if the idea of writing programs is completely mystifying to you this book will show you just how easy it is and how much fun you can have learning. In no time you will be able to write and enjoy complex programs. If you want to learn to program your Commodore then The Complete Commodore BASIC Course is the book for you.

Seeing is

You'll see the difference from the moment you pick up one of the games from Firebird's new Silver Range.

We keep our flights of fancy for the game. On the pack, you'll find there is a true representation of the high quality screen graphics.

Here's a sneak look at three of the NEW games:



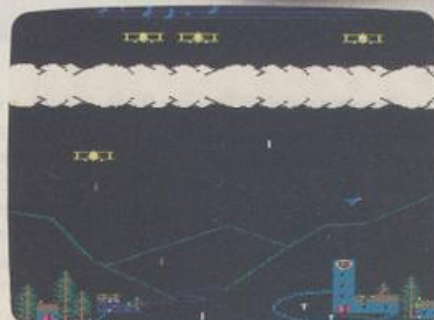
BOOTY

Well shiver me timbers and splice the mainbrace and pass the grog, me hearties. Here be the greatest pirate adventure of them all, aboard that scourge of the Seven Seas – the dreaded Black Galleon. Feast yer eyes on the BOOTY-ful treasure stored in 20 holds. There be pirates, parrots and fun galore. If you don't like it, matey, we'll hang you by the highest yard-arm!!!



THE WILD BUNCH

Blamed for a murder you did not commit, your only hope is to identify and capture the real killer – a member of the notorious gang, The Wild Bunch. But can you also survive life on the run in this adventure set in the Wild West...



BIRD STRIKE

Wing a plane to release a carrier pigeon... shoot the carrier pigeon and add a note to the stave at the top of the screen... shoot enough pigeons to complete the tune (without getting wiped out by the relentless, pursuing planes)... next wave.

Look out for these games in the FIREBIRD silver range at selected high street stores.

SPECTRUM: THE WILD BUNCH · BOOTY · MR. FREEZE · TERRA FORCE · VIKING RAIDERS · MENACE · BYTE BITTEN · EXODUS · RUN BABY RUN ·
COMMODORE 64: BOOTY · MR. FREEZE · EXODUS · HEADACHE · ZULU ·
VIC 20: SNAKE BITE · MICKEY THE BRICKY ·
BBC MICRO B: BIRD STRIKE · GOLD DIGGER · ACID DROPS · DUCK!

s believing

There are twenty games now available from Firebird, and that's just the beginning. All the software is produced to the same high professional standards and all are available at the remarkably low price of

£2.50



Firebird

SOFTWARE

The new range from British Telecom.



You'd better believe it!!!

FIREBIRD SOFTWARE, WELLINGTON HOUSE, UPPER ST. MARTIN'S LANE, LONDON WC2 9DL. TEL: 01-379 6755/5626
Firebird and the Firebird logo are trademarks of British Telecommunications plc.



TOUCH TABLET from KOALA.

The friendly, easy way to use your computer, as a graphics tablet to write or draw on the screen, as a paddle controller or joystick, as a custom keyboard, as a way to make music, play games, create graphs, all at the Touch of a Tablet!



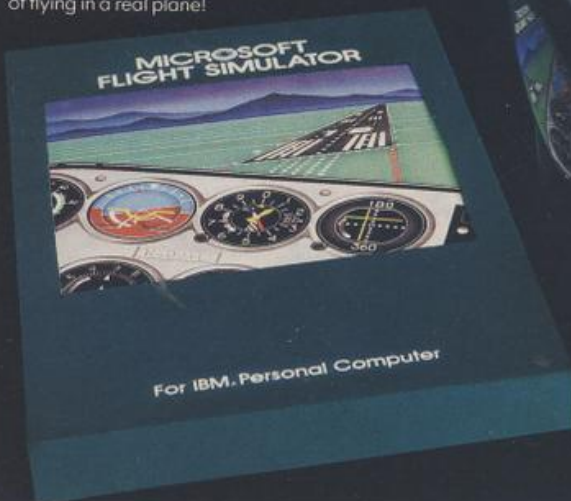
SORCERER from INFOCOM.
The most powerful leader of the Enchanters must be found, tracked through treacherous mists of time, avoiding the evil sorcery where terrible death awaits, and gaining the powers and cunning of a true sorcerer.



THE ENTERTAINERS

FLIGHT SIMULATOR from MICROSOFT

A highly accurate simulation of flight in a single-engine aircraft, with working instruments, panoramic out-of-the-window graphic views, and real-time flight conditions. All the excitement of flying in a real plane!



The Softsel dealer has all the software you should need: recreation, home, education and business. When you want the best service, go to a Softsel dealer who has the best back-up in the world.

Alderley Glomorgan Inley Computer Services (0685) 881828. Birmingham Home Entertainment (021) 643 9100. The Software Shop (021) 622 3289. Bradford Pace Software Supplies (0274) 72 9306. Brighton Camer (0273) 698 424. Bristol Softalk City (0272) 877 245. Chalfont St Peters Softshop (0753) 889 01. Chester Computer Link (0244) 316 516. Guernsey Guernsey Computers (0481) 287 38. Jersey Audio & Computer Centre (0534) 7 400. Leighton Buzzard Milton Keynes Music (0525) 37 6622. London Games Workshop NW10 (01) 965 3713. Adv Technology Centre SE9 (01) 859 7696. Chromasonic Personal Computers N19 (01) 263 9493. Davinci Computers NW4 (01) 202 2272. Pilot Software City W1 (01) 636 2666. Programs Unlimited W1 (01) 487 3351. Software City 382 Kings Road SW3 (01) 352 9220. Vic Ocklens SE1 (01) 403 1988. Video Palace W1 (01) 637 0366. Woodland Software W1 (01) 960 4877. The 64 Software Centre WC1 (01) 430 0954. Tomorrow's World Today W1 (01) 437 2040. Maidstone Galaxy Video (0622) 682575. Manchester Quodport (061) 969 8729. Paignton Devon Computers (0803) 526 303. Preston, Lancs Channel 8 Software (0772) 53 057. Redditch MCL (0527) 26051. Sidcup Silica Shop (01) 301 1111. Skipton Singleton (0756) 60 078. Slough Silicon Chip (75) 70639. Southampton Microchips (0703) 38899. Stafford Computerama (0785) 41899. Teddington Photographical and Optical Services (01) 977 3498/9. Wallasey Microbyte (051) 630 6933. Waterlooville G B Microland (0705) 259911. Weymouth Silicon Chip Comps (030 57) 87592. Whitstable 64 Supplies (0227) 266289. Worthing Data Direct (0903) 40509. York York Computer Centre (0904) 641862.

SOFTSEL

The number one source for software. In the world.

*Registered trademarks.

UNBEATABLE VALUE

£229
inc. VAT

ibico LETTER QUALITY PRINTER

A compact (12" x 2½" x 8"), letter quality printer from Classic Computers with a host of outstanding features at the unbelievable price of £229.00 inc. VAT.

Plugs straight into most computers, with optional adaptors available for Commodore 64 and Sinclair Spectrum. Compatible with BBC A or B and any computer with parallel interface.

- Prints 12 characters per second • Elite type (12 characters per inch) • Bi-directional printing • Logic seeking • Plain paper — uses your letterheading • Up to A4 size paper • Instant change ink roller • 96 characters, full UK ASCII code • 80 columns • Separate power switch • On/off pilot lamp

FULL 12 MONTHS PARTS & LABOUR GUARANTEE. FULL 21-DAY MONEY BACK GUARANTEE FOR MAIL ORDER CUSTOMERS. CALLERS WELCOME.

CLASSIC COMPUTERS

A Division of Classic Typewriters Ltd.,
Established over 30 years
5/6 LANSLOWNE HOUSE, CHRISTCHURCH ROAD,
BOURNEMOUTH. BH1 3JP. Tel: (0202) 23456

To: Classic Computers, 5/6 Lansdowne House,
Christchurch Road, Bournemouth BH1 3JP.

Please supply:

.... Ibico LTR-1 letter quality printer	£229.00
.... Printer cable for BBC A or B	£17.95
.... Adaptor for Commodore 64	£29.95
.... Adaptor for Sinclair Spectrum	£39.95

I enclose a cheque/P.O. for £.....
(Plus £3.50 for postage and packing)

Please debit my Access/Barclaycard Card: Expiry

No: date

or telephone your credit card order

Name:

Address:

Post Code

Tel. No.:

YC1

Educational Software LCL

MICRO
ENGLISH



**BBC Micro
ZX Spectrum
Commodore 64
Electron
unexpanded Vic
ZX81
Apple
PET
Dragon (book only)
All software for the
above computers.**

MICRO ENGLISH (BBC, Electron). Complete English Language self-tuition and revision course, to O-Level, of 24 programs. Includes "speak-and-spell" (no extras). £24.50.

MICRO MATHS 24 program revision or self-tuition course to O-Level. £24.50 (except ZX81 £12.00).

BRAINTEASERS (BBC, Electron, CBM 64, Spectrum, Dragon, Vic) Book of IQ tests & puzzle programs. £3.95.

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. £90.
"... the programming standard is high". TIMES EDUCATIONAL SUPPLEMENT

Immediate dispatch Micro Maths, Micro English and Master Maths. Phone or send orders or requests for free catalogue (200 programs) to:

World leaders in 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

Only by conquering **Stonehenge** can you free the world of the **evil** curses and **eternal darkness**. Join us on this **marvellous** arcade adventure and **challenge** your wits against the evil forces of the **Necromancer** with his spectacular **trickery** and **deception**.

CBM 64

VGA 6007 JOYSTICK CONTROL

SORCERY

£7.95

- Marvellously detailed graphics and animation.
- Many objects to collect and exchange.
- Joystick control. • 17 screens to master.
- Atmospheric music and sound effects.
- 'Flashload' rapid load system.

PROGRAMMED BY 'GANG OF FIVE' FROM
AN ORIGINAL IDEA BY MARTIN WHEELER

FLASHLOAD



NEW!

FOR SPECTRUM 48K

A RANGE OF SOFTWARE SELECTED BY KEVIN TOMS

"Over the past few months many people have sent me the best software that they have written and asked me to publish it for them. I've picked the best of the best and they are available now from Silicon Joy"

Kevin Toms

GRAND PRIX MANAGER

£6.95

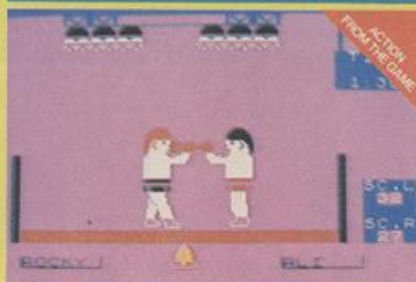


"This excellent strategy game puts you in charge of a Grand Prix team and your task is to try and win the Team Championship."

Features: Race Action ★ Driver selection
★ Racing Car Engineering ★ Mechanics
★ Finances ★ Sponsorship problems
★ Crashes etc.

BOXING

£5.95



"A 2 or more player Boxing game in which you fight your opponents with excellent on screen fight action. There is even a **World Championship league** included in the game!"

RUN-YOUR-OWN -LEAGUE

Requires Printer £6.95

SCORES FOR FIXTURE WEEK 3

1	Addictive R.	v	Stourvale A.	5	0
2	Corinthians	v	Richmond Utd	2	2
3	Wimborne W.	v	Kings Arms	2	1
4	AFC Spectrum	v	Red Lion	1	1
5	Poole DB	v	Charminster	3	0

"A very useful utility program which allows anyone to run a League with ease. This professional program is designed to be used for almost any sport or game and has many features." E.g. Up to 30 teams per division ★ Match cancellation/award ★ League Tables calculated ★ Variable points systems etc. etc.

TRIO

3 quality games on one cassette for just £5.95 (under £1.99 each!)

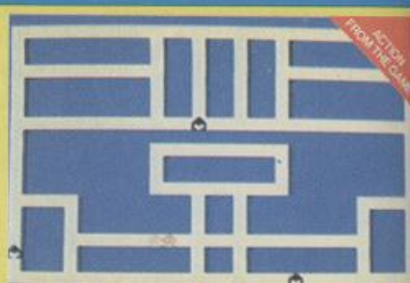
TRIO



ASCOT - "an excellent horse racing gambling game with superb race graphics." Realistic odds and up to 6 players per season.



DRACULA'S CASTLE - "This is an amusing arcade game in which you must run around the castle to switch the lights on while avoiding the vampire bats. Beware of sleeping Dracula as lights wake him from his coffin. Can you survive till dawn!"



CHAOTIC CAVERNS - "A highly addictive maze chase game with 7 caverns. What really makes this game is that it requires a high degree of strategy to master it."

Look for the yellow packs in Software Stockists nationwide.



SILICON Joy

To order by mail (p&p free)
send cheques/P.O.s to:

Silicon Joy, 7A Richmond Hill
Bournemouth, Dorset BH2 6HE

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

A division of Addictive Games Ltd.

Educational Software For The Spectrum.



Educational tapes for infants right through to

"O" level students.

Programs are designed so that they can be used many times, and include help facilities and explanations where appropriate.

Cassettes are packaged in full colour presentation boxes which include a helpful leaflet.

Two new tapes available in November-HIGHWAY CODE and "O" LEVEL PHYSICS.



Rose Software

148 Widney Lane, Solihull, West Midlands
B91 3LH. Tel: 021 - 705 2895

Please send me.....
£6.95 each (Includes P&P)

I enclose cheque/P.O. for £.....

Please send me a FREE brochure ☐

Name.....

Address.....



only £6.95 ea
(Includes P&P)

DACC Software Express DACC

*** Commodore 64 ***		£
Beach Head (US Gold)		9.95
Monty Mole (Gremlin Graphics)		7.95
Daley Thompson's Decathlon (Ocean)		7.95
Arabian Knights (Interceptor)		6.95
International Soccer (CBM)		9.95
Dallas Quest (Disk) (US Gold)		9.95
Strip Poker (US Gold)		9.95
Solo Flight (US Gold)		14.95
747 Flight Simulator (DACC)		9.95
*** ZX-Spectrum ***		
Beach Head (US Gold)		9.95
Monty Mole (Gremlin Graphics)		6.95
Daley Thompson's Decathlon (Ocean)		6.90
Match Point (Psion)		7.95
Lords of Midnight (Beyond)		9.95
Sabre Wulf (Ultimate)		9.95
Solo Flight (US Gold)		9.95
747 Flight Simulator (DACC)		7.95
*** BBC Model/B ***		
Frak (Aardvark)		8.95
Blagger (Alligata)		7.95
Zalaga (Aardvark)		6.95
SPRITE-GEN (DACC)		17.95
Fortress (Pace)		8.95
Aviator (Acornsoft)		14.95
747 Flight Simulator (DACC)		9.95
*** Acorn Electron ***		
SPRITE-GEN (DACC)		9.95
747 Flight Simulator (DACC)		9.95
Space Rescue & Space Pilot Test (DACC)		
(two arcade games on one cassette)		6.95
*** Dragon 32/64 ***		
747 Flight Simulator (DACC)		9.95
*** Computer Accessories ***		
*** High quality PVC dust covers: -		
Commodore 64	each	2.95
ZX Spectrum	each	1.95
BBC Model/B	each	2.95
Acorn Electron	each	2.95
Dragon 32	each	2.95
*** Blank C20 cassettes	five for	2.75
*** Disks s/s s/d	each	1.95
*** Disk storage box	each	1.95
*** Flow-chart template	each	1.00
SPECIAL OFFER order three cassettes and receive a PVC dust cover for your computer absolutely FREE.		
All prices include VAT POST AND PACKING FREE!		
All items in stock, despatched within 48 hours by first class post, order from: -		
DACC Ltd.		
(Dept YC0) 23 Waverley Road, Hindley, Wigan, Lancs WN2 3BN		

The **the biz** game

Written by CHRIS SIEVEL of THE FRESHIES, a real life rock star with real life hits including "I'm In Love With The Girl On The Virgin Manchester Megastore Checkout Desk."

THE BIZ has got it all and tells it like it is...

- EARLY DAYS PLAYING SMALL GIGS • BUS
- UPS WITH THE REST OF THE BAND AND YOUR M
- AGER • RECORD COMPANY DEALS • TROU
- WITH YOUR VAN AND EQUIPMENT • YU
- RECORDING STUDIOS • MUSIC
- INTERVIEWS • A HIT SINGLE

YOU NAME IT... IT'S IN THE BIZ.

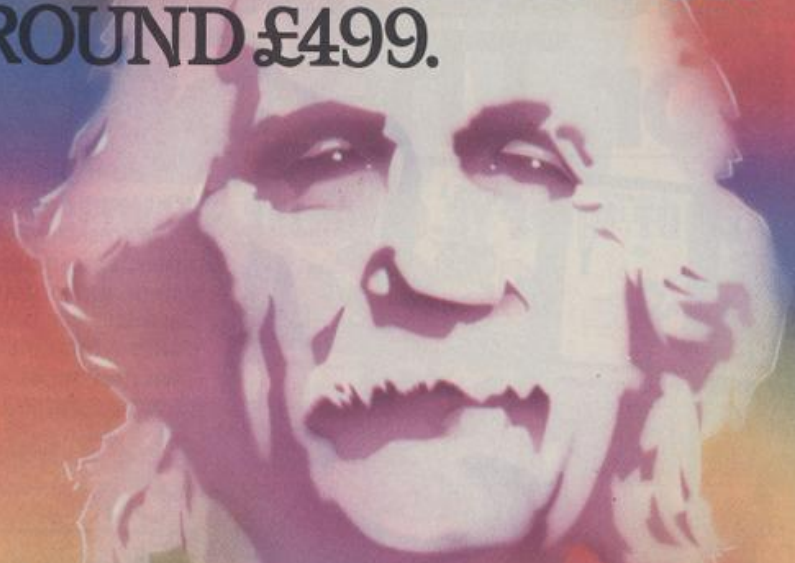
Don't give up your day job till you've played the game. THE BIZ comes complete with EIGHT HITS from CHRIS SIEVEL and THE FRESHIES. THE BIZ goes where other ROCK SOFTWARE has feared to tread.

ONLY £5.95

the first person to get a No 1 single will record with CHRIS and appear on STAGE at a FRESHIES GIG.

SPECTRUM ASK VGC 1070

A COMPLETE COLOUR MICRO WITH NO HIDDEN EXTRAS FOR AROUND £499.



The title of 'genius' is not bestowed lightly on man or machine: those extraordinary qualities and powers of intellect are rare.

Einstein had them in full measure. And so now does the new micro computer from Tatung, designed and built in Britain and appropriately named - Einstein.

Einstein was created by Tatung, one of the world's leading electronic companies, and given the capacity and the remarkable capabilities to compete with computers costing far more.

Its simplicity of operation will appeal to the first time buyer and to businessmen who don't want to lose staff to expensive and time-consuming training courses. At the same time its operating system is both powerful and sophisticated to satisfy the most advanced requirements.

For those who have outgrown their existing primitive machine, the speed and capacity of the 500K built-in disc drive will make all the difference. And for the small businessman, the ability to store and retrieve all information in seconds will be as important as Einstein's built-in flexibility, which allows the system to grow as the business develops.

BUILT-IN 80K MEMORY

Total memory capacity 80K RAM divided into 64K 'user' memory and 16K for colour graphics production.



BUILT-IN DISC DRIVE
500K 3" compact floppy disc drive. Potential for massive extra storage with a second 500K disc drive internally.

BUILT-IN 16 COLOUR GRAPHICS High resolution graphic animation from 32 sprites (definable shapes), 16 vivid colours.



BUILT-IN EXPANSION PORTS

Connection to both TV and optional colour monitor, most printers and other computers via RS232C interface. Also twin joystick ports, 8 bit user port, exclusive Tatung Pipe.

BUILT-IN FLEXIBILITY

Powerful Crystal BASIC. Multi-lingual plus ability to run CP/M.

BUILT-IN VERSATILE SOUND

Sound synthesiser facility includes chromatic music with three voices. Substantial speaker with volume control. Provision for speech synthesiser.

Einstein has them all. Feature for feature, it meets the needs of the novice and the experienced operator, both at home and in the office.

Einstein, designed and built in Britain, is a complete colour micro computer with no hidden extras.

And for under £500 is sheer genius.

TATUNG
Einstein
SHEER GENIUS: AT WORK, AT HOME.

DIAL 100 AND ASK FOR FREEFONE EINSTEIN FOR YOUR NEAREST STOCKIST.

†CP/M is a trade mark of Digital Research Inc.

From
GILSOFT
*The Welsh Wizards of
Adventure*

THE QUILL
ADVENTURE WRITER
FOR THE
SPECTRUM 48K
AND
COMMODORE 64

48K SPECTRUM CASSETTE	£14.95
COMMODORE 64 CASSETTE	£14.95
COMMODORE 64 DISK	£19.95

SELECTED TITLES AVAILABLE FROM
W.H. Smith, Boots, John Menzies, and from
Good Computer Shops Nationwide

Or Direct From Us
By Post or Telephone

GILSOFT
30 Hawthorn Road
Barry
South Glamorgan
☎: (0446) 732765

Credit Card Order Line 24 hour service ☎ : (0222) 41361 ext 430



SKC® PERFECTION ASSURED
FLOPPY DISK MEET ANSI, DIN,
ECMA, IBM, JIS AND SHUGART
SPECIFICATIONS.

MINI FLOPPY DISK EVERY DISK IS CERTIFIED
AND GUARANTEED TO BE
100% ERROR FREE.

ALL THESE PRICES INCLUDE VAT.

**LOW PRICE —
HIGH QUALITY**
BOXES OF 10 DISKS

40 TRACK	
S/S S/D	£12.00
S/S D/D	£12.60
D/S D/D	£14.80

80 TRACK	
S/S D/D	£14.70
D/S D/D	£18.40

ADD £1 POST AND PACKING

ALSO COMPUTER CASSETTES
BOXES OF 100

C10	£26.50
C15	£27.50
C20	£28.75

ADD £3.50 CARRIAGE

P.V. TUBES

Dept. D
104 ABBEY STREET, ACCRINGTON, LANCs BB5 1EE.
Tel: (0245) 36521. (0254) 32611
Telex: 635562 Griffin G for PV

Phone in Access/Visa card no. for same day dispatch



"... Dare you accept this mission?" ...

SPECTRUM 48K
VGC 1019

- A massive arcade adventure with a wealth of incredible graphics.
- Game Save facility.
- Flashload rapid loading system.
- 240 uniquely detailed locations, many of which contain hidden surprises and ingredients necessary to complete the game.
- Key control selection.
- Interactive robots.
- Pick up/use object facility.



Programmed by Charles Goodwin.

£5.95



... not days, not weeks but MONTHS of enjoyment ...

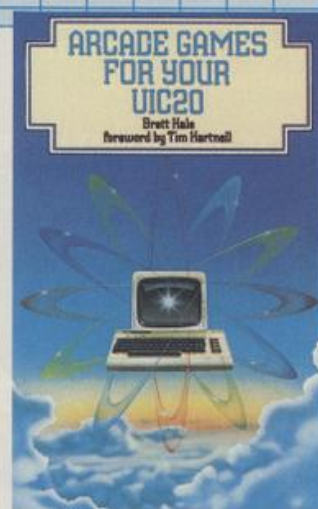
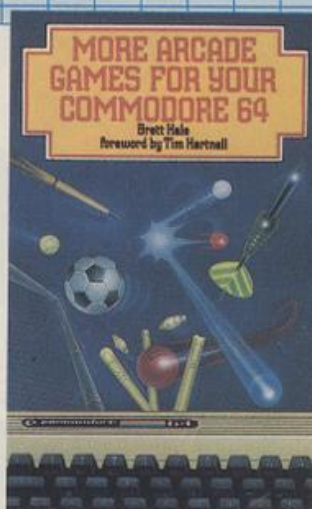
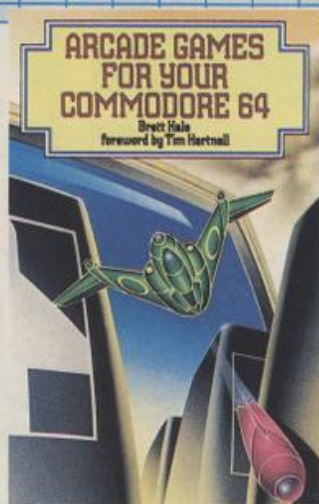
FLASHLOAD

STRANGELoop

"Strangeloop is unique, graphically impressive, vast, and devious. In short, brilliant. Not only all this, but it's cheap too." Popular Computing Weekly 5.9.84

STOP!

YOU OWN A COMMODORE 64 OR VIC 20, BUT ARE YOU MAKING THE MOST OF IT?



YOU SOON WILL BE, WITH ONE OF THESE BOOKS FROM CORGI/ADDISON-WESLEY!

**Each one is packed with a stunning array of arcade games,
enabling you to explore the full power and potential of your micro.**

- * All the games are in BASIC, so you can modify them however you want
- * Each one is listed twice – once for keyboard use, and once for use with a joystick

A DAZZLING SELECTION OF GAMES AWAIT YOU!



CORGI/ADDISON-WESLEY
TOGETHER,
THE NEW FORCE IN COMPUTER BOOK PUBLISHING



All these books are available at your bookshop, though should you find any difficulty in obtaining them, they can be ordered direct from the publisher. Simply fill in the form below.

Please send me

- ___ 99124 4 Arcade Games for your Vic 20 at £4.95 (128 pages)
- ___ 99125 2 Arcade Games for your Commodore 64 at £4.95 (128 pages)
- ___ 99127 9 More Arcade Games for your Commodore 64 at £4.95 (128 pages)

Please allow cost of book(s) plus 30p for one book plus 15p for each additional book for postage and packing.

I enclose my cheque/postal order for £ _____
payable to: TRANSWORLD PUBLISHERS LTD.

(IN BLOCK CAPITALS PLEASE)

Signed _____ Date _____

Name _____

Address _____

Now send to CORGI/ADDISON-WESLEY BOOKS,
61-63 Uxbridge Road, London W5 5SA

(A)

COMPUTERBASE

only
£199.00
(+ VAT)



IBICO'S New Letter Quality Printer Model LTR-1

Professional standards at your fingertips
for letters, lists, files, addresses etc.

- ☆ Compact 292 x 57 x 165mm
- ☆ Takes full A4 sheet
- ☆ Continuous or manual feed
- ☆ Elite type 12 pitch
- ☆ Parallel and serial interface
- ☆ 80 Columns
- ☆ 96 characters
- ☆ 12 CPS Bi-directional

ALSO AVAILABLE –
Optional adaptors for:
Sinclair Spectrum
Commodore 64
Standard parallel printer cable

Computerbase Dept YC1, 21 Market Avenue, City Centre, Plymouth PL1 1PG

Computerbase Dept YC1, 21 Market Avenue, City Centre, Plymouth PL1 1PG

Please supply:

..... IBCO Printers
..... Adaptor for Commodore 64
..... Adaptor for Sinclair Spectrum
..... Parallel Printer Cable to fit Computer (state computer make)
I enclose a cheque or Postal Order for made payable to Computerbase or
debit my Access/Barclaycard/Diner: Expiry date.....
Account No
Name
Delivery address

Price per unit	
£199.00	
£21.70	
£34.74	
£8.65	
£5 P & P	£5
Vat @ 15%	
Grand Total	

BETA BASIC 1.8

ENHANCED BASIC FOR SPECTRUM 48K

FOR GRAPHICS – STRUCTURED PROGRAMMING

– DATA HANDLING

Release 1.8 is more powerful than ever! We don't have space to do this program justice – if you can't believe the ad, send us a large S.A.E. for further information.

Features: Commands are single-entry keywords in graphics mode. Syntax is checked on entry. Fully compatible with Spectrum Basic. Microdrive compatible. Comprehensive manual.

NOTE: Release 1.0 is still available for 16/48K Spectrum at £11.00.

ALTER screen colour
(general or specific)
AUTO line numbering
BREAK out of code loops
CLOCK digital clock
CURSOR CONTROL CODES allow
strings to have complex shapes
DEF KEY user definable keys
DELETE a block of lines
DO-LOOP structure
DPOKE double poke
EST specified line
ELSE (used with IF...THEN)
EXIT leave DO-LOOP

FILL enclosed area with specified ink
or paper
GET wait for keypress
JOIN two program lines
KEYIN a string
KEYWORDS new keywords on/off
LISTLIST list TO line
USED based with GOTO, GOSUB
ON ERROR trap errors
(with LINE, STAT and ERROR)
PLOT a string (may contain cursor
control codes)
POKE a string
POP Basic's stack
PROC, DEF PROC, END PROC
(for named procedures)

RENUM versatile renumber
ROLL all or part of screen in any
direction by specified number of
pixels, with or without attributes
SCROLL like ROLL, but without wrap-
round
SORT arrays (very fast)
SPLIT program lines
TRACE program execution
UNTIL used with DO or LOOP
USING used with PRINT
WHILE used with DO or LOOP
XOS, YOS move PLOT origin
XRG, YRG change PLOT scale

FUNCTIONS

AND (bit-by-bit)
BNE decimal to binary
CHARS number to 2 characters
CODE fast cosine
DEC hexadecimal to decimal
DPEEK double PEEK
FILLED filled area

NEXT decimal to hexadecimal
NEXTEND string search
MEM free memory
MEMORY# all of memory as a string
MOD modules
NUMBER 2 characters to number
OR (bit-by-bit)

RNDM fast RND
SCREEN recognises user graphics
SINE fast sine
STRINGS repeats strings
TIME# current time
USING# formats numbers
XOR (bit-by-bit)

Only £11.00 inclusive! (Upgrade price for Release 1.0 owners is £4.00. This includes a 12-page supplement to your manual. Please quote date of purchase. If you did not purchase from us, state supplier and return original cassette.)

Please send me:
Beta Basic, Release 1.8. Payment of £11.00 is enclosed.
(or £11.50 for foreign orders). Cheques payable to BETASOFT.

I don't believe it! Please send me full details of Beta Basic 1.8. I enclose a stamped addressed envelope.

NAME:
ADDRESS

BETASOFT
92 OXFORD ROAD, MOSELEY,
BIRMINGHAM B13 9SQ.

... Having obtained the upper hand in this
desperate desert battle, the enemy
is about to launch its final
offensive
on your
battered
town ...

FALCON PATROL 2

FPTII



£7.95

- Incredible 3D graphics
- Flashload rapid load system (faster than disc)
- 16 level game with increasing difficulty
- 3 types of enemy helicopters – Solo, Gunship, Transport
- Marvellous sound effects and theme tune
- Air-to-ground missiles
- Radar jammers
- Joystick control
- Flak batteries
- Air-to-air missiles

VGA 6005

If you thought Falcon Patrol was good ...

Programmed by Steve Lee

FLASHLOAD

The Key To Success!

Now, with the new Stonechip Spectrum Keyboard, the user has no worry of damaging the Spectrum itself as improved designing enables it to fit the case perfectly.

Assembling the case is simple as it consists of two halves, the top half containing the keyboard, with a small printed circuit board, attached by ribbon cable, plugging into the rear of the Spectrum. The lower half fits precisely around the Spectrum, thus preventing any risk of damaging through movement.

Your Sinclair guarantee need not be invalidated since the Spectrum does not require removal from its case.



THE MAIN FEATURES OF THE KEYBOARD ARE:

- ☐ No modifications to Spectrum necessary as it connects via rear port.
- ☐ Full-length space bar.
- ☐ Built-in 'Echo' amplifier and tape interface.
- ☐ RESET keys remove the need to disconnect power supply lead.
- ☐ Single key 'DELETE'.
- ☐ Single key 'Extended Mode' selection (ie one key replaces the CAPS SHIFT and SYMBOL SHIFT function).
- ☐ Fully compatible with Interface 1 and most peripherals.

**STONECHIP
ELECTRONICS**

Stonechip Electronics, Unit 9, The Brook Industrial Estate,
Deadbrook Lane, Aldershot, Hants. Telephone: (0252) 333361

Extender unit available to use with Interface
2 and Kempston Joystick Interface. £2.50.

£59.95

DEALER ENQUIRIES WELCOME
Delivery approximately 28 days

To: Stonechip Electronics, Unit 9, The Brook Industrial Estate,
Deadbrook Lane, Aldershot, Hants. Telephone: (0252) 333361

Please forward me the following products:

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

Name

Address



Please debit my Access

Card Number

I enclose Cheque/PO for £

Twin Kingdom Valley

48k Spectrum

BUG-BYTE

L You really can't go wrong with any Level 9 game as they are really brilliant

CRASH MICRO SEPT '84.

✓ Whichever machine you own, if you have the vaguest tendency towards adventure playing then you must try one of these games (unfortunately you'll probably end up wanting to buy the lot!).
Computing Today, August 84

✓ To me, all Level 9 adventures create a remarkable atmosphere because the descriptions sound so life-like. This is where so many other adventures fail.
Crash, July 84

✓ But it's not just the size of the game it's the quality as well that is astonishing ... scenes to fire the imagination.
PCG, April 84

✓ 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.
Which Micro?, February 84

✓ (LORDS OF TIME). As we have come to expect from Level 9, the program is executed with wonderful style ... Highly recommended.
PCW, 1 February 84

✓ I thoroughly recommend these Adventures, they are excellent value for money. No self-respecting Adventure-addict should be without them. I believe Level 9 are producing a series of Adventures which should be regarded as classics.
Atari User, July 84

✓ These programs run very fast and there are no frustrating pauses. Level 9 Adventures are superbly designed and programmed, the contents first rate. The implementation of Colossal Adventure is nothing short of brilliant; rush out and buy it. While you're at buy their others too. Simply smashing!
Your 64, June 84

✓ Level 9 - arguably the producer of the best adventure games in the UK - has done it again. LORDS OF TIME is a sparkling addition to its stable of winners.
Acom User, July 84

✓ (SNOWBALL). This is another imaginative, massive-scaled immensely enjoyable adventure from those experts down at Level 9 Computing.
Your Computer, March 84

Return to Eden



Level 9 Computing

NEW

Level 9's epic adventures are now here for the AMSTRAD. Disk versions are available for the BBC (40/80 track) and Commodore 64. And, best of all, RETURN TO EDEN is ready. It's been a busy month!

RETURN TO EDEN is the long-awaited sequel to Level 9's top-selling Snowball adventure. Now it's here with 220 locations, masses of puzzles, and with pictures on the CBM and Spectrum versions.



Available from WH Smith and good computer shops everywhere. If your local dealer doesn't stock Level 9 adventures yet, get him to contact us or: Centresoft, Microdealer UK, Ferranti & Craig, Leisuresoft, Lime Tree, LVL, PCS, R & R or Wonderbridge.

1. **COLOSSAL ADVENTURE.** The classic mainframe game with 70 bonus rooms.
2. **ADVENTURE QUEST.** An epic journey through Middle Earth.
3. **DUNGEON ADVENTURE.** A massive game which completes the Middle Earth Trilogy.
4. **SNOWBALL.** Save the interstar freezer, Snowball 9, in a huge space adventure with over 7000 locations.
5. **RETURN TO EDEN.** SF adventure on the weirdest planet ever. The sequel to Snowball, though you don't need to have played this.
7. **LORDS OF TIME.** A humorous romp through World History.

Cassette Disk
£9.95 £11.95

☐ ☐
☐ ☐
☐ ☐
☐ ☐

I ENCLOSE A CHEQUE/PO FOR \$9.95 EACH (CASSETTE) OR £11.95 EACH (DISK) FOR BBC OR CBM 64

My name:

My address:

My micro is a:
(one of those listed below, with at least 32K of memory).

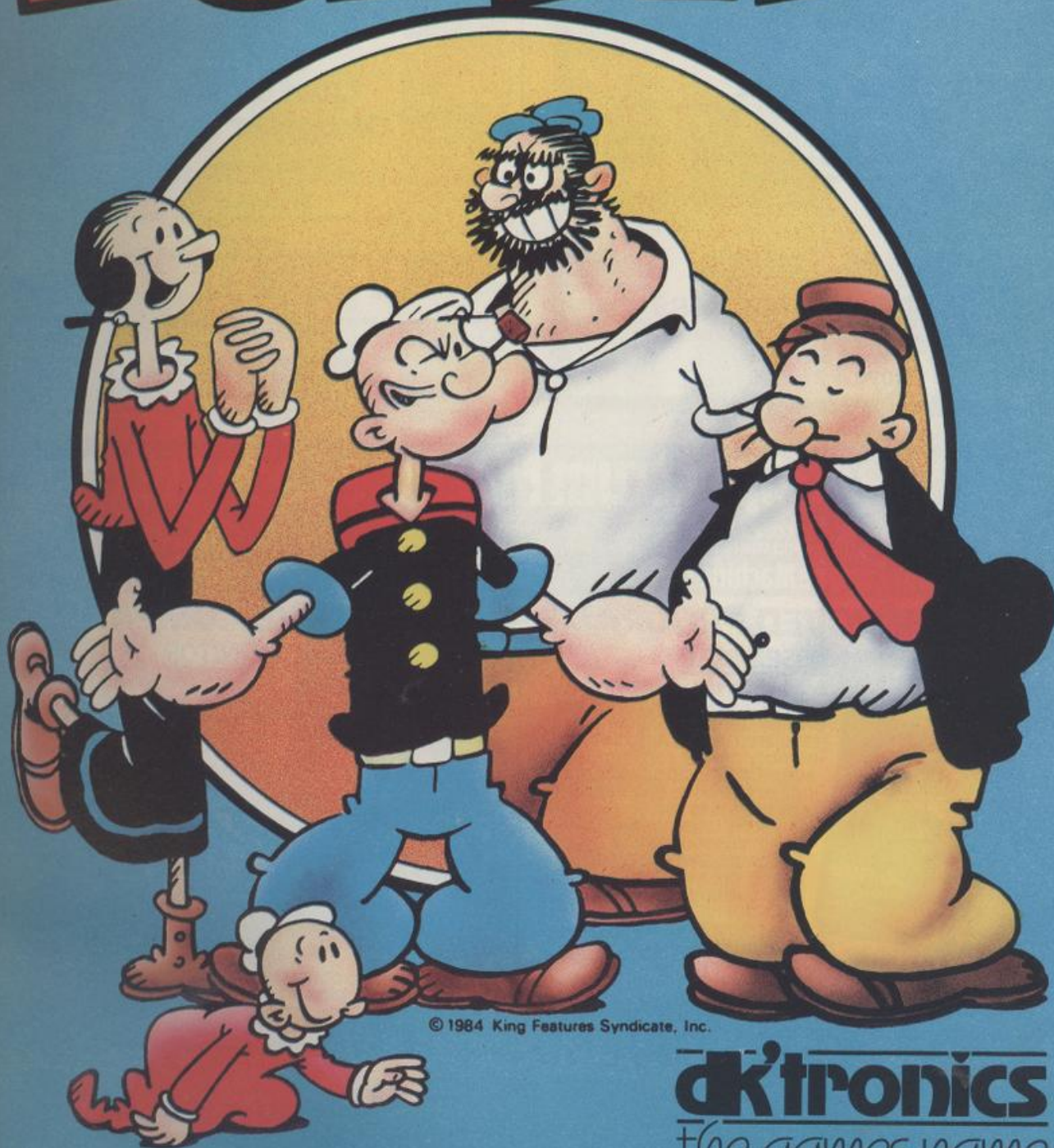
Contact:

LEVEL 9 COMPUTING

Dept. , 229, Hughenden Road
High Wycombe, Bucks. HP13 5PG

AMSTRAD BBC CBM64 SPECTRUM MTX ORIG 1 LYNX NASCOM ATARI

POPEYE[®]



© 1984 King Features Syndicate, Inc.

dk'tronics
the games name

Ring for sample Printout, Full Spec and latest Price

PRINTER BARGAINS

STAR DP 8480 (RS232) 197 ...	£187.00 INC VAT
STAR GEMINI 10X	£235.00 INC VAT
STAR GEMINI 15X	£380.00 INC VAT
STAR DELTA 10	£358.00 INC VAT
JUKI 6100	£380.00 INC VAT
CANON PW1080A	£320.00 INC VAT

Securicor delivery £8.00

CJE Micros BBC Printer Packs for Star, Canon & Juki Printers.

Include 1. the Printer. 2. Delivery by Securicor.

3. Cable to the BBC 1-3 Meters.

4. Screen Dump Program (M/C Source).

5. Text Dump Program.

6. Function Key Set Up Program, for use with word wise.

7. Function Key Label Printing Program for use with above.

8. View Printer Driver.

9. 100 Sheets of Paper.

10. A Mains Plug with a 3 amp plug.

11. Booklet giving details of using the Printer with a BBC.

PRINTER PACK PRICEPrinter Price + £20.00

CJE Printer Packs for other Micros include — Printer Cable, Paper, Mains Plug & Delivery.

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,

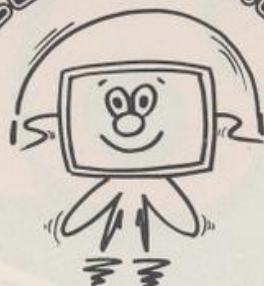
West Sussex.

(0903) 213900

TYKES!

It's all in Headingley at

FLEXIWORDS



The Super Computer Shop

We stock **HARDWARE**

Computers, disk drives, printers, monitors, disks, tapes, paper, accessories.

and **SOFTWARE**

Utilities, adventures, education, business, games.

FROM

Acorn, Amstrad, Commodore, Microwriter, Sinclair.

FOR

Access, Amex, Barclaycard, Diners, Cheques, even pound coins.

You're welcome to come in and browse, and remember, you're better off at a proper computershop.

flexiwords computershop

18 Otley Road Leeds LS6 2AD

(0532) 758474

The Key to Spectrum Machine Code Success.

Picturesque's MACHINE CODE SYSTEM is used and recommended by professional software writers, yet the excellent documentation and the friendly, easy-to-use programs have been highly recommended for beginners.

You will only buy one Machine Code System, so buy the best, the one the professionals use.

NEW IMPROVED PROGRAMS — MICRODRIVE COMPATIBLE



ASSEMBLER

Completely self-contained with its own line editor, giving an easy-to-read 40 column tabulated listing. Auto line numbering, line renumbering and auto tabulation make this one of the fastest and easiest Assemblers to use. 5-character label names. Decimal, Hex or ASCII constants. SAVE/LOAD/VERIFY both the listing and Machine Code to cassette/MICRODRIVE/NETWORK.

Assemble from cassette or Microdrive into memory for very large programs. Customise to most Centronics printer Interfaces, or RS232 (with Interface 1) for 80 column printout. FAST ASSEMBLY — 1k of code in 7 seconds. Assembler Directives:— ORG, END, DEFB, DEFW, DEFB, EQU, DEFL. (Microdrive and Centronics facilities only operate with 48K machines.)

£8.50

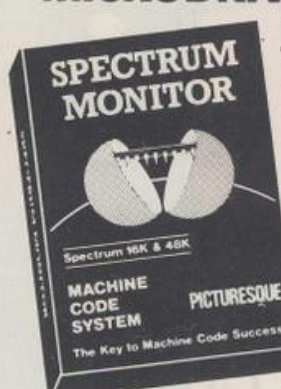
INCL. VAT & P&P.

Programs supplied on cassette with option to Save onto Microdrive (cartridge not supplied.)

Existing owners can obtain the new programs by returning the cassette only to Picturesque, along with a cheque/PO for £1.50 per program (inc. VAT & P&P). New cassettes will be supplied by return of post.

Available from the "SPECTRUM" chain of stores, branches of John Menzies and all good computer shops, or by mail order by sending cheque/PO to:

PICTURESQUE, 6 Corkscrew Hill, West Wickham, Kent, BR4 9BB. Send SAE for details.



MONITOR

The ideal tool to help the beginner get started, yet it contains all the commands for the experienced programmer to run and de-bug machine code programs. Inspect and alter memory contents in Hex or ASCII. Breakpoints and full Register display. NOW WITH SINGLE STEPPING through RAM or ROM. Disassemble any part of memory, RAM or ROM. Dec-Hex-Dec number converter. Printer output to ZX

printer or via RS232 (with Interface 1) or customise to most Centronics printer Interfaces. General memory management commands include Hex dump, Insert, Delete, Fill and Move. Can reside in memory with the Assembler (48K machines only) to give a complete Machine Code programming system.

£7.50

INCL. VAT & P&P.

PICTURESQUE
PICTURESQUE
PICTURESQUE

ANIROG



TURBO COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64

Also available on Disk



COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64



COMMODORE 64

COMMODORE 64 & VIC 20 16K

VIC 20



C.A.M. 64 & VIC 20 16K



C.A.M. 64 & VIC 20 16K



C.A.M. 64 & VIC 20 16K



VIC 20 16K EXP.



C.A.M. 64 & VIC 20 16K



C.A.M. 64 & VIC 20 16K



C.A.M. 64 & VIC 20 16K



C.A.M. 64 & VIC 20 16K



C.A.M. 64 & VIC 20 16K



VIC 20 UMEX.



VIC 20 UMEX.



VIC 20 UMEX.

AMSTRAD

MSX

UTILITIES



AMSTRAD



AMSTRAD



MSX



SPECTRA



TRADE ENQUIRIES: ANIROG SOFTWARE LTD., 29 WEST HILL, DARTFORD, KENT (0322) 92513/8
MAIL ORDER: 8 HIGH STREET, HORLEY, SURREY. 24 HOUR CREDIT CARD SALES: HORLEY (02334) 6083
PAYMENT BY CHEQUE: P.O. ACCESS/VISA: 50p POSTAGE & PACKAGING

FROM THE SOURCE OF NEW IDEAS

English Software presents 5 original games.



1 JET-BOOT JACK™

Commodore 64,
BBC Model B/Acorn Electron,
Amstrad CPC464:

£7.95 each Cassette

Electron
version is



joystick
interface
compatible.

Atari 400/800 and XL Models 32K:

£9.95 (Cassette and Disc)

4

HOMESWEETHOMES

starring little HENRY
Commodore 64: Cassette:

£8.95

2

Witch Switch

Commodore 64: Cassette

£8.95

3

Soldier of Fortune

Commodore 64:
Cassette

£7.95

3



Commodore 64:
Cassette (Release
Date - December)

£9.95

PROGRAMMERS WANTED

We're always on the lookout for new programmers. If you can work to the English Software standard of quality, we'll reward you by marketing your programs across Europe and USA! Contact us today.

ENGLISH
SOFTWARE™

THE POWER OF EXCITEMENT

The English Software Company, Box 43, Manchester M60 3AD
Trade Enquiries Tel: 061 835 1358.

ALL COMMODORE 64 CASSETTES ARE SUPPLIED
ON PAVLODA ULTRA-FAST LOAD.

JET-BOOT JACK THE REVIEWERS' CHOICE!



"Excellent throughout - a likely chart topper" (5 stars)

PERSONAL COMPUTER NEWS
"Excellent game with beautifully coloured and defined graphics"

WHICH MICRO?
"This game is excellent - Jack looked almost human!"
GAMES COMPUTING
"Arcade standard - should please most addicts" (5 Star Rating)

HOME COMPUTING WEEKLY
"In short, a first rate game"

TV GAMER
"Jet-Boot Jack is a gem!"
COMPUTER AND VIDEO GAMES
"This has to be one of the best, most playable and carefully thought out games for the Atari that I've seen for a while"

PERSONAL COMPUTER NEWS
What more can WE say!?!?!?

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

TRIGA COMMAND

IS HERE!

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

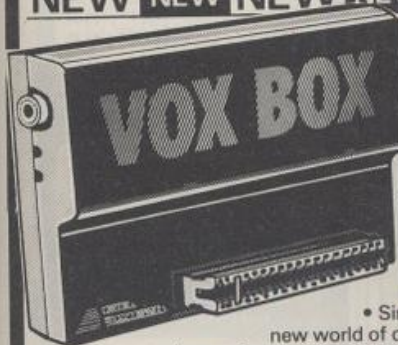


To fit your **SPECTRUM**
ONLY **£19.99** + £1.50 P + P

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

Also available for Commodore / Atari / BBC /

NEW NEW NEW NEW ONLY **£29.99**



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

- 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. (Kempton compatible).
- Complete with Demo Cassette.
- Full Instructions.

NOW for the Commodore 64
The COMMVERSA
SPEECH SYNTHESISER
CARTRIDGE

£24.99 + £1.50 P + P
PRICE BREAKTHROUGH.



- Simply plug into the exciting world of Speech Synthesis.
- The Commversa has an unlimited vocabulary using the now standard Allophone System.
- Programming is so easy and sentences can be made up in minutes!
- Comes complete with full instructions + Free Demo Tape. No extras required.

<input type="checkbox"/> Triga Command Spectrum	£19.99
<input type="checkbox"/> Triga Command Atari	£9.95
<input type="checkbox"/> Triga Command Commodore	£12.99
<input type="checkbox"/> Triga Command BBC	£19.99
<input type="checkbox"/> Vox Box, Spectrum	£29.99
<input type="checkbox"/> Vox Box and Triga Command	£39.99
<input type="checkbox"/> Commversa Commodore 64	£24.99

Postage Please Add £1.50
TRADE ENQUIRIES WELCOME

24 HR CREDIT
CARD LINE

ALLOW
7 DAYS

**DATTEL
ELECTRONICS**

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

COMCON

Programmable
Joystick Interface for
the Spectrum

£19.95

(incl. VAT and P & P)



Simple and fast programming:
Plug the six function connectors
into the required Spectrum key
positions - Ready!

Two independent fire actions:
Photon Blasters and Neutron Bombs
at the touch of your fingertips.

Extension port for Currah Micro-
speech unit: Combine joystick with
sound and speech for ultimate
arcade action.

Compatible with all Atari type
joysticks including Quickshot II
(without rapid fire action).

Interface operates joystick parallel
to keyboard: Joystick action com-
patible with any add-ons including
Microdrives.

QUICKSHOT 2+2 JOYSTICK

modified to incorporate
2 independent fire actions
and no rapid fire option

£13.95

(incl. VAT and P & P)



FLIGHTLINK JOYSTICK

with 2 independent
fire actions

£10.50

(incl. VAT and P & P)

CURRAH µSPEECH UNIT

fits into COMCON extension slot

£29.95

(incl. VAT and P & P)

Dealer Enquiries Welcome
Phone Ludlow (0584) 4894

Send to:
**ALSO AVAILABLE FROM
SELECTED RETAIL
OUTLETS**

FREL LTD.

Hockeys Mill, Temeside,
Ludlow, Shropshire SY8 1PD

Mr/Mrs/Miss _____

Address _____

Postcode _____

Qty	Code	Item	Item Price	Total £
	01	Comcon Interface	@ £19.95	
	02	Flightlink Joystick	@ £10.50	
	03	Quickshot 2+2 Joystick	@ £13.95	
	04	Comcon + Quickshot 2+2	@ £31.90	
	05	Comcon + Flightlink	@ £28.45	
	06	Currah µSpeech unit	@ £29.95	

I enclose a cheque/postal order made payable to FREL LTD for: £

COMCON

YOUR COMPUTER CLASSIFIED

01- 661 3036

Contact: Lucy O'Sullivan

ADVERTISEMENT RATES

Lineage: 50p per word
(Min 20 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	:	£9.00
Three insertions	:	£8.70
Six insertions	:	£8.50
Twelve insertions	:	£8.00

Display advertisers should
preferably reserve space by phone.

Copy Date

Closing date for Classified
advertisements is the 26th
Nov. for the Jan. edition.

Post to
Your Computer, Classified
Department, Room H211,
Quadrant House, The Quadrant,
Sutton, Surrey SM2 5AS.

Britain's Biggest Selling Home Computer Magazine

HOME ACCOUNTS

Put your house in order!
Probably the best home use
for your computer! Compre-
hensive coverage of bank
accounts, credit cards, HP,
etc. Inbuilt accuracy check
for all transactions. Project
cashflow for any period
ahead. Available for CBM 64
or Vic-20. £7.50 or free
details from:

DISCUS SOFTWARE
FREEPOST, Windmill Hill
Brixham TQ5 9BR
Tel: 080 45 55532

MICRODRIVE TRANSFER TAPE

At last MAJORITY of your software can
be transferred to Microdrive, even auto-
start commercially made games WILL
run as intended.

* The NEW 007 MD cassette enables you
to transfer the Headerless programs as
well.

* Includes an intelligent Header Reader
which tells YOU if any special actions
required.

* Does NOT require an additional Help
tape.

* Semi-Automatic. Fully automatic
systems have proved limited.

How it works: Copies Code to the
Microdrive using its push-button copier.
YOU make a few very easy changes to the
Basic loader part. Save it to Microdrive,
and magic, INSTANT SUCCESS.

007 MD IS JUST £5.95

(Europe + 50p Other areas + £1.50)

SPECIAL OFFER: Membership of the
MICRODRIVE EXCHANGE Newsletter
club plus 007 MD for just £10. (Or on
cartridge for £15).

ZX-GUARANTEED (Dept YC)
29 Chadderton Drive, Unsworth,
Bury, Lancs. BL9 8NL
Tel: 061-766 5712

Spectrum Repairs

£16.95 inclusive of labour, parts, p&p
etc. ZX81 for £11. Fast reliable service.
(Av. repair 24 hrs) by qualified engi-
neers. Send computer only to:
HS COMPUTER SERVICES
2 The Orchard, Warton, Preston, Lancs.
PR4 1BE. Tel. 0772 632686 or 634897

COMMODORE 64

R.B.S.
(Rapid Backup System)

Convert your single and multipart tape
programs to turbo-load, faster than the
Commodore disc drive. Each converted
program will load independently of
R.B.S. No pokes, no Sys. Calls. No User
Knowledge required. Load "The Hobbit"
in 120 secs. for personal use only.
Cassette £7.50 inc.

Hypersave — 64
A versatile and flexible fast-loading utility.
8 additional basic commands.
Save/Load/Verify up to 48K continuous
RAM at Hyperspeed. Cassette £7.50 inc.

Backup — Deluxe
A powerful and user friendly security
backup utility. Load/save all program
parts continuously. Incorporates a
sophisticated header-reader. For personal
use only. Cassette £3.50 inc.

Pro — Sprite
Sprite library. Design, manipulate,
catalogue multi and single colour sprites.
Create data, Joystick control. Packed
with features. 100% machine code.
Cassette £7.50 inc. Complete with your
first Sprite library.

Special Discount: Any two programs
£9.99. All four £19.00 plus free! secrets!
I/O guide with every order.

Cheque/P.O. or SAE to:

DOSOFT
2 OAKMOOR AVENUE
BLACKPOOL FY2 0EE

FAST DELIVERY GUARANTEED

**THE TRIAL OF
ARNOLD BLACKWOOD**
A New adventure of intrigue
for the AMSTRAD 64
(also available for DRAGON 32) £5.50
inc. (state micro)
NEMESIS
10 Carlow Road, Ringstead,
Kettering, Northants NN14 4DW.

ORIGINAL programs urgently needed Oric and
Commodore 64. Educational or Games. Cash
payment or royalties. Professional ethics
strictly adhered to. Send your program for
consideration. Knight Products (UK) Ltd., 71
Colne Road, Earby, Lancashire BB8 6XL.
257

MICRO ARTS Magazine and Software

"A forum organisation for people interested in
high-tech art and related areas."
"Magazine: issue one — "Language": What is
Computer Art? Language as Virus; Electronic
Beowulf; Music; Graphics; Film; Video; more.
Issue two — "Sex"; Setech — Sexuality and
Technology; Programmer as Onanist; Music 2;
Systems Music; Random Soul; More for
November.

Direct 90p per issue incl. post.
Software Spectrum 16X8K (specify)
MA1—Abstract originals (8 menu controlled
graphics) £2.50.
Mag various unusual events £1.95.
BBC Model 'B'; MA3; Martin Rootes Graphics
— £3.00.

MICRO ARTS
PO Box 587, London SW4 9PH
Tel. (01) 720 4456

BLANK CASSETTES

Rely on the professionals for guaranteed top quality computer/audio cassettes at great value
budget prices. Packed in boxes of 10, complete with labels, inlay cards and library case.

Prices include VAT, post & packing

Length	Box Price (10)	Qty.	Value
5 mins (c.5)	£4.35		
10 mins (c.10)	£4.40		
12 mins (c.12)	£4.45		
15 mins (c.15)	£4.50		
30 mins (c.30)	£4.70		
60 mins (c.60)	£5.30		
90 mins (c.90)	£7.00		

Cheque Postal Order enclosed for
TRADE ENQUIRIES WELCOME. GET BEST TERMS, SERVICE & PRODUCT, BUY DIRECT FROM
MANUFACTURERS OF PROFESSIONAL BRAND CASSETTES.

NAME _____
ADDRESS _____

PROFESSIONAL MAGNETICS LTD
(Dept. CCO), Cassette House, 329 Hunslet Road, Leeds LS10 3YY
FREEPOST Tel: (0532) 706066

TAPE COPIERS

Unique machine code programs to allow security
back-up copies of the majority of protected software.
Available for:
COMMODORE 64 £5.95 **ORIC 1** £5.95
VIC 20 £5.95 **ATARI** £5.95
SPECTRUM £5.95 **BBC** £5.95
ELECTRON £5.95
ALL WITH FULL INSTRUCTION BOOKS

HIGH SPEED BACK-UP

commodore
COMMODORE 64 owners, at last the long wait
is over — **FASTBACK** converts your software to
TURBO LOAD — creates fast loading copies of
most programs (single and multi-part) that run
independently of the utility. For example "The
Hobbit" loads in 150 seconds with **FASTBACK**.
Supplied on tape with full instructions
ONLY £9.95

AMSTRAD
SPEEDMASTER is here. Allows choice of save
speed. Creates fast loading copies of all
software tested
ONLY £7.95

TAPE TO DISK TRANSFER UTILITIES

Transfer games etc. to disk. Supplied on tape
with full instructions for —
BBC £9.95
ATARI (All models) £9.95
COMMODORE 64 £9.95
DISCO £9.95
NEW IMPROVED VERSION £9.95
No user knowledge required.
We guarantee this is the best available.
All prices include VAT,
Post & Packing. Cheques, P.O.
or Phone your Card Number to:

EVESHAM MICRO CENTRE
Bridge St, Evesham, Worcestershire
Tel: 0586 49641
NEW SHOP NOW OPEN — Road Centre
1156 Pershore Rd, Cotteridge, Birmingham Tel: 021 458 0566
TRADE AND OVERSEAS ORDERS WELCOME

DISKOUNT PRICES

5 1/4" SS/DD Diskettes	£1.50
3 1/2" SS/SD Diskettes	£4.50
2000 Sheets (11"x3 1/2")	
Listing Paper (11"x3")	£16.00
CASSETTES: C15 50p	
C20 60p C30 70p	
(Case/Labels Inclusive)	
* 1 Year Guarantee	
* p&p free: Delivery 7 days	
* Further discounts available	
* We supply schools & colleges	

Cheques/P.O.'s to:
C & S Computer Services
144 Sutcliffe Avenue, Grimsby
Sth Humbs. DN33 1AP.

THE BAT CAVE SPECTRUM 48K

Escape from building and its inmates!
Tacky horror, humour, skill levels, hi-
score and lots of locations to test your
survival skills. Two different versions on
same tape. £6.00. Send cheque/PO to:
Augen' Blick, 89 Teesdale Avenue,
Birmingham B34 6JQ.

ARROW MICRO SERVICES
— Commodore 64 —

ARROW TURBO-SEVER
Feed up with waiting for those programs to load? Well now you need Turbo-Sever to use and faster than the 1501 disk drive programs reload independent of Turbo-Sever.....£7.00

ARROW DISKCOPY
This selective disk copier will copy both Prg and Sef files faster than 1541 disk-up and you don't need to copy all the disk, very user friendly and easy to use.....£7.00

ARROW TRANSFER
Transfer your favourite games to disk both multi port and Auto Run's, works with most software.....£7.00

ARROW DISK-DOCTOR
Now you can recover scratched files easily, edit any file on any disk in hex or ASCII, alter programs, edit the directory, format disks.....£8.00

20 Portmeadow Walk
London SE2

THE PUNTER'S PAL COLLECTION
Starters Orders — A simple to use horse race predictor. Producing 67% success rate on top-tips. Suitable for both National Hunt or Flat races. On each predicted horse an easy to understand rating is given.

Controlled tests have shown that the program consistently beats ANY tipster in ANY newspaper. Simply enter form from any Daily Newspaper. Now with dual and straight forecasts, and tricast. The least expensive such program on the market at only £6 inc. p&p.

Also HARE'S RUNNING — as with Starter's Orders but for use with greyhound racing for £5.

BUY BOTH PROGRAMS FOR £10. Both programs are available for any Spectrum or Commodore 64, (please state which).

Orders to: David Jackson, 1 Osborne Place, Todmorden, Lancs. OL14 5BQ. (Or send SAE for more details)

MAKE YOUR OWN TV MOVIES
using
SPECTRUM 48K PROGRAM

Tape your movies and play back to amuse friends. ZX-81 and Spectrum morse-code reading programs.

for details:

PINEHURST DATA STUDIOS
69 Pinehurst Park, W. Moors
Wimborne, Dorset BH22 0BP

EDUCATION

Whether it be SPECTRUM, ZX81 or BBC B, we hold in stock probably the largest range of educational software available, currently in excess of 50 DIFFERENT EDUCATIONAL CASSETTES

produced by the major software houses.
SAE for catalogue and SPECIAL OFFERS. Also GAMES TAPES: 3 for price of 2.
LOCATOR, 12, Fernhall Drive, Redbridge, Essex, IG4 5BN. Tel. 01-550 5575

SUPERIOR SPECTRUM TAPE COPIER

The NEW 007 SPY in the ONLY copier capable of copying even a full 48K Headerless program.

- * Copies multipart programs all in one loading, automatically.
- * Copies programs from 1 to 65279 bytes long. (Can yours?)
- * Copies Headerless files up to a full 48K. (No other copier can).
- * Copies ALL types, Basic, Code, Screen, Arrays, Headerless.
- * Guaranteed easiest to use.

007 SPY IS JUST £3.95

(Europe + 50p Other areas + £1.50)
(Please order as 007N)

ZX-GUARANTEE (Dept YC)
29 Chadderton Drive, Unsworth,
Bury, Lancs. BL9 8NL.
Tel: 061-766 5712

The Publishers take all reasonable care to ensure that classified advertisements are genuine, but readers must satisfy themselves that they will be obtaining what they require before entering into transactions, particularly if they involve large sums of money.

CBM-64 tape copier. Makes back up copies of most programs available. Copies multi part programs one part at a time. £2.75. J. Hudson, 44 Nightingale Drive, West Ewell, Surrey. 454

EPSON FX-80 hi-res dot matrix printer for sale compatible with any computer owner upgrading hence £300 ono. Tel. 01-674 7795. Also Cumana 100K slimline disk-drive with psu/cable under guarantee £140. 442

A BBC B 'WORD PROCESSOR'
80 columns, editing, justification, saving, printing, inc. instructions) suit Microline, Epsom or equivalent
Cassette £6.95 40 Track Disk £8.95
Send cheque/PO to: CONE SOFTWARE
11a Highview Rd, Sidcup,
Kent DA14 4EX

DUST COVERS. Quality anti-static material. Spectrum £1.50. DK Tronic, Commodore, BBC Dragon £2.50 inc. p&p also available for printers cassetted disc drives etc. Computa Covers, 17 Lichfield St, Wolverhampton, West Midlands. 407

PROM SERVICES

ANALOGUE CONVERTERS
for ZX81 and SPECTRUMS
8 bit 8 channel input £23.95
8 bit 3 channel output £26.95
12 bit 8 channel input £57.95
3 slot motherboard £16.95
23/28 way edge cards 75p,
connectors £2.50.

SAE for details of these and many other interfaces.

EPROM SERVICES
3 Wedgewood Drive,
Leeds LS8 1EF.
Tel. (0532) 667183

AMSTRAD COMPUTER DUST COVERS

Made in one piece, from matching proofed anti-static nylon. Piped in green with Amstrad CPC 464, printed keyboard section £6.95. State mono or colour.

BBD Covers
39 Manse Ave.,
Wrightington, WN6 9RP.

Discount Software

Spectrum-Commodore-Vic 20-ZX81
Spectrum-Manic Miner, Pool £4.95 each.
CBM-Egbert, Condor, Everest £4.75 each.
Vic-Invasion, Get Lost, Logrun £3.40. ZX-Brickstop, Breakout, Othello £2.00. Many more send SAE for latest list. Cheque PO to: A. J. Wilkins (Software), 10 Lawford Close, Wallington, Surrey SM6 9HA (Mail order only)

COMPUTER COURSES

Take a micro break and come to Bournemouth. Mid-week and weekend courses, beginners to advanced basic. Machine code and assembler courses available on request. Maximum 16 persons per course. Commodore 64s and BBC Bs used or bring your own micro and we will adapt our course to your machine. For further information write to: Micro learning centre, 10 St. Swithuns Rd South, Bournemouth. Tel: (0202) 290677

TOP PROGRAMS — TOP DISCOUNTS

AMSTRAD: £5.95 Flight Path 737, House of Usher, Space Pilot, £7.95 Harrier Attack, Chess, Code Name Matt, Star Commando, Roland in Caves/On Ropes. SPECTRUM 48K: £4.95 Kokotoni, Wilf, Gilligans Gold, Cosmic Kanga, T.L.L. £5.95 Daley Thompsons Decathlon, Giants Revenge, Monty Mole, Micromega Games, Rapsallion, Black Hawk, Delta Wing, £6.95 Beachhead, Enduro, Project Volcano, Twin Kingdom Valley.

Plus many other programs for the Dragon 32 and Oric 48K (all Atmos compatible). Cassette Recorder with counter (BBC, Elect, Oric, Spec.) £21.95. Quickshot II with interface (Kempston) for Spec. only £19.95.

Prices incl. p&p (Europe + 50, other + £1)
C/I/PO to O. J. Software
(see for list, state machine)
273 Mossy Lea Road, Warrington,
Wigan, Lancs., WN6 9RN.
Tel (0257) 421915 for price on latest software.

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 £39
16 programmable channels
ORIC PRINTER £95
26 col. matrix, graphics double 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

SPECTRUM CHESS

Dare you face The Turk

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

OCP now offer you the twentieth century equivalent of that Turk — a chess-playing computer program. The Turk challenges you to a game of chess!



MANY OPTIONS INCLUDE:

- 6 Levels of Difficulty
- Demonstration Mode
- Board Editor
- Games Printout Facility
- Blitz Chess Against the Clock
- Two Player Mode
- Unfinished Games can be Stored
- Recommended Move

FULL INSTRUCTIONS PROVIDED
CHESS THE TURK
ONLY £8.95
Post order to
Oxford Computer Publishing,
P.O. Box 99, Oxford.

134/4

FREE

with "Your Team" a Bobby Charlton Leather Match Ball worth £6.99

A must for all soccer enthusiasts

Yes, absolutely free for a limited period, with every copy of the program "Your Team" a real leather Match Ball autographed by Bobby Charlton (R.R.P. £6.99). "Your Team" is a database program to record and analyse your favourite teams match results, scores, attendances, statistics etc. All recorded in your clubs colours. Football league, Scottish league or your own team school or club can be kept season after season. Available for Spectrum, BBC, Electron, CBM 64 - £9.95 plus £1.00 p&p. Order today enclosing cheques/P.O. Access/Visa to: Bec Sports, Dept YC, Bec House, Highlands Ave, Northampton. Tel: 0604 499 246.

ATARI 400/600/800/XL

Cartridge Backup System

Backup 8/16K cartridge to tape and disc. 400/800 with 48K ram. De luxe version has gold edge blades on cartridge simulator.

Cartridge to tape & disc.....£15.00
de luxe £20.00
Spare simulator board.....£12.00
de luxe £17.00

XL Cartridge Backup

600 XL £25.00
800 XL £30.00

Specify Tape or Disk

Tape Duplicator

Duplicate almost any single or multistage tape. BASIC program, 48K ram recommended.

Tape Duplicator.....£6.00

Fast Loader

Reduce tape loading time of almost all of your single multistage tapes by up to 49%.

Fast Loader.....£6.00

600 XL Memory Upgrade

Upgrade your 16K to 64K. Complete kit with full instructions.

Memory Upgrade.....£75.00

Services

Listing and prom blowing services also available. Send for details.

Send large SAE for further details on any/all of the above and new products. All prices are inclusive of p&p. Utilities are for 400/800/XL/800XL unless otherwise specified.

S. Terrell

17 Cock Close Road, Yaxley, Peterborough PE7 3HJ

WHAT PRICE SUCCESS FOR YOUR CHILD? SPECTRUM/BBC

Carefully constructed programs, designed by teachers, to motivate and explain those difficult but essential concepts.

CHEMISTRY

1. Formula Package
Good Software Guide: "Simple, well thought out and well presented, it succeeds admirably in its intention"

2. Reactions

Micronet: "Well designed and executed"

3. Titration Package

PCW: "Excellent teaching aid"

NEW

4. Write Equations

Everything you need to know about writing Chemical Equations

5. MOLE: Chemistry Calculations

6. Periodic Table
Prints table! Explanations and educational game

PRIMARY

7. Countdown

5 superb programs: Numeracy skills, money, recognition, money, and association

All available for Spectrum 48K for £5.50 per program

Formula package also BBC B - Cassette: £8.50



CLOUD 9 SOFTWARE
Dept. YC6, 4 Dolvin Road,
Tavistock PL19 9EA. 379

DISCOUNT MAIL ORDER SOFTWARE

ZAXXON.....£4.15
TRASHMAN.....£5.35
JET SET WILLIE.....£5.35
FOOTBALL MANAGER.....£6.25
MANIC MINER.....£5.35
THE BOSS.....£8.05
COSMIC CRUISER.....£4.95
SNOOKER.....£8.05

And more.

State title and machine
S.A.E. for lists.

Cheque/P.O. To Dept YC

Universal Publishing

65 Thurlow Park Rd.

London, SE21 8JP

SPECTRUM SOFTWARE CLUB!

LOWEST COST FREE CASSETTE!

- * Hire and Exchange games from just 50p
- * Buy new games at the best possible discounts
- * Hundreds and hundreds of games to choose from
- * Regular Newsletter with details of new releases etc
- * Every new member gets a FREE BLANK CASSETTE!
- * All the benefits of other clubs at HALF THE PRICE!

Send just £3.95 and we will rush you your Membership Kit and Free Cassette:

SPECTRUM SOFTWARE CLUB (YC)
287-291 HIGH STREET, EPPING, ESSEX CM16 4DA
(or send a stamp for catalogue)

SPECTRUM KOPYKAT

Simply the best. Copying any 16/48K Spectrum program is as easy as LOADING & SAVING your own programs. Even unstoppable programs can now be backed-up onto a fresh tape. Only £4.95.

IT CAN EVEN COPY ITSELF

NEW

MICRODRIVE KOPYKAT

Transfer your cassette based software onto the ZX Microdrive RELOCATES programs, Stops & reveals programs ESSENTIAL for M/D transfer. Only £4.95.

Both with FREE Header Reader Despatched by Return of Post.

MEDSOFT

PO Box 84, Basingstoke, Hants

COMMODORE 64 CASSETTE COPIER

HARDWARE interface enables you to make back-up copies of ALL CMB64, VIC 20 & PET software (+ ALL types of 'turbo-loads').

ONLY £14.95 inc.

(Please add £1.00 for overseas orders)

For further details of this and other products, send large SAE to: STAGSOFT, 23 Brock Rd., Chorley, Lancs. PR6 0DB.

Z80 ASSEMBLER

Specially written for AMSTRAD CPC 464
By the author of BEEBUG'S 'EXMON'

- * FULL SCREEN EDITOR
- * Disassembler & Hex Dump
- * Allows freely mixed BASIC Machine Code (similar to BBC BASIC)
- * Many directives and I/O options
- * Expression evaluation
- * Super fast - approx. 3,000 lines/min.
- * Colour output
- * Comprehensive instruction manual

SPECIAL INTRODUCTORY OFFER

£11.60 (inc. p&p)

ARNOR LTD.

PO Box 619, London SE25 6JL.

Spectrum Markbook (48k)

A full teacher's markbook on computer. Holds all your classes; easily updated; automatic totals, percentages, orders of merit, mean & S.D. graphs etc. Now completely revised. More features than ever. £6.50 with manual and demo.

Mentor Software

69 Beech Rd, Halton, Lancaster

VIC-20 Software Hire

Free membership. 500 Members. 100 titles from 50p per week. SAE for your free Membership kit to: VSH (HCW), 242 Ransom Road, Mapperley, Nottingham.

SPECTRUM & BBC

POOLS

PREDICTOR

FREE RACING ANALYSER

WITH 11,000 MATCH DATABASE

BOTH PROGRAMS FOR ONLY

£8.99

Now in its 3rd successful season. Mayday Software's Pools Predictor has been made even more powerful with a new and unique 11,000 match database. Seven separate forecasting techniques have been combined to give you the best forecasts yet. And, just as easy to use, is our new Racing Analyser. This uses the racecard from your daily paper to analyse any horse race - and it's yours for no extra charge!

MAYDAY 181 Portland Crescent
SOFTWARE Stanmore, Middx. HA7 1LR.

COMPUTER BOOKS

To help you write better programs

SPECTRUM

Adventures.....£5.95

Machine Code Applications.....£6.95

Master Your Microdrive.....£6.95

COMMODORE 64

Adventures.....£5.95

Machine Code Master.....£6.95

Advanced Programming

Techniques.....£5.95

DRAGON 32

Games Master.....£5.95

Other titles/machines also available

SAE for details. Please add postage

1 book 75p, additional books + 30p each.

JAMES ELECTRONICS

P.O. Box 2 Rothwell, Leeds LS26 0UY.

SPECTRUM

DATA-SAVE

If you own a 16/48K Spectrum you cannot afford to be without this program. DATA-SAVE ensures that you produce top quality BACK-UP copies of ALL types of programs and data files with ABSOLUTE SIMPLICITY. Advanced features include: Continuous Loading, Saving and Verifying of single and MULTIPART programs. MENU DRIVEN with comprehensive on-screen information. Plus FREE CHARACTER GENERATOR Programs. Send cheque/PO for £6.00 to: GREEN BANK SOFTWARE, 2A, CURZON PARK SOUTH, CHESTER, CHESHIRE CH4 8AB.

SINCLAIR ZX Spectrum 48K personal computer with Sinclair ZX printer. Various software. £110 ono. (0243) 554020. 426

TURN MACHINE-CODE INTO BASIC

Turn Machine-Code into Basic? Yes you CAN. Long machine-code programs are nearly all, all or part Basic.

MY STOP-REVEAL TAPE WILL:

- * STOP virtually ANY Spectrum programs, Basic, Code and even Headerless programs, protected or not, & LIST.
- * REVEAL hidden Basic in machine code programs. (Could be clues in Adventure games).
- * LISTs actual machine-code on your video.

Now you can STOP, LIST, MODIFY, STUDY most Spectrum programs at your leisure. Even 48K programs.

Includes: a DISASSEMBLER, HEADER READER and SECRETS OF TRADE pages explaining how professionals hide programs, and How to reveal them.

All for the price of one game!

Post £5.95 free

(Europe + 50p Elsewhere + £1.50)

392

KERR, 24/25 HIGH STREET, KING'S LYNN, PE30 1BP

FREE SOFTWARE... But how? You've got friends with computers... Show them our huge discount games lists. They like to save money, and you earn some too. That's all... and it doesn't cost you a thing. Interested... Yes... More details please.

TECHNIPLAY SOFTWARE

74 Dornoch Drive,
Hull HU8 8JL 0482 712958

LYNX 48K & 96K

Quality software for your LYNX RALLY BRITAIN — navigation game £5.95 (inc.). COCONUTS — animated word game £4.99 (inc.). DATAL — a sophisticated data storage and retrieval program. Easy to use, fast, flexible and very friendly. User manual includes Address Book, and Home Accounts. A must for all LYNX owners at £19.55 + 45p p&p. Send cheques/PO to:

ORIGINATION

Dept Y, 2-3 Forge Row,
Nr. Soudley, Cinderford,
Glos GL14 2UF.
or please send SAE for further details.

LOAD CORRECTLY

with the
LOADMASTER

Set the volume control on your cassette recorder right EVERY time. Just plugs between recorder and computer. Price inc. p&p £11.49.

PROBEMASTER LTD.

23 The Ridgeway,
Cuffley, Potters Bar,
Herts. EN6 4BB.

CBM 64

**BLACK OUT AND
TURTLE TRIALS**

Two brand new and exciting games for the Commodore 64. Only £5.99. Send cheques and PO's to:

T. Scallion Software
82 Sorbus Close,
Salford M6 5AR.

STOP—REVEAL

A unique cassette for the 48K Spectrum. Genuinely lets you:

1. STOP virtually all programs, BASIC, MACHINE CODE and even HEADERLESS FILES, protected or not.
2. REVEALS the hidden Basic in Machine-Code programs. (Could be clues in adventure games).
3. LISTS actual Machine-Code on your video.

Now you can STOP, LIST, MODIFY, STUDY most Spectrum programs at your leisure. (And cassette is Microdrive compatible).

Includes a DISASSEMBLER so can even study Sinclair ROM, etc. plus the most Advanced HEADER-READER ever written, plus pages of SECRETS OF THE TRADE explaining professional methods used to hide lines/programs, etc.

**YOU CANNOT GET A MORE
POWERFUL CASSETTE**

(Even STOPS/REVEALS programs which are a genuine 48K long).

POST £5.95 FREE

(Europe add £1. Other areas add £2)
KERR, 24/25 HIGH STREET,
KING'S LYNN, PE30 1BP.

BECOME A PROGRAMMER

Improve your prospects in the industry of the 80's. We'll develop your skills more quickly and more professionally with our home study Programming Course, based on Spectrum. Write for Free Brochure.

IDEAL SCHOOLS

Ref: YC4, Freepost,
Woking, Surrey GU21 4BR.

RETAILERS

For fast speedy distribution service contact
Drake Distribution on 0752 500951/2

We can offer you:

- 24-hour delivery in UK
- The Best Discounts
- Starter packs available
- All the latest software
- Personal weekly delivery service throughout the UK
- Export enquiries welcome
- 48-Hour delivery can be arranged

As retailers ourselves we know the titles that sell — Phone or write for a price list now.

DRAKE DISTRIBUTION
Unit 45, Enterprise Plymouth,
Somerset Place, Plymouth PL3 4BB

DISC DRIVES for your BBC Spectrum (interface available), Dragon, & TRS80. We stock the widest range of drives & media in the country. Best prices around. Over 60 models. For brochure ring Datafax Systems, Basingstoke 64187. 424

COMMODORE 64 SPECTRUM - VIC 20

(S)TOP SECRET(S) II

48K Spectrum/Commodore 64/Vic 20. Puts you back in FULL control of your MICRO. A machine code UTILITY to STOP most basic/machine code incl. HEADERLESS programs, protected or not, without crashes. If you can stop them you can learn their SECRETS/LEARN/LIST/MODIFY. Ideal MICRO-DRIVE/DISK DRIVE companion. PLUS Mach. Code DISASSEMBLER. List Mach. Code/Basic/Hidden Basic/ROM. PLUS an advanced HEADER READER. PLUS HEX/DEC DEC/HEX converters. PLUS SECRET INFORMATION about how the professionals keep their secrets hidden. CASS-£5.95 DISK-£9.95 MICRO-£11.95. Previous customers EXCHANGE previous tape plus £1.50p for NEW copy.

BYTE BACK

Commodore 64/Vic 20

Complete companion to (S)TOP SECRET(S). A hardware/software package containing: (i) A RESET device which plugs into your micro, no mode needed. (ii) A m/code program which completely RESTORES programs after reset. (iii) A mach. code ASSEMBLER, enter mach. code easily in understandable form. IDEAL FOR MODIFYING or writing programs. (iv) A superb m/code DISASSEMBLER which lets you examine, and explains mach. code. PLUS with BYTE BACK it is virtually impossible to CRASH your own programs. CAS-SETTE-£6.95/DISK-£9.95.

SUPERKIT 64

Commodore 64 only

SUPERB TOOLKIT of m/code routines: Complete RE-NUMBER/AUTO LINE-TRACE/FIND AUTO RUN/BLOCK DELETE/MEMORY SAVE and more. Software controlled flexibility, and at a sensible price. CASSETTE-£6.95/DISK-£9.95. With SUPERKIT 64, BYTE BACK and (S)TOP SECRET(S) you have almost unbeatable STOPPING power and all the EXTRA UTILITIES for writing/modifying programs. SPECIAL DISCOUNT for COMMODORE OWNERS. Buy all three programs — £2.00 discount. Eliminate C2N Datasette problems.

REKORDAKIT 64

HEAR your Datasette performing. Keep C2N in tip top condition. Simple to use plug-in device which reproduces audio output and a TEST TAPE to ensure tape heads are correctly set. £5.95.

REMEMBER State Computer

Cheque/PO to:
ASH BYPRODUCTS
PO Box 510
Birmingham B17 9ES.

COPYMATE TWO

COMMODORE 64 tape back-up utility. A professional product with an EXTENDED RANGE and the ability to SAVE TO TAPE AND/OR DISK. Supplied on a quality cassette with full instructions for only £5.75 or on disk for only £7.75.

64 MONITOR

For the CBM 64. Designed for both the beginner and expert m/c programmer. Supplied with a 40 page explanatory manual, 14 useful commands including a built-in assembler/disassembler. Tape only £5.95 or disk for £7.95.

Horizon Software
15 Bamburgh Close
Danesholme, Corby,
Northants, NN18 9PA.

QL USER Guide Index. Separate index for each chapter plus universal index for rapid reference. £4 or £6 incl. postage. Dane Kurth, CH3292 Russell, Switzerland. 428

SUPER BREAKER

For the Commodore 64, this utility will make back-up copies of tape programs onto tape or disk. Supplied with written instructions on tape at £4.99 inc. or on disk for £6.99 inc.

1541 DISC MANAGEMENT

This 20 function disk management utility includes features like edit track and sector, full disk back-up, protect/unprotect programs, enhanced and normal disk commands. Supplied on disk with comprehensive booklet for only £8.75 inc. cheque/PO to:

CLARK KENT SOFTWARE
26 North Cape Walk
Corby, Northamptonshire.

DISCOUNT software for Spectrum/CBM64/Atari/BBC/Electron/Amstrad. SAE for lists quote micro. Sunaro Software (YC1), PO Box 78, Macclesfield, Cheshire SK10 3PK. 427

Microdrive transfer listings for "TLL", "Full Throttle", "Lords of Midnight", "Chequered Flag" and "3D Tank Duel". 50p each SAE to Y. Russell, 16a Glenluce Rd., Blackheath, London SE3.

AMSTRAD, Atmos 8 Oric 1 software club. Best from the latest added monthly. SAE for details. 26 Beechley Drive, Cardiff, CF5 3SN. 429

48K SPECTRUM ASSEMBLER & DEBUGGER

Easy to use, no new editors or monitors to learn. Menus to ASSEMBLE DIS-ASSEMBLE, TEST, SAVE, LOAD, DELETE. Microdrive and printer supported. Use assembler like BASIC, Testing — SINGLE STEP, TRACE, VIDEO GAMES TRACE, BREAKPOINT, NON-STOP CALLS, HISTORY. Dynamic displays — this and next instruction with addresses, current and last register value, stack contents, flags, selected memory bytes, all in hex and decimal. Special CONVERSATIONAL ASSEMBLY INSTRUCTION INPUT/EXECUTION with full displays, a unique testing and machine code learning aid. Cassette £9.95, Microdrive cartridge £13.95 with demonstrations.

Dept. YC. 45 Hullbridge Road, Rayleigh,
Essex SS6 9NL. Send SAE for details.

AMSTRAD COMPUTER DUST COVERS

Either in one of two piece from matching proofed anti-static nylon. Piped in green with Amstrad CPC 464 printed on keyboard £5.95.

State 1 or 2 piece and for colour or mon.

**BBD COVERS 39 Manse Cross,
Wrightington WN6 9RP.**

SHARP SOFTWARE

Superb new and original home, business and utility programs for the MZ-700 and MZ-711. Also local private tuition in programming from beginner to business level. For complete details (specify programs/tuition) send SAE to: Mayssoft (DMB), 50 Thompson Avenue, Colchester, Essex CO3 4HW.

EUROPE QUIZ

for 16/48K ZX Spectrum.

Fascinating Maps Quiz — Educational and lots of fun — with stunning maps. Europe Quiz is suitable for all ages. Also included is "WORLD MAPS". Mail order: Send cheque or PO for £4.50 inc. p&p to:

HARRIS Software, 7 Thorsden Court,
Guildford Road, Woking, Surrey,
GU22 7QS.

CRAZYHORSE SOFTWARE

presents

MAGNIFICENT SEVEN

Disc utilities for

CBM 64 1541

Fast Backup Format,

Most Errors 280 secs

File Copy, Fileclone,

Disc to Tape, Tape to Disc

Disc to Turbo to Disc

£19.55 inc p.p

7 Railway Mews, London W10

Trade Enquiries Welcome



**GOOD IDEAS
are welcome at
GRIFFIN SOFTWARE**

GS

The leading educational software suppliers. If you think you have an exceptional educational program (basic or machine code) for any of the most popular home computers, we would like to hear from you.

Contact: Roger Blake

Griffin Software, Ealing Road,
Wembley, Middlesex, HA0 1HJ.
Tel: 01-997 3344

Fisons plc Scientific Equipment Division

AMSTRAD

**ZEDIS... EDITOR and DIS-
ASSEMBLER for the Z80.** Includes full instructions for Disassembling ROMs. £6.95 To **PRIDE UTILITIES, 7 Chalton Hts,
Chalton, Luton, Beds.**

U.S. GOLD

All American Software

The premier publishers of American Computer Software offer "Fantastic Opportunities" for

Assembly Language Z-80 Programmers

Translation coding from Commodore 64 to ZX Spectrum.

First class work will be highly rewarded with guaranteed payments.

Programming includes Arcade Games, Simulations Adventure, Strategy and War Games.

Write or phone now to Software Development Department, U.S.G. 6 Central Street, Manchester M2. or phone 061 832-6633

But hurry! Limited contracts left for this year.

Completed programs for Spectrum also considered.

COMMODORE 64 — AMSTRAD — MSX OWNERS MIDLAND COMPUTER LIBRARY

- 1 All the latest titles on cassette, disc and cartridge
 - 2 Hire your first two games absolutely free.
 - 3 Life membership £6.00.
 - 4 Hire charge from only £1 inc. p&p for full 7 days.
 - 5 No limit to the amount of games you can hire.
 - 6 All games originals with full documentation.
 - 7 Games, Business and Educational software.
 - 8 Return of post service guaranteed.
 - 9 Lowest new hard and software prices in the UK.
 - 10 Join now on money back guarantee.
- Send cheque or postal order for £6 with your two selections or large SAE for further details to:

MIDLAND COMPUTER LIBRARY
The first and largest Commodore 64 library in the world
31 Evenlode Close, Lodge Park
Redditch B98 7NA
Telephone 0527 23584

ROAD RUNNER COMPUTERS

6 Litchton St., Barnstaple,
Nth. Devon.

Streets ahead of others. Better prices, better service, latest software, including disk software. If you can't call at the shop, just phone Barnstaple 74663 for Mail Order which is second to none.

! NEW VERSION !

Would you like to transfer your Spectrum programs from

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

Then do it with

TRANS-EXPRESS

TRANS-EXPRESS is the most comprehensive package of four m/c utilities for transferring Spectrum programs. They are user-friendly, simple to use, reliable & very efficient.

They will enable you to transfer any kind of programs up to the full 48.0K length. TAPE TO M/DRIVE will also automatically, if necessary, modify, restructure and relocate both BASIC and M/C to run from m/drives.

You can buy any of the 4 programs for £5.50 or TAPE TO M/DRIVE AND M/DRIVE TO M/DRIVE together for £7.50, or all the 4 programs on a tape for £9.95 or on a m/drive cartridge for £14.95.

MICRODRIVE TO MICRODRIVE

Please send me a copy of TRANS-EXPRESS ① ② ③ ④ Please tick where applicable I enclose cheque/PO for _____ YC

Name _____ Address _____ 215

ROMANTIC ROBOT 113 Melrose Ave, London NW2

The Jet Set Willy editor. 100% machine code program. Will totally redesign Jet Set Willy and create an extra three rooms. £3.50 incl. p&p. Send cheques or postal orders to:

1 Rowan Place, Dundee, DD3 0PH

BRUNWORD FOR THE MEMOTECH

- * Wordprocessor for the MTX 500/512, requiring no additional hardware.
- * Uses memory similar to discs. (MTX 500 — 7 pages, MTX 512 — 14 pages).
- * Fast access to memory files (approx 1 sec) and no noticeable typing delay.
- * TEXT mode with insert/overwrite, word wrap, continuous screen edit, full cursor control and right justify.
- * ESCAPE mode based on key words but only the first letter is typed. SAVE, LOAD, DIRECTORY, GET from memory, MEMORY save, KILL, PRINT, TEAR, WEAVE, REMOVE, INITIALISE, CLEAR, ONSCREEN, FIND.
- * Automatic formatting up to 130 columns, suitable for all printers.
- * Printer controls can be embedded in the text (single character).
- * ONLY £19.50 inclusive. (OR SEND FOR FULL INFORMATION).

BRUNNING SOFTWARE
34 HELSTON ROAD,
CHELMSFORD, ESSEX CM1 5JF.

QUICKBEAM SOFTWARE presents

DICKIE DIVER

Daring Dickie Diver, Dives Deep to the Depths of the Dark Dingy Domain of the Deadly Demons. Will our hero, Dashing Dickie, Drown, or will he Dice with Death and Dodge the Demons. Discover the Undersea World of Dickie Diver. Swim through the Massive Cavern and collect the Oysters with which you have to buy your air. But beware of the Acid Plants and the Thingummies which thrive in the Dark Dingy Domain. A pure machine code arcade game for 1/2 players. Joystick/Keyboard options (Spectrum).....£5.95

TERROR CASTLE

Dare you attempt this Adventure. Have you the nerve to set foot in Terror Castle. This spine chilling adventure is not for those of a nervous disposition or for people who are scared of things that go bump in the night. (Dragon 32, BBC Electron, Spectrum).....£5.95

THE SHRUNKEN SCIENTISTS' QUEST

Can you imagine being only one inch tall, mole hills are like mountains, puddles are like lakes and every insect is a monster. Due to a scientific mishap this has happened to you. Your task, to get to the antidote. But how will you do it? A tough and addictive adventure that will not be solved in a day. (Dragon 32, BBC).....£5.95

SUPER DRAUGHTS

A version of the classic game with 10 levels, making it suitable for the beginner to the expert. (Spectrum, Commodore 64).....£5.95

TOMBSTONE AND COD CREEK

Two classic games for the whole family. Many hours of entertainment for 1 to 4 players. Excellent value. (Dragon 32).....£5.95

DUPLICAS

The Dragon 32 cassette copier. This copier will even make backups of the latest Dongle software. "Of the numerous back-up programs I have Duplicas outperforms them all" D.M. of Warrington. (Dragon 32).....£5.95

Make cheques/PO payable to:

QUICKBEAM SOFTWARE
67 Old Nazeing Road, Broxbourne, Herts EN10 6RN.

SPECTRUM and DRAGON TAPE COPIER 5 and now MICRODRIVE 1

WE OFFER ON ALL PRODUCTS A FULL MONEY BACK GUARANTEE, an update service, and FULLY detailed instructions, with USER friendly programs. Match that!

TAPE COPIER 5 (TC5) makes BACK-UP copies of ANY type of SPECTRUM (16/48K) program (incl headerless, mic, unstoppable) easily with MANY unique features.

MAXIMUM 5 STARS from H.C. Weekly (just like GRAPHICS and SOUND TOOLKIT) — £5.50

- LOADS in all program parts CONTINUOUSLY — even without pressing a key. Other copiers require many loadings — MASSIVELY saving you time and trouble! Maxbytes even manages a working copy of the full 48K.
- MicroDrive — this extra option GENUINELY copies BASIC, MCODE + arrays onto MICRODRIVE.
- Verifies Repeat copies Auto Abort! Program name plus HEADER data.
- Copies virtually ALL programs, UPDATE service for old customers, to keep pace with latest developments. £1.50 (£2 with midrive) + SAE + old TAPE.

MICRODRIVE ONE (MD1)

48K Spectrum owners with midrive can NOW transfer the MAJORITY of their programs (incl headerless, long programs, + those with LOW addresses — say 16384).

TC5 transfers the bytes, but MD1 has 5 programs to HELP YOU get them running + 2 "CAT" housekeeping programs. Includes advanced header reader, program analysis, and other programs that produce the micode you need. Manual has examples/exercises. UNRIVALLED!

Spectrum T.Copier £4.50 (or £5.50 with midrive option). Dragon Copier £6.99. Microdrive One £6.50.

OVERSEAS customers: add £1 Europe, £2 others for each product. Please send SAE for enquiries.

LERM, DEPT YC, 10 BRUNSWICK Gdns, CORBY, NORTHANTS.

New Releases

of computer software for the CBM64 BBC, Spectrum, Atari, new list every 2 weeks. Also software for the T199/4A, Dragon, Electron, Lynx, Sharp MZ700, Tandy, Vic 20, ZX81. Please state computer business and games software.

M. J. SEAWARD
St. Olafs Road, Stratton,
Nr. Bude, Cornwall.

Very short but powerful programs
Strongly recommended by educational
authorities

EDUCARE'S 50

Book of fifty programs for primary
education

Spectrum ZX81 (1K) £5.95 BBC Micro/
Electron £7.95

EDUCARE 139a Sloane St.,
London SW1X 9AY.

It's easy to complain about advertisements. But which ones?

Every week millions of advertisements appear in print, on posters or in the cinema.

Most of them comply with the rules contained in the British Code of Advertising Practice.

But some of them break the rules and warrant your complaints.

If you're not sure about which ones they are, however, drop us a line and we'll send you an abridged copy of the Advertising Code.

Then, if an advertisement bothers you, you'll be justified in bothering us.

The Advertising Standards Authority.
If an advertisement is wrong, we're here to put it right.

ASA Ltd, Dept 2 Brook House, Torrington Place, London WC1E 7HN

This space is donated in the interests of high standards of advertising.

SELL IT WITH YOUR COMPUTER

CLASSIFIED ORDER FORM

Classified Rates

Linage: 50p per word (Min 20 words) —
prepayable

Linage advertisers should complete the 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 scc (Min 2scc)

One insertion : £9.00
Three insertions : £8.70
Six insertions : £8.50
Twelve insertions : £8.00

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.
(011) 661 3036

Please insert the following advertisement in Your Computer Classified Section

					LINAGE
					£10.00
					£12.50
					£15.00
					£17.50
					£20.00
					£22.50
					£25.00

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 26th NOV. FOR JAN. ISSUE PUBLICATION

Company Registered Number: 151537 (England) Registered Office: Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

FUN WITH SPEECH 64!



Speech Synthesiser for the Commodore 64

SPEECH 64 for the Commodore 64 is ready to talk immediately on power-up, has an infinite vocabulary and extra BASIC commands. Retailing at only **£29.95**, **SPEECH 64**'s advanced features will give you, your family and friends lots more fun with your computer! Its sister unit **μSPEECH** — for the Sinclair Spectrum — is a smash hit in the UK and over 10 other countries, and has been awarded the CTA 'Product of the Year' accolade.

SPEECH 64 is easy to use! It needs no software to be loaded, it does not steal RAM from the BASIC operating system, or stop arcade style action.

With extended BASIC commands like SAY and its Text to Speech facility **SPEECH 64** can be programmed in plain English, just like this: **SAY "to say anything you want"**

You can choose from two different voices, each with programmable intonation, and other commands control the voicing of keys as they are pressed — a useful educational aid for young children.

SPEECH 64 comes complete with full documentation and two free full colour posters. Watch out for **SPEECH 64** as it appears in retail outlets nationwide — or use the order form below, at no extra cost.

CURRAH

Computer Components Ltd

To: **SPEECH 64 Offer**, P.O. Box 1, Gateshead, Tyne & Wear, NE8 1AJ

Please Supply **SPEECH 64** unit(s) at £29.95 each incl. VAT & P & P

Name (please print) _____ GC1

Address (please print) _____

Postcode _____

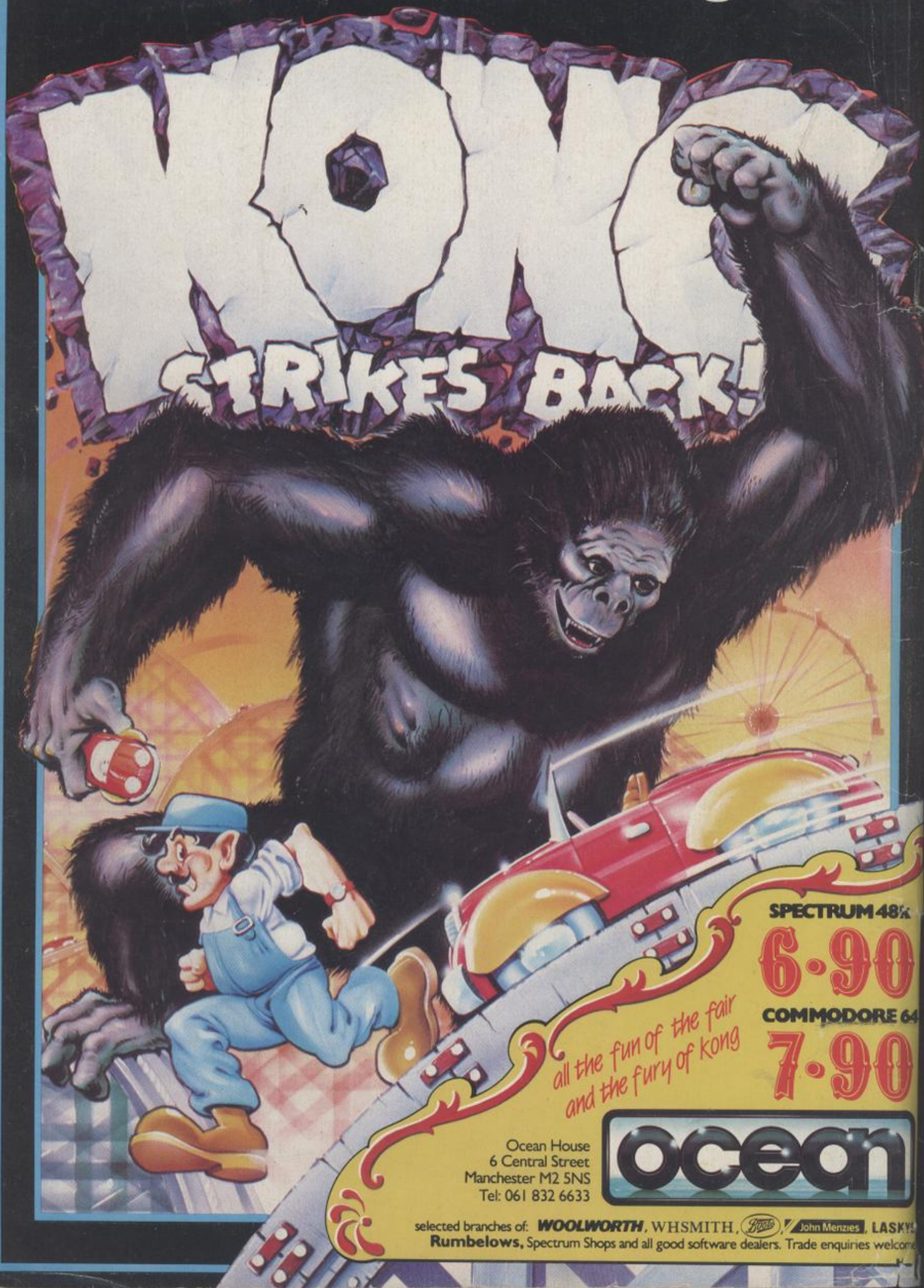
I enclose a cheque/PO payable to 'SPEECH 64 Offer' value £: _____

or debit my Access/BarclayCard No.

Signed (credit card orders not accepted unless signed) _____

Credit Card Hotline 091 - 482 4683 Please allow 28 days for delivery. Offer valid UK only

The king returns with a vengeance!



SPECTRUM 48K

6.90

COMMODORE 64

7.90

*all the fun of the fair
and the fury of kong*

Ocean House
6 Central Street
Manchester M2 5NS
Tel: 061 832 6633

ocean

selected branches of: **WOOLWORTH**, **WHSMITH**, **John Menzies**, **LASKYS**,
Rumbelows, Spectrum Shops and all good software dealers. Trade enquiries welcome