WIN AN AMSTRAD

YOUR COMPUTER

Canada	C$	4.00
Denmark	DKr	33.00
Germany	Dm	8.00
Greece	Dra	280.00
Holland	DFL	7.00
Italy	L	3900
Singapore	M$	5.25
Spain	Pts	350.00
Sweden	SKr	22.20
Switzerland	SFr	6.40
U.S.A.	$3.95 (D72163)	

85p

JUNE 1984 BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE Vol. 4 No. 6

Secrets of the black boxes—
QL and Amstrad reviews
Dragon Kart and Animator
Atari World Quiz
Oric Trek
BBC Sprites and Krazy John
Pongo and Spectrum Draw
CBM 64 games test
and Caves of Mars



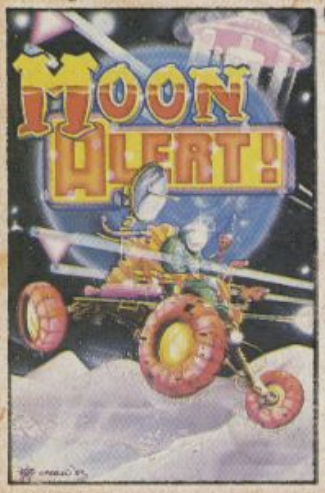
You are not alone

Put your micro on the phone and plug into the real world

The sky's the limit!!..
for fun and excitement with these cracking new stunners from Ocean.















Here's more top games from Ocean to test the best of you top games masters.
Outstanding classics and incredible originals all available for the **Spectrum 48K**.
For the **Commodore 64**: Chinese Juggler, Cavelon, Gilligan's Gold, Mr. Wimpy and Hunchback.
For the **Dragon**: Hunchback.

Games prices:
SPECTRUM 48K **5·90**
COMMODORE 64 ORIC, DRAGON **6·90**

Ocean Software Ltd.
6 Central Street
Manchester M2 5NS
Telephone: 061 832 6633

ocean

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

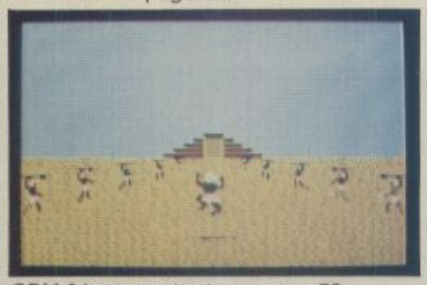
YOUR COMPUTER

Contents

JUNE 1984



QL review — page 64.



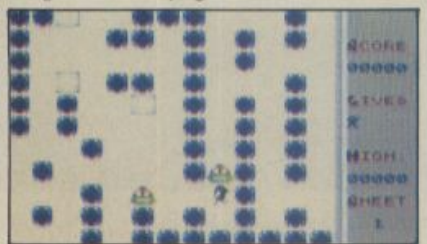
CBM-64 games tests — page 78.



Plug in to the modem world — page 80.



Dragon Kart — page 142.



Spectrum Pongo — page 96.

42 EDITORIAL AND YOUR LETTERS: The first QLs of spring; the dangers of using butter in printer maintenance; an assessment of MSX.

44 NEWS: Autumn launch for MSX; cheaper Apple IIs with mice; at last the Acorn BBC Z-80 second processor; CBM-16, the Vic-20 substitute; QL controversy.

49 FIRST BYTES: Bit-mapped screens, logical operators.

53 COMPUTER CLUB: Paul Bond visits Milton's birthplace.

55 SOFTWARE SHORTLIST: New commercial releases.

61 QUEST CORNER: Hugo North guides you to your goal.

64 QL REVIEW: Tim Hartnell makes overt contact with the new arrival from Sinclair and finds it is not alone. It has a box tacked on to it.

70 AMSTRAD REVIEW: A rosy future is predicted by Simon Beesley for this new hi-fidelity micro: £229 with monochrome set and cassette storage.

77 AMSTRAD COMPETITION: Try your luck with *Your Computer.*

78 CBM-64 GAMES SURVEY: Paul Bond in the software forest.

80 THE WORLD OF MODEMS: Modulate and demodulate in the comfort of your own duplex with Richard Lambley.

85 BBC COMMUNICATIONS: John Dawson looks at Commstar package.

93 PRESTEL ADAPTORS: BBC and Sinclair adaptors by Jack Russell.

96 SPECTRUM PONGO: Pick up a penguin with Jonathan Ward in this chillingly exciting game. A chip off the old block.

98 CBM-64 CAVES OF MARS: In the last quarter of the 20th century, Bruce Russell turned his telescope on the red planet and discovered treasure.

103 ZX-81 HI-RISE HIVE: Dave Rogers and Colin Hogg plunge you headlong into an apiarist's nightmare. Can you get to the exit and avoid the killer bees?

108 ATARI WORLD QUIZ: No good talking to someone from Mendocino on your modem if you don't know where it is. HP Lord clues you in on Planet Earth.

113 BBC KRAZY JOHN: Excuse me, I just jumped off the Empire State Building. Control Krazy John, the foolhardy climber, in John Wilson's game.

117 VIC GUARDIAN: Extraterrestrial ghoulies and ghosties dog your faltering footsteps as you try to get treasure away from the unprincipled Guardian.

120 BBC SPRITES: Bobby Rao speeds up your programming by introducing you to some very user-friendly, easily defined sprites.

127 DRAGON ANIMATOR: The SAM chip is the real star of this show as Derek Gladding shows you how to get a little life into your graphics.

133 SPECTRUM DRAW: A bigger splash for your artistic ideas thanks to Torsten Martinsen.

139 VIC THINGS: It's raining, so you can't get out of the house. You stare ruefully at your old Vic-20. Andrew Bacon suggests a few things to do.

142 DRAGON KART: John Nash screams round the track. This makes up for the apparent lack of car simulators on the Dragon 32.

147 MICRODRIVE FILE: Making the most of your Microdrive? Robert Newman looks at the possibilities for database management and data retrieval.

153 ORIC TREK: Dennis Salisbury takes his Oric out of planetary orbit and into the far distant reaches of the galaxy. Your chance to split infinitives all over infinity.

160 SINCLAIR QL COMPETITION RESULTS: The winner and also-rans — together with a selection of the best entries.

165 ZX-81 TEXT EDITOR: Julian Ossowkhi processes words.

169 RESPONSE FRAME: Tim Hartnell answers your problems.

171 SOFTWARE FILE: Programs for most home micros.

218 DATABASE: Paul Bond rounds up micro events.

Learn a foreign la in twelve hou It's as easy as B

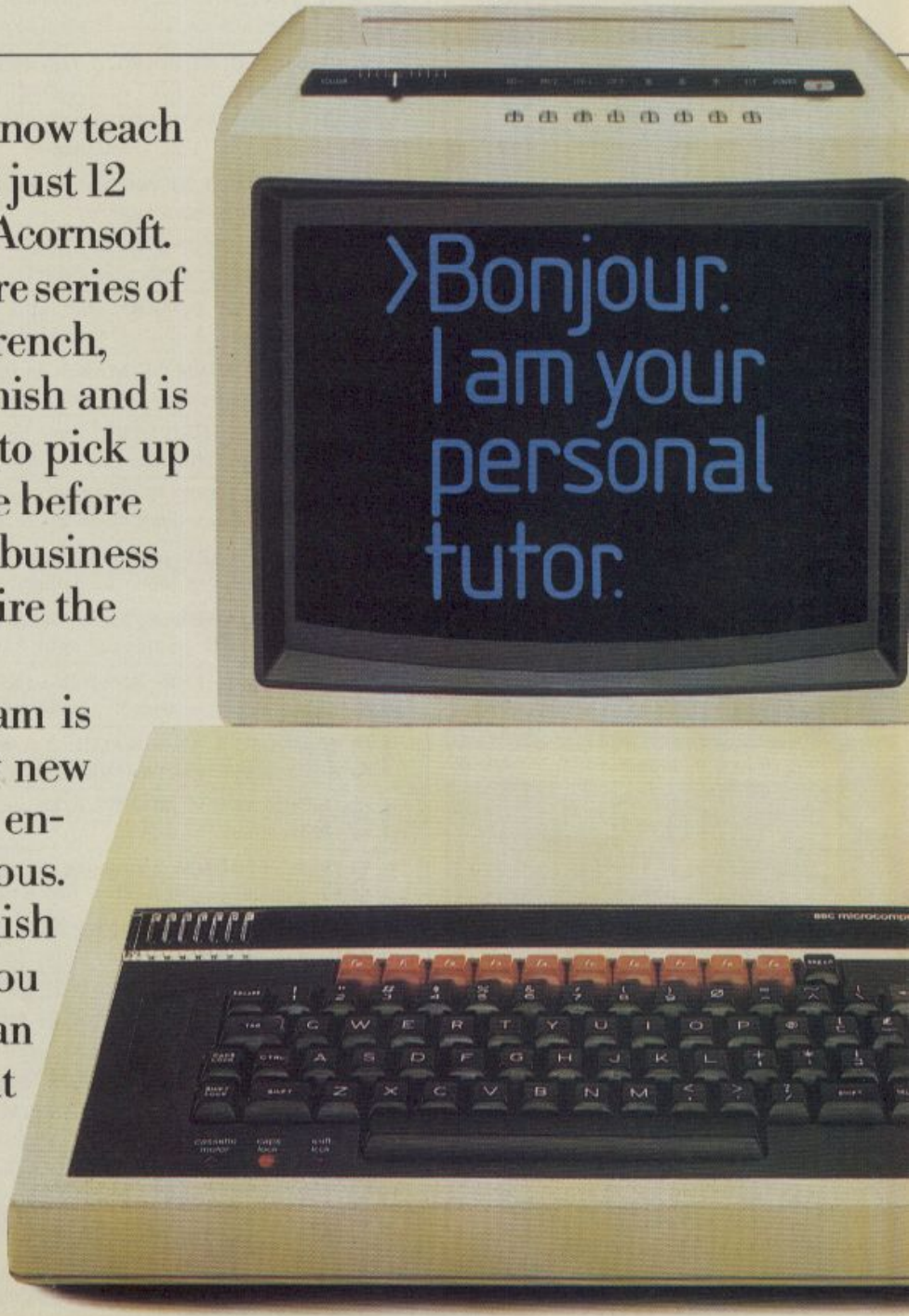
Your BBC Micro can now teach you a foreign language in just 12 hours, via Linkword from Acornsoft.

Linkword is a software series of four language courses – French, Italian, German and Spanish and is ideal for those who want to pick up an elementary knowledge before going on holiday, or for business people who need to acquire the basics in a hurry.

Each 12 hour program is based on a revolutionary new format, making learning enjoyable rather than laborious.

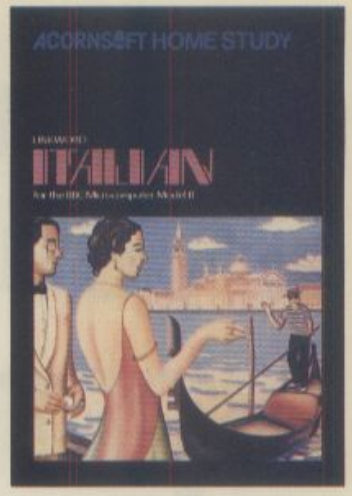
For instance, the Spanish word for bread is 'pan', so you are asked to imagine a pan full of bread and hold that image in your head for 10 seconds.

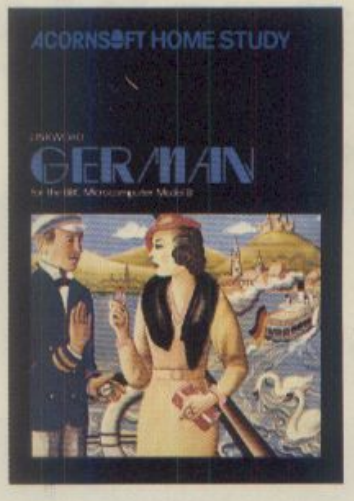
This method will rapidly enable you to



nguage rs. BC.









build up a vocabulary of around 400 words covering a wide range of useful topics.

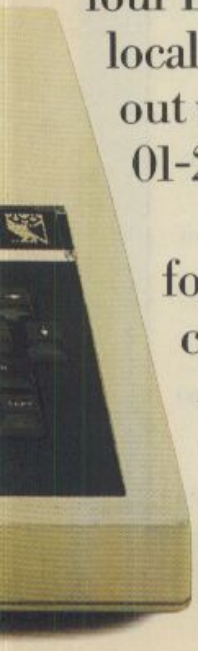
Once again, it's another exciting dimension to fulfilling your BBC Micro's potential.

You can order by filling in the coupon opposite. Credit card holders can order by calling 0933 79300 during office hours.

Alternatively, you'll find all four Linkword programs at your local Acornsoft dealer. (To find out where that is, simply call 01-200 0200.)

They come in cassette form, complete with an audio cassette demonstrating the correct pronounciation.

And at just £14.95 each it shouldn't be hard to talk yourself into buying one.



To: Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL.
Please send me the following language software packages at £14.95 each.

PROGRAM	QUANTITY	TOTAL	(Code Acornsoft use only.)
French			SBX13
Italian			SBX14
German			SBX15
Spanish			SBX16
	TOTAL		

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

Card Number_____
Amex/Diners/Visa/Access (Delete)

Please send me details of the BBC Microcomputer System ☐
Please send me the latest Acornsoft Catalogue ☐

Name_____

Address_____

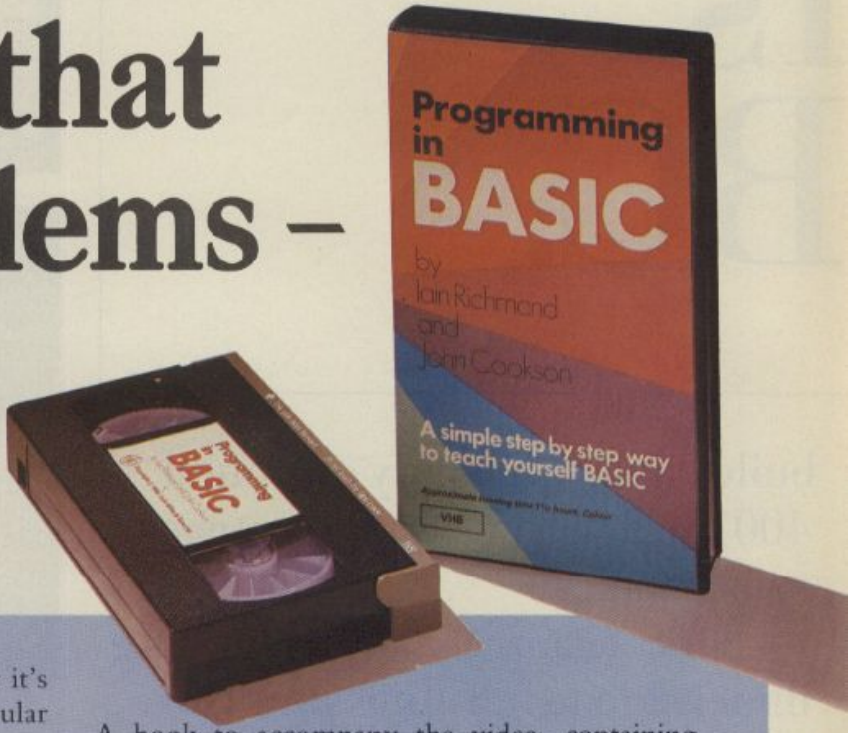
_____ Postcode_____

Signature_____

Registered No. 1524763 VAT No. 215 8123 85

ACORNSOFT

Recommended viewing if you want to write programs that solve problems – not create them.....



If you've recently bought a microcomputer it's almost certain to run BASIC, the highly popular language used widely for teaching computer programming.

Learning to program in BASIC is an ideal first step towards getting the greatest use out of your microcomputer, whether at home or work.

However, there's more to good programming than simply writing a list of statements in computer language. The ability to analyse problems and produce sensible solutions to them is ultimately required in order to design the most successful applications.

Helping you to develop that ability is precisely the aim of this new video course *Programming in BASIC*. Each section of the course is packed with information explaining the various aspects of programming.

Step by step *Programming in BASIC* shows how to use BASIC safely and sensibly. And by emphasising the careful construction of programs it will put you in good stead for progressing to more modern, structured languages.

Programming in BASIC was written by Iain Richmond and John Cookson, both of the Edinburgh Regional Computing Centre, University of Edinburgh. It is available for VHS and BETAMAX video systems at a price of £29.95. (Running time approx. 1½ hours.)

A book to accompany the video, containing further detailed information is also available, price £4.95.

Both items may be ordered through bookshops and computer stores or direct from the publisher, John Wiley & Sons Ltd, Baffins Lane, Chichester, Sussex, England (Reg. No. 641132), by simply returning the coupon (no stamp required).

Please send me

☐ Programming in BASIC Video Cassette @ £29.95

Please tick version required ☐ BETAMAX ☐ VHS

☐ Programming in BASIC Book @ £4.95

☐ I enclose cheque for . . . . . payable to John Wiley & Sons Ltd.

☐ Please charge my AMERICAN EXPRESS/DINERS CLUB/ BARCLAYCARD/VISA/ACCESS CARD

No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Date of expiry . . . . . .

To telephone credit card orders (in UK only) dial 100 and ask for FREEFONE 3477

Name/Address _____

_____

_____

Signature _____ YC 6/84

Return this coupon to: Annabella Duckit, John Wiley & Sons Ltd, FREEPOST, Baffins Lane, CHICHESTER, Sussex PO19 1YP Telephone (0243) 784531

*Commodore-64
*Dragon 32/64
*Atari 400/600/800 (48K)
*Acorn Electron
*BBC Model/B
*Tandy c/c (32K)

747 Flight Simulator

from DACC — The Simulation specialists



Actual screen photograph (BBC version)

Unrivalled and unbeatable for accuracy and realism — the DACC 747 Flight Simulator is the most successful of its kind on home computers. The only simulator which shows all the essential flight and engine instrumentation of the Jumbo Jet, as they really are — real dials — and with a precise 3D view of the runway. The control and response of the 747 are faithfully reproduced using genuine aero-dynamics formulae. Start options include take-off, random landing approach, passenger and fuel load selection, etc. You control the throttles, elevators, ailerons, flaps, spoilers, landding gear, brakes, reverse thrust, etc. Joysticks are optional on all but Dragon and Tandy versions.

Cassette £9.95 (inc. VAT and P&P)

Special Officer on Joysticks

Normally £17.95 per pair. Yours for only £12.95 if ordered with 747 Simulator (Atari & CBM-64 types £14.95).

Please state type of computer on all orders.

WE DESPATCH WITHIN 48 HOURS

Order direct from:

DACC Ltd. (Dept YC2)
23, Waverley Road, Hindley, Nr. Wigan, Lancs. WN2 3BN.

VIC 20 · SPECTRUM · ORIC · CBM 64 · BBC · DRAGON · ZX 81

SOFTWARE EXCHANGE...

...invited YOU to join THE CLUB

WHY??

Joining **THE CLUB** will enable you to...

... 1) Swap software with other members
2) Sell software to other members
3) Sell equipment to other members
4) Rent a selection of the best games available

OTHERS

WHAT DO I GET??

A monthly publication which advertises...

... 1) The software you want to swap
2) The software you want to sell
3) Any equipment you want to sell
and 4) Lists all new games available for rental

WHAT DOES IT COST??

6 monthly membership costs £5.50
Annual membership costs £10.00

(full refund, within 28 days, if not delighted)

I enclose a cheque/P.O. for £.....

Please rush me my membership card, a full list of games available for rental and full membership details.

SOFTWARE EXCHANGE, 6, 2 SHADYLANE, BROOKLANDS, MANCHESTER 23 9PU.

I own a ..... (micro)

FULL NAME .....

ADDRESS .....

.....

..... YC6

48k SPECTRUM OWNERS

READ THIS FROM OCP

MACHINE CODE TEST TOOLS FOR SPECTRUM, ZX81 AND TS1000

The ultimate professional tutor and de-bug program, we wrote these to help us write our own machine code programs.
● **TEST** and display machine code instructions as they're written. ● **IDEAL** for both the novice and the expert. ● **FULLY** documented with a 32 page tutorial.
● **HEX:DECIMAL** conversion as standard. ● **CHARACTER GENERATOR** — of unbelievable quality!!! supplied free with the spectrum version.

MASTER TOOLKIT (16/48K)

YOUR BASIC WILL NEVER BE THE SAME AGAIN!
This program adds a whole range of really powerful commands:— ● Real time clock and alarm with off/on/set and print commands. ● BLOCK MOVE, COPY, DELETE and MERGE two lines, FIND and CHANGE character string, RENUMBER, 10 programmable keys, TRACE with execution display, VARIABLE display and dump, COMPRESS, REMKILL and PACK to minimise program bytes, CHANGE CASE upper to lower and back.

FULL SCREEN EDITOR/ASSEMBLER (16/48K)

voted THE MCST POWERFUL MACHINE CODE PROGRAMMING TOOL YET SEEN by HOME COMPUTER WEEKLY
● Editing facilities comparable to the most sophisticated word processor with MOVE, COPY and/or DELETE lines or blocks of code. ● LOCATE, CHANGE or DELETE strings/characters, full 280 set supported, syrtax check, powerful expression evaluator etc. and "SNAKE" a fully notated source code demonstration program.

ADDRESS MANAGER (16/48K)

Works on the 16K and 48K Spectrum, in 48K it will store, file, select and retrieve over 400 full addresses (over 1500 individual names). Dynamic Memory Management and compression techniques makes all this possible and there's a lot more: ● **FULL SCREEN INPUT and EDITING** — see it as a page as it happens with insert, delete and TAB Commands. ● **MULTIPLE INDEXING** — 3 way user-defined index enables you to define, catalogue, select and print entries as needed, (essential for the more sophisticated applications.)
● **INSTANT RESPONSE** — yes this program is very very fast. ● **SUPER FRIENDLY** — extremely easy to use and efficient in a way that BASIC can never be. Standard Program uses ZX Printer.

FINANCE MANAGER (48K)

FINANCE MANAGER is a powerful, flexible and fast MENU DRIVEN general purpose program carefully designed to handle up to 255 separate accounts for domestic and business accounting applications. The magic of MACHINE CODE has enabled us to produce the very latest "on the page" presentation which lets you enter and edit data naturally, as if with a pencil and paper. But that's not all, not by a long way. This program automatically raises a corresponding debit or credit for every entry, and will even open a new account if an entry features an unrecorded account name. Accounts can be MERGED, DELETED, ANALYSED, MARKED, as priority, RENAMED, EDITED and SCROLLED. Transactions can be RECONCILED, AMENDED, DELETED, PRINTED, DESCRIBED for analysis and RENAMED. Standing orders can be APPLIED, REMOVED, DESCRIBED, AMENDED, DELETED and even DUMMIED for planning purposes. Standard Program uses ZX Printer.

PLUS 80 VERSIONS

of ADDRESS MANAGER, FINANCE MANAGER and EDITOR ASSEMBLER are available to give 80 COLUMN PRINTOUTS USING KEMPSTON'S INTERFACE AND CENTRONICS PRINTER.

CHESS — THE TURK (48K)

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 challanges 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 OPTION ● FULL INSTRUCTIONS PROVIDED

POST TO: OXFORD COMPUTER PUBLISHING LTD
4a HIGH STREET, CHALFONT ST. PETER, BUCKS. SL9 9QB

Please rush me **Machine Code Test Tool (Spectrum) £9.95** ☐ **Machine Code Test Tool ZX81 £9.95** ☐ **Master Tool Kit £9.95** ☐ **Chess — The Turk £8.95** ☐ **Address Manager £8.95** ☐ **Plus 80 £19.95** ☐ **Finance Manager £8.95** ☐ **Plus 80 £19.95** ☐ **Full Screen Editor/Assembler £9.95** ☐ **Plus 80 £19.95** ☐

NAME.....

ADDRESS.....

.....

ACCESS CARD NO..... **EXPIRY DATE**.....



Jet Set Willy **£5.95**

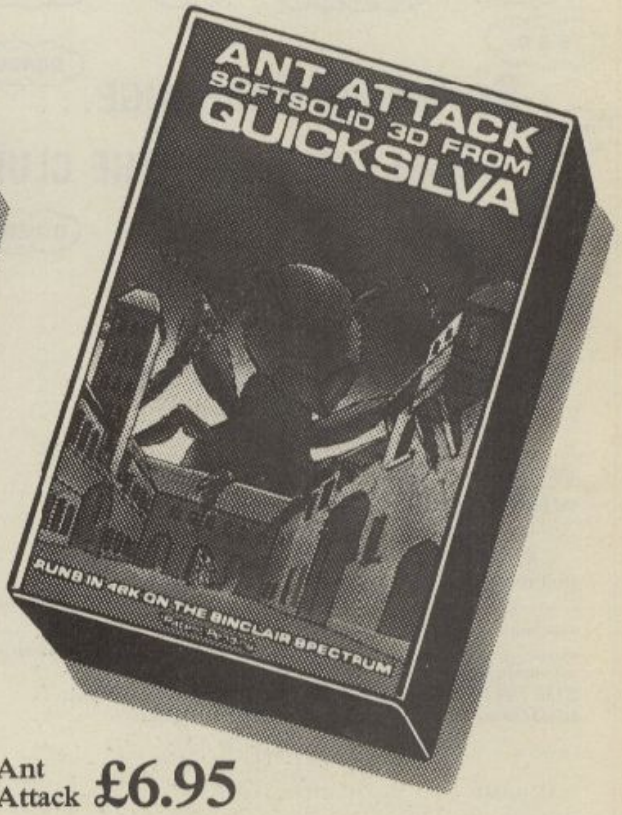


Bear Bovver **£6.95**

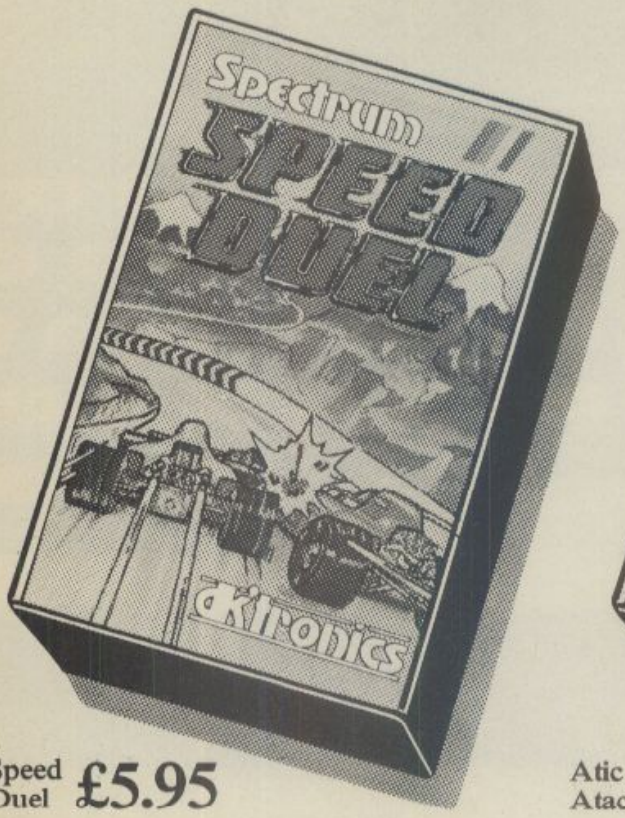
Thousands of Spectrum



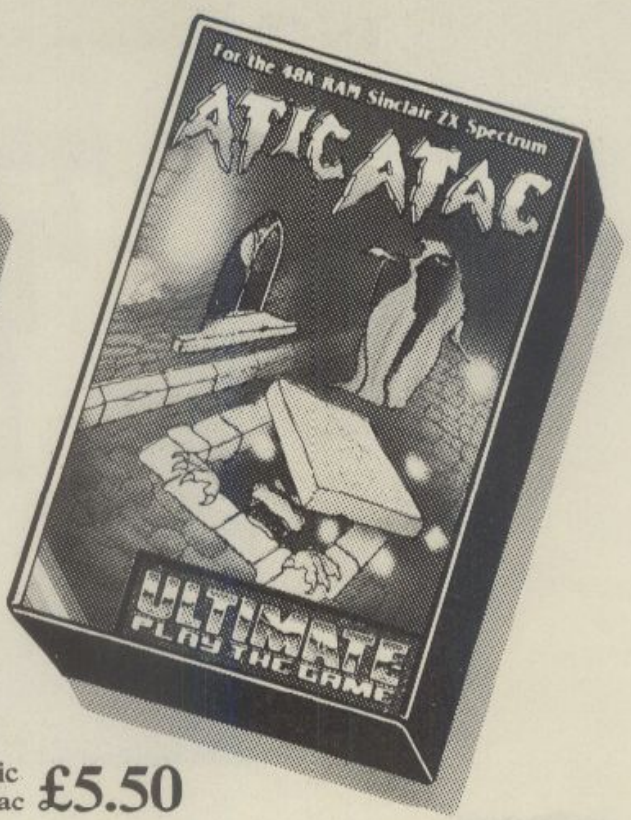
Chequered Flag **£6.95**



Ant Attack **£6.95**



Speed Duel £5.95



Atic Atac £5.50

owners know we're in the right game

Last year W. H. Smith sold thousands of Sinclair Spectrums, making us one of the leading stockists in the country and the ideal choice for Spectrum Software.

With Arcade Games ranging from Jet Set Willy to Ant Attack we've got action and excitement just waiting for you.

Of course, our range doesn't just stop at games. As leading stockists, we can also offer you an extensive choice of educational software.

What's more, we're constantly updating the range, as new software is released so you can count on us having all the latest, most current programs.

In fact, for the full spectrum, you can't do better than come to the people who know the game.

WHSMITH

Subject to availability. Prices correct at time of going to press. At selected branches only.



Chances are, we your new Ac

If you're itching to get your fingers on this long-awaited computer, your best bet is to find a larger branch of W. H. Smith, because we're the major distributor of the Electron.

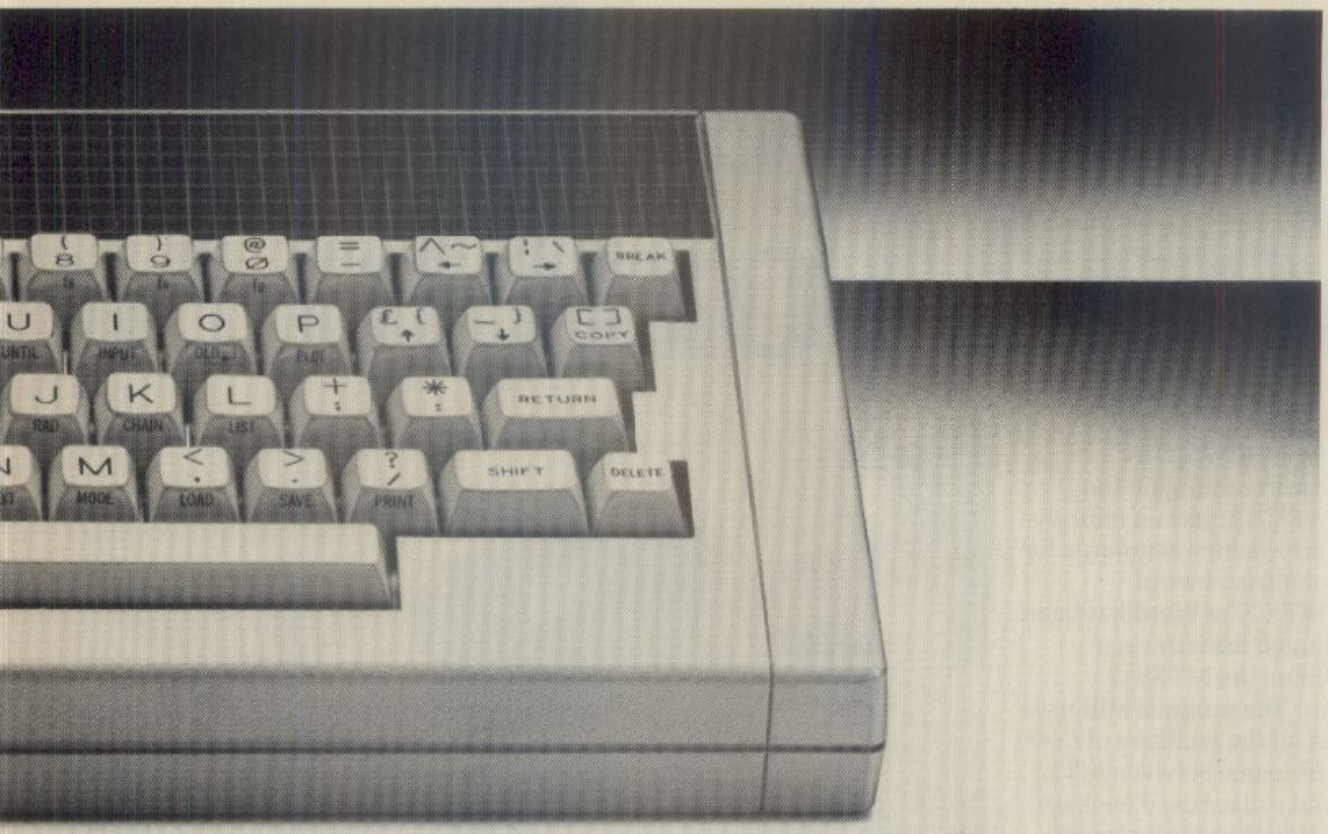
Of course it's not surprising that it's proving to be so popular.



A selection from the range of Acorn Electron software.

It speaks BBC Basic. Its 56 key electric typewriter style keyboard is robustly constructed with a good solid feel.

The Electron provides seven different display modes from high resolution graphics necessary in games, to a full eighty columns of text



'll be supplying orn Electron

across the the screen. It comes not only with a comprehensive user-guide, but also with a book that takes you through the principles of Basic programming, as well as a demonstration cassette containing fifteen programs.

And it costs only £199: at this price and with its impressive specification, the Acorn Electron represents outstanding value for money.

As well as the Electron, you'll find we have the range of Electron software.

So come in and see us at W. H. Smith.

WHSMITH

Price correct at time of going to press. Subject to availability. Available at selected branches only.

Memotech MTX
NewWord® to Ne

MTX NEWWORD + MTX512
A UNIQUE COMBINATION

MTX NewWord, running on the Memotech MTX512, sets an entirely new set of performance standards for microcomputer based word processors. MTX NewWord has been specially adapted from its CP/M version to run on the MTX512 without discs. The program still uses CP/M, and has all the facilities of CP/M – the only difference between MTX NewWord and a disc based package is that MTX NewWord is faster and much more cost-effective.



DEVELOPED ON DISC TO RUN ON ROM

The power of MTX NewWord is in its software – it doesn't need expensive disc drives and their supporting hardware even though it operates as if it had them.
It is this feature that makes the progam unique – it has disc sized power without a disc sized price.
MTX NewWord was developed by the same team that created Wordstar – the powerful word processing system designed for the business environment.

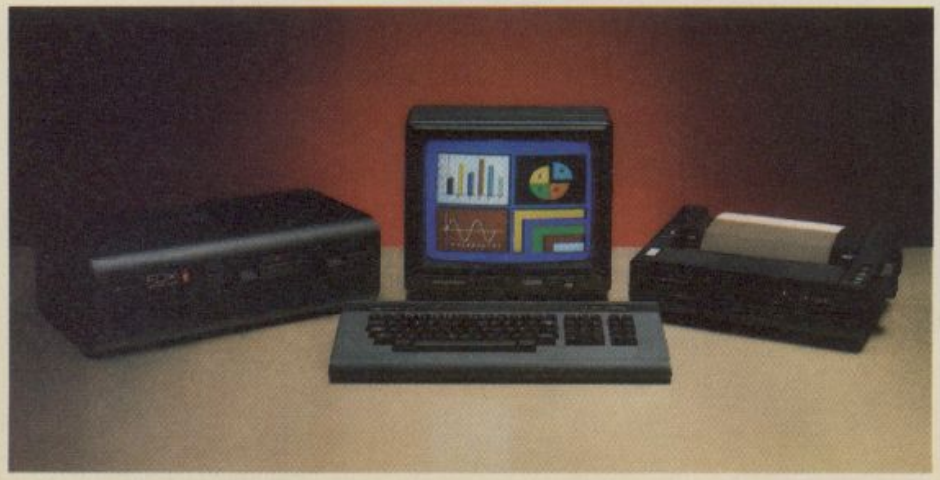
THE PROGRAM

Memotech have combined the professional typewriter style keyboard of the MTX Series with ROM memory, to produce a package that has everything a disc based system has.
The program is Menu-driven, which means it includes a step by step Onscreen Guide to all its functions, with Opening, Editing, Saving & Printing, Quick Function, On-Screen Format and Help menus plus many fast, powerful functions like FIND, SEARCH & REPLACE and DECIMAL TABBING.
If you've ever used Wordstar, you're already familiar with MTX NewWord – NewWord's increased speed and efficiency are the only noticeable differences.

THE MTX NEWWORD PACKAGE

MTX NewWord on disc sells for $249.00 in the USA, although MTX NewWord on ROM costs only £75.00 (or less if you take advantage of our package offer).

The MTX NewWord Package price of £645.00 includes a Memotech DMX80 Dot Matrix Printer, MTX NewWord on ROM and an 80K MTX512 micro.
The package will run other types of software like Memotech's MTX Accounting Package and programs in the First Lessons educational series (not to mention Goldmine and Kilopede!).



COMMANDS AND FUNCTIONS

^A	cursor word left
^B	align paragraph
^C	scroll down screen
^D	cursor right
^E	cursor up
^F	cursor word right
^G	erase to the right
^H	erase to the left
^I	cursor to tab
^J	help
^KD	save file
^KQ	abandon changes
^KS	save and resume
^L	find/replace again
^M	carriage return
^O	on-screen menu
^OC	centre a line
^OD	print control display
^OI	set tab stop
^OJ	justify on/off
^OL	set left margin
^ON	clear tab stop
^OR	set right margin
^OS	set line spacing
^OX	margin release
^P	print controls menu
^PB	bold print on/off
^PC	pause in document
^PS	underlining on/off
^Q	quick menu
^QA	find and replace
^QC	go to document end
^QF	find
^QR	go to document start
^QY	delete to end of line
^R	scroll up a screen
^S	cursor left
^T	delete a word
^U	escape
^X	line down
^Y	delete entire line

DOT COMMANDS

.MB	set bottom margin
.MT	set top margin
.OP	omit default page nos.
.PA	page break
.PC	set page number col.
.PL	set page length
.PN	set page number
.PO	set page offset
..	comment line

OPENING MENU

X	Exit
J	Help
D	Load a document
C	Create a document

OTHER MENUS

^O	Onscreen Format
^Q	Quick menu
^K	Save & printing
^P	Print controls
^J	Help pages

X software, from wton to Nemo.....



MEMOTECH EDUCATIONAL SOFTWARE

Memotech are currently producing two separate series of educational software. They are written for two age ranges; The FIRST LESSONS series covers ages four to seven years and the MATHS and PHYSICS series (each in four parts) cover seven years old up to "O" Level standard.

1st LESSONS is designed to teach younger children the basics of letter and word recognition, with option menus providing the parent or teacher with full control over the program's complexity and reward levels. The child is rewarded with full colour high resolution displays for the right answers.

The MATHS and PHYSICS series are each designed to provide constructive revision texts, and contain animated diagrams, and facilities to go straight to a desired topic.

MEMOTECH MINI PROGRAMS

Memotech Mini Programs are designed to provide a starting point from which the programmer can expand and/or alter the listings to suit his or her particular application. Below is a list of currently available titles:



BUSINESS
CALCULATOR BANK ACCOUNT TYPEWRITER

MATHS & STATISTICS
MATRIX ALGEBRA
INTEGRATION
STANDARD DEVIATION
TWO WAY ANALYSIS OF VARIABLES
TESTS OF SIGNIFICANCE

UTILITIES
RENUMBER MERGE
40 COL. TEXT/GRAPHICS SCREEN
DATA SAVE/LOAD
BINARY/HEX/DEC CONVERTER
SPRITE GENERATOR

TEACH YOURSELF MTX BASIC
GRAPHICS I (PLOT, LINE, DRAW, ETC.)
GRAPHICS II. (ANIMATION)
HOW TO USE MTX ROM RESTART COMMANDS
ASSEMBLER (INTRODUCTION)
SOUND VIRTUAL SCREENS

GENERAL PURPOSE
CHARTS AND GRAPHS
CONVERTER–CURRENCY, LENGTHS, ETC.
SCIENTIFIC CALCULATOR
BRIDGE SCORER
DIARY
ADDRESS BOOK

MEMOTECH ACCOUNTS PACKAGE

The Memotech Accounting Package is a complete set of programs designed for the small to medium sized business (up to 170 employees when used on an MTX512). There are six programs in the series.
The **Payroll** program, for example, handles all necessary calculations to produce wage slips and maintain employee records, and also works out denominations and quantities of notes and coin required for cash paid employees.
Other programs in the series are **Sales Ledger, Purchase Ledger, Nominal Ledger, Bank Account** and **Fixed Assets.**

If you would like to learn more about how Memotech can help you at home or in the office please fill in the coupon below, or ring us for more information. We will be happy to send you an MTX NewWord manual on request.

CPM is a registered trademark of Digital Research Inc.
Newword is a registered trademark of Newstar Inc.

MEMOTECH

Memotech Limited
Station Lane Industrial Estate,
Witney, Oxon. OX8 6BX.
Telephone (0993) 2977

Please supply the following:

☐ **MTX Newword** Packages at £645.00 inc. VAT
☐ An **MTX Newword** Manual only
☐ Further information on the MTX Series

NAME TELEPHONE

ADDRESS

POST CODE

I enclose a cheque for

Please debit my Access/Barclaycard Account, No:

SIGNATURE

Memotech Limited, Station Lane Witney, Oxon. OX8 6BX Telephone (0993) 2977.

MTX 500 – VOTED PRODUCT OF THE YEAR BY COMPUTER TRADE ASSOCIATION

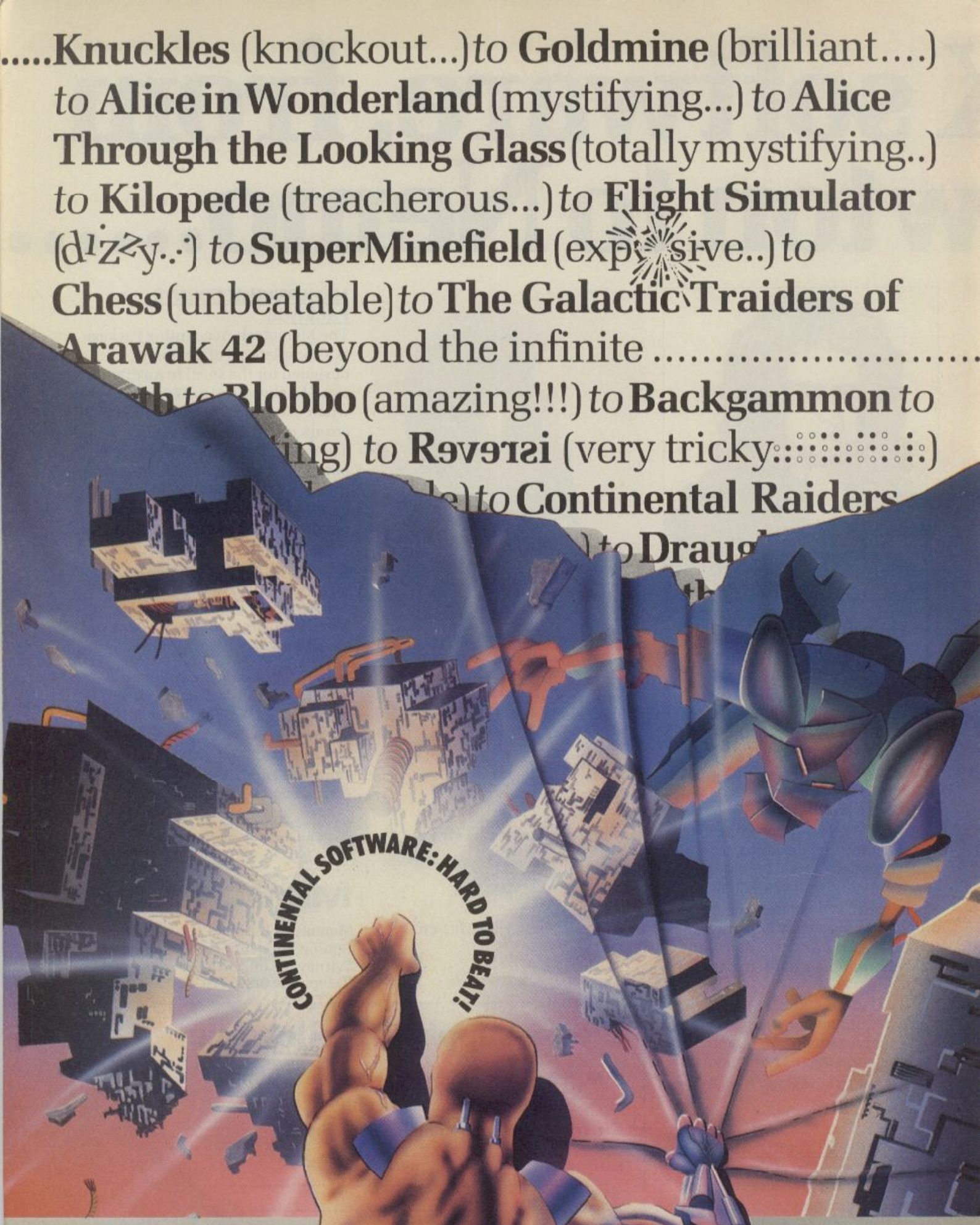
MEMOTECH MTX SERIES

.....**Knuckles** (knockout...) *to* **Goldmine** (brilliant....) *to* **Alice in Wonderland** (mystifying...) *to* **Alice Through the Looking Glass** (totally mystifying..) *to* **Kilopede** (treacherous...) *to* **Flight Simulator** (dizzy..) *to* **SuperMinefield** (explosive..) *to* **Chess** (unbeatable) *to* **The Galactic Traiders of Arawak 42** (beyond the infinite .....

...th *to* **Blobbo** (amazing!!!) *to* **Backgammon** *to* ...ing) *to* **Reversi** (very tricky.....)

...le) *to* **Continental Raiders**

...) *to* **Draug...**



Memotech MTX Software *from*
Continental Software Limited
Station Lane Industrial Estate,
Witney, Oxon.
Telephone (0993) 5071

CONTINENTAL SOFTWARE

OUT NOW! 811 IDEAS FOR YOUR COMPUTER

NEW SAME-DAY DELIVERY

IDEAS BOOK

In the Inmac catalogue of ideas for your computer check to see what is in the latest issue for you:

Cables, cables and more cables! How to order custom-built cables. When to use screened cables. How to choose the right **EIA RS-232** extension cables for your VDU's and how to connect your **Apple, Commodore,** or other micros to **Qume, Diablo,** NEC printers. Compatible cables for connecting new peripherals to your **DEC, Data General, Hewlett Packard, IBM, Osborne** and **Tandy computers.**

Lifetime Floppies Read about Inmac Plus — the floppy with a lifetime guarantee! Choose from our range of **100% error-free** disk cartridges, **flag-free** disk packs, each with a 3-year replacement guarantee.

New Ideas! Dozens of exciting new products — many never seen in Europe before now — and lots of helpful hints on getting more from your computer department.

Service and Quality — a promise you can rely on! We promise a **next day** delivery service of our products, a **30-day risk-FREE trial**, and a **12-month** trouble-free quality replacement guarantee.

Send today for your **FREE** catalogue with no obligation to purchase — but be warned: you will want to buy once you have read the Inmac catalogue ideas book!



FREE! IF YOU USE A COMPUTER ☎ 09285-67551/01 740 9450

Send this coupon to Dept.YC, Inmac (UK) Ltd., Davy Road, Astmoor, Runcorn, Cheshire WA7 1QF.

Name_____

Company_____

Title_____

Address_____

_____

Postcode_____ Tel._____

Computer System_____

24 hour tel. no.
☎ 09285-67551

GOLD

A NEW GENERATION

GOLDSTAR ENTERTAINMENT

classic tales of mystery and adventure to challenge your greatest puzzle-solving skills

Imaginatively written and intelligently programmed, this is software which captivates and enchants, and provides hours of creative activity.

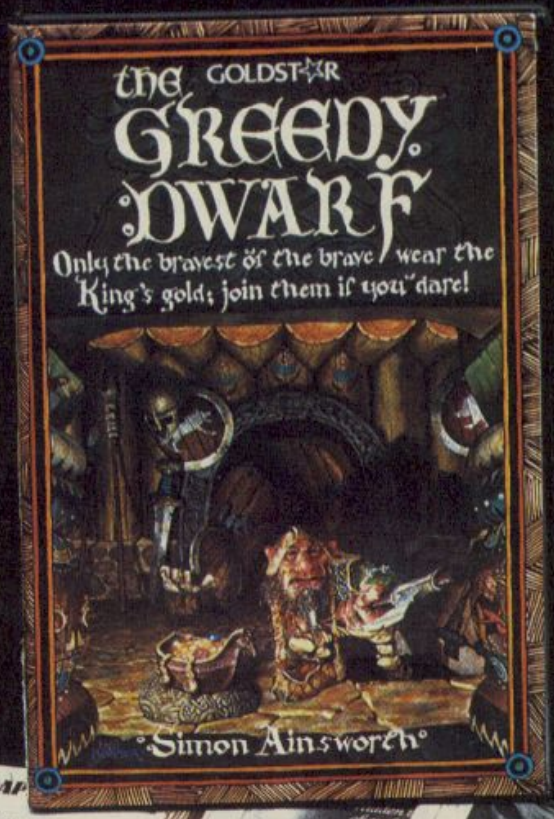
GOLDSTAR HOME REFERENCE

informative and helpful programs which teach useful, practical skills

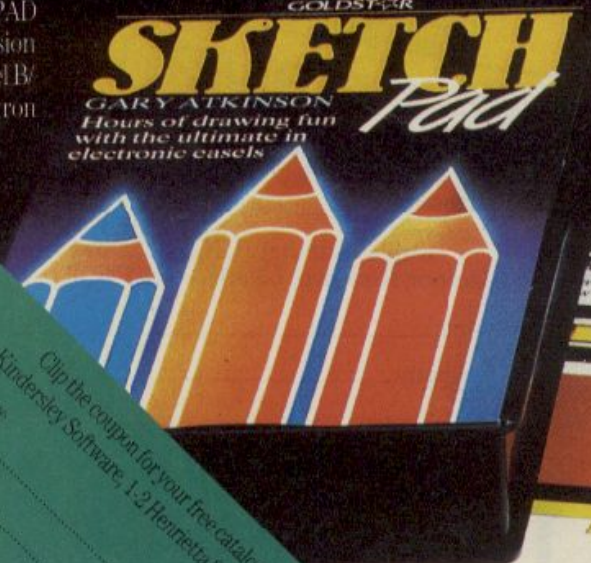
With applications to business and professional purposes as well, this is software which will turn your home computer into an invaluable learning resource.



TINY TOUCH 'N' GO
cassette version
Dragon 32,
BBC Model B,
Commodore 64,
Acorn Electron



SKETCH PAD
cassette version
BBC Model B/
Acorn Electron

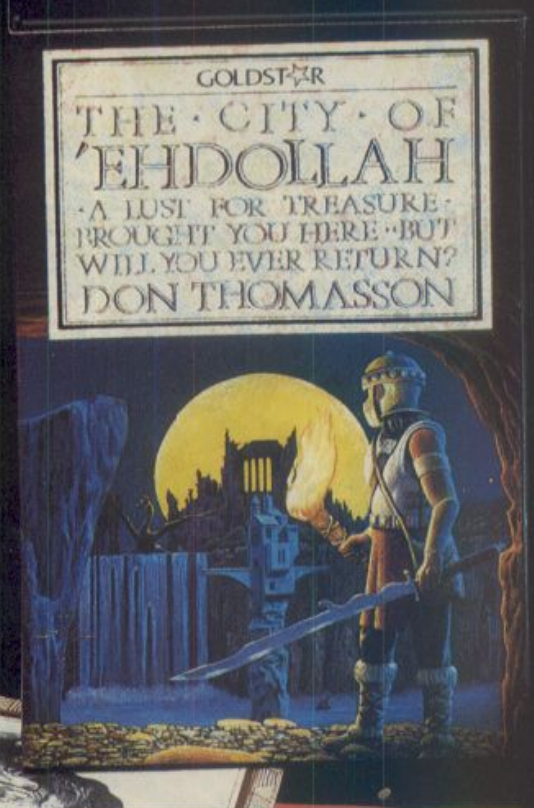


THE GREEDY DWARF
cassette version, BBC Model B, Commodore 64,
ZX Spectrum (48K), Acorn Electron

Clip the coupon for your free catalogue
Send to: Dorling Kindersley Software, 1-2 Henrietta Street, London WC2E 8PS
Block Capitals Please
Name .....
Address .....
Post Code .....

Full supporting documentation in each pack

GOLDSTAR OF SOFTWARE



THE CITY OF 'EHDOLLAH
cassette version, ZX Spectrum (48K),
BBC Model B, Commodore 64, Dragon 32

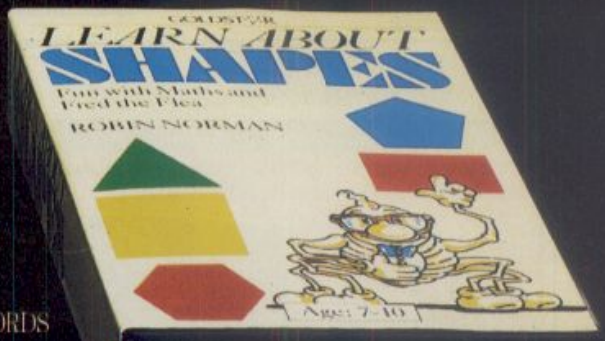


GOLDSTAR EDUCATION

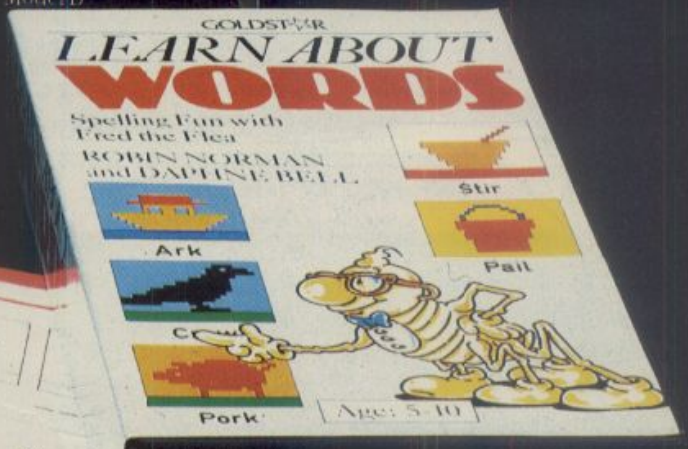
teacher-and-pupil tested programs that really aid learning

Developed with education authority programmers, this is software that presents academically sound content in innovative and exciting ways.

LEARN ABOUT SHAPES
cassette version for
BBC Model B/
Acorn Electron



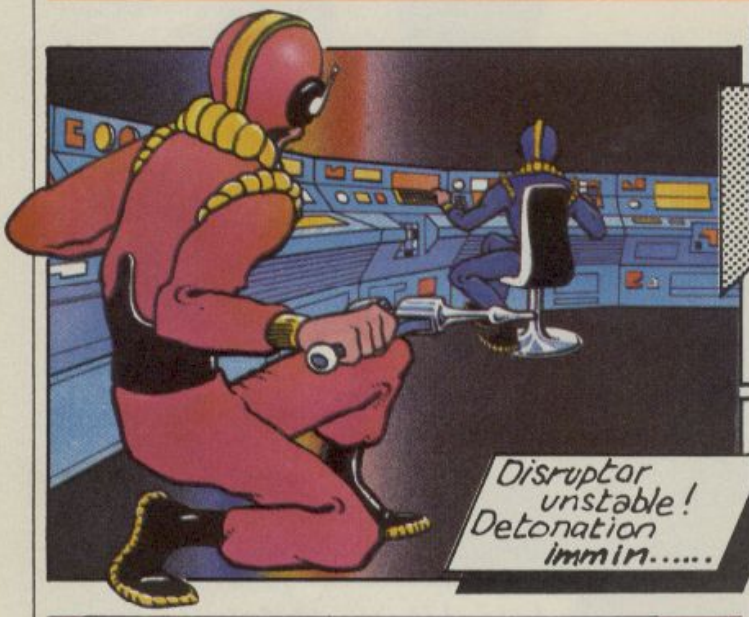
LEARN ABOUT WORDS
cassette version for
BBC Model B



Setting the standard for today's computer user

BEYOND

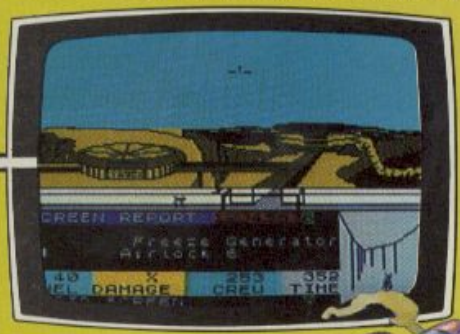
CHALLENGING SOFTWARE



NEW

PSYTRON

Matter Disruptor complex report terminated: Estimate 75 personnel unaccounted for: Repair and medi-crews alerted: Defence circuits detect responsible alien craft now locked onto new target. Saboteur sighted in central corridor Sector 7: Pursuit Droid activated: Switching to visual:::



Spectrum

From the Necromancer's Cauldron...

...Were conjured the ghouls, ghosts and outraged spirits of centuries of sacrifices to the occult. Hurled forth from who-knew-whence to thwart your escape down the perilous fortress steps. An ill-timed move will plunge you into his waiting spider's tangled web. 12 levels of haunting action.



Spectrum

NEW

Spellbound



NEW

The War of the Solstice will Commence!



the LORDS of MIDNIGHT



Gather those you can to your banner. The World's first Epic game. Not an adventure but a living fantasy novel. And you are the author of the action.

Spectrum





UP PERISCOPE
DRAGON 32

Goodness Gracious
COMMODORE 64



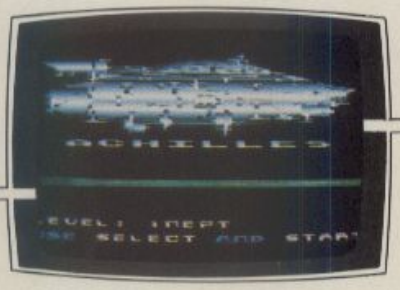




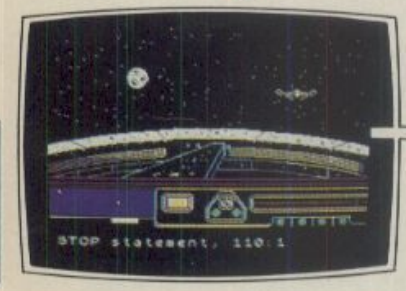


Kriegspiel
DRAGON 32

S.S. Achilles
ATARI 400/800 WITH 48K









SPECTRUM 48K
SPACE STATION Zebra

To . . . **Beyond** Competition House,
Farndon Road, Market Harborough,
Leicestershire LE19 9NR

Please send me . . .	*Qty*	*Total Price*
KRIEGSPIEL **£6.95**		
UP PERISCOPE **£6.95**		
GOODNESS GRACIOUS **£6.95**		
SS ACHILLES (DISC) **£19.95**		
SPACE STATION ZEBRA **£6.95**		
PSYTRON **£7.95**		
SPELLBOUND **£5.95**		
THE LORDS OF MIDNIGHT **£9.95**		

BEYOND HOTLINE
0858 34567

GRAND TOTAL

all prices include p&p

I enclose a Postal Order/Cheque payable to Beyond, or charge my credit card.

Card Number _____
Access/Visa (Delete as necessary)

Name _____

Address _____

_____

_____ Post code _____

Signature _____

Please rush me details of the 'Enter the Beyond' Software Club ☐

YC7

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

A NEW WORLD OF ADVENTURE

BLACK CRYSTAL



BLACK CRYSTAL
A THIRD CONTINENT SERIES ADVENTURE

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

CRYPT



THE CRYPT by Stephen Renton

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

Available for the 48K Spectrum at £4.95

ADVENTURES OF ST. BERNARD

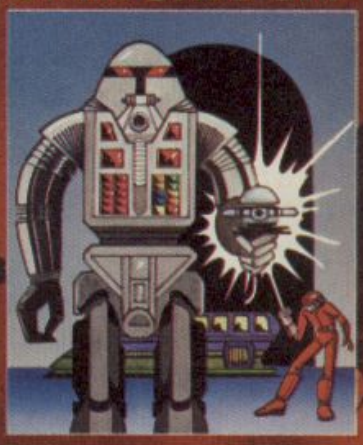


THE ADVENTURES OF ST. BERNARD

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

Available for 48K Spectrum £5.95

STARFORCE ONE



STARFORCE ONE

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

Available for 48K Spectrum £5.95

VOLCANIC DUNGEON



VOLCANIC DUNGEON
A THIRD CONTINENT SERIES ADVENTURE

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

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

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

DEVIL RIDES IN



THE DEVIL RIDES IN

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

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

Available for 48K Spectrum £5.95

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

CARNELL SOFTWARE LTD.,

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

DEALERS: Contact us for your nearest wholesaler

FROM CARNELL SOFTWARE



"THE WRATH OF MAGRA" A THIRD CONTINENT SERIES ADVENTURE

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

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

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

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

Available from Feb '84

CARNELL SOFTWARE LTD

cp software — Commodore 64 and Spectrum Programs

SUPERCHESS 3.0

ABSOLUTELY GUARANTEED ABLE TO CONSISTENTLY BEAT ALL OTHER SPECTRUM CHESS PROGRAMS

★ *Declared 'Champion of Champions' by Computer Choice Magazine Chess Championship (May 1984)*

★ *Achieved overall 50% against graded human players at its local Chess Club!*

Superchess 3.0 has been developed to bring you the strongest chess program yet for the Spectrum computer.

At the tournament level Superchess 3.0 has a look-ahead of five to seven ply (moves) in the middle game, and ten to twelve ply in the end game. This gives Superchess 3.0 a substantial advantage against other chess programs and promises the experienced player an interesting and challenging game of chess.

Unlike other chess programs, Superchess 3.0 is not just a brute-force calculator, but employs artificial intelligence techniques to allow deeper searching along the main lines of play.

FEATURES:

- 10 levels—all play within tournament time limits.
- First level made especially easy for beginners.
- Easy to use—help menus provided.
- Recommended move option.
- Change sides and level during game.
- Self play mode.
- Set up/change position.
- Technical information—how the program 'thinks'.
- Program's internal score for position displayed.
- Number of evaluated positions displayed.
- Library of opening moves.
- Select your own colour scheme for graphic board display.
- Solve mating problems—up to mate in four.



48K SPECTRUM—Price £8.95

BRIDGE PLAYER

PLAY AN ENTIRE GAME OF BRIDGE AGAINST YOUR SPECTRUM —WITHOUT GETTING IN THREE FRIENDS FOR THE PURPOSE

UPDATED VERSION NOW AVAILABLE

Dealing—the program shuffles, deals and sorts the cards to produce randomly dealt hands. An almost infinite number of hands are therefore possible, with all kinds of distributions.

Bidding—is in the familiar ACOL system, including Stayman and Blackwood conventions. You bid your hand while the Spectrum bids the other three hands.

Card Play—you play from your own and dummy's hands, which are displayed as they would be at the bridge table, with the program playing the other two hands.

Scoring—at the end of each hand the score is calculated, including honours, slam and rubber points. Both the old and new scores are displayed in the usual manner.

Replay—at the end of each hand, all four hands can be displayed and, if desired, the hand replayed.

48K SPECTRUM
BRIDGE PLAYER—£8.95

An ideal complement to the Bridge Player Program:

Bridge Tutor (Beginners)—**£5.95**
Bridge Tutor (Advanced)—**£5.95**

SPECIAL OFFER:

Bridge Player and both Bridge Tutors—£18.95



Available at most good computer stores.

DELIVERY:
UK—prices include VAT and postage & packing.
EUROPE—add 80p per program
ALL OTHER PLACES—for air mail add £2 for the first program and 50p for each subsequent program. Surface delivery add 80p per program.

Send SAE for Catalogue.

cp software
DEALER HOTLINE: 0895 31579

Send Cheque, Postal Order or Access No. to:
CP SOFTWARE, Dept YC2
2 Glebe Road, Uxbridge
Middlesex UB8 2RD

Buy it with Access

AIRBASE INVADER

Non-sexist, non violent, satirical, sprite graphic all-action arcade adventure.

Featuring:

- Iron Lady
- Ronnie Raygun
- Old Bill
- Squaddies
- Gutter-press photographers
- Peace women

—and maybe the end of the world!

Compatible Kempston and Keyboard Joysticks

48K SPECTRUM—£5.95



SUPERCODE —for 16K and 48K Spectrum

100+ ROUTINES

MICRODRIVE VERSION NOW AVAILABLE

This is a superior machine code tool kit with one hundred machine code routines that are relocatable for use in your own BASIC and/or machine code programs, the combined user friendly BASIC program, 48k Spectrum only, gives easy access to all routines: ● Index of routines. ● Call up details of each routine including all information required to tailor the routine to your needs. ● Demonstration of how the routine works under software control, the demonstration is repeatable. ● Save and verify individual routines. ● Comprehensive user guide.

1. Block Memory Insert
2. Block Line Delete
3. Chr$ Swop
4. Chr$ Scramble
5. Super-Renumber
6. 2 Byte Converter
7. Dec-> Hex Converter
8. Hex-> Dec Converter
9. Remkill Condenser
10. On Error Goto
11. On Break Goto
12. Free-Scroller
13. Non-Deletable Lines
14. Border Effects
15. Screen Search
16. Variables Search/List
17. 24-Line Printing
18. Star Draw
19. Flash Switch
20. Bright Switch
21. Paint Shape
22. Record Sound
23. Replay Sound
24. Sci-Fi Character Set
25. Memory Available
26. Line Renumber
27. Uni-Note Sound-Gen
28. Dual-Note Sound-Gen
29. Uni-Beep Simulator
30. Multi-Beep Simulator
31. Screen Fill
32. Screen Store
33. Screen Exchange
34. Protect Program
35. Block Copy
36. Contract
37. Expand
38. Expand Rem
39. Append
40. Count Program
41. Tape Header Reader
42. Address
43. Checker-Board
44. Remove Colours
45. Display Memory
46. Hex Loader
47. Wait-Key
48. Strings to Upper Case
49. Strings to Lower Case
50. Program to Upper Case
51. Program to Lower Case
52. Confuse
53. Clarify
54. Space Saver
55. Screen Overprint
56. Screen Invert
57. Clear All
58. Ink Change
59. Paper Change
60. Flash On
61. Flash Off
62. Bright On
63. Bright Off
64. Screen-Print
65. Random Number Generator

Routines 66-100: Screen routines

SUPERCODE £9.95

Plus for 48K Spectrum unless otherwise stated:			
FLOATING POINT FORTH with EDITOR	**£13.95**	**SUPERCHESS II** (Lynx)	**£8.95**
INTEGER FORTH	**£9.95**	**SUPERCHESS II** (Jupiter Ace)	**£8.95**
SUPERCHESS II	**£4.95**	**PINBALL WIZARD** (48K Spectrum)	**£5.95**
SUPERCHESS I (16K ZX81)	**£4.95**	**PINBALL WIZARD** (Commodore 64)	**£6.95**
16K SUPERCHESS (16K Spectrum)	**£6.95**	**DRAUGHTS**	**£5.95**
REVERSI	**£6.95**	**BACKGAMMON**	**£5.95**
SPECIAL OFFER:		**SNAIL LOGO** (Turtle Graphics)	**£9.95**
LOGO and FLOATING POINT FORTH	**£20.95**	**GOLFING WORLD**	**£5.95**
SUPERCODE and EXTENDED BASIC	**£17.95**	**SPECTRUM EXTENDED BASIC**	**£9.95**
DRAUGHTS and BACKGAMMON	**£9.95**		

WANTED:

Interesting programs for Spectrum, Commodore 64 and QL

ESPECIALLY WANTED:

QL/Commodore 64 Bridge Player

ANY OFFERS?

HE KNOWS OUR SECRET!



A new professional Microdrive compatible keyboard that offers more keys and functions than any other in its price range.

Constructed from high density black ABS **our** keyboard will transform your humble Spectrum into the "professional league."

It has 52 "stepped" keys plus space bar. A separate numeric key pad consisting of 12 red keys facilitates fast numeric data entry.

The 15" x 9" x 2½" case will accommodate your Spectrum and other add-ons like interface I, power supply etc. and forms and attractive self-contained unit.

All connections, Power, Mic, Ear, T.V., network RS232 and expansion port are easily accessible at the rear.

A few minutes, a screw-driver and the simple instructions supplied are all you need to fit your Spectrum.

ONLY **£45.00**

No Price Increases!

Guaranteed 10 day delivery

Please rush me the following

..... Keyboards @ ..... £_____

Please add post and packing £1.25

I enclose cheque/PO/Cash for..... Total £_____

or debit my Access/Barclaycard No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature _____

Name _____

Address _____

YC6

And it's Available NOW!

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

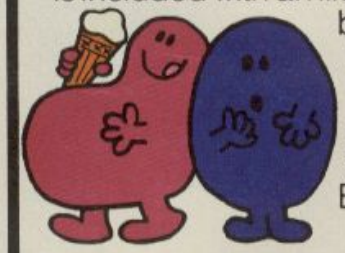
More than fun and games!

FIRST STEPS with the Mr. Men

by Primer Educational Software

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

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



QUICK THINKING!

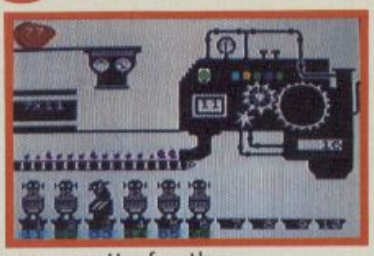
by Widgit Software

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

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

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

Knowing your multiplication tables is the key to controlling the robot-making machine. With a learning mode and a testing mode, Robot Tables is a fun way for early learners, and more advanced children, to master an important and often neglected skill.



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

CAESAR THE CAT

by Andromeda Software

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

A fast, colourful, all-action, arcade-style game with catchy music and a best-score record. Challenging for high-scoring arcade addicts as well as great fun to play for the novice. Available on cassette for the Commodore 64 **£8.95**.

NOW ON SPECTRUM 48K £6.95



Prices include VAT and post and packaging. MIRRORSOFT programs are available from selected branches of W.H. Smith and Boots, and other leading software stockists. Trade enquiries welcome: phone 01-822 3580

MIRRORSOFT

SOFTWARE FOR ALL THE FAMILY

To MIRRORSOFT, PO Box 50, Bromley, Kent BR2 9TT
Please send me the following (enter number required of each item in the space provided):

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

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

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

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

Signature.....

Name.....

Address.....

.....Postcode.....

Offer applies to Great Britain and Eire only. Please allow up to 28 days for delivery in the UK. MIRRORSOFT is a registered trade mark of Mirror Group Newspapers Ltd., Co. Reg. No. 168960. Reg. Office: Holborn Circus, London EC1

NOT JUST A PRETTY Inter/FACE!

Programmable Joystick Interface



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

- Eight directional movement
- Keyboard fully functional
- Rear connector for other add-ons
- Microdrive compatible



ONLY **£22.95**

Quickshot Joystick I®

- Super positive response
- Stabilizing suction caps
- 2 fire buttons
- 4ft lead

ONLY **£9.99**



Please rush me the following

..... Programmable joystick interface . . . . @ £ .....
..... Quickshot Joystick I . . . . . @ £ .....
..... Quickshot Joystick II . . . . . @ £ .....
Please add post and packing . . . . . £ 1.25
I enclose cheque/PO/Cash for . . . . . Total £ .....
or debit my Access/Barclaycard No.

Signature .....
Name .....
Address .....

Quickshot Joystick II®

Incorporating all the features of 'Quickshot I' plus

- Improved control grip
- Trigger fire button
- Rapid fire option

ONLY **£12.95**

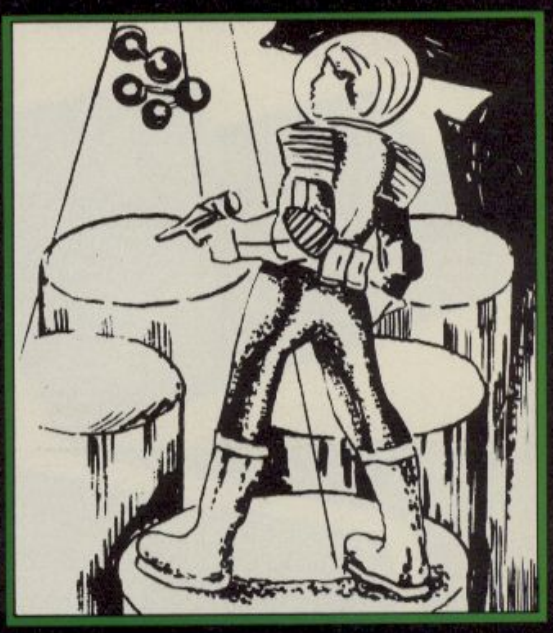


dk'tronics

DK Tronics Ltd., Unit 6, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ. Telephone: (0799) 26350 (24 hrs) 5 lines

The Spectrum Connection

Can poor Dan decontaminate the atomic fuel rods in time? In this new 3D machine code game, you control Dan Dan The Atomiser Man, jumping him from disc to disc, trying to reduce the ever increasing radiation levels in an atomic pile. However, Up 'n' Atom 'Arry and his gang of vagrant particles are thirsting for the energy in your back pack, which makes life a bit awkward at times. Then there's Ron the Rapacious Robot, not the sort to meet in a dark alley (or anywhere else for that matter)!! As if life isn't difficult enough between each reactor is a hyper-tunnel full of laser traps mutant pac-men and energy pot holes.



DISCO DAN

For The 48K SPECTRUM



Other titles available

Spectrum

Oh Mummy	£4.95
Sub Chase	£4.95

BBC

Tank Attack	£7.95
Galactic Empire	£9.95
Util-1	£9.95

£4.95

Also the very best software for Lynx, Dragon and ZX81.

Selected titles available from,

Alpha, Boots Centre Soft, Dixons, Laskys, Martins, PCS, Pilonmist, Prism, Spectrum, Software Supplies, Websters and all good software dealers or direct from

GEM SOFTWARE

Unit D, The Maltings, Sawbridgeworth, Herts. (0279) 723567/723518

NOT JUST A PRETTY Inter FACE!

Light pen and Interface



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**

dk'tronics

Please rush me the following
..... 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_____

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

AGF

PROGRAMMABLE JOYSTICK INTERFACE

ONLY 26.95 +£1.00pp

MICRODRIVE COMPATIBLE

for Spectrum or ZX81

Works with QUICKSHOT II & TRACKBALL

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

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

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

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

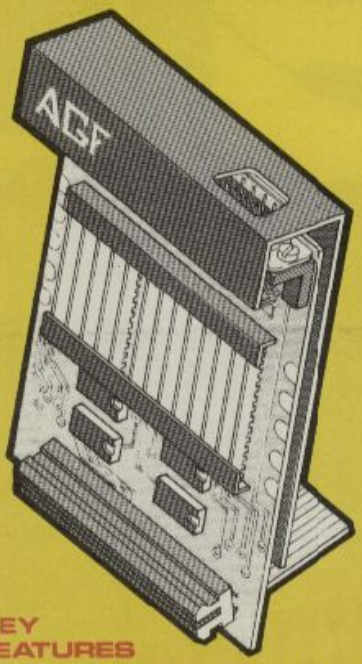
Programming is achieved by a two-digit code, which is looked up on the Programming Chart supplied, for each direction and firing button. These two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

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

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

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

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



KEY FEATURES

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

PACK CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE.



- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements.



- 12 months guarantee and full written instructions.

ONLY 11.95 +£1 P&P



Quickshot II® JOYSTICK

NEW IMPROVED GRIP : BUILT-IN STABILIZING SUCTION CUPS

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

AGF Hardware, Bognor Regis, West Sussex PO22 9BY. Telephone: (0243) 823337.

FROM: MR/MRS/MISS — **Please allow up to 28 days for delivery.**

ADDRESS

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

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

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	27.95	
	JOYSTICK(S)	12.95	
	PACK(S) QUICK REFERENCE CARDS	1.00	
	ZX81 ☐ ZX SPECTRUM ☐ Please tick	FINAL TOTAL	

DEALER ENQUIRIES WELCOME *EXPORT PRICES ON APPLICATION*

Data to your Commodore and music to your ears



THE ROTRONICS DR2301
AUDIO/DATA CASSETTE RECORDER

• Why should you need two cassette recorders just because you are a Commodore user?
• 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, inbuilt 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.
• All this at a price which is a lot less than you would pay for a dedicated data recorder – just £34.95 (p & p £2.00). Send your order form to (no stamp required):

SMT SMT, FREEPOST, Greens Norton, Towcester, Northants. NN12 8BR.

£34·95
(p+p £2·00)

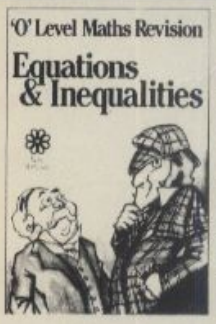
ORDER FORM
Please send _____ Rotronics audio/data recorder(s) at £36.95 (inc p & p) each. All prices inclusive of VAT. Please make cheques payable to SMT. Allow 28 days for delivery.
Name _____
Address _____
_____
_____
YC6

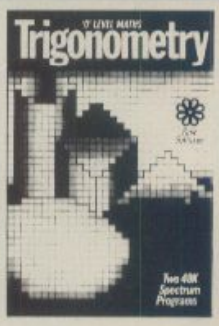
VIC 20 and CBM 64 are registered trademarks of Commodore Business Machines

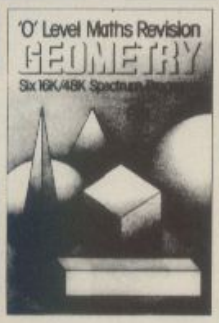
---

SPECTRUM

'O' Level Revision MATHS and FRENCH









In full colour presentation boxes which include a useful leaflet of topics covered.

Programs are compatible with most 'O' level boards and randomised data is used where possible in the questions so the programs can be used many times.

Help facilities and full explanations are given where appropriate.

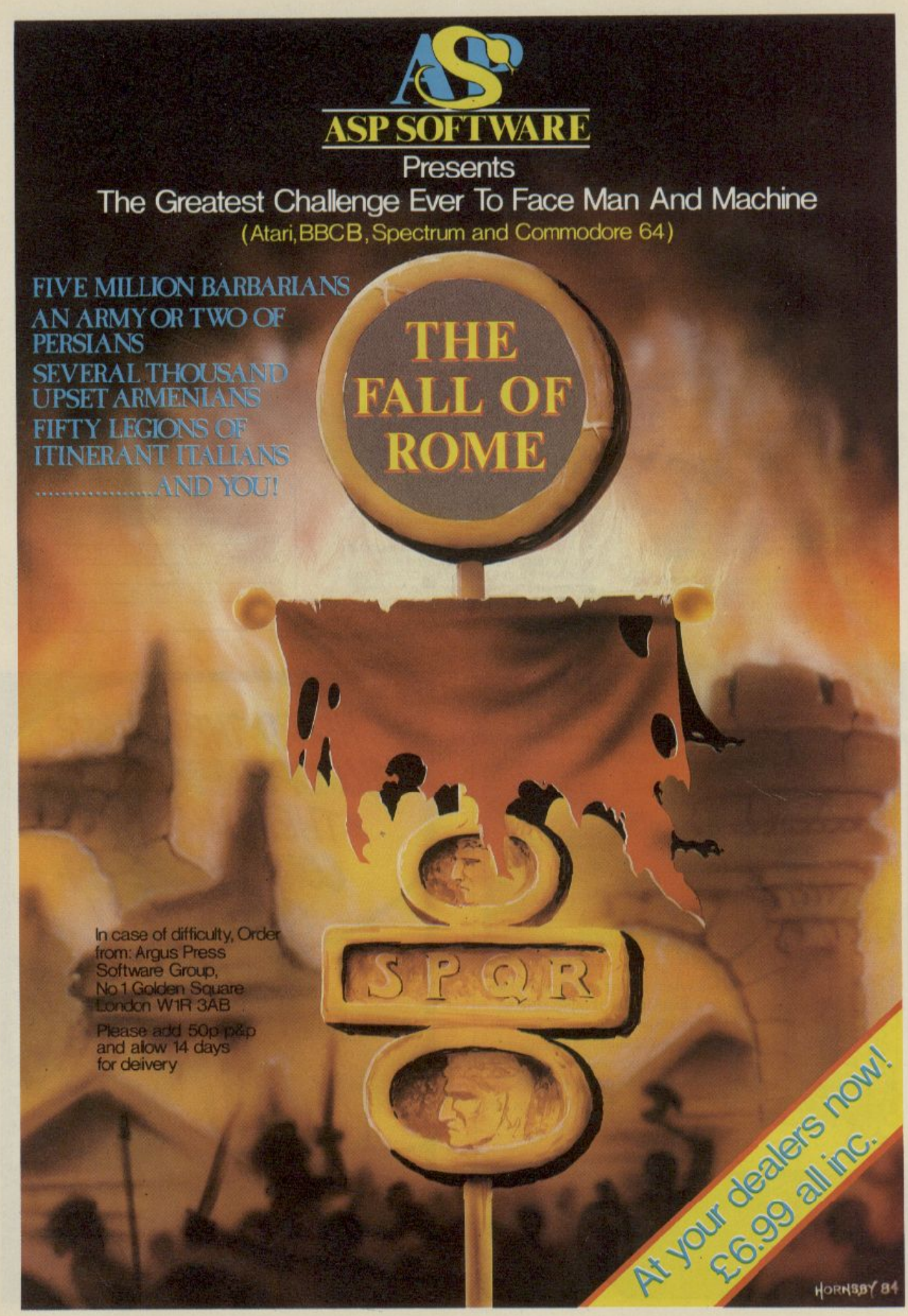
sae for free brochure

ROSE SOFTWARE
148 WIDNEY LANE
SOLIHULL
WEST MIDLANDS B91 3LH
TEL: 021-705 2895

Rose Software

£6.95 (inc p&p)




ASP SOFTWARE
Presents
The Greatest Challenge Ever To Face Man And Machine
(Atari, BBC B, Spectrum and Commodore 64)
FIVE MILLION BARBARIANS
AN ARMY OR TWO OF PERSIANS
SEVERAL THOUSAND UPSET ARMENIANS
FIFTY LEGIONS OF ITINERANT ITALIANS
.....AND YOU!
THE FALL OF ROME
SPQR
In case of difficulty, Order from: Argus Press Software Group, No 1 Golden Square London W1R 3AB
Please add 50p p&p and allow 14 days for delivery
At your dealers now!
£6.99 all inc.
HORNSBY 84

STACK 100 LIGHTPEN - £28.75 GIVES YOUR COMPUTER EYES!

Available for: CBM 64, VIC 20, BBC/B, ATARI

SLR
(STACK LIGHT RIFLE)



JUST TWO OF THE EXCITING PRODUCTS IN THE STACK 100 RANGE

Available for the CBM 64, VIC-20 and 48K Sinclair Spectrum, this quality rifle comes complete with three exciting games and connects to your computer with 12 feet of cable. ***The SLR puts you in a different league.***

£29.95

THE STACK 100 RANGE

CBM 64 Accessories

Cartridges:-
HELP - over 20 extra commands, disassembler and machine code monitor, DOS **£28.75**
SUPERHELP - as 'HELP' but with a comprehensive 2 pass assembler **£40.25**
ARROW - loads and saves a 32K program faster than a 1541 disk drive (use with 1530/C2N cassette deck) **£33.35**
ARROW PLUS - as 'ARROW' but with a comprehensive 6502 assembler **£44.85**
4-SLOT MOTHERBOARD - (switched) **£33.35**
and a full range of printer interfaces.

Please send me a Free brochure, price list and the address of my nearest stockist.

Name .....

Address .....

.....

E. & O.E.

STACK 100
CUSTOMER INFORMATION CENTRE
290-298 Derby Road. Bootle. Liverpool L20 8LN
Trade Enquiries: 051-933 5511 ask for 'Trade Sales'

All prices are inclusive of VAT and delivery.





A&F Software A&F Software A&F Software A&F Software A&F Software A&F Software A&F Software A&F Software A&F Software A&F Software A&F Soft



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



	CM64	BBC	ELECTRON	DRAGON	SPECTRUM
CHUCKIE EGG	£7.90	£7.90	£7.90	£7.90	£6.90
CYLON ATTACK		£7.90	£7.90		
JUNGLE FEVER					£6.90
PHARAOHS TOMB		£7.90	£7.90		

Sold subject to A & F Software Ltd. Full terms and conditions available on request

A&F Software

AVAILABLE FROM ALL GOOD COMPUTER SHOPS

John Menzies

Boots Selected Stores

GSH

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

ELECTRON USER...

...this is the add-on you have been waiting for.
A switched joystick interface for the Electron user.

Only £24.95 incl. VAT



- Plug in cartridge design
- Attractive tough plastic casing
- Reliable positive-fit connectors
- Compatible with all "Atari-style" 9 pin joysticks
- Does not interfere with keyboard operation
- 12 month guarantee
- Supported by leading software houses
- User programming details provided
- Extends the versatility of your Electron computer

STOP PRESS – "FREE Game Conversion Program to allow use with existing software"

FIRST BYTE

First Byte Computers, 10, Castlefields, Main Centre, Derby DE1 2PE Tel: Derby (0332) 365280

A Genuine First Byte Add-on

MAIL ORDER FORM YC
Please send me a genuine First Byte S-J- Interface
☐ I enclose a cheque made payable to F B C Systems Ltd.
I wish to pay by ☐ Access ☐ Visa
No. _____ Expiry date _____
Name _____
Address _____
Tel. _____

COMPUTER LINK

CONNECTORS IDC

	Card Edge	(Transition) PCB	2 Row Socket
10-way	£1.20	£0.85	£0.80
14-way	—	—	£0.90
16-way	£1.60	£1.20	£1.00
20-way	£1.90	£1.35	£1.30
26-way	£2.40	£1.60	£1.45
34-way	£3.10	£1.95	£1.80
40-way	£3.40	£2.00	£1.85
50-way	£3.85	£2.25	£2.00
60-way	£4.80	£2.60	£2.25

IDC SHROUDED HEADERS WITH EJECTING LOCKING ARMS

	Straight	Right Angle
10-way	.85	.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 25 WAY D CONN

Jumper Lead Ribbon Cable (RS232) Assembly

18" long Single End Male	£4.65
18" long S. End Female	£5.10
36" long D. Ended M/M	£9.75
36" long D. Ended F/F	£10.00
36" long D. Ended M/F	£9.85

IDC AMPHENOL PLUGS

	(Centronics)
36-way	£5.20

D CONNECTORS

Solder Bucket	Male	Female
9-way	.75	£1.00
15-way	.95	£1.50
25-way	£1.50	£1.90
37-way	£2.40	£3.25
HOODS .95		

DIL PLUG (Headers) IDC

Pins	
14	£0.90
16	£1.00
24	£1.40
40	£2.15

RIBBON CABLE (Price per ft)

	Grey	Rainbow
9-way	.13	.24
10-way	.15	.28
14-way	.18	.32
15-way	.20	.36
16-way	.22	.40
20-way	.30	.50
24-way	.36	.60
25-way	.40	.65
26-way	.45	.70
34-way	.60	.80
37-way	.65	.85
50-way	.70	.90
50-way	.95	£1.25
60-way	£1.10	£1.40
64-way	£1.15	£1.50

BBC OR SPECTRUM JOYSTICK INTERFACES

FOR USE WITH ANY ATARI TYPE JOYSTICK

ONLY £11.25

IDC JUMPERS 36" SINGLE ENDED

Ways	2 Row Socket	Card Edge	Transition PCB
10	£1.35	£1.95	£1.45
14	£1.70	—	—
16	£1.90	£2.45	£1.75
20	£2.20	£2.95	£1.95
26	£2.95	£3.85	£2.95
34	£3.40	£4.35	£3.35
40	£4.50	£5.65	£4.20
50	£5.25	£6.85	£5.20
60	£6.25	£8.25	£6.20

COMPUTER LEADS

BBC PRINTER LEAD
1 METRE = £10.40
Dual disk drive 1m £10.25
Single disk drive 1m £7.25
DRAGON PRINTER LEADS
1 METRE = £10.40
36-way Amphenol to 36-way Amphenol 1m £16.20
7 pin DIN Plug to 2x3.5mm 1x2.5m 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 & 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
2x9-way VIC20/64	£1.20

DOUBLE SIDED PLUG BOARDS

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

CUSTOM ASSEMBLIES

ANY COMBINATION OF IDC & RIBBON CABLE LEADS MADE TO ORDER

COMPUTER CASSETTES

HIGH GRADE
C12 46p; C15 47p
Qty. price 100 off 39p each

5 Pin Domino Plug	50p
6 Pin DIN Plug	50p
7 Pin DIN Plug	50p
8 Pin DIN Plug	50p

DIL PLUG HEADERS

Jumper Leads Ribbon Cable Assembly

Single ended leads: Length	14 Pin	16 Pin	24 Pin	40 Pin
24"	£1.35	£1.55	£2.30	£3.20
Double ended leads:				
6"	£1.80	£2.00	£2.90	£3.25
12"	£1.90	£2.10	£3.10	£4.85
24"	£2.00	£2.25	£3.40	£5.30
36"	£2.25	£2.45	£3.65	£5.85

JOYSTICKS

A tough rugged high speed performance, two fast action fire buttons Atari type joystick with suction caps ONLY £8.25

SPECTRUM

IDC 56-way card edge £4.25
6 inch extn. cable dbl end M to F £10.50
12 inch extn cable dbl end M to F £10.75
Other configurations made to order — write or phone for quote.

Please add 15% VAT

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

COMPUTER LINK Dept YC6, PO Box 1, Ware, Herts.
Telephone: 0920 5285



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

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

TRIGA COMMAND

IS HERE!



To fit your SPECTRUM

ONLY £19.99 + £1.50 P+P

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

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

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

Also available for Commodore/Atari/BBC/

NEW NEW NEW NEW NEW NEW NEW NEW NEW



SPEECH SYNTHESIZER WITH BUILT IN JOYSTICK INTERFACE FOR THE SPECTRUM

NEW

ONLY £29.99

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

☐ Triga Command Spectrum £19.99	☐ Triga Command BBC £19.99
☐ Triga Command Atari £12.99	☐ Vox Box, Spectrum £29.99
☐ Triga Command Commodore £12.99	☐ Vox Box and Triga Command £39.99

TRADE ENQUIRIES WELCOME

Postage Please Add £1.50

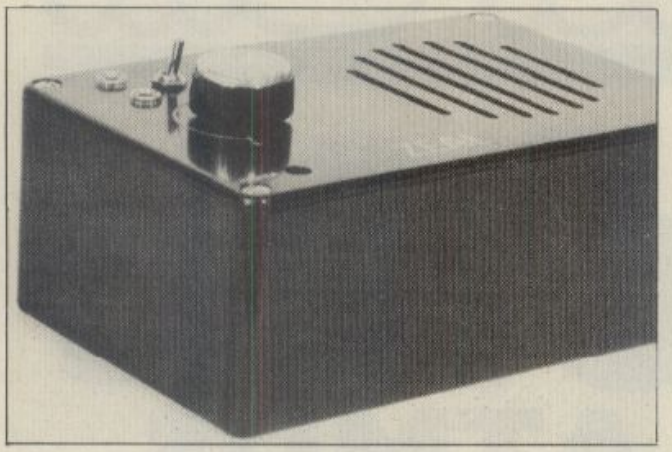
DATEL ELECTRONICS

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

24 HR CREDIT CARD LINE

Access BARCLAYCARD VISA

ZEAL
SOUND BOOSTER
FOR SPECTRUM



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

BRING THE SOUND OF YOUR GAMES TO EXCITING LIFE FOR JUST **£14.99**

(Including VAT + P&P)

NEWSFLASH!
14" MICROVITEC
COLOUR MONITOR
SPECTRUM COMPATIBLE
£285 (INCL VAT & CARRIAGE)

16K RAMPACK FOR ZX81
£17.50 (INCL. VAT & P/P)

Please send me (enter quantity in box)

☐ Sound Boosters @ £14.99

☐ Colour Monitors (Spectrum Compatible) £285.00

☐ Rampacks for ZX81 @ £17.50

Above prices include VAT/P/P/Carriage

NAME.....

ADDRESS.....

.....

I enclose cheque/P.O. for £.....

ZEAL MARKETING LTD
VANGUARD TRADING ESTATE, STORFORTH LANE
CHESTERFIELD, DERBYSHIRE S40 2TZ
Telephone: (0246) 208555

SPANISH IMPORTER AND DISTRIBUTOR

Is looking for a good and relible exporter of microcomputers and peripherals (ZX-SPECTRUM, ORIC-ATMOS, DRAGON, and other popular micros) in order to import these goods in parallel with the official distributors or become the official distributors in Spain. We need lowest prices possible and orders would be in lots of 200 to 2000 units each shipment monthly, depending on the models.

Please, contact us writing:

ELECTRONICA
P.O. BOX 875
Barcelona
SPAIN



spectrum

The Latest NEWS from Spectrum

Just Arriving!

SINCLAIR INTERFACE I

£49.95

SINCLAIR MICRODRIVE

£49.95

Fantastic Value from Spectrum!

SUPER SAVER CASSETTE RECORDER

For COMMODORE 64 & VIC-20 ..... ONLY £39.95

LATEST NEWS

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

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: MIKE STERN or DUDLEY LANGMEAD Spectrum UK Ltd., Burrowfield, Welwyn Garden City, Herts or Telephone (07073) 34761

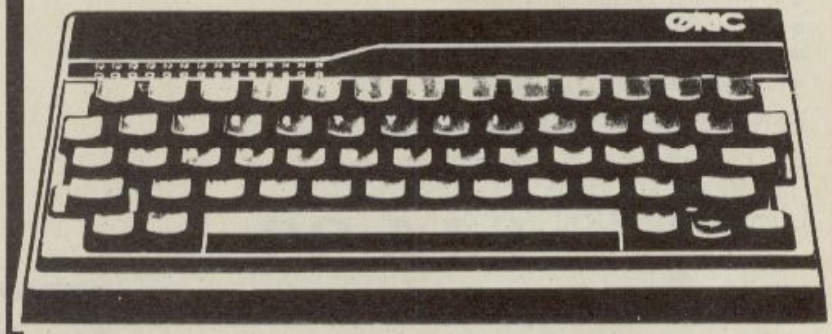
UP TO £1,000 Instant Credit

With your Spectrum Chargecard

spectrum CHARGE CARD

• 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%

The superb ORIC ATMOS



- Lots of exciting programs available
- Built-in centronics printer interface (no RS232 needed - just plug in your printer)
- Full-featured keyboard with sculptured keys
- Seperate keys for cursor control
- Built-in speaker
- Special sound effects for game programmers

The ATMOS has taken a remarkable step forward in home computer technology. But how?

Most Micros 'waste' a large amount of memory on operating functions like graphics, colour and sound. Oric saw that by running these tasks from a ROM memory a huge amount of the ATMOS's valuable 48K RAM capacity could be freed for more advanced operations.

So the colour capability (8 graphics, 8 background), powerful sound synthesis and high-resolution graphics of the ATMOS are achieved with fewer demands on computing power than its competitors.

So what else makes the ATMOS so exciting? There's now a typewriter-style full-response keyboard; it's directly compatible with most domestic cassette players; and there's a wide choice of software. The ATMOS is designed for convienience, too – it uses extended Microsoft BASIC; your printer plugs in without an RS232; and it comes complete with leads and everything you need to get going.

We've a 4-colour Oric printer (which accepts normal paper) at a terrific value-for-money price. Soon, a 3" Microdisc Drive will be available, too, to complete the system. Take a look at the superb new ORIC ATMOS in its highly distinctive black-and-red trim, at your Spectrum dealer NOW!

SPECTRUM PRICE

£169.99

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



Now from Spectrum - a complete business computer system for under £900



COMMODORE 64

BUSINESS PACKAGE

■ Extremely simple to use - no computer experience required ■ Complete & ready to run with Sales/Invoicing & purchase ledger programs. ■ Complete end-of-month reports at the touch of a button - including Creditors/Debtors lists Sales & cash lists, statements, VAT balances etc.

Includes ■ COMMODORE 64 ■ DISK DRIVE ■ COLOUR MONITOR ■ COMMODORE PRINTER ■ PURCHASE LEDGER PROGRAM ■ SALES LEDGER PROGRAM ■ EASY SCRIPT PROGRAM Plus! ■ FREE! GAMES DISK WITH SIX GAMES

FROM ONLY

£899.95 WITH MPS801 Printer

Just Arriving! It's the new, superb COMMODORE SX64 PORTABLE



BIG NEWS from Spectrum - stocks are just arriving of the incredible new Commodore SX 64 Portable Colour Computer - a dream come true for the travelling executive! This superb, compact Micro incorporates all of the top-selling Commodore 64's functions, and features a detachable, full function keyboard plus built-in colour monitor AND single disk drive. We're very excited – you can see it at your local Spectrum dealer now!

SPECTRUM PRICE

£895

FREE! FREE! FREE!

● FREE with each SX64 Portable three superb programs - Easy Script, Future Finance and Easy Stock.

COMMODORE VIC-20



Super Value!

STARTER PACK

A complete Home Computer system including the VIC-20 Computer, a Cassette Unit, introduction to BASIC part 1 -a simple explanation of computer programs - Blitz, Type-A-Tune, Race & Hoppit. A fantastic deal!! and great value-for-money. But HURRY! offer only while stocks last.

SPECTRUM PRICE

£139.99

Also available

VIC-20

Spectrum Price

£99.95

Including:

4 FREE ROM GAMES

WORTH £39.96

Commodore VIC-20, SOFTWARE PACKS at HALF PRICE

● Multipack 1: Omega race, Voodoo castle, Cosmic crunch Avenger ● Multipack 2: Gorf, Adventureland, Raid on Fort Knox, Mole Attack. ● Multipack 3: Sargon Chess, The Count, Mission Impossible, Cosmic Cruncher. ● Multipack 4: Sargon Chess, Pirate Cove, Rat Race. Super Lander. ● Multipack 5: Omega Race, The Count, Menagerie, Mole Attack.

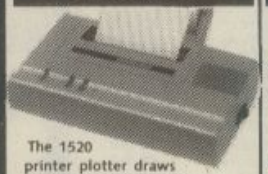
Each Pack Only **£19.98** WHILE STOCKS LAST

SPECIAL OFFER! on Commodore 64 ROM GAMES

SAVE £9.99 when you buy any of the following Multipacks:

MULTIPACK 1: Music Composer, Lazarian & Clowns MULTIPACK 2: Visible Solar System, Jupiter Lander & Le Mans MULTIPACK 3: Visible Solar System, Lazarian & Sea Wolf MULTIPACK 4: Jupiter Lander, Clowns & Lazarian MULTIPACK 5: Jupiter Lander, Omega Race & Clowns

Commodore 1520 PRINTER - PLOTTER



The 1520 printer plotter draws in 4 colours, and prints characters and numbers.

£99.99

COMMODORE 1526 PRINTER



Superb Dot Matrix (near letter quality printer)

£345.00

ACCESSORIES FOR COMMODORE

Alphacom 42 Printer with Vic 20 Interface.... £99.90
Stack Light Pen.... £28.75
Plus 80 16K RAM.... £37.99
Viscount 64K RAM. £69.95
4 Slot Mutherboard £24.95
Adman Chatterbox. £49.95
Stonechip 16K switchable RAM..... £34.95

Turn the page for more super offers from Spectrum . . .

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

spectrum

The Top 50 SOFTWARE TITLES

Selected by Britain's leading Software Distributor

MICRO DEALER UK





PROGRAM	SUPPLIER	MACHINE	PRICE
Jet Set Willy	Software Projects	Spectrum	£5.95
Fighter Pilot	Digital	Spectrum	£7.95
Hunchback 64	Ocean	Spectrum	£6.90
Blue Thunder	Richard Wilcox	Spectrum	£5.95
3-D Ant Attack	Quicksilva	Spectrum	£6.95
Fred	Quicksilva	Spectrum	£6.95
Chinese Juggler	Ocean	CBM 64	£6.90
Revenge of Mutant Camels	Llamasoft	CBM 64	£7.50
Atic Atac	Ultimate	Spectrum	£5.50
Space Pilot	Anirog	CBM 64	£7.95
Blagger	Alligata	CBM 64	£7.95
Wheelie	Microsphere	Spectrum	£5.95
Hunchback	Ocean	Spectrum	£5.90
Alchemist	Imagine	Spectrum	£5.50
Eskimo Eddie	Ocean	Spectrum	£5.90
Manic Miner	Software Projects	Spectrum	£5.95
Jet Pac	Ultimate	Spectrum	£5.50
Quest of Merravid	Durrell/Martech	CBM 64	£7.95
Pinball Wizard	C.P. Software	Spectrum	£5.95
Scooba Dive 64	Durrell/Martek	CBM 64	£6.95
Pogo	Ocean	Spectrum	£5.90
Chequered Flag	Psion/Melbourne House	Spectrum	£6.95
Android Two	Vortex	Spectrum	£5.95
Horace and the Spiders	Psion/Melbourne House	Spectrum	£5.95
Birds and the Bees	Bug-Byte	Spectrum	£5.95
Hovver Bovver	Llamasoft	CBM 64	£7.50
Fortress	Amcom	BBC	£7.95
Stonkers	Imagine	Spectrum	£5.50
Zylogon	Big G Software	CBM 64	£6.95
Metagalactic Llamas	Llamasoft	VIC 20	£6.00
Plumb Crazy	Terminal	CBM 64	£6.95
Mr Wimpey 64	Ocean	CBM 64	£6.90
Sting	Quicksilva	CBM 64	£7.95
Hunter Killer	Protek	Spectrum	£7.95
Pedro	Imagine	Spectrum	£5.50
Rebel Star Raiders	Red Shift	Spectrum	£9.95
Colossus Chess	C.D.S.	CBM 64	£9.95
Skull	Games Machine	Spectrum	£6.95
Hellgate 64	Llamasoft	CBM 64	£5.00
Tribble Trubble	Software Projects	Spectrum	£5.95
Pool	C.D.S.	Spectrum	£5.95
Trashman	New Generation	Spectrum	£5.95
Lazerzone 64	Llamasoft	CBM 64	£7.50
Scuba Dive	Durrell/Martech	Spectrum	£5.95
Code Name Mat	Micromega	Spectrum	£6.95
Penguin	H. Soft	BBC	£7.95
Amaze-in-Space	Opus	BBC	£7.95
Dinky Doo	Software Projects	CBM 64	£7.95

Superb value-for-money!

MEMOTECH

MTX SERIES



MEMOTECH MTX 512 64K RAM

16 User definable Function Keys • 12 Key Numeric Pad • Z80A at 4MHz • 24K ROM containing MTX BASIC • MTX NODDY FRONT PANEL DISPAY • ASSEMBLER/ DISASSEMBLER Video Display Processor with 16K video-RAM • 64K User RAM Twin RS232 Communications Board ROM Expansions: Node Systems • MTX PASCAL • MTX FORTH Eight User Definable Virtual Screens • Up to 32 SPRITES

SPECTRUM PRICE

£315

Also available MTX 500 32K RAM £275

FDX DISK DRIVE

Up to eight Floppy Drives • Colour 80 Column Board (optional) Fast Access Silicon Discs • Powerful Floppy Disc Controller Board CP/M 2.2 Supplied • Teletext Compatible

SPECTRUM PRICE £995.00

Memotech 32K RAM Expansion £50
Memotech 64K RAM Expansion £85.00
Memotech 128K RAM Expansion.... £160.00
Memotech RS232 Communication Port £60.00

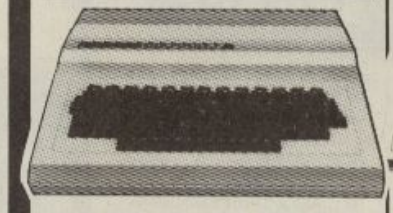
SEPERATE EXPANSION ITEMS

Silicon Disc (256K) £385.00
80 Column Colour Board. £100.00
Floppy Disc Controller Board..... £230.00
7 Way Bus & Support Software for S.O. £50.00

MEMOTECH SOFTWARE

Backgammon (Cassette) £8.95
Chess (Cassette) £9.95
Blobbo (Cassette) £6.95
Kilopede (Cassette) £6.95
Super Minefield (Cassette)..... £6.95

DRAGON

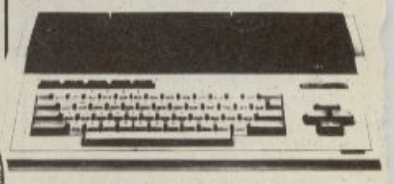


DRAGON 32

Check with your local SPECTRUM dealer for our LOW price

DRAGON 64 **£225.00**

SHARP



SHARP MZ-711

(MZ-700 Series Computer)

The super new colour computer from SHARP. Now available in limited quantities

SPECTRUM PRICE

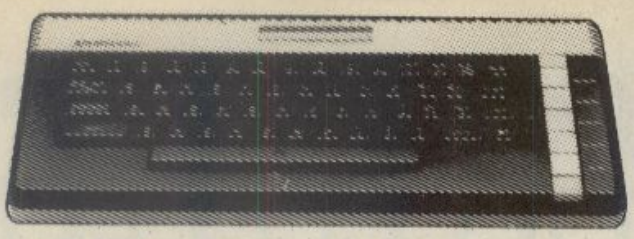
£249.95

with FREE Cassette Recorder and 10 FREE Games

Total Value of Package **over £320.00**

SHARP PRINTER £129.95
CASSETTE RECORDER £39.95

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



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
£249.95

ATARI 600XL **£159.99**

1010 CASSETTE RECORDER	£49.99	TRACK BALL	£39.99
1050 DISK DRIVE	£299.99	SOFTWARE	
1027 LETTER QUALITY PRINTER	£299.99	DIG DUG	£29.99
1020 PRINTER PLOTTER	£199.99	LONE RAIDER	£14.99
		And many more	

MONITORS

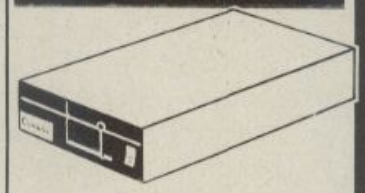
Commodore Model 1701
A superb Colour Monitor with sound



SPECTRUM PRICE **£230**

PHOENIX Amber **£126.50**
FIDELITY CM14 Colour **£199.95**
SANYO 14" Colour TV (ideal as a monitor) ..... **£229..95**
SANYO CDD 3125NB Colour Monitor **£285.35**
SANYO 12" Green Monitor **£99.95**

CUMANA DISK DRIVES



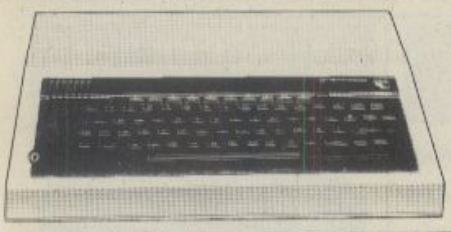
FOR BBC

CS100E	£217.35
CS100	£244.95
CS200E	£254.15
CS200	£881.75

FOR DRAGON

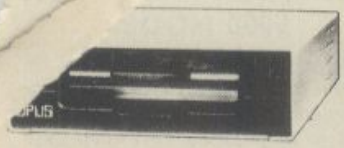
CDS250	£365.95
CDS500	£401.80
CDS1000	£503.95
CDD500	£557.60

BBC



Model B
SPECTRUM PRICE
£399

Sensational Offer
OPUS DISK DRIVE
for BBC Model 'B'



SPECTRUM LOW PRICE
£189
for BBC Owners
Including: MANUAL & UTILITIES DISC.

BIT PRINTER

An inexpensive quality printer for the BBC 'B' Just look at our fantastic low price on this super Dot Matrix printer! The ideal machine for the home user, the Bit Printer combines practicality with low cost - now you can list programs for debugging without spending a three-figure sum. The Bit Printer interfaces directly with the BBC 'B'. See it at your local Spectrum dealer now!



SPECTRUM PRICE ONLY
£89.95

ACCESSORIES for BBC

BBC Dual Disk Drive	£750.00	Acorn Software Cassette-Based from	£9.95
BBC BUGGY	£189.00	Acorn Disk-Based software	£11.50
RC DIGITAL TRACER for the BBC	£55.50	BBC Disk-Based software from	£9.95
GRAF PAD Graphics Tablet	£143.75	BBC BUGGY Spectrum Price	£189.00
PROLINK Joystick Interface	£9.95	BBC Disk Manual & Utilities Disc	£34.50
BIT-PRINT ZX Printer	£89.95	QUICK-SHOT JOYSTICK Especially for the BBC - Spectrum Price	£19.95
BBC Single Disc Drive	£265.00		
BBC Disk Interface Kit (inc. fitting)	£97.00		

Sensational PRINTER OFFERS from Spectrum

Incredible Value! from Spectrum



NEW!

SEIKOSHA Model GP100A MkII

- Printing speed 50 C.P.S.
- Full Graphics capability
- Double width character output under software control
- Centronics type parallel interface
- Paper width is adjustable up to 10 inches

SPECTRUM LOW PRICE
£199.95

Other Printer Bargains

SEIKOSHA GP100 VC	£199.95
SEIKOSHA GP100 AS	£199.95
SEIKOSHA GP250 X	£249.95
EPSON FX 80	£495.95
EPSON RX 80	£314.95
EPSON RX 80 F/T	£366.85
ALPHACOM 42 for VIC-20, Commodore 64, Dragon, Atari, BBC with required interface	£99.90
ALPHACOM 3C for ZX Spectrum	£59.95
Bit Print 24 for the BBC	£89.95

ALPHACOM



ALPHACOM 42 For DRAGON, BBC, COMMODORE, ATARI (Interfaces extra) ..... Spectrum price **£79.95**
ALPHACOM 32 For ZX SPECTRUM ..... Spectrum Price **£59.95**
Paper Rolls for Alphacom printers
Box of 5 Rolls **£6.00**

STACK LIGHT RIFLE



Available for the SPECTRUM, VIC-20, and the COMMODORE 64 (Arriving Now!!) comes complete with 12 feet of cable and three exciting action software games including "HIGH NOON SHOOTOUT" with full sound effects.

For Commodore 64, VIC-20 & ZX Spectrum



Spectrum Price **£29.95** Including 3 FREE Games

spectrum CHARGE CARD

UP TO £1,000 Instant Credit

● There's up to £1,000 worth of Instant Credit available on a Spectrum Chargecard. See your local SPECTRUM dealer for written details (UK mainland only) Typical APR -29.8%

Turn the page for more super offers from Spectrum . . .

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

spectrum

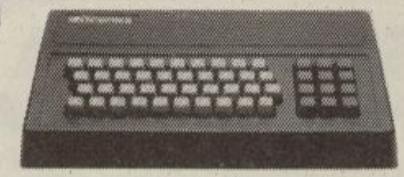
Everything you've ever wanted for your

ZX SPECTRUM

Superb ZX add-on's from your local Spectrum dealer

DK'Tronics KEYBOARD

For ZX SPECTRUM
SPECTRUM PRICE
£45





ZX SPECTRUM 16K
£99.95
ZX SPECTRUM 48K
£129.95

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

New & exclusive to Spectrum!

INDESCOMP

Superb quality add-on's for the ZX SPECTRUM

SOUND AMPLIFIER

£10.95

32K RAM PACK

£39.95

JOYSTICK Interface

£14.95

DOMESTIC CONTROLLER

£49.95

ALPHACOM Thermal printer for ZX SPECTRUM - NOW DOWN TO **£59.95**

DIGITAL TRACER

From RD Labs for the ZX Spectrum

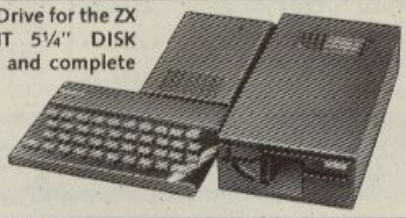
£55.50



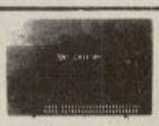
VISCOUNT DISK DRIVE

Now from SPECTRUM a Disk Drive for the ZX SPECTRUM. The VISCOUNT 5¼" DISK DRIVE with interface system and complete with all leads.

ONLY £245



CHEETAH
32K RAM Pack
£39.95



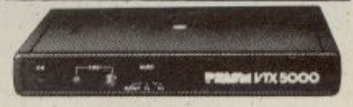


KEMPSTON
Joystick Interface **£15**
(Joysticks opt. extra)

CURRAH Speech Synthesiser . £29.95
DK'TRONICS Lightpen £19.95
DK'TRONICS DUALPORT Joystick Interface £14.95
STACKLIGHT Rifle with 3 FREE GAMES £29.95

Sinclair ZX INTERFACE 2
The new ROM Cartridge/Joystick interface. Loads programs instantly! Takes two joysticks! Just plug in and play. **ONLY £19.95**
Plus New ROM cartridge software.

PRISM VTX 5000 MODEM



NOW, YOUR ZX SPECTRUM IS YOUR KEY TO THE WORLD with the incredible PRISM VTX 5000 MODEM

■ Versatile modem for ZX Spectrum (16K or 48K) versions ■ Slim design fits easily, matches your micro ■ Instant access to Prestel™ & Micronet800 information services ■ Instant communication with other ZX Spectrum users ■ Use the Prism VTX 5000 with a Sinclair printer - and print Prestel frames

SPECTRUM PRICE
£99.95

STONECHIP ACCESSORIES

For the ZX SPECTRUM
ECHO AMPLIFIER
£19.95
PROGRAMMABLE JOYSTICK INTERFACE **£24.95**

Coming soon ....
SPECTRUM KEYBOARD WITH SOUND NO NEED TO TAKE YOUR SPECTRUM APART
£59.95

BOOKS

GRANADA PERSONAL COMPUTING TITLES
The ZX Spectrum and how to get the most from it £5.95
The Spectrum Programmer £5.95
The Spectrum Book of Games £5.95
Introducing Spectrum Machine Code £7.95
The Apple II Programmer's Handbook £10.95
Programming with Graphics £5.95
The Dragon & how to make the most of it . £5.95
Computing for the Hobbyist & small Business £6.95
Simple Interfacing Projects £6.95
The BBC Micro: An expert guide £6.95
Commodore 64 Computing £5.95
The Oric-1 and how to get the most from it £5.95
The Dragon 32 book of games £5.95
Computer Languages and their uses £5.95
Lynx Computing £6.95
21 Games for the BBC Micro £5.95
Choosing a Microcomputer £4.95
Databases for fun & profit £5.95
Introducing the BBC Micro £5.95

SUNSHINE
The Working Spectrum £5.95
Functional Forth for the BBC £5.95
The Working Dragon 32 ..... £5.95
Dragon 32 Games Master £5.95
The Working Commodore 64 ..... £5.95
Commodore 64 Machine Code Master £6.95
The Working Dragon £5.95
The Working Spectrum £5.95
The Working CBM 64 ..... £5.95
Dragon 32 Games Master £5.95

JOHN WILEY
Atari Basic £9.75
Using BBC Basic £6.95
Winning games on the Commodore 64 .... £5.95
Hot programs to feed your Dragon £6.95
ZX Spectrum explored £5.95
Mastering th ZX Spectrum £5.95
Mastering the Vic 20 ..... £5.95
Small business computers for the first time users £7.95

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

There's a Spectrum Centre 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

BLETHCLEY Rams Computer Centre, 117 Queensway Tel: (0908) 647744
CHESHAM Reed Photography & Computers, 113 High St Tel: (0494) 783373

CAMBRIDGESHIRE

CAMBRIDGE K P Computers Ltd. 19/20 Market St Tel: (0223) 312240 (Open 6 Days)
PETERBOROUGH Ptrbrgh Communications, 91 Midland Rd (0733) 41007

CHANNEL ISLANDS

GUERNSEY Gruts, 3-5 The Pollett, St Peter Port Tel: (0481) 24682
JERSEY Audio & Computer Centre, 7 Peter St, St Helier Tel: (0534) 74000

CHESHIRE

ALTRINCHAM Mr Micro 28 High St Tel: (061) 941 6213
CHESTER Oakleaf Computers Ltd 100 Boughton Tel: (0244) 310099
CREWE Microman Unit 2, 128 Nantwich Rd Tel: (0270) 216014
ELLESMERE PORT RFR Computers, 1 Pooltown Rd Whitby Tel: 051 356 4150
MACCLESFIELD Camera & Computer Centre 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

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

CORNWALL

ST AUSTELL A B & C Computers, Duchy House, 6 Lower Aylmer Sq Tel: (0726) 67337

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
DERBY C T Electronics, at Camera Thorpe, The Spot Tel: (0332) 360456

DEVON

EXETER Seven Counties (Computers) Ltd., 7 Paris Street Tel: (0392) 211212
EXMOUTH Open Channel, 30 The Strand Tel: (0395) 264408
PLYMOUTH Syntax Ltd., 76 Cornwall St Tel: (0752) 28705
TIVERTON Actron Micro Computers, 37 Bampton St Tel: (0884) 252854
TORQUAY Devon Computers, 8 Torhill Rd, Castle Circus Tel: (0803) 526303

DORSET

BOURNEMOUTH Lansdowne Computer Ctr 1 Lansdowne Crescent Tel: (0202) 20165

DURHAM

DARLINGTON McKenna & Brown, 102 Bondgate Tel: (0325) 459744

ESSEX

BASILDON Godfrey's 28-32 East Walk, Tel: (0268) 289379
BASILDON Godfrey's Computer Centre, 5 Laindon Main Centre Laindon Tel: (0268) 416747
CANVEY ISLAND Tower Radio Ltd., 43 High St Tel: 0268 682211
CHELMSFORD Maxton Hayman Ltd., 5 Broomfield Rd Tel: (0245) 354595
COLCHESTER Colchester Computer Ctr. 16 St Botolphs St Tel: (0206) 47242
GRAYS H Reynolds, 79 Orsett Rd Tel: (0375) 5948
ILFORD Woolfmans, 76 Ilford Lane Tel: (01) 478 1307
ROMFORD Computer Centre, 72 North St Tel: 0708 752862
SOUTHEND Computer Centre 332 London Rd Tel: (0702) 45431

HAMPSHIRE

ANDOVER Andover Audio, 105 High St Tel: (0264) 58251
BASINGSTOKE Fisher's, 2-3 Market Place Tel: (0256) 22079
PORTSMOUTH Cygnus Computers Ltd. 261 Commercial Rd Tel: (0705) 833938
PORTSMOUTH (Waterlooville) G B Microland, London Rd., (Opp. Co-op) Tel: (07014) 59911
SOUTHAMPTON RJ Parker & Son Ltd., 11 West End Rd., Bitterne Tel: (0703) 445926
WINCHESTER Winchester Camera & Computer Centre, 75 Parchment St Tel: (0962) 53982

HEREFORD

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

HERTFORDSHIRE

BOREHAMWOOD Master Micro, 36 Shenley Rd Tel: (01) 953 6368
HITCHIN Camera Arts (Micro Computer Division), 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

BROADSTAIRS Video Vision 19/20 Willow Court, St Peters Park Road Tel: (0843) 63284 (No Early Closing Day)
DOVER Kent Photos & Computers, 4 King St Tel: (0304) 202020
GRAVESEND Marshalls Computers & Cameras, 3 Windmill St Tel: (0474) 65930
ORPINGTON Ellis Marketing Ltd., 25 Station Sq., Petts Wood Tel: (0689) 39476
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 Cmptrs Ltd 28-30 St Johns Rd Tel: (0892) 41555

LANCASHIRE

ACCRINGTON PV Computers, 38A Water St Tel: (0254) 36521/32611
BLACKBURN Tempo Computers, 9 Railway Rd Tel: (0254) 691333
BURNLEY IMO Computer Centre, 39/43 Standish St BB11 1AP Tel: (0282) 54299
BURY (Lancs) Micro-North, 7 Broad St Tel: (061) 797 5764
PRESTON Wilding's, 49 Fishergate Tel: (0772) 556250

LEICESTERSHIRE

LEICESTER Youngs, 40/42 Belvoir St Tel: (0533) 544774
MARKET HARBOROUGH Harborough Home Computers, 7 Church St Tel: (0858) 63056

LINCOLNSHIRE

GRANTHAM Oakleaf Computers Ltd. 121 Dudley Rd Tel: (0476) 76994/60000
LINCOLN MKD Computers, 24 Newlands Tel: (0522) 25907

LONDON

E6 Percivals, 85 High St North, East Ham Tel: (01) 472 8941
E17 Erol Computers Ltd., 125 High Street Walthamstow Tel: (01) 520 7763
EC1 Pedro Computer Services Ltd., 47 Clerkenwell Road Tel: (01) 251 8635
EC2 Devron 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
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
SE25 Ellis Marketing, 79 High St., South Norwood Tel: (01) 653 4224
SW5 CLM/Matmos 264 Earls Court Tel: (01) 373 458/6333
SW16 Buffer Micro Shop, 310 Streatham High Rd Tel: (01) 769 2887
SW19 Emcom, 31 High St., Wimbledon Tel: (01) 947 7678
W1 Computers of Wigmore St., 87 Wigmore St Tel: (01) 486 0373
W1 GK Photo & Computers, 92-94 Wardour St Tel: (01) 437 0182
W1 Sonic Foto & Micro Centre, 256 Tottenham Court Rd Tel: (01) 580 5826
W2 Devron, 4 Edgware Rd Tel: (01) 724 2373
W3 Thames Computing 169 High St Acton Tel: (01) 992 6888
W7 TK Electronics, 11/13 Boston Rd., Hanwell Tel: (01) 579 2842

MANCHESTER GREATER

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 Thorngard 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 Whitechapel Tel: (051) 709 9898
LIVERPOOL (Aintree) Hargreaves, 31-37 Warbreck Moor Tel: (051) 525 1782
SOUTHPORT Central Computers, 575 Lord St Tel: (0704) 31881
ST HELENS Studio 55, 55 Ormskirk St Tel: (0744) 39496

MIDDLESEX

EDGWARE GK Photographic & Computers 106 High St Tel: (01) 951 1000
HARROW Camera Arts, (Micro Computer Division) 24 St Annes Rd Tel: (01) 427 5469
STAINES Spelthorne Microsystems Ltd. 2 Kingston Rd Tel: (0784) 55659/55554
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
NORWICH Sound Marketing, 52 St Benedicts St Tel: (0603) 667725
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 (Just Opening)
WORKSOP Computergraphix, 132 Bridge St Tel: (0909) 472248

NORTHERN IRELAND

BELFAST Arthur Hobson Ltd., 37 Great Victoria St Tel: (0232) 246336
COUNTY DOWN Oltrosoft Unit 8 Town & Country Shopping Centre Carryduff Tel: (0232) 812014
PORTSDOWN Pedlows, 16 Market St., Craigavon Co Armagh Tel: (0762) 332265
LONDONDERRY 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 Sturt St Tel: (0235) 21207
BANBURY Computer Plus, 2 Church Lane Tel: (0295) 55890
OXFORD Ivor Fields, 7 St Ebbes 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
KILMARNOCK Vennals, 49 Foregate Tel: (0563) 32175
STORNOWAY Cameron's Computers The Playhouse Tel: (0851) 3427

SHROPSHIRE

SHREWSBURY Computerama, 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 Computerama, 59 Forgate St Tel: (0785) 41899
STOKE-ON-TRENT Computerama, 11 Mkt Square Arcade Hanley (0782) 268620
STOKE-ON-TRENT The Microchip, 37 Station Rd, Biddulph Tel: (0782) 511559

SUFFOLK

BURY ST EDMUNDS Bury Computer Centre, 11 Guildhall St Tel: (0284) 705772
IPSWICH Brainwave, 24 Crown St Tel: (0473) 50965
LOWESTOFT John Wells, 44 London Rd North Tel: (0502 3742

SURREY

CAMBERLEY Camera Arts (Micro Computer Division), 36 High St Tel: (0276) 65848
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
NEW MALDEN Surrey Micro Systems, 31 High St Tel: (01) 942 0478
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) 61061

SUSSEX

BEXHILL-ON-SEA Computerware, 22 St Leonards Rd Tel: (0424) 223340
CRAWLEY Gatwick Computer Services, 62 Boulevard Tel: (0293) 37842
LITTLEHAMPTON Allan 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
PEMBROKE Randall Cox, 19 Main St Tel: (064) 682876
WREXHAM T E Roberts, 26 King St Tel: (0978) 364404/364527

WARWICKSHIRE

LEAMINGTON SPA IC Computers, 43 Russell St Tel: (0926) 36244
NUNEATON Micro City 1A Queens Road Tel: (0203) 382049
RUGBY The Rugby Micro Centre, 9-11 Regent St Tel: (0788) 70522

WEST MIDLANDS

BIRMINGHAM Sherwoods, Gt Western Arcade Tel: (021) 236 7211
COVENTRY Greens, 22 Market Way Tel: (0203) 28342
DUDLEY Central Computers, 35 Church Hill Precinct Tel: (0384) 238169
WEST BROMWICH Bell & Jones, 39 Queens Square Tel: (021) 553 0820

WILTSHIRE

SALISBURY Whymark Computer Centre, 20 Milford St Tel: (0722) 26638

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 Rawson Square Tel: (0274) 309266
DEWSBURY Home & Business Computers, 56 Daisy Hill Tel: (0924) 455300
DONCASTER The Soft Centre 8 Queensgate Waterdale Centre Tel: (0302) 20088
HUDDERSFIELD 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

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

A SATISFIED QL CUSTOMER

In defence of Sinclair following the public outcry resulting from the late delivery of the QL, I am pleased to say that my computer arrived in the month of April as promised by Sinclair — delivered by private car.

I had attempted during the week ending April 28 to obtain a delivery date from Sinclair and was advised that no depatch dates on the QL were available on their inquiry computer. I was somewhat incredulous to hear the young lady say that delivery would still be met — yet another broken promise I thought.

On Monday, April 30 — the last day for Sinclair to meet their self-imposed dead line — no QL in the mail. During the day I was pleasantly surprised to be advised by my wife that the computer had been delivered to my Crawley address by car.



I placed an order with Acorn for a BBC A Micro at £235 prior to the price increase and suffered excuses and non-delivery for a year — until I gave up on Acorn. Even a letter to the Director General of the BBC duly answered by the BBC failed to evoke response from Acorn.

I was pleased that someone in the home micro business could keep a promise. The QL arrived complete with the add-on Eprom cartridge plus the free RS-232C lead and a blank Microdrive cartridge additional to the four promised. The manual was incomplete as no SuperBasic reference information was available. A note with the computer advised of despatch by post in the new few days.

The extra blank Microdrive cartridges are essential as you are requested in the manual to make back-up copies of the Psion software, the only blank cartridges to be supplied would thus leave no blanks for your own use.

The bundled software from Psion was quite impressive for its completeness — no home/small business micro user is likely to require more powerful software.

I await the remainder of the manual with interest to explore the facilities available — yes there are windows and they do seem to work. Thank you Sinclair for keeping your promise.

Ian B. Michie, Crawley, Sussex.

THE QL SAGA

Those who ordered a Spectrum in the first couple of days of its release received the computer within seven weeks. Any delay in ordering and the prospective customer joined the queue for a 16-week wait. The machine, except for a slight timing fault, was ready at the launch and Sinclair could reasonably point to the massive demand as an excuse for the delays.

Early 1983 the computing press in general gave Oric a very bad time for announcing a machine that was not ready. Those who placed early orders waited 14 weeks to receive a machine which was obviously sub-standard with terrible display problems. Even greater delays were found by those who ordered a while after the launch.

One year on, here we go again. Sinclair has sent letters to some of those people who ordered a QL before the official launch date of January 20 giving a delivery date of before the end of April — 16 weeks. It was still late. Complaints by the public were upheld by the advertising standards authority over deliveries of the ZX-81 and Spectrum. This latest fiasco indicates how ineffectual writing to the authority becomes. I actually received a card post marked January 25 informing me that the QL was being processed for despatch.

On February 15 I received a letter dated February 9 informing me of the "expected" delivery date of before the end of April. This arrived virtually to the day on the 28-day original order delivery date.

Darren Robert, Woking, Surrey.

PAC-81 CHANGE

I want to thank you and Philip Harwood for that very good Pac-81 game. But while my children are used to the W-D-X-A keys to move up-right-down-left, I have made the following changes. Maybe they are of use for other readers.

```
POKE 16907,84
POKE 16914,76
POKE 16918,3
POKE 16921,92
POKE 16925,69
POKE 16929,2
POKE 16932,77
```

They also like to start playing with high score set to zero. This can be done by Poking 156 in the addresses 16865 to 16869.

I hope you will continue to publish machine code games for the ZX-81, because I find that's the computer most people started with.

G. Mannaerts, Kluislaan 9, B-2070 Ekeren (Antw).

NO TO BUTTER

With reference to *Your Computer*, March Kathleen Peel has dropped an awful clanger in her article on cleaning the Sinclair printer. NEVER USE BUTTER as a lubricant.

It contains (or is likely to contain) salt and water — guaranteed to cause corrosion on anything but highly alloyed stainless steel. Use Vaseline Instead.

I write this as an urgent message to prevent thousands of printers being irreparably damaged.

Don F. Gordon, Sheffield.

DON'T USE VDUs

The article accompanying the Squares game for the BBC Micro, in the April edition of *Your Computer*, gives an erroneous impression regarding the use of VDU statements to speed up program execution. In the article, Keith Miles suggests that replacing commands such as Move and GCol by VDU25,4 and VDU18 will give faster programs.

Unfortunately, this is a commonly held misconception. Using these VDU statements will, in fact, make BBC Basic programs run slightly slower. As a general rule, it is usually best to use special commands such as Move or Draw, where provided, in preference to the equivalent VDU statements. If readers wish to speed up the Squares program, I would suggest they try replacing the long variable and procedure names with much shorter ones, using upper case characters instead of lower case. While this leads to some loss of readibility, these techniques have a more favourable effect on execution speed than the mistaken suggestions regarding VDU statement substitution.

Lawson B. Wakefield, South Wirral.

GETTING IN

As you will probably know, the sequel to Manic Miner is out. Jet Set Willy is a superb program in two ways; first it is a great game and second it has one of the best protections I have ever seen. If you don't know what it is, everybody who buys the program gets a card which has 180 locations on it. At each of these locations there is a four-digit colour code. Whenever the user loads up the program, it will ask him to enter the code at any one of the locations.

The program only gives the user one go at entering the code. If he gets it wrong then the computer will ask for another location. If he gets this wrong the computer resets! In other words you must have the card to run the program. The card cannot be photocopied because the colours used in the code would not show up. Because replacement cards are not given out it would be disastrous if someone lost their card.

I have, however, found out a way of getting round this problem. Before you load the program type in

YC FINDS READER A JOB

I was interested to read your editorial — and would like to make a couple of observations. The first relates to your Design a Micro contest. We took up the opportunity to hire one of your entrants whose "product" and CV appeared in your last issue — it's very much part of our overall strategy of listening to what the active user wants.

The second is to observe that from your editorial assessment list of likes and dislikes about the computing scene at present — our machine is already the one most closely associated with your ideal — yet it is demonstrably the lowest cost product.

The third is to mention that your comment that Amstrad has no experience of making computers is perhaps counterbalanced by the simple observation that those presently in this market could use a few lessons in mass-producing a product for the consumer marketplace themselves — although I readily confess that half the fun of the computer press seems tied into the latest instalments in the "will they — won't they" sagas.

The separate establishment of Amsoft is playing a very important role in bridging the gap in Amstrad's knowledge of this marketplace by being staffed by the "usual" mix of people who are steeped in the business, bright lads and an eager following of independent authors plus an in-house publications team who are designing and producing a range of supporting literature that will be as much a feature of the overall project as the tower system of computing itself. We would not want you to think that Amstrad have not been thorough in their overall approach to a market which they see as featuring heavily in the future of any right minded consumer electronics marketplace.

William Poel, General Manager, Amsoft, Essex.

25 POKE 23672,0:POKE 23673,0:
POKE 23674,0

then instead of loading the first program use the Merge command — this stops the autorun. After the first program is loaded, stop the tape, type Run and start the tape again. The program will load and run normally.

Finally, I also found a way of getting more lives. This is done by typing in:

35 POKE 34785, (the number of lives you require)

at the same time that you would type in line 25.

Mark Sanderson,
Taunton,
Somerset.

HEX ERROR

I would be grateful if you could point out an error which crept in during your re-writing of the hex-loader accompanying my 'Tapesys' article in your magazine, as I have already received two enquries regarding this:

Line 30 should read:

30 DEF FN h(h$)=CODE h$ – 48 – 7* (h$(1)7"9")

as otherwise, bytes beginning with 9 — e.g., 50056 — are not properly converted. The hex listing itself is fine, so no problems will have been encountered by those using their own hexloaders.

The editing out of the assembler language listing has also caused some confusion. See the following two addresses:

MSGP = 51557
PAUSD = 51638

Paul Rhodes,
Luton,
Bedfordshire.

BETTA BASIC

A few mistakes crept into the ZX-81 program Betta Basic in the April issue of *Your Computer* and I would be most grateful if you could publish the following corrections

First my name Jason and not John as the article says. A line of spaces has disappeared from the top listing on page 131. Line 10 should read:

LET R$ = "(34 spaces)"

Under c) of the PRT command on page 126, a semi-colon has been omitted. There should be two of them after Print statement and not just one as shown. Lastly, error "T" means "missing comma", i.e., one or more arguments have been left out when a routine expects one.

Jason Judge,
Cheltenham,
Gloucestershire.

CORRECTIONS

An error crept into the hexloader program, Listing 1, for the Quickload feature in the May issue. Line 90 should read: LET z=FN h(a$(1))* 16+FN h(a$(2)).

The ZX-81 Speech article in May neglected to mention that the machine code needs to be stored in a Rem statement. At the front of Listing 1 insert a Rem statement containing 400 characters as Line 1.

EDITORIAL

WHAT WAS IT THAT made some of the U.K.'s biggest shops and software houses meet in secret with a group of foreign electronics manufacturers? If you happened to know that that manufacturers in question were Japanese, the answer to this riddle becomes a little clearer. Whatever went on at that meeting in April persuaded 20 of our largest software makers to produce MSX programs.

Three months ago MSX, the software and hardware specification adopted by most of the Japanese manufacturers, looked to be no more than an interesting exercise in standardisation. Now the well developed U.K. market has been singled out as the first stop in an itinerary of world domination. Soon MSX giants such as Sony, Yamaha, JVC and Hitachi will threaten the future of the British companies Acorn, Dragon, Oric and Sinclair.

Even computer firms outside Japan are coming round to the idea that software compatibility is important. Proud independents like Commodore are being forced to go for standardisation — the latest Commodore business machines are IBM compatible. Acorn's Z-20 version second processor turns the BBC Micro into a CP/M machine.

Companies like Binatone, cautious after its ill-fated 1982 computer project, have been looking very carefully in recent months at going for the safety of MSX. The bigger rewards of going their own way will always be matched by bigger risks.

With the Japanese flair for manufacture, marketing and distribution behind MSX it may look unstoppable. But there are strong arguments against it: standards by their very nature go for proven technology — and MSX is no exception.

If MSX's Z-80 based hardware specification appears a little staid today, what will it look like in 1986. Even by 1985 Sinclair will have sorted out the QL's teething problems. Furthermore, could the MSX choice of well established technology actually put a brake on software development.

The pro-MSX lobby says that this is missing the point. MSX machines will not necessarily be bought by Spectrum owners who have been educated to expect always a technological step up when they buy a new micro.

MSX will find its market with those who have held back for fear of buying a lemon computer. Quantum leaps forward in innovation are unpopular when equated with quantum leaps back in reliability. Also for new buyers the guarantee of software support may be more important than the machine itself.

As for the point about software development, programs have a lot of catching up to do before they find existing hardware a hindrance. Imagination has always been the limiting factor.

What is certain is that with MSX computers being internally identical, the cosmetics of computer design will become even more vital. No longer will Sinclair be able to say you can have one of his computers in any colour as long as it is black. MSX micros will also be marketed on their expandibility, so the add-ons market will receive a new uplift.

Even though the British manufacturers know what they are up against, they have little time to prepare for the battle which will start this autumn. If they fare well in the first wave of the attack they will find little reassurance in the description of MSX as being no more than the prototype for MSX 2.

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

Staff Writer
SIMON BEESLEY

Production Editor
IAN VALLELY

Sub-editor
PAUL BOND

Editorial Secretary
LYNN DAWSON

Editorial: 01-661 3144
Subscriptions: U.K. £11.50 for 12 issues

ABC
122,642 July-December, 1983.

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.

Advertisement Manager
SHOBHAN GAJJAR 01-661 3127

Assistant Advertisement Manager
NICHOLAS RATNIEKS 01-661 8548

Advertisement Executives
NIGEL BORRELL 01-661 3660
JULIAN BIDLAKE 01-661 8458
KAY FILBIN 01-661 8484

Northern Office
RON SOUTHALL 061-872 8861

Advertisement Secretary
JEANETTE MACKRELL

Classified
CLAIRE NOTLEY 01-661 3036

Publishing Director
CHRIS HIPWELL

Your Computer, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

© Business Press International Ltd 1984

"Waiter — there's a mouse on my Apple" "Sir — keep quiet they'll all be wanting one"

MICE ARE MOVING IN. Apple's long overdue price cut and the introduction of Mouse IIe means that you can buy a disc-based Apple IIe with a mouse and a Macintosh-style Mouse-paint program for £930. A raw Apple IIe now costs £595 instead of £845 and if you already have a 64K Apple with disc the mixed hardware/software Mouse IIe package is extremely good value at £135.

Apple's mice with everything policy even extends to the new Apple IIc battery-operated portable. This is smaller than a portable typewriter and much lighter — just 7½ lb., yet includes a built-in disc drive and 128K memory. It is also much more expensive — £925. Until the liquid-crystal display panel for the IIc arrives in a few months typing in programs on the move will be a matter of guesswork, though it will plug into a TV at home, and the optional mouse may be a little bit difficult to use on your lap on a train or bus.







Epson — which has also announced a portable this month, the PX-8, has taken a different route based on the lessons of the Epson HX-20. Although the price is similar, £1,000, the PX-8 has just 64K of RAM and a minicassette instead of a disc drive. However, it has a pop-up eight-line 80-column LCD display as standard together with built-in word processing, spreadsheet and communications.

Life after the MC-10

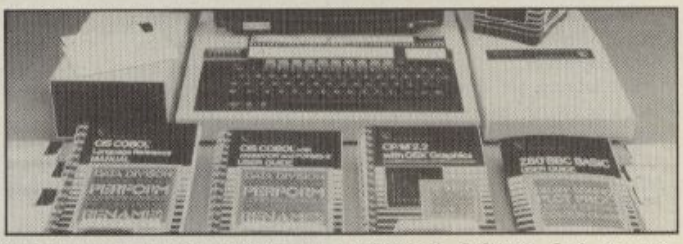
TANDY'S MC-10 colour computer introduced just over six months ago for £99 has already bitten the dust. Our review at the time in October 1983 described it as overpriced, a non-runner and a year too late. Now the last few MC-10s are being sold off for less than £40 each.

No product has been announced to take over from the MC-10 or its ancient bigger brother the Tandy Colour Computer. However, John Roach, Chairman of the Board of Tandy Corporation, is talking about introducing "adequate home systems for £500 to £1,000" consisting of keyboard, computer, disc drive, printer, and software.

Acorn's £300 Z-80 package will turn BBC into business machine

FOLLOWING ITS release of a 6502 second processor, Acorn has now launched a Z-80 version which turns the BBC into a CP/M-based business system. For £299 the unit provides 64K RAM and comes with a suite of programs that are intended to meet all the needs of the small business.

Acorn says that the software would be worth £3,000 if sold separately. Along with CP/M 2.2 which is supplied with the GSX Graphics System extension, the package includes word processing, database, spreadsheet and accounting programs, as well as Nucleus, a program generator.



Together with these application programs there are three languages — CIS Cobol, Professional Basic and a Z-80 version of BBC Basic. Professional Basic takes code generated by Nucleus and is also compatible with Microsoft Basic.

In addition to the bundled software it will also be possible to run many of the existing range of CP/M programs. Acorn has commissioned Software Ltd to configure its catalogue of 300 packages to BBC disc format.

The dual-processor system gives substantial speed improvements. By handing over all I/O processing — disc and screen handling — to the 6502 processor, the Z-80 is left free to concentrate on running programs. On top of this, the processor used is a Z-80B which runs 50 percent faster than the more common Z-80A.

Although the launch of his Enterprise home computer has been delayed till September Enterprise director and International Chess Master David Levy, at the chess board, still has plenty to smile about. Since the 1960s he has laid a series of bets that he could beat any computer at chess. Until last month's GEC Dragon Computer Chess Challenge no machine had ever had the better of him. The Dragon Chess Challenge proved to be no exception — Levy won again. Not surprising, you might think, if he was playing against a Dragon, but David was up against a Cray XMP mainframe — one of the most powerful computers ever built, and it was running the best computer chess program yet written — whose author Robert Hyatt is on the right of the picture with his terminal linked to the Cray.



Sinclair QLs arrive so do the complaints

FRANTIC DASHES in hired cars delivered the first few dozen QLs before midnight on the last day of April. So much for the good news — that the first QLs were delivered to customers a mere 11 and a half weeks after the 28-day delivery time elapsed. A Sinclair spokesman described this delivery as "quite genuinely a goodwill gesture".

The bad news is that the few QLs which have been delivered are not working properly. Apart from the overspill box plugged into the ROM socket — see QL review page 64 — which prevents you using plug-in ROMs, QL owners have been ringing up to complain about their machines. Shoddy finish and often unloadable software seems to be the least of their problems. The Screen Editor can make the system crash and the promised real-time clock is missing — along with the manuals.



It will be at least a couple of months until real QLs with the whole operating system on the main circuit board go out and Sinclair Research is hoping to iron out the bugs before that happens.

September MSX launch

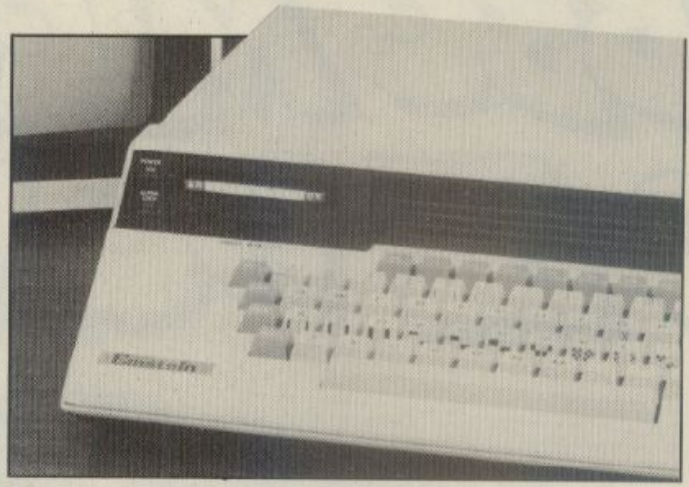
SECRET MEETINGS with software houses and Japanese manufacturers over the last two months have convinced Britain's biggest high street stores to back the oven-ready computers — MSX micros.

The shops have agreed to take hundreds of thousands of Sony Hit-Bits Sanyo MPCs, Toshiba Pasopias, Yamaha CX-5s and Canon V-10s starting from September, not to mention Hitachis, JVCs, and Mitsubishis. See *Your Computer* March 1984 pages 68 and 69. The stores are confident that the reputation of the Japanese for reliability plus the confidence of knowing that all the software is interchangeable will convince many sceptics to buy a home computer this Christmas.

Now they are pressurising software houses to convert all their best programs to MSX. One programmer told us bluntly: "the big multiples have said, 'You're writing for it!' " Meanwhile, Spectravideo, the company which launched the SV-318 and 328 nearly MSX computers is working on a cheap portable which really will run MSX programs this time.

Cooking with a computer conjures up images of the early days of the ZX-80 when overheating could be delayed by making hot drinks on the back of the machine. Now Bug-Byte has employed a chef, Ian Hoare, to produce a computer cookbook. You just tell the computer what you have in the fridge and it will suggest some suitable recipes. The program will even tell you what wine you should drink with your meal. It can select recipes by price, country of origin and how long the meal will take to cook. The Computer Cookbook which is only available on the Spectrum costs £9.50 for 80 recipes.





Tatung built-in disc was Einstein's secret

DESPITE ITS NAME the Tatung Einstein deserves to be taken seriously — if only because it is the first computer with a built-in disc drive to break the £500 barrier.

The Einstein has similar performance to the MSX micros, not surprisingly as it has a Z-80A central processor, Texas TMS-9129 video chip and AY-3-8910 sound processor but it has its own Tatung/Xtal Dos and Basic. There is 64K of RAM with an additional 16K video RAM and 8K ROM expandable internally to 32K. This gives it 256 by 192 resolution, 16 colours and 32 sprites with 40-column or 32-column text. 80-column display will be an option.

What makes it different is the built-in 500K 3in. Teac disc drive. This gives 200K per side formatted.

Tatung is a Taiwanese company, the name means Universal Family, and the company motto is "Honesty, integrity, industry and frugality". Tatung describes the Einstein as "all-British" but it might be more in line with the company motto to say it is designed and assembled in Britain.

The Einstein has a full typewriter keyboard, Centronics and RS-232 ports, A/D converter and Z-80 bus. A second disc drive can be fitted into the Tatung's case as well as up to another two externally.

New Dragons for our Fair

DRAGON IS LAUNCHING a new range of computers at our Computer Fair which opens at Earl's Court on Friday June 15. QLs will also be on display at this mixed hardware/software show backed by *Your Computer, Practical Computing* and *Computer Choice.* The Fair is open from 10am till 6pm Friday and Saturday and 10am till 5pm Sunday June 17. See pages 204-205 of this issue for further details.

Cheap games boom time

WHILE 99 PERCENT of the nation was enjoying this year's sunny spring, software house heads were doing a raindance. Every time the temperature rises games sales fall, as you throw your computers into the cupboard and head for the great outdoors. But companies like Mastertronic and Atlantis think they can beat the sales drought by dropping prices to £2 a time.

Mastertronic claims to have sold 250,000 cassettes in five weeks to unconventional outlets like newsagents, garages and even off-licences. Now Atlantis Software is following Mastertronic downmarket by launching a range of £2 games. If the price war takes off it could be a long hot summer for the established software houses.

Watch out, Martians have landed: War of the Worlds on a Spectrum

WHAT WITH interplanetary travel, tanks and time machines H G Wells never quite got round to inventing the home computer but if had, perhaps *War of the Worlds* would have come out first as a video game rather than after the book, film and record.

When Clement Chambers of Computer Rentals Limited wanted to produce a video game based on the Wells book he was not sure who to approach for the rights — but in the end it turned out that Jeff Wayne who made a *War of the Worlds* record in 1978 also had the game rights. Jeff took an interest in the project — as well as a cut in the take and themes from his record now accompany the 116 frames of action which allow you to roam around the whole of a desolate southern England under siege from the Martians.

You play the role of the journalist trying to survive and find out what the little green men are up to. You can use a joystick to control your movements as a text panel at the bottom of the screen tells you what your options are. In order to fit so many frames of action in, CRL had to "compress whole landscapes into very little information".

It was Clement Chambers first encounter with the record industry and he found the book-sized contracts he had to sign intimidating. "You just breathe out of time", he says "and you get done". The game of the record of the radio play of the film of the book will be available on Spectrum, Oric BBC, Electron, Commodore 64 and MSX. Anyone for posters and T shirts?

When NEC introduced the £85 PC-2021 battery-operated Centronics printer late last year it received an enthusiastic welcome from Your Computer. *Now NEC has put it together with a tape recorder and the PC-8201 hand-held micro to make a go-anywhere system which weighs just 6lb — even if it costs £600.*



25 BBC MICROS TO BE WON!



WALL'S ICE CREAM AND ACORN COMPUTER INVITE SCHOOLS TO DEVISE A COMPUTER GAME

Here's a great chance to win one of 25 BBC Microcomputers (B) for your school.

To celebrate the launch of the new MegaBytes lolly, Wall's and Acorn are offering these superb micros free to winners of this 'Mega' competition.

The competition is open to all UK primary, secondary and special schools.

To enter, each school team must:

1. Devise a computer game program which features ice lollies and;
2. List as many words as possible using letters from the phrase: 'Wall's and Acorn'.

There is no limit to the number of entries per school but each entry must be accompanied by fifteen MegaBytes lolly wrappers and arrive by 28 July 1984 at MegaBytes, PO Box 4XZ, LONDON W1A 4XZ.

Entries will be judged by a young computer games author and a team of professional programmers from Acornsoft. Points will be awarded for originality; quality of graphics; speed; sound effects; playability and overall presentation with attention to detail.

To win a computer, your school entry must have a high scoring game program and a sufficient number of words.

FULL RULES

1. Entries can be submitted on cassette or disk and written in either BBC Basic or machine code, each entry being signed by the teacher of computer studies or head teacher of the school. Entries should run on a BBC Microcomputer Model B or Acorn Electron.
2. All games must be clearly identified and accompanied by a full printed listing as well as a games catalogue style description of the game (not more than 200 words). The cassette/disk and listing should each carry the entrant's name and address.
3. Each school may only win one prize, irrespective of the number of entries of games submitted. Entries will be acknowledged upon receipt but not returned. Correspondence will be entered into at the absolute discretion of the promoters.
4. The entry instructions constitute part of the competition rules and are binding upon entry.
5. Responsibility cannot be accepted for entries lost, damaged or delayed in transit to the competition address. Illegible or altered entries will be disqualified, as will those not conforming to the entry instructions.
6. Entries will be judged by a panel of judges which will contain at least one independent member not connected with the promoter. The decision of the judges will be final and legally binding and in all respects of the competition the decision of Birds Eye Wall's Limited shall be final.
7. Copyright in all material entered rests in Paragon Communications on behalf of Birds Eye Wall's Ltd., and Acornsoft Ltd.
8. Winning schools will be notified as soon as possible after the closing date. A list of winners will be sent to anyone who encloses a stamped addressed envelope with their competition entry.
9. Entry is open to all qualifying UK residents except for employees of Birds Eye Wall's and Acorn Computer, their advertising and promotion agencies, or anyone directly connected with the competition or their families.

Wall's

New MegaBytes

ACORN COMPUTER



Rabbits may need MSX jabs to survive in British climate

RABBIT'S WRAPBIT II is a Z-80 based 80K Kong Kong built machine due to arrive in our shops this autumn. Like so many other machines it has opted for a Z-80 plus the standard Texas graphics and General Instruments sound chips.

Rabbit's parent company in Hong Kong, Foton is known to be negotiating to join the MSX club which has led to speculation that the Wrapbit might be MSXed before it is officially launched in this country. Rabbit claims that the £250 Wrapbit is Coleco-compatible and will have a CP/M option.

Case remains the same as CBM-16 replaces Vic

COMMODORE is replacing the aging Vic-20 with the 16K Commodore 16. In America the price will be $100 which will probably translate to £90 if the 16 is launched here this autumn. But Commodore is famous for announcing products which never see the light of day — like the £100 Commodore Max announced in April 1982, so don't hold your breath.

Although the 16 will come in the familiar Vic-20/CBM-64 plastic case it will be related inside to the new Commodore 264 micro now also known as the Plus 4 which will offer 60K free memory, built-in word processor, spreadsheet, filer and graph drawer programs for $300 — £280. Any software for the 16 will run on the 264. Commodore expects to sell over two million computers worldwide this year.

YOUR COMPUTER TOP 20

Game	Company	Machine
☐Blue Thunder	Richard Wilcox	Spectrum
☐Chequered Flag	Psion	Spectrum
☐Chuckie Egg	A&F Software	Dragon
☐Demolator	Visions	BBC
☐Eightball	Microdeal	Dragon
☐Falcon Patrol	Virgin	CBM-64
☐Flight Simulation	Sinclair	ZX-81
☐Fortress	Pace	BBC
☐Hunchback	Ocean	CBM-64
☐Hunchback	Ocean	Spectrum
☐Jet Pac	Ultimate	Vic-20
☐Jet Set Willy	Software Projects	Spectrum
☐Krazy Kong	PSS	ZX-81
☐Mr Wimpy	Ocean	CBM-64
☐Orc Attack	Atari	Atari
☐Q Man's Brother	MRM	BBC
☐Snooker	Visions	Vic-20
☐Ugh	Softech	Dragon
☐Wizard & The Princess	Melbourne	Vic-20
☐Zaxxon	Centresoft	Atari

Legal, decent honest...

UP FIVE PLACES in this year's Advertising Standards Authority bad boys chart go computer adverts. In 1982/83 there were enough justified complaints about misleading adverts by micro software and hardware companies to scrape into the ASA top 10.

This year's chart covering March 1983 to March 1984 has just been compiled and the bad news is that complaints about computer ads have overtaken Photography, Furniture, Services and Property to take the number 5 position. You don't need a micro to work out that at that rate of progress computers could soon overtake Finance, Travel and Holidays to topple cars and garages from the number 1 spot.

Sinclair, Acorn, Commodore, Dragon and Oric have all had complaints against them investigated and upheld by the authority. Most of the complainants claimed that the adverts were misleading or that products had not been delivered within 28 days. Peripheral manufacturers like Fuller were also criticised by the ASA.

Advance into IBM land try your discs at Smiths

AT LAST THE ADVANCE has gone on sale. Ferranti, who will be manufacturing the computer expects to make 100,000 this year — up to half of which could be sold in Britain by W H Smith.

For a fraction of the price of a PC the Advance is IBM-compatible which in this case means it will run most IBM programs — including Lotus 123 and Flight Simulator which often catch out IBM look-alikes. Advance director Jack Dangoor admits that a man who came to see him with a farming program that recognised cows on an IBM PC could not get it to run on the Advance so W H Smith will be encouraging potential customers especially farmers to try out any IBM software that they are thinking of buying on an Advance in the shop first.

Smiths will be selling both the cassette-based £400 Advance 86A, reviewed *Your Computer* May 1984, and the disc-based £1,500 86B. They both have an 8086 processor and 128K but the B also comes with two disc drives, a word processor, spread sheet, database and spelling checker.



Amstrad man puts his stomach on the line for delivery

WILLIAM POEL Amstrad's software division general manager is so confident that the CPC-464 will be out on time that he says: "I will be prepared to sit down and eat one in Trafalgar Square if its late. Dock strikes and Russian aircraft attacks permitting we will be in the shops in June." The *Your Computer* snatch squad will be waiting in the shadow of Nelson's column at dawn on July 1 in case Amstrad fails to make the deadline.

One *Your Computer* reader is already cutting his teeth at Amstrad. Alexander Martin's Da Vinci entry was commenced in our April 1984 Design a Micro round up. It also carried a personal message "Product design graduate — job needed". When he went for an interview with Amstrad soon after the magazine came out it helped him to get the job. "At the interview he waved a copy of *Your Computer* at us", says William Poel "and we'd seen it the day before so it was fresh in our memory."



Microvitec's new dual disc drive for the Dragon is not cheap — £525 — but it adds a massive 1 megabyte of storage, 720K formatted, to your 32 or 64. Microvitec is on 0274-390011.



We've gone to town again on our biggest ever Computer Show.

The 5th International Commodore Computer Show.

NOVOTEL LONDON
(FORMERLY CUNARD INTERNATIONAL HOTEL)
SHORTLANDS, HAMMERSMITH, LONDON W6.

THURSDAY JUNE 7th 10 a.m.–6 p.m.
FRIDAY JUNE 8th 10 a.m.–6 p.m.
SATURDAY JUNE 9th 9 a.m.–5 p.m.

commodore
Number One in the world of microcomputers.

This is our 5th International Commodore Computer Show and it's going to be bigger and better than ever, with something to capture everybody's interest.

Come along and try out the whole range of Commodore home and business computers, peripherals and software, and talk to the experts about them.

If you're a business man, you can keep ahead of the times by visiting our seminars hosted by Jim Butterfield, the internationally renowned computer expert, or for advice, visit the Milton Keynes Information Exchange.

But don't miss Patrick Moore, who'll be on hand to demonstrate the Commodore Astronomy software, and unravel the mysteries of the Universe. He'll also attempt to answer any questions under the sun.

The kids will have fun meeting B.J. the Bear, Gortek, and adventuring in the games arcade.

There's lots more to enjoy, including music from Radio Luxembourg, so be sure not to miss this year's show.

All these fun and games cost only £1 for a child, £2 for an adult, or £3 for a family of up to four.

But then the knowledge you'll gain is priceless.



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.

I could do that...

For this month's task we would like you to equip your computer with a glimmering of artificial intelligence. Write a program which allows you to carry on a dialogue with the computer. It should start off by asking the user a question and then respond to the answer, keeping it up for at least four exchanges. The program should not be longer than 20 single statement lines, including data statements.

We will award the £15 prize to the program whose questions and responses are judged to be the most amusing, or apparently intelligent.

Program 1.

```
  10 REM**DOT-MOVER**
  60 MODE7
 (60 CLS)
  70 LET A=10
  80 LET B=10
  85 REM** A, B ARE START
POSITION**
  90 PRINT TAB(A,B)"*"
 (90 PRINT AT B,A"*")
 (95 IF INKEY$="" THEN GOTO 95)
 100 LET C$=GET$
(100 LET C$=INKEY$)
 110 PRINT TAB(A,B)"."
(110 PRINT AT B,A".")
 115
REM*5-LEFT;8-RIGHT;7-UP;6-DOWN*
 120 IF C$="5" THEN LET A=A-1
 130 IF C$="8" THEN LET A=A+1
 140 IF C$="7" THEN LET B=B-1
 150 IF C$="6" THEN LET B=B+1
 160 IF A<1 THEN LET A=1
 170 IF A>38 THEN LET A=38
(170 IF A>30 THEN LET A=30)
 180 IF B<1 THEN LET B=1
 190 IF B>23 THEN LET B=23
(190 IF B>19 THEN LET B=19)
 200 PRINT TAB(A,B)"*"
(200 PRINT AT B,A"*")
 210 GOTO 100
```

Logical operators?

"What exactly are 'logical operators' used for?"

MOST BEGINNERS don't take long to learn to use the relational operators. These are =<> > < <= and >=. Their use with arithmetic variables, such as:

```
110 IF Q<20 THEN GOTO 70
```

is soon extended to string variables, like:

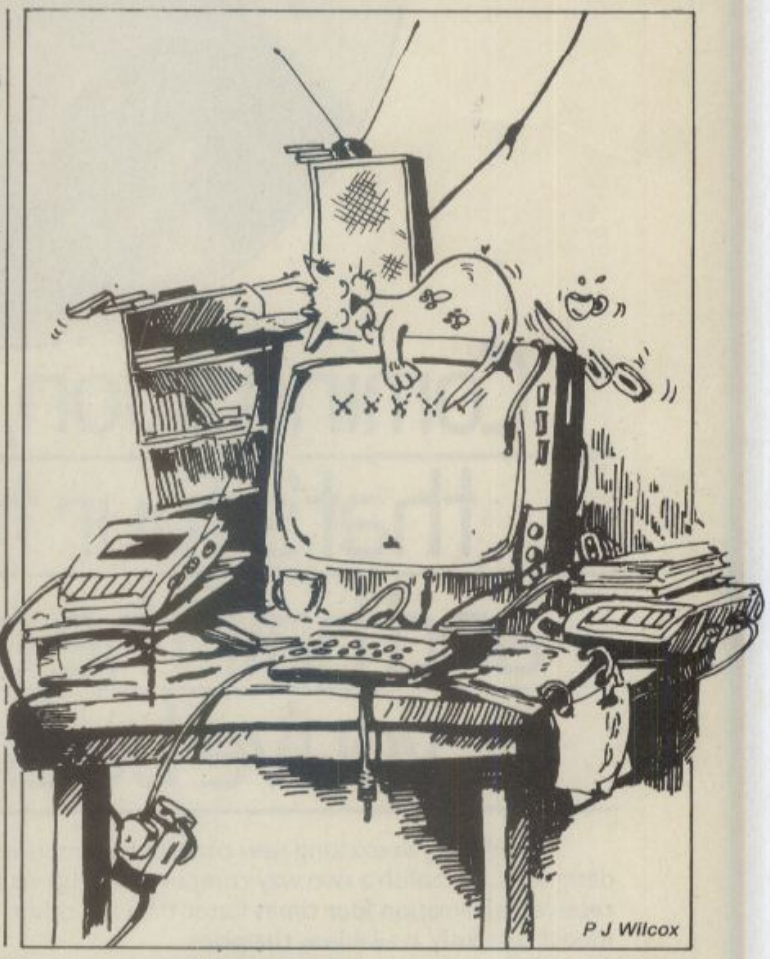
```
430 IF N$="SMITH" THEN PRINT
      N$,T$
```

The use of logical operators such as And Or Not EOR takes longer to grasp. The problem is complicated by the fact that different micros use them in different ways, and the fact that the rules which underly their use come from one of the more obscure backwaters of mathematics; Boolean algebra. But whatever the theory, the use of Logical Operators can lead to very neat program routines.

Try the programs with this article. As printed, they will run on a BBC micro, a ZX-81 or a Spectrum, and they should be easy for beginners to modify them to run on many other machines.

The first program moves a star around the screen, leaving behind a trail of dots. ZX lines are in brackets.

(continued on page 51)



P J Wilcox

Disc operating systems

"What is a disc operating system and what does it do?"

A DISC OPERATING system — DOS — is simply a machine-code program — usually 8K long — which handles loading and saving to disc. Most home micros come without a disc operating system so if you want to add a disc drive you will also have to buy a disc interface with the DOS stored on ROM.

On the Spectrum, for example, the DOS for the Microdrive is supplied with the Interface 1, while BBC owners have to plug a DOS chip into the main board. Commodore, however, incorporates the DOS within the disc drive.

Business micros, by contrast, generally store the DOS on disc. They hold a short routine in ROM — a bootstrap routine — whose purpose is to load the DOS into RAM when the machine is powered up. This is the method used to run CP/M, by far the most popular eight-bit operating system.

Disc operating systems provide a far greater range of facilities than their cassette counterparts. Perhaps the most important difference lies in the way the DOS keeps track of what is stored on disc and where.

Consider what you have to do before saving a program to tape: you need to make a note of where other programs start and finish, and of how much space is left on the tape; you need to physically position the tape at the right spot. A disc operating system does all this for you.

It reserves space on the disc for a directory in which it stores details of where programs are stored and how long they are. When you come to save a new program the DOS finds space for it and adds its details to the directory. If the disc is full it tells you so. When you load in a program the DOS consults the directory to find its location.

In this way the DOS performs what are often called its housekeeping duties. Not having to worry about such chores is one of the great advantages of disc systems over cassettes.

On top of this a good DOS will offer an extensive spread of commands and utilities. Naturally, these vary from DOS to DOS. They should include commands to delete selected files on an entire disc, and facilities for copying files either to another disc drive or to another disc inserted in the same drive.

There will also be a set of commands for creating data files. These will allow you to read in a series of records — sequential files — or pull in specific records out of order — random-access files.

Other facilities may be for renaming programs, protecting them, setting up different program libraries, or tidying up the disc by rewriting files head to tail. To find out more you will need to take a look at a DOS manual. You may find that learning to use a DOS fully is almost as demanding a task as mastering the computer itself.



Coming soon, a new Modem that's four times as fast and half the cost of the one you've been looking at.

Introducing an exciting new concept in computer communications—the Protek 1200 Modem. Specially designed to establish a two way computer link-up via the telephone, the Protek Modem transmits and receives information four times faster than any other model currently available at the price.

With so much to offer at such a competitive price, the Protek Modem is well worth waiting for. But don't worry, you won't have to wait too long.

- **Two operating speeds: Mode 1 1200/1200: Mode 2 1200/75**
- **Accoustic coupling**
- **Flexible design for perfect acoustic connections**
- **Battery powered (40 hours from 4AA 1.5V battery)**
- **LED indicator**
- **Available for delivery 1st June 1984.**

Protek 1200 Modem— £59.95

CONNECTS TO ANY RS232C COMPATIBLE COMPUTER	
SPECTRUM	(INTERFACE REQUIRED)
ORIC	(INTERFACE REQUIRED)
BBC	(CABLE REQUIRED)
ELECTRON	(INTERFACE REQUIRED)
VIC 20	(CABLE REQUIRED)
COMM. 64	(CABLE REQUIRED)

Protek

VISA

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

(continued from page 49)

Look at program 1. Easy to follow, but all those If...Thens! Now erase lines 120 to 190, and type in the two lines in program 2 instead.

I hope you agree that this makes the program shorter, neater, and therefore better. ZX programs can be made even neater, but by using ZX Basic in a way which is not allowed on most other machines. 120 LET A=A+(C$="8" AND A<31) - (C$=...etc.

To follow the logic read line 120 as:

"Let A become A+1 provided C$ is 8 and provided A is less than 38; and let A become A-1 provided C$ is 5 and provided A is greater than zero."

Using OR needs much more care. With most Basics, watch out for double negatives — what your old English teacher said may have seemed pointless in everyday life, but it really does matter here. Another ghost from the past; in most Basics, OR is like the "either ... or ..." comparisons of English, and compares just two things. Forget this at your peril! However, unlike English, in Basic you can string together logical operations using brackets. You can have:

```
340 LET K=K + (1 AND (C>7 OR
    C<19) AND L$<>"*")
```

Back to the little dot moving program. You can try changing lines 120 and 130, to allow you to move along diagonals — see program 3.

Experiment with the programs, and make sure you understand how the logical operations work. Next, look out for them in program listings for your own machine. That way you are likely to get some fresh ideas to use in your own programs. You may find examples of the use of Not. See if you can work out why they used this rather than <>.

Program 2.

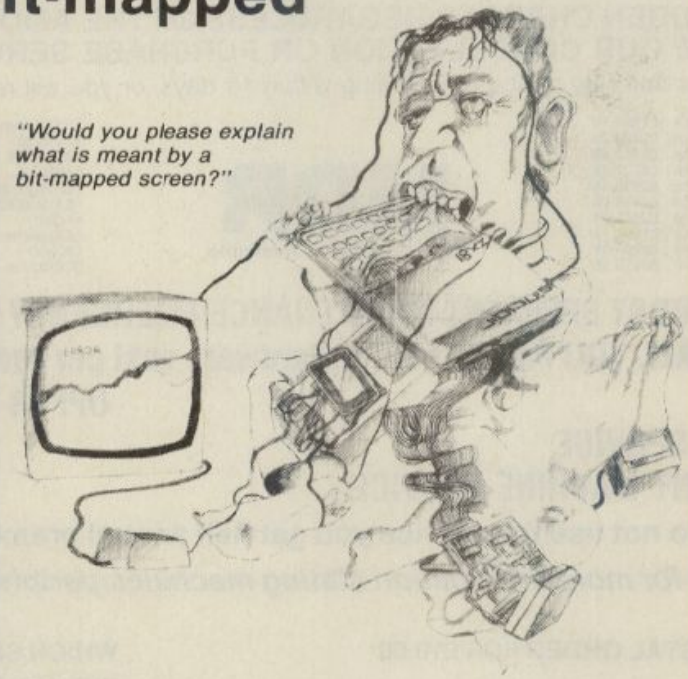
```
120 LET A=A+(1 AND C$="8" AND
A<38)-(1 AND C$="5" AND A>0)
130 LET B=B+(1 AND C$="6" AND
B<23)-(1 AND C$="7" AND B>0)
(A<31 and B<20 with ZX machines)
```

BEGINNERS first bytes

Program 3.

```
 120 A=A+(1 AND (C$="8" OR
C$="9" OR C$="0") AND A<38)-(1
AND (C$="5" OR C$="4" OR C$="3")
AND A>0)
 130 B=B+(1 AND (C$="6" OR
C$="4" OR C$="9") AND B<23)-(1
AND (C$="7" OR C$="3" OR C$="0")
AND B>0)
 120 LET A=A+((C$="8" OR C$="9"
OR C$="0") AND A<30)-((C$="5" OR
C$="4" OR C$="3") AND A>0)
 130 LET B=B+((C$="6" OR C$="4"
OR C$="9") AND B<20)-((C$="7" OR
C$="3" OR C$="0") AND B>0)
```

What are bit-mapped screens?



"Would you please explain what is meant by a bit-mapped screen?"

TO UNDERSTAND the idea of a bit-mapped screen you need only to remember that each byte of memory is made up of eight bits, and that each bit can have one of two values, 0 or 1.

In a bit-mapped screen each pixel on the display is represented by a bit or several bits in memory. Thus the pattern of binary 0s and 1s in the screen memory copies the pattern of dots on the screen.

In the simplest case where a pixel can only have one colour — is either off or on — only one bit is needed to register the state of one pixel; so a line of eight pixels would be stored in the screen memory as binary 11111111, or 255 in decimal.

Bit-mapped screens permit higher resolution than character-mapped screens but consume much more memory. Characters are usually defined on an 8 by 8 grid of dots so storing the dot pattern for a character will require 64 bits which is eight bytes. Contrast this with a character-mapped screen where the code for a single character is stored in a single byte.

To work out just how much memory a bit-mapped screen will take up you simply work out how many pixels there are, allow one bit for each pixel and divide by either to find the number of bytes. Mode 0, for example, on the BBC gives a resolution of 640 by 256. Multiply these two numbers together and divide by eight and you will arrive at a figure of 20480. Divide this by 1024 — the number of bytes in one K — and you finish up with 20K which is the amount of RAM used by Mode 0.

If you also want to store information about the colour of a pixel you will need even more RAM. If each pixel can have one of four colours including the background colour then twice as much memory is required since two bits now need to be allocated to one pixel.

This explains why on the BBC the four colour Mode 1 uses as much RAM as Mode 0 although it only offers half the resolution. There is trade-off here between colour and resolution: the more colour the lower resolution, and vice versa.

The Spectrum circumvents this problem by using an attribute file separate from the bit-mapped display file. Each byte in the attribute file contains the details of colour, brightness and flash status for all the pixels within a character space.

Although it minimises memory consumption the drawback to this method of storing colour information is that it means you can only have one colour within a character space. This gives rise to the effect — often noticeable in Spectrum games — of having blocks of colour from different shapes overrun each other.

A further complexity of bit-mapped displays is the way in which the bytes in memory are laid out in relation to the pixels on screen. You might think the simplest method was to have consecutive bits and bytes store the details of consecutive pixels running from left to right, row by row from top to bottom. But it rarely works out this way.

Poking consecutive bytes in the screen memory on the BBC fills out not a row but a character space at a time. The Spectrum's screen memory organisation is even more complex. The first 32 bytes correspond to the first row of pixels but the second 32 store the pattern of the ninth row down — the first row of the second character line.

All this makes dealing directly with bit-mapped screen memories — by Poking or Peeking — slower in Basic than using Plot or Print commands. Machine-code programmers, however, have no option, and one of the machine-code gamesters first tasks is to work out an algorithm for plotting to the screen.

Either way you can investigate the complexities of your screen layout by simply Poking the first thousand bytes of screen memory with 255. By noting the order in which the pixels fill up you can then observe your computer's screen organisation in action. ■

M.D.R.

"JOIN NOW — WIN ONE OF FOUR SINCLAIR QLs"

SAVE ££s — CONSULT US!

Whether you're thinking of buying a micro, peripherals, or software, for business or pleasure — consult us and we will advise you as to making the Right Choice.

ALL FOR £10.00 MEMBERSHIP FEE

- If you know what you want, we can supply all hardware, software and peripherals at a

GREAT DISCOUNT (10-20%)

Examples:

SANYO MBC 555	**£810 + VAT**
COMMODORE 64	**£143.65 + VAT**

- If we can't help you, we will give you a

FULL REFUND

Write to us at:

MDR

27 Belleville Road, London SW11 6QS

TEL 223 1613

— stating what your purpose or user-problem is, or what particular piece of Hardware/Software you're interested in. Please enclose a cheque or postal order made out to MDR for £10.00.

THERE ARE NO HIDDEN CHARGES REGARDLESS OF THE AMOUNT OF TIMES YOU USE OUR CONSULTATION OR PURCHASE SERVICE

We will reply to your letter by phone or in writing within 10 days, or you will receive a Full Refund.

1 IBM PC	£2,390	Our price	**£2366.10**
2 ACT Sirius	£2,525	Our price	**£2499.75**
3 ACT Apricot	£1,760	Our price	**£1742.40**
4 Apple III	£2,755	Our price	**£2727.45**
5 DEC Rainbow 100	£2,359	Our price	**£2335.41**
6 Olivetti M20	£2,180	Our price	**£2158.20**
7 Wang Professional	£3,076	Our price	**£3045.24**
8 NCR Decision Mate V	£1,984	Our price	**£1964.16**
9 Kaypro 10	£2,595	Our price	**£2569.05**
10 Data General Ent 1000	£2,645	Our price	**£2618.55**

MDR
Credit Facilities Available

11 Spectrum	£99	Our price	**£89.10**
12 VIC 20	£140	Our price	**£126**
13 CBM 64	£229	Our price	**£206.10**
14 BBC B	£399	Our price	**£359.10**
15 Dragon 32	£175	Our price	**£157.50**
16 Atari 600XL	£150	Our price	**£135**
17 Oric 1	£99	Our price	**£89.10**
18 Apple IIe	£750	Our price	**£675**
19 ZX81	£40	Our price	**£36**
20 Electron	£199	Our price	**£179.10**

MDR's MOST EFFICIENT MAINTENANCE/EMERGENCY SERVICE
ALL YOU PAY IS 14% of Hardware cost per year

What you get

24 hr EMERGENCY SERVICE

48 hr REPLACEMENT MACHINE SERVICE

OFFER OPEN TO BUSINESS AND HOME USERS

And if you do not use the service you get half annual premium returned

Write to MDR for more information stating machines/peripherals for cover

I enclose CHEQUE/POSTAL ORDER FOR £10.00

NAME_____

ADDRESS_____

_____

_____

_____

_____

Tel:_____

WHICH SERVICE YOU REQUIRE

PURCHASING ☐

CONSULTANCY ☐

MAINTENANCE ☐

ALSO ENCLOSE A BRIEF EXPLANATION ON THE SERVICE YOU REQUIRE

SEND TO: MDR, 27 BELLEVILLE ROAD, LONDON SW11 6QS

1.30pm — 5.30pm PHONE 223 1613

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

Local news

Llanelli

If you have a computer and are wondering what you can do with it other than play games, then Llanelli Computer Club is the place for you. Whichever make you have, there will be someone else with whom you can discuss and grumble about the different features of your machines. Anyone who is interested is invited to come along and see for themselves. The club meets every Friday evening at 7 pm at the Mutual Aid Shop, John Street, Llanelli. Contact Trevor Walters, or Ray Collins on 05542-56917.

Oxford

Neglected machines though they be a hardcore enclave of TI-99/4 and TI-99/4A users has formed in Oxfordshire. Oxon TI Users has a montly newsletter called *TI-Lines* which has one unusual feature: it is read on to audio cassette for the benefit of blind/partially-sighted users. Contact Peter Brooks, 29 Kestrel Crescent, Blackbird Leys, Oxford OX4 5DY. Telephone 0865-64811, or 0865-717985.

Tyne & Wear

Newcastle-upon-Tyne Personal Computer Society meets at Room D103, Newcastle Polytechnic on the first Tuesday of every month. They try and organise some sort of demonstration every month. There is a wide range of machines from ZX-81s to sophisticated business machines. Contact Pete Scargill, 21 Percy Park, Tynemouth. Telephone 0632-573905.

COMPUTER *club*

What do John Milton and browse options have in common? After a flying visit to the Chilterns Paul Bond is in a position to reveal all.



CHILTERN MICROCOMPUTER Club, held on the first Wednesday of every month at the Old Garden Centre, School Lane, Chalfont St Giles, Buckinghamshire has the unusual distinction of meeting not far from the home of John Milton, 1608-1674, of *Paradise Lost* fame. And while not exactly a feast of nectared sweets where no crude surfeit reigns, coffee and buscuits are nevertheless provided, to give people a chance to exchange ideas before the main business of the evening; usually a lecture or a look at some piece of computer hardware — either a new home computer, or perhaps a business machine that other club members are interested in seeing.

The club does not limit itself to any particular machine or interest area. Nevertheless, they have been in the unfortunate position of having to discourage younger members because, due to rural transport problems, this would necessitate meeting at an earlier time. It would also influence the nature of topics covered in the meetings.

Wendy Tibbits, secretary of the club pending the annual general meeting, was also its founder. An ex-mainframe programmer, she now does freelance software writing from home so that she can devote more time to the family. She even advertises within the pages of *Your Computer*.

The club chairman, Ian Spedding, joined the club at its inception two years ago but was, in fact, standing in for his son who had gone to university by the time regular meetings got underway.

He explained that the club, apart from looking at every kind of machine from the Memotech MTX-500 to the IBM PC, had done things like organise an introductory seminar for people who had never written a single program instruction. Held in January of this year, the session dealt with very basic things like how to tune a television set into the microcomputer and worked up to a 15 instruction program which was worked through one step at a time.

Club members comprise a high proportion of people involved in data processing or business applications of computers — Ian Spedding himself is a systems analyst — but also people who are interested in micros purely from a hobbyist viewpoint.

The club also provides a bit of a pressure group on the local schools who, it would seem, have been a bit slow off the mark when it comes to seizing the challenge proffered by new technology, letting those government grants for micro-computers just slip away. If teachers have a mental block against computers, their pupils will suffer.

Although the club does not print a newsletter, the noticeboard keeps it in touch with developments like Micronet 800's Freebie of the Month competition — a possible £100 prize here for BBC or Spectrum programmers together with the possibility of a club modem — for more details telephone 0733-63100. Also Interdisc Records of 249-251 Kensal Road are moving into software and want programmers subsequent to their deal with EMI and Island.



The evening's talk was given by Bob Finch, a local businessman. His field is really radio-electronics but he got into computing after getting a contract for a hospital radio system run by a PDP-11/05. "I had to learn to drive it." Shortly after this his children started computer studies at school so he went in for a BBC Micro.

The machine he used for most of his business purposes, however, was the somewhat more exalted ICL model 26. This could be run with two screens and two printers one dot matrix and one Olympia Typewriter. On this he did price-list, letters and accounts. He had customised a WordStar program, rewritten by a friend. It had softkey functions making it very user-friendly. Since the program is menu driven you can rename, copy, delete files etc.

For data management he used a program called Delta. This simply writes serial files on a disc. You have to define the key field — character, numeric, data — the record and how to get into the file. The program has a choice of five browse options. This means different parameters can be selected in order to locate things if you can't remember all the details. This kind of program is used by mail order companies. For more details of Chiltern micro club contact Mrs W Tibbits on 024 074906. ■

LOWEST PRICES

IMMEDIATE EXPORT QUOTES AVAILABLE. MAINTENANCE OR INSURANCE AVAILABLE ON ALL EQUIPMENT.

ALL PRICES ARE EXCLUSIVE OF V.A.T.

DAISYWHEEL PRINTERS

BROTHER HR1	449.00
BROTHER HR15	345.00
TRACTOR	65.00
SHEETFEEDER	190.00
KEYBOARD	140.00
BROTHER HR25	555.00
DAISY STEP 2000 (20cps)	246.00
DIABLO 620 (RO)	675.00
DIABLO 630 (API)	1320.00
DIABLO 630 TRACTOR	149.00
JUKI 6100	335.00
TRACTOR	89.00
SHEETFEEDER	199.00
QUME 11/40 (RO)	1190.00
QUME 11/55 (RO)	1375.00
QUME 9/45 (RO)	1590.00
QUME 9/55 (RO)	1940.00
RICOH RP 1300 (P or S)	899.00
RICOH FLOWRITER 1300	999.00
RICOH RP 1600 (P or S)	1239.00
RICOH FLOWRITER 1600	1299.00

ALL OTHER PRINTERS AVAILABLE: FUJITSU, NEC, OLYMPIA, TEC, UCHIDA, SILVER REED, SMITH CORONA, OLIVETTI.

DOT MATRIX PRINTERS

ANADEX DP 9000	799.00
ANADEX DP 9620	949.00
ANADEX 9725 (Colour)	1099.00
COMMODORE MTS 801	175.00
EPSON RX80T	215.00
EPSON RX80F/T	240.00
EPSON FX80	325.00
EPSON MS 100F/T III	370.00
EPSON FX100F/T	425.00
HERMES 612C (inc. Tractor)	1650.00
MANNESMANN TALLY MT 80	230.00
MANNESMANN TALLY MT 160	399.00
MANNESMANN TALLY MT 180	599.00
OKI MICROLINE 80A	199.00
OKI MICROLINE 82A	259.00
OKI MICROLINE 92	399.00
OKI MICROLINE 2410	1549.00
RADIX 10(NLQ)	449.00
RADIX 15(NLQ)	549.00
SEIKOSHA GP100A	179.00
SEIKOSHA GP100VC	175.00
SEIKOSHA GP250X	215.00
SEIKOSHA GP700A (Colour)	369.00
SHINWA CP80 F/T	185.00
SHINWA 40 (Colour)	119.00
STAR GEMINI 10X	239.00
STAR GEMINI 15X	309.00
STAR DELTA 10	319.00
STAR DELTA 15	425.00
TEC 1550	439.00

MANY OTHERS AVAILABLE: DRE-NEWBURY, I.D.S. MICROPRISM, RITEMAN, TEXAS, TOSHIBA.

COMPUTERS

APRICOT 256K 1×315K D/D+MON	1400.00
APRICOT 256K 2×315K D/D+MON	1550.00
COMMODORE VIC 20	78.25
COMMODORE VIC 20 STARTER PACK	108.69
COMMODORE 64	152.17
EPSON QX10	1649.00
KAY PRO II	1199.00
KAY PRO 10MB	2099.00
ORIC ATMOS 48K	145.00
SANYO MBC 550	699.00
SANYO MBC 555	899.00
SINCLAIR ZX81	33.00
SINCLAIR ZX81 16K	53.00
SINCLAIR SPECTRUM 16K	80.00
SINCLAIR SPECTRUM 48K	100.00
SIRIUS '1' 128K 1.2MB	1650.00
SIRIUS '1' 256K 2.4MB	2150.00
SIRIUS '1' 256K 1.2+10.6MB	2950.00
TELEVIDEO 1605	2245.00
TELEVIDEO TS802	2875.00
TELEVIDEO TS800A	1075.00

MANY OTHERS AVAILABLE.

PERIPHERALS

MONITORS, UPGRADE BOARDS, CABLES, SOFTWARE, PAPER FEEDERS, DISKS, PAPER-DELIVERY.

Spa House, 27–29 Worple Road Mews,
Wimbledon, London SW19 4JS

Tel: 01·947·8562

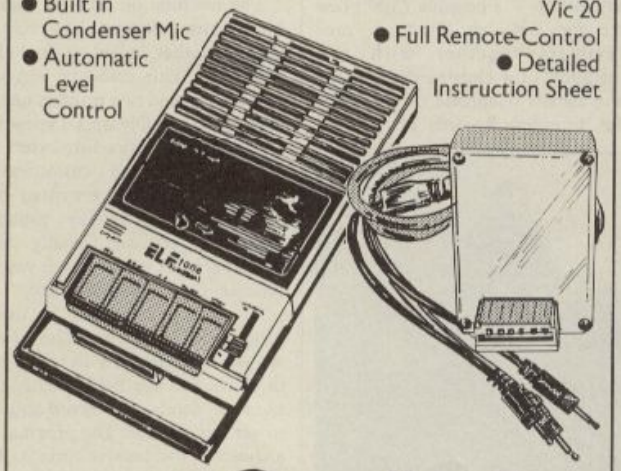
Telex: WOWICO 8955888

WORLDWIDE COMPUTERS LTD.

COMMODORE COMPATABLE CASSETTE RECORDER AND CASSETTE INTERFACE ONLY £29.95

ELFTONE 08011 £19.95
- Battery/Mains
- Built in Condenser Mic
- Automatic Level Control

COMM. CASSETTE INTERFACE—£9.95
- Load+Save for Comm 64/ Vic 20
- Full Remote-Control
- Detailed Instruction Sheet



Protek

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

THE SKY'S THE LIMIT WITH... AIR TRAFFIC CONTROL

NEW!

Try this absorbing game



LIVE SITUATIONS TOTALLY COMPELLING



By HAMA SYSTEMS
For use with Sinclair ZX81 (16K RAM)

ON SALE AT MOST LEADING COMPUTER OUTLETS, OR BY MAIL ORDER FROM: SACKVILLE PLACE, 44-48, MAGDALEN STREET, NORWICH. **£6.95**

Star chart

Zigzag

Spectrum 48K:
Novelty:
£6.95:
DK'tronics:

★ ★ ★

You must chase Scarabags in your Vectrakker DKT Mk II prototype and, once you've cornered one, interrogate it to find out how to enter the next sector. Then kill it. Occasionaly, Hoverdroids appear and you must destroy these too. A 3D maze effect and speech module capability make this an unusual game. The Scarabags, quaking in a corner, made me feel sorry for them — I didn't exterminate many.

Ad Astra

Spectrum 48K:
Shoot-'em-up:
£6.95:
Gargoyle Games:

★ ★ ★

This game looks better than it actually is — the graphics are very good but the scenario is an old one. Blow up the alien hoardes and survive the asteroids. At least the game is in perspective and this raises it above the standard shoot-'em-up fare.

Laserwarp

Spectrum 48K:
Shoot-'em-up:
£6.95:
Micro-gen:

★ ★

Destroy nine waves of attackers including Interstellar pogos and hyperspace chickens before encountering the Master — destroy his ship for bonus points. A slow and boring Galaxians-type game.

Croakit

BBC B:
Novelty:
£5.95:
Kerian:

★ ★

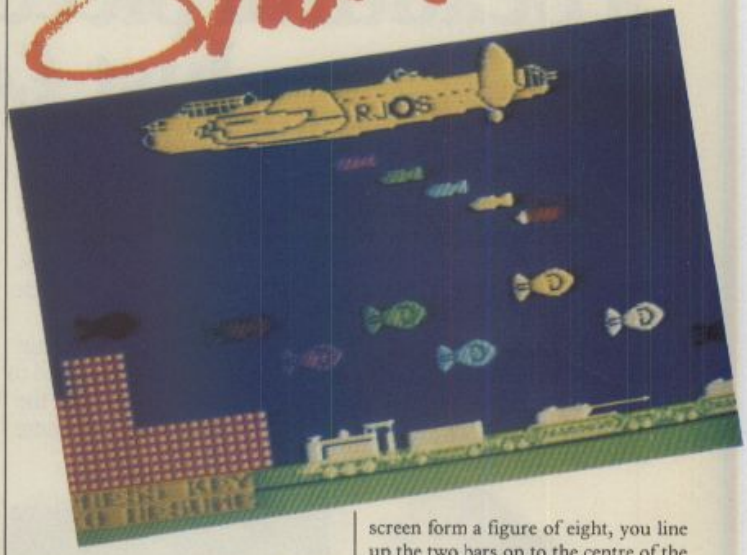
The cassette only version says on the cover card: "Probably the most exciting version of the well known arcade game". I disagree. The music is as boring as most, but the river traffic has a slight difference.

SOFTWARE Shortlist

Night Gunner

- *Spectrum 48K*
- *£6.95*
- *Digital Integration*

★ ★ ★



FROM THE PEOPLE who brought you the excellent Fighter Pilot F-15 Eagle simulator, this program obliquely relives the experiences of a World War Two air-gunner on a bombing mission over enemy territory.

Three types of mission are available. First you defend the bomber from nightfighters. Twin engine aircraft swoop towards you as you manipulate the keyboard/joystick to get them in your sights. The delicate tracery of bullets weaves a fine mesh of death in the night sky. Oops, getting carried away there.

There is also a variety of ground attack options. As you unleash your cargo of destruction on the unsleeping factories of the enemy your view of the terrain is occasionally obscured by clouds. You can manoeuvre looking for a break in the cloud-cover.

The ground attack display shows you planes and sometimes lorries on the ground. You strafe them mercilessly with rockets, but watch your altimeter in case you turn your plane into a rather expensive lawnmower.

Plane damage is caused by attack from enemy aircraft or being hit by flak on the bombing runs. The plane's status panel at the bottom of the screen displays damage on an aircraft symbol. Time to target or end of mission are also displayed in seconds as is time remaining during ground attack. You periodically get messages from the captain during the mission.

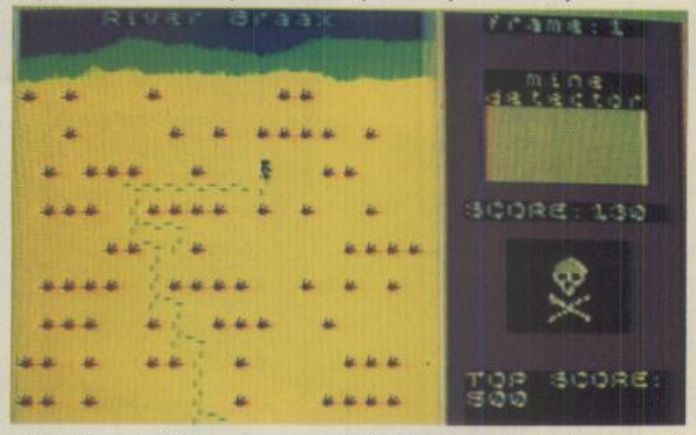
Damage to the flight deck results in random movement of the aircraft making it difficult to hit your targets.

The sight on the ultimate mission is different from the others, in true Barnes-Wallis style. Adjusting your height so that the two spots on the screen form a figure of eight, you line up the two bars on to the centre of the towers and release your bomb. Barrage balloons and bonus planes periodically cross the sky.

Dyslexia Beater

- *Spectrum 48K*
- *£9.95*
- *Dunitz Software*

★ ★ ★



"SIGNIFICANTLY, MANY of the programmers I have met seem to be dyslexic to some degree." Thus Dr Beve Hornsby in her new book *Overcoming Dyslexia*. The relevance to this column is that Dyslexia Beater is a series of three addictive, easy-to-play arcade games created by educational psychologist Dr Colin Terrell and his colleague Charles Smith designed to accompany the aforesaid book.

The programs aim to help youngsters develop good letter recognition skills and sense of direction. Directional confusion from being uncertain of which is left and right to being unable to read properly is a common symptom of dyslexia. It appears to be a hereditary condition.

The first game, Desert of Durg, appears to cater for directional confusion. You have to guide Dyslexia Beater to the River Braax, avoiding mines and, on later screens, monsters. It is a standard format game of the type that presents you with a map of a minefield. You tiptoe round this using the keyboard. Then you have to do it again — but this time the mines are invisible. You have to follow the instructions which are displayed on the right-hand side of the screen. They warn you that mines are to the right, left, above, below. The pink monsters which appear later mean you have to do a bit of strategic thinking to figure out how to avoid them.

Crossing the Braax is the second game. This deals with letter recognition. You build a bridge by catching letters falling in yellow boxes that are the same as your moving target or letter-catcher. Each correct catch builds up an arch, scores 30, erases the falling letter's yellow box and changes the letter you are using to catch identical letters with.

This is an excellent idea and quite a good game in its own right. The only quibble I have is that it might be a little wearing on the eyes, due to the Spectrum's character set. If you are seriously going to use this with dyslexics, you will have to get hold of a big monitor.

The third game, Escape from Dyslexon, necessitates steering Dyslexia Beater's rocket ship through the green space gates, while observing direction instructions — a kind of primitive Scramble with the computer playing backseat driver. You get vaporised if you are hit three times by stars or the red space wall. The program is menu-driven so players can access any game at the touch of a button. The price of book and tape together is £12.95. The telephone number of Martin Dunitz Ltd is 01-482 2202.

(continued on page 57)

THE SCOTCADE HOME COMPUTER BUREAU

At last, a computer centre that's a beautiful piece of furniture too. Just £49.95 (+p&p)

The home computer is here to stay, so naturally it needs a home of its own. And here it is...the purpose-built Home Computer Bureau, designed by Scotcade and British made to look good in your home – whatever your taste in furniture.

The elegant lines are reminiscent of a classic roll-top desk, yet its unfussy style is totally in keeping with the job it's made to do.

The Computer Bureau is veneered in solid wood, satin finished in either mahogany or pine. And this isn't restricted to just the parts you can see. The undersides of the shelves, the inside facing of the sides, even the back, receive the same attention to detail.



Why have we gone to such lengths? To create a piece of furniture as beautiful as it is functional – and just as much at home in the lounge as it is in the bedroom or study.

PLENTY OF SPACE FOR ANY SIZE OF HOME COMPUTER SYSTEM.

We looked at the requirements of home computer users – and designed the Computer Bureau accordingly. It's 36" tall, and the 12½" × 32½" top holds most popular monitors or smaller TVs solidly and safely. The 20" × 31" main desk surface provides space for your keyboard, while leaving easy access to a special recessed shelf for cassette and disc storage; and there's plenty of room for a cassette unit or disc drive, and even a printer. The low level document shelf can be located to the left or right, whichever suits you best. And the back features cut-outs for leads, again for left or right hand positioning of your equipment.

ASSEMBLED IN MINUTES...LASTS FOR YEARS

Your Computer Bureau is remarkably easy to assemble. Simply follow the instructions and in minutes you'll be rewarded with a fine piece of furniture that will give you years of hardwearing use.

SATISFACTION OR YOUR MONEY BACK

...that's the Scotcade promise. So order now, using the coupon below, or 'phone 07462 5744 quoting your credit card number. If you're not delighted with your Computer Bureau, return it intact within 30 days and we'll refund your money in full. Please allow 28 days for delivery.

Scotcade Ltd.

33-34 High Street, Bridgnorth, Shropshire, WV16 4HG.

To: Scotcade Ltd, 33-34 High Street, Bridgnorth, Shropshire, WV16 4HG.

Please send me:

.....Mahogany-finish Computer Bureau(x) (CBM –)

.....Pine-finish Computer Bureau(x) (CBP –)

at £53.90 (inc. £3.95 p&p) each.

I enclose cheque/postal order for £.....or please debit my Access/American Express/ Diners Club/Visa/Trustcard.

No_____

Signature _____

Mr/Mrs/Miss _____

(BLOCK CAPITALS PLEASE)

Address_____

_____

_____

_____ Postcode _____ YC/00/06

Registered No. 1653140 England.
Delivery subject to availability. U.K. exc. Channel Islands.

© Scotcade 1984.

ORDER BY PHONE. RING 07462 5744 DAY OR NIGHT, AND QUOTE YOUR CREDIT CARD NUMBER. **ORDER BY POST.** FILL IN THE COUPON AND SEND IT WITH WHATEVER METHOD OF PAYMENT YOU'VE CHOSEN. **PERSONAL CALLERS** TO OUR BRIDGNORTH SHOWROOM ARE WELCOME.

Star chart

Submarine Strike

Spectrum 48K:
Novelty:
£6.95:
Pulsonic:

★ ★

Hi there! Good shooting captain! Enemy plane Destroyed! Variable not found, 7410:2. These are just some of the messages that greet you as you play this simple game of submarine warfare. You get the standard instrument display, map display, periscope display. You shoot down enemy planes — don't forget to load — and also sink tankers, flat-tops, etc. You have to aim off to the left for some reason which adds an element of trickiness.

Knight Driver

Spectrum 48K:
Racing:
£8.95:
Hewson Consultants:

★ ★

A breakneck racing game which gives you a downward looking view of a tortuously-twisting race track. Accelerate, decelerate turn accurately left and right. Don't hit anything.

Good for your reflexes, but I found I tired of it somewhat rapidly.

Jammin'

CBM-64:
Novelty:
£6.90:
Task Set:

★ ★ ★

A real blaad claat of a computer game, this ethnic little number has you guiding Rankin' Rodney through the top 20 mazes to number one. Done out in true Rastafarian colours plus blue for some reason, the maze is divided into four sections. You have to collect instruments from the four corners of the display and return them to the centre of the screen, avoiding spiders and bum notes, and voodoo skeleton men.

A simple idea, elegantly implemented. Avoid overconfidence. The harder they come, you know?

(continued from page 55)

Frogger

■ *Atari*
■ *£34.95*
■ *Parker*

★ ★ ★ ★

BRILLIANT GRAPHICS, increasing complexity and enhancement of game interest factors — it's all here and at this price so it jolly well ought to be. Parker are very cagey about how much this cartridge is likely to retail for, so you might see it around for £29.95. But still — you can buy a whole computer for that much.

The object of the game is to hop as many frogs across the road and the river to safety as you can. This cartridge will fit into Ataris 400, 800 or XL and then you are plunged into life in the fast lane with a vengeance. When the music starts, the time band at the base of the screen starts to shrink. Your amphibian will become an ex-frog if he touches any vehicle in the four lanes of traffic; and when it comes to crossing the river, treacherous turtles sometimes submerge — apparently this frog cannot swim. As the game progresses, some of the logs become alligators hungry for frog aperitif. Alligators' heads also show up in the home bays occasionally. After you get five frogs home, the game continues at a higher level — speed and density of the traffic and river objects start to vary and snakes slither along the logs and pavement.

The game, of course, has some basis in fact. Ecologically-minded people in Norfolk have formed toad patrols.

SOFTWARE Shortlist



Apparently toads need a large flat area when croaking out their mating call and, unfortunately, lots of them choose six-lane motorways with the result that they become road pizzas. The well-meaning toad-lovers carry them singing off the motorway in sacks. I bet the toads are pretty confused.

As far as the frogs go, the love interest is faithfully reproduced. While crossing the river, you can score extra points by hopping on to a pink lady frog and escorting her home. Should there be a fly in your home bay when you hop into it, this will also score extra points.

This is one of the few frogger games that has managed to hold my interest for more than a few minutes — it is well-designed and enjoyable to play.

Q-bert

■ *Atari*
■ *Parker*
■ *£34.95*

★ ★ ★ ★

THE ONE, THE only, the original Q-bert — or at any rate the one under license from Mylstar Electronics Inc this game for MC Escher freaks shows a screen display illustrating a pyramidal assembly of cubes like a pile of playbricks. Your goal is to score as many as possible by changing the colour of the cubes on the pyramid from a starting colour to a destination colour. You do this by hoping the ovoid Q-bert from block to block. The idea is to change the whole pyramid to the colour shown at the left of the screen.

He has to avoid hopping off the sides or the bottom of the pyramid or else he is lost. Meanwhile, keep a weather eye out for Red Balls who is liable to squash Q-bert and Purple Ball, who does the same plus hatching Coily the Snake at the bottom of the pyramid.

In a real emergency Q-bert can can hop onto a flying disc, the number and position of which differs according to the level of play. Other characters include Ugg who travels sideways and up and jumps on people, Slick who confuses the issue by re-changing the colours of the cubes, and finally Green Ball. If Q-bert can catch Green Ball he freezes all the other characters, scoring extra points. The round ends when the pyramid has changed colour completely.



If you have any lives left, you progress to the next round — and the game speeds up. What makes this game is the element of planning of strategy. You can't really just hop around and hope to achieve something worthwhile. For a start, after level 2 you dont just change the cubes from their start colour to their final colour. There is an intermediate colour stage to go through as well. After this the sequence of changes becomes even more complex. There are nine levels of play. The graphics are clear and well-designed, not without a certain humourous appeal.

For example when Q-bert is struck down by the cruel twists of fate, not to mention the purple balls he utters, in the form of a speech balloon, that primal scream which can only be represented by squiggle exclamation mark hash sign question mark squiggle. Whatever this word is, I have yet to hear it on Channel Four.

Pedro

■ *Dragon 32*
■ *£5.50*
■ *Imagine*

★ ★ ★

ALSO AVAILABLE for the Spectrum, this program as implemented on the Dragon creates a most impressive screen display, reminiscent of the three dimensional maze game Antescher — only you cannot move any deeper into the maze than is already shown on the screen.

Pedro is a gardener South of the Border — the herbaceous border, presumably — but his garden is a great attraction for all the local life-forms.

To deter creatures from eating his

(continued on page 59)

THE ZARAK SOFTWARE COURT HAS DECIDED THAT C.R.L. PROGRAMMES ARE TOO GOOD FOR EARTHLINGS.





'An extract from the Zarak's Software Court Ruling'

CRL programs are so good it has become necessary for us to eliminate the entire range of CRL's software programs, from their no. 1 seller 'Glug Glug' to the mind blowing 'Omega Run' which are available for most of the popular earthling computers. Programs must be vapourized at Boots, Menzies, W H Smith's, Spectrum Group and any good computer shop — we must do it soon — tomorrow might be too late!

John Menzies · Boots · WHSMITH · spectrum

CRL

THE DREAM MAKERS

CRL House, 9 Kings Yard,
Carpenters Road, London E15 2HD.
Tel: 01-533 2918

Star chart

Staircase Stampede

BBC B:
Novelty:
£5.95:
Comsoft:

★ ★ ★

A very fast Q-bert game. There is a veritable outbreak of these on all machines at the moment and there is not much more to be said about this one. It is colourful, gripping and grows in complexity and speed as the game progresses.

Gun Fight

Unexpanded Vic-20:
Shoot-'em-up:
£6.95:
Sumlock:

★ ★

The sort of game that gives hi-res graphics a misleading name. Nevertheless plenty of fun to be had as you steer your gunfighter around the screen trying to take out the opposing son of a gun who appears to have about as much sense of direction as a decapitated chicken. It is obviously your duty to the public to shoot him since he is wheeling around the desert obviously the worse for tequila.

Microbot

Spectrum:
Shoot-'em-up/maze:
£5.95:
Softek:

★ ★

You are a disgruntled droid who would rather have been a truck driver than a brain surgeon: debugging the large positronic brains of the new batch of QT robots is very risky. Left screen displays a map showing the 12 sectors of the robot brain. Below this are readouts showing damage status and power level. You destroy blue bugs with blue fix-a-tive balls, and yellow ones with yellow ones. You also can drive them away for a bit with repulsa blobs. Colourful with good graphics.

(continued from page 57)

herbs Pedro must collect bricks or compost from the bottom corners of the screen and block the maze exits.

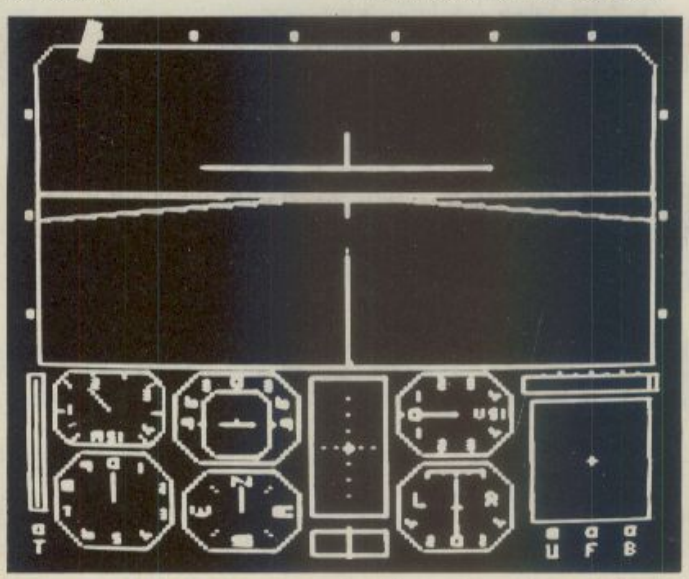
The game is joystick-compatible, but the keyboard arrangement is reasonably sensible. Any key on the top row or the space bar will enable you to jump on the marauding pests — Pedro must have big boots because he seems to be able to jump on ants or elks with impunity. Should you be standing close to heaps of bricks or compost, or the seedbox, pressing these buttons will enable you to pick them up.

The keys to move left are all on the bottom row, beginning with Z and alternating. The remaining keys enable you to move right. To go up any of the keys on the third row up may be used, to move down any of the keys on the second row up may be used. At the end of each level a bonus is calculated

If any of Pedro's prize blooms fall victim to the local fauna, he has to plant new seeds. This task is aggravated by a tramp who wonders on and tries to steal the seeds. This unsavoury character appears on the screen at random intervals, homing straight in on the seed-box. He is quite easily frightened away, so you do not have to trample on the tramp.

So a thing still most rare in Dragon software; amusing colourful graphics and an absorbing and taxing game.

SOFTWARE Shortlist



Sea Wolf

- *Sinclair ZX-81*
- *£5.95*
- *Stephen Hartley Software*

★ ★ ★

GIVEN THE limitations of the machine, an excellent litle submarine shoot-'em-up. Two screen displays: periscope display, accessed by pressing P, shows you the familiar endless borderline between sea and sky. Over the horizon lurk the hostile ships of the enemy.

To torpedo a target you must find the ship in the periscope and turn the submarine until its heading is identical with the bearing on top of the periscope display.

On the left hand side of the screen throughout are displayed heading, depth, speed, and whether or not the snorkel is open or closed. Power being used and air left are also indicated. You can recharge your air supply in the time-honoured way by surfacing and using your snorkel. When you fire two white squares shoot off toward the somewhat crude representation of a surface vessel, which explodes and disappears.

The real expertise in this game seems to be figuring out the heading on which you must travel from the radar display. The heading can also be changed by turning the rudder — press keys 8 or 5. The longer either key is held down the more the rudder turns.

This kind of simulation of the inertia of a large submarine vessel is a nice touch in a game implemented on what, with the best will in the world, must be described as a primitive machine.

Forty Niner

- *Sinclair ZX-81*
- *Software Farm*
- *£5.95*

★ ★ ★ ★

A GAME SIMILAR in format to Dig-Dug, but for the black-and-white ZX-81, which can justifiably claim to have hi-res graphics and quite interesting, nay, recognisable ones at that. At least once you've read the useful cassette inlay which has a diagram numbering the 11 different features of this games program, you'll be able to recognise the players in this tense underground tragedy.

Aviator

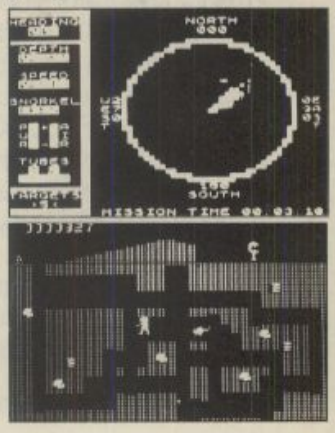
- *BBC Model B*
- *£14.95*
- *Acornsoft*

★ ★ ★

OFF WE GO INTO the wild blue yonder, or rather, in this case, the wild black yonder. Yes, it's one of those games where they have apparently sacrificed colour for hi-res graphics. The difficulty with flying around a load of white lines on a black screen is that you are apt to forget where you are and fly straight into the perimeter track thinking it to be the horizon. Of course this would not happen if you were sensible and took a close look at your instruments.

There are instruments galore in this program — Acornsoft have made much capital out of getting a real Battle of Britain ace to promote the game. The aircraft simulated is a Spitfire II — and, given the lack of colour, there are some very nice touches like the way your nose pitches down once the airspeed has built up enough to lift the tailplane clear of the runway. A little unnerving for our experienced shuttle pilots.

Documentation is unhelpful. There's no point in making a complex game more complex by not giving you a clear straightforward example of a standard training flight telling you which buttons to press in order to do a few circuits and bumps. There is a bridge for you to fly under in this game.



The great American Gold Rush started in 1849 when everybody rushed to the West Coast to look for gold, according to Software Farm. None of these people can have got very rich because the big '49 gold strike was up north in the Klondike. Still historical accuracy is not at issue here because giant rats and vicious gremlins have never been regarded as common hazards to gold miners, either.

YES!



A 100k BBC-drive for £99 + VAT

We've done it! We've built a storage system for your BBC Micro with the power and convenience of a floppy disk drive, at a fraction of the price. Interface to the BBC costs £26 + VAT and runs up to 8 drives.

PHLOOPY's special secret

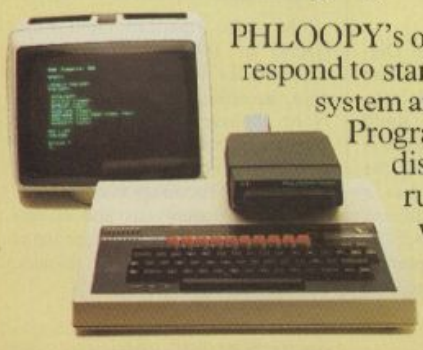


PHLOOPY does not record on a disk, but on a loop of quarter-inch tape contained in a rugged interchangeable cartridge.

The heart of PHLOOPY is a unique "byte-wide" magnetic head, that gives it its speed by recording nine tracks across the tape. Typically, you can access a file in only 3 or 4 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 – up to 100 times faster.

Talking to your PHLOOPY



PHLOOPY's own software makes it respond to standard BBC filing system and Basic commands. Programs written to run on disk or cassette should run on PHLOOPY without problem. And because your PHLOOPY drive contains its own microprocessor – a second computer which does most of the hard work – it puts very little load on the BBC. The on-board computer also checks and automatically corrects any read errors.

Your PHLOOPY Library



PHLOOPY cartridges hold a full 100k of data. You can buy blank cartridges for £3.75 each plus VAT. Many BBC programs will be available on PHLOOPY.

Phi Mag Systems Ltd. PO Box 21, Falmouth, Cornwall TR11 3TD Tel: (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.

YC

NEWS

oaeo
rssu
ttttt
h h

The crystal ball

Help is at hand for those thousands of adventurers who have not yet managed to complete The Hobbit. Shining brightly amidst my newly delivered batch of spell volumes is a splendid new tome from Melbourne House entitled "A Guide To Playing The Hobbit". Priced at £3.95, the book gives vital guidance on strategy and tactics together with essential information to help in solving all the Hobbit's dark secrets. A sorely needed book and an absolute must for every owner of this very successful adventure.

An itch in my palm tells me to expect a new adventure from Shards Software, a "pre-quel" to the unusual Pettigrew's Diary and possibly to be called Operation Sasfras.

My raven reports that Phipps Associates have released a new text and graphics adventure for the Spectrum — Colditz is its name.

The tea leaves distinctly indicate that a text and graphics blockbuster for the Commodore 64 is about to be released from Prolific English Software. Watch this space.

A helping hand

One of my favourite brain-bogglers is Acornsoft's Philosopher's Quest for the BBC Model B. It is choc-a-bloc with cunning puzzles and sadistic surprises. Perhaps you are having trouble getting past the Portcullis then into and out of the danger room. If so, here's the way to get in:

HTRON PMUJ NEHT
TELUMA BUR

And the way to get out again:

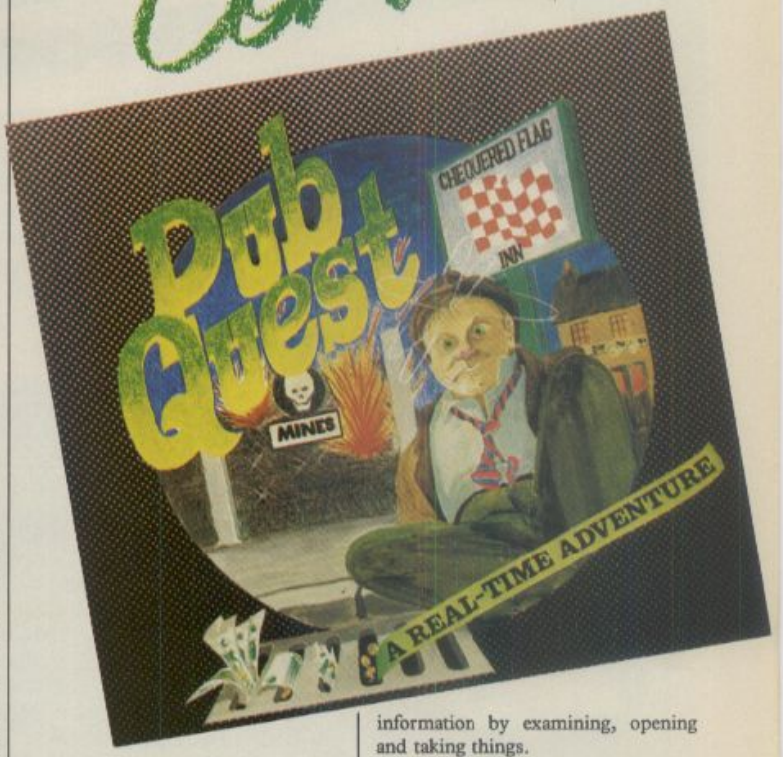
HTUOS NUR DNA
KSAMSAG TEG

Stymied by a serpent on a box in Phipps mind-stretching Knight's Quest?

EPOR A OTNI SNRUT TI
EKANS ELGNARTS

QUEST corner

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.



Pub Quest

Commodore 64
£5.95
Dream Software

THERE ARE MANY underground settings for adventures but I do not think I have yet seen one where some of the action is set in a sewer system. It would be a pity if that sort of environment puts you off since Pub Quest turns out to be an unusual, testing and quite funny adventure.

To pay off the massive debt you have managed to build up at the local hostelry, you must somehow quickly accumulate some money. You realise that there is likely to be quite a bit of cash down the nearby drain since most of it was originally dropped there by you while inebriated.

Your journey starts by the main street outside the pub. Cross the busy road at the wrong place and you will find your body covered in tyre marks — end of mission! The Pelican crossing is none too reliable, either. You may well find yourself up a tree — getting down is another matter.

The game has quite a few tricks and surprises in store. Although there are one or two spelling mistakes, in general it is an enjoyable and engrossing program.

If you are feeling a bit jaded, this is an adventure to liven up your liver and tickle your funnybone.

Quest for the Holy Grail

48K Spectrum
£5.95
Dream Software

IF YOU HAVE seen the Monty Python film of the same name, you will have an idea of what this adventure is about. Included in the plot are such creations as the Knights that go "Nic!" — always on the lookout for a nice shrubbery; an extremely unpleasantly behaved French Guard; a ferocious white rabbit and a three-headed knight.

The adventure offers both text and graphics, the latter being fairly simple pictures of each location. There are plenty of locations but not very many objects or characters. The "Save/Load Game" feature is very fast, making it little bother to save a position at any perilous point.

The quest is rather easy to complete and as such is more suitable for the novice adventurer.

Pettigrew's Diary

BBC B/Dragon
£9.95
Shards Software

BBC MODEL B owners may now give three cheers — one of the most original adventures on the market, Pettigrew's Diary, is now available for their machine.

On the cassette are three separate programs, each one a sequential chapter linked by the mysterious diary. Successfully completing one of them provides you with a password into the next — without the vital word you cannot progress further. Some pretty good theme music introduces each section of the adventure.

Chapter 1 is mainly graphic. You are inside a burning farm house where you move around and try to collect information by examining, opening and taking things.

London Frolics is the title of chapter 2. This is more the traditional text adventure, except that the action takes place in real time and the text is delivered in teletype style. Here you wander around London, visiting interesting people and places in your search for more information. Beware — some characters may not be what they seem to be . . .

Chapter 3, European Trek, is a series of eight different challenges on a range of abilities. These include getting Pierre down from the Eiffel Tower and discovering who the best German barber is.

Completely original and highly intriguing, Pettigrew's Diary will give your grey matter a thorough work-out.

June 13th

At last the mysteries seem to be unfolding before me. Very soon, I sense, the ultimate secret will be mine. But also, I can sense the evil forces closing in. Every day they seem stranger. It is my duty, then, to maintain this journal of events, so that it may guide he who may follow, if anything should happen.....

DISK GAMES

FOR THE 64 commodore

If you've got a 1541, you don't want to spend ages waiting for cassette games to load. Freed from the restraints of loading times, Audiogenic Disk Games can give you typically around 30K of machine code! More code means better games, better graphics and sound, more variation, and those little extra touches that you will come to expect from a game. Here are our first great releases!

FORBIDDEN FOREST

Forbidden Forest is more of a quest than just a game! The action takes place in a four dimensional scrolling forest landscape which many have entered, but none has returned. Yes, I did say FOUR dimensional - day fades into night as the action unfolds! The quest is to seek out and destroy the Demogorgon, mystic ruler of the Forbidden Forest. Before you can even set eyes on him you will have to contend with his army of fearsome creatures, including mutant spiders, showers of giant frogs, snakes, dragons, skeleton soldiers and more! You have only your trusty bow and arrows to depend on!



*







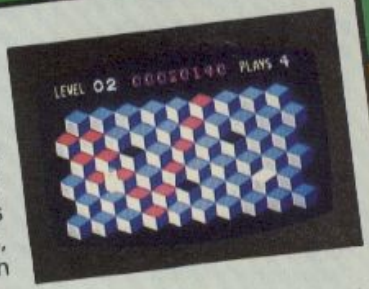
AZTEC CHALLENGE

A challenge on an epic scale! Aztec Challenge takes you on a journey to Mexico and the ancient pyramid of Tenochtitlan. The ancient Aztec gods and their devotees have ensured that no ordinary human can learn the secrets of the temple and live to tell the tale. The pyramid is protected by all manner of treacherous traps and hidden perils - an epic test of your courage and cunning. Aztec Challenge features no less than seven totally different screens - here are just three of them - each of which presents a brand new challenge. We hope your joystick can stand up to it!

*

SLINKY

Slinky, the spring, was having fun hopping about when suddenly he came upon a pile of coloured blocks, so he thought he'd play around on them for a while. Much to his amazement he found that they changed colour when he landed on them. Wow! But unknown to him, the blocks belonged to the Wicked Wizard, who sent his friends along to tease our poor hero. Slinky is a real fun package with ninety-nine levels, amazing reward displays, and action replays. Where else could you meet such charming characters as Dusty the dust cloud, Marge the magnet, Ralph the random raindrop, and Lorenzo the chameleon hopper?



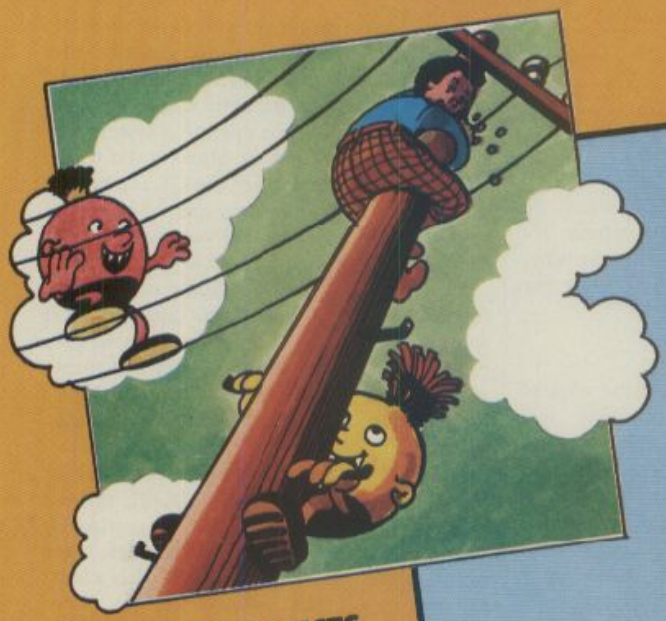
*

DISK GAMES £12.95

Audiogenic LTD

FOR FREE COLOUR CATALOGUE OF OUR

FROM **Audiogenic!**



FRANTIC FREDDIE

Frantic Freddie is fun all the way! Played to an unbelievable soundtrack of brilliantly arranged tunes, Frantic Freddie contains all the ingredients that make a game into a classic! Freddie is a telephone line engineer who has to climb up and down the telegraph poles, picking up pots of gold and avoiding the dreaded Greeblies. The Greeblies take on a different form with every new screeen, but one thing's for sure - they may look cute, but they show no mercy! Frantic Freddie also features wacky messages, funny interludes and silly bonuses. Frantic Freddie - a game with a sense of humour!



AUDIOGENIC PRODUCTS ARE AVAILABLE IN ALL MAJOR STORES OR BY MAIL ORDER DIRECT FROM US. (MAJOR CREDIT CARDS ACCEPTED)
PRICES INCLUDE V.A.T. AND POSTAGE AND PACKING



PEGASIS

Pegasis takes us back to the mythical age when the battle between Good and Evil was fought by heroes on winged steeds. As the champion of the forces of Good, you must topple the evil Black Warriors from their jet black flying horses by swooping down on them from above, then land and finish them off before they can remount. In order to keep airborne, you must keep your wings flapping with the joystick Fire button, and control direction with the stick. The brilliant programming of Pegasis gives you stunning graphics, bonus creatures, great wing flapping sound effects, an incredible simulation of flying horse aerodynamics, plus - two players can play at the same time!



*THESE FUN-PACKED PROGRAMS ARE ALSO AVAILABLE ON CASSETTE - £8.95

OTHER PROGRAMS, CLIP AND RETURN COUPON

PLEASE SEND ME YOUR FULL COLOUR CATALOGUES
NAME .....
ADDRESS .....
GC/4/84

AUDIOGENIC LTD
P.O. BOX 88
READING
BERKS.

REVIEW

QL'S DARK SECRETS

SINCLAIR'S QL RAISES a number of questions. Why was it announced so prematurely? Is it worth £399? Is the "free" software of any real value? And so on. The 128K QL has been surrounded by misinformation since the beginning. And Uncle Clive — no stranger to criticism — has come in for more than his usual share during the first four months of this year since the announcement of the machine in January.

In this review, I will attempt to provide answers to some of the questions I've raised. Most computer reviews concentrate on the machinery, the hardware, and leave the ideas which lie behind the machine, the concepts the designers tried to embody in it, for other, later commentators to examine. But the *concept* of the QL, and the ideas which lie behind its resident language SuperBasic are fundamental to understanding the machine, so they must be discussed, along with the hardware.

Strange rumours

"Those who operate at the cutting edge of technology shall be sacrificed upon it," observed Adam Osborne, and Clive and his staff have been proving the truth of that pronouncement since QL launch day — extraordinary delays in delivery; strange rumours that, perhaps, the machine might never even appear — the QL attracted a lot of flak. I was amused to see that internal Sinclair documents on the QL referred to it as the ZX-83. We all thought of the Spectrum, before its launch, as the ZX-82, and I guess now that that was also its working designation within Sinclair Research. As a way of compensating for delivery delays, and lost interest on money forwarded for the computers, Sinclair are sending out the RS-232 lead — normally £14.95 — as a "free gift" with all QLs which have taken longer than 28 days to deliver. This will happen even if your QL was ordered via credit card, and the amount was not deducted from your card until the computer was sent out. If you had, in fact, ordered the RS-232 lead, Sinclair will send you £14.95 back.

One of the reasons for the delivery delays will be evident if you get one of the first several thousand machines sent out. The QL does not fit within its natty dark-grey case. "We can't get all of the operating system in," a spokesman confided. So sticking out of the ROM socket at the back of the QL is a blob of metal, slightly larger than a matchbox, which contains the bits of the computer which Sinclair could not squeeze into the case.

Eventually, QLs will be going out without the extra blob at the back, but Sinclair felt it was more important to quiet the clamour over protracted delivery delays — even if it meant sending out cobbled together machines — than it was to delay the whole thing until they got it right.

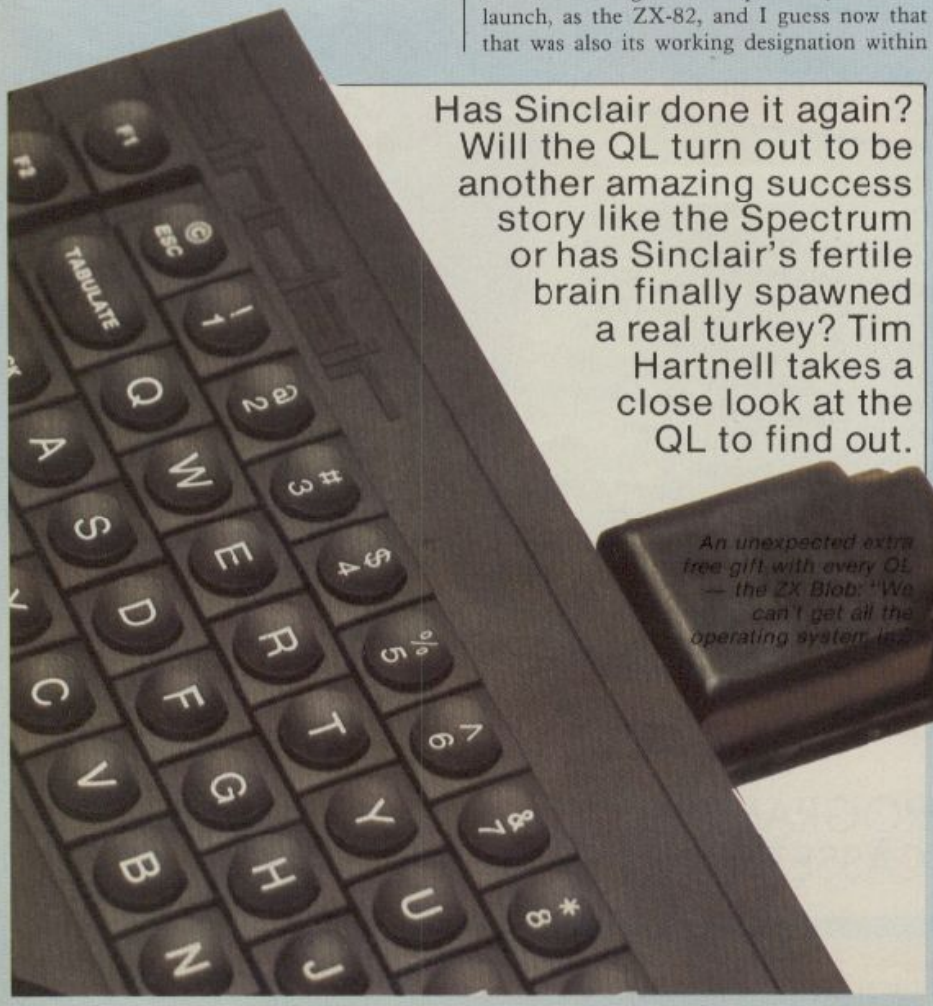
Sinclair Research intimated — without ever saying it straight out — that if the QL without compulsory blob of metal is significantly better than the first edition deliveries, there would be some facility for exchange. No hints as to how this would occur were volunteered.

It seems that the QLs shown at the tumultuous press conference in January did not contain all of the computer. It has been no particular secret within the industry that Psion — the company which developed the four software packs supplied "free" with the QL — did not have access to anything like the final version of QDOS when they were writing the programs. QDOS is the QL Operating System, which looks after such things as task scheduling and resource allocation. And if conversations taking place while I was at Sinclair Research in late April were any indication, it seems that QDOS was far from being finalised even then, only 10 days before the first machines on the greatly delayed delivery schedule were due to go out.

For example, Nigel Searle, managing director of Sinclair Research, told me they were thinking of radically changing the way the Microdrives accessed programs. At present, the QL finds the first block of data which makes up the program, then keeps the tape spinning until it comes to block two, then once it has digested that, looks for block three, and so on. The modification would allow the computer to accept the blocks out of order, thus greatly minimising the time it takes a program to load.

I timed the loading of Quill, the word-processing program provided with the computer, and found it took 70 seconds from the time loading began until the program was ready to use. This may not seem very long if you're used to cassettes, but it is an age compared to discs.

There are now three different editions of the Spectrum around. It seems obvious that



Has Sinclair done it again? Will the QL turn out to be another amazing success story like the Spectrum or has Sinclair's fertile brain finally spawned a real turkey? Tim Hartnell takes a close look at the QL to find out.

An unexpected extra free gift with every QL — the ZX Blob: "We can't get all the operating system in."

Figure 1.

Inbuilt Procedures
ARC
ELLIPSE
LINE
POINT
SCALE
BEEP
INPUT
PAUSE
PRINT
BAUD
CLOSE
COPY
COPY_N
DELETE
DIR
FORMAT
OPEN
OPEN_IN
OPEN_NEW
POKE
POKE_W
POKE_L
RANDOMISE
CLEAR
CONTINUE
EXEC
EXEC_W
LBYTES
LIST
LOAD
LRUN
MERGE
MRUN
NEW
RETRY
RUN
SAVE
SBYTES
SEXEC
STOP
AT
BLOCK
BORDER
CLS
CSIZE
CURSOR
FLASH
INK
OVER
PAN
PAPER
RECOL
SCROLL
STRIP
UNDER
WINDOW

Inbuilt Functions
BEEPING
INKEY$
KEYROW
ABS
ACOS
ACOT
ASIN
ATAN
COS
COT
EXP
INT
LN
LOG10
SIN
SQRT
TAN
PI
CHR$
CODE
PEEK
PEEK_W
PEEK_L
RND

Commands
FOR
REPeat
SELect ON
IF THEN ELSE
DEFine
PROCedure
RETURN
DATA
END FOR
END IF
END REPeat
END DEFine
END SELect
EXIT
NEXT



there will be at least two editions of the QL. There may well be more than two of the software packs. I found two spelling errors in the help menu for Quill when I was reviewing the software — although I knew, and it is only fair to point it out, that I was only using a late development version of the software, rather than the final version — and was given the impression that correcting these errors would be incredibly easy. This was, as I've said, just 10 days before the first product was due to leave the warehouse.

Now that we have looked at the fun and games concerning the first QLs which will be released to the market, let's see what sort of a computer it *really* is. Many early "reviews" of the machine were based on the press release, plus two minutes "hands on" at the press conference. I spent many, many hours with a QL trying to assess it completely.

Wet towel test

You know what the QL looks like. The photographs with this review show you the by-now-familiar long, blackish case, with the Microdrives occupying the right-hand six inches, and the rest of the 19-inch length being occupied by the keyboard. The machine is light, but does not appear particularly fragile.

I tried to "wring" the computer — as one would a wet towel — and there was very little give, and no ominous cracking sounds. The horror of losing the 16K RAM pack off the back of the ZX-81 — which meant you treated the machine with great care — does not seem necessary with the QL. Even shaking it fairly violently failed to dislodge the ROM pack, or to disturb the image on the TV screen.

Sinclair keyboards were one of the main sources of complaint on earlier machines. You use the keyboard nearly all the time when interacting with the computer, and any design failure at this point becomes a constant irritation. The QL is about 1½ inches thick, which means when it is lying flat on the table, the keyboard is not particularly easy to use.

However, the machine is supplied with three little plastic square feet which stick on the bottom of the QL and allow it to be tilted forward, to an angle which I found extremely convenient.

The keyboard itself was a surprise, and a very pleasant one. As I spend a lot of my waking hours working with keyboards — generally word-processing on an IBM PC, or writing with an electric typewriter — I am accustomed to keyboards which work *with*, rather than against, me. I have become boringly impatient with crummy keyboards, or with design faults which mean the keyboard cannot keep up with me when I type quickly. The QL is surprisingly satisfactory to use.

The keys are made up of separate keytops, sitting on a membrane keypad below. The membrane construction is not evident from using the keys. Although there is a slight need to press the keytops down rather than just tap them as would be the case with an electric typewriter, only the slightest push is needed to get them to work. The keytops are moulded, so that fast, accurate program entry is easy.

RAM wipeout

The keys auto-repeat after about a third of a second. The space-bar rattles a bit, but this is not particularly important. The Enter key is a large, L-shaped key on the left, there are two Shift keys, and Escape is up near the top right-hand corner of the keyboard. A Reset key is hidden down the side, next to the Microdrives. It is easy to press without looking for it, but is unlikely to be pressed by accident which is just as well, as it performs a total RAM wipeout.

My only criticism of the keyboard lies in the position of the cursor keys. To the left of the

(continued on next page)

(continued from previous page)
space-bar are the left and right arrows, while the up and down arrow keys are to the right of the bar. I'm sure you will get used to them in that position, but I found their initial use far from intuitive.

No such criticism can be aimed at the position of the five function keys, which form a straight line down the left-hand edge of the keyboard. They are easy to use in this position and are used frequently in the four software packs such as function key 4 being used in Quill to change the typeface.

Sinclair has abandoned the single-touch key-word entry system which, to date, has been a hallmark of his designs. You type the relevant word in full. You can do this in upper, or lower case, and the computer will automatically render the word upper case in the listing. I'll have more to say about this in a moment, but for now, let's turn the machine on, and see what you'll experience when you first plug it in.

There is no on/off switch. The QL comes with an external power supply, slightly taller than that provided with the Spectrum, with the power supply unit sitting in about the middle of this lead. When you turn the power on, the screen fills very briefly with parallel vertical green and red strips, then this is replaced with hi-res rubbish while the QL does a little internal checking. The screen clears to black, and then the following message appears at the bottom of the screen:

F1...monitor
F2...TV
© 1983 Sinclair Research.

The reference to F1 and F2 is printed in red on a white oblong, surrounded by a green border, while the copyright message is in white on a long, red strip. If you press function key 1 to indicate you have a monitor connected to the socket marked RGB, the screen clears to show a rectangular area which fills about two-thirds of the screen.

The left half of this rectangle is white, the right half is red. If you press function key 2 — to tell the QL you have a TV attached to the UHF socket — the screen clears completely to white.

The graphics modes

There are two graphics modes, Mode 256 which is the lowest resolution mode with, as expected, 256 pixels across and Mode 512, which is double the 256 resolution. The QL falls into 256 if you press TV — with a square, purple, flashing cursor — and into 512 if you press for the monitor — with a thin rectangular cursor, flashing red. You can display eight colours — blue, red, magenta, green, cyan, yellow, white and black — on the 256 by 256 screen, while only four are available — black, red, green and white — in the 512 by 256 mode.

Many other colours can be created using the various stipple combinations. There are four stipple patterns — vertical bars, horizontal bars, big foreground dots, small foreground dots — which allow an enormous range of colours to be created. I worked out a program which combined use of the Contrast, Foreground and Stipple commands, which appeared to generate 255 different coloured screens.

Back with our opening frame when you first turn the QL on. If you work with a monitor, or with the QL sending out the monitor hi-res signal, there is a real delight awaiting you when you enter your first program. As you type on the keys, the program you are entering appears in green on the black area below the white half of the coloured rectangle. But each time you press Enter, the program line reappears in red, on the white above you.

There is room for four lines of program below the white area. Once these four are filled, the top one scrolls up under the white area, and vanishes. Similarly, commands like



Enter the real Sinclair keyboard.

Run stay in place in the black area, even after they have been executed.

Now, when you enter the program, it appears line by line in red on the white square above you. If you decide to enter a new line with the same line number as one already in place, the new line automatically takes the place of the original line, in position within the program automatically.

The real magic is to come. Remember, you are in the high-resolution mode, with half the rectangle in white — with the program printed on it in red — and the other half of the rectangle in red. Type in Run, and the program runs on the right-hand side of the screen, appearing — unless other colours are specified — in white on the red background. Your program listing stays in place. So you can see the listing on one side, and the effect of running that listing on the other side, at the same time.

If you are in Mode 256, when the screen clears to a white rectangle, the program listing appears in red on the white as before but with each character stretched twice as wide as in the higher-resolution mode.

However, when you enter Run and press Enter, the program starts running at the top of the white area, overwriting the program listing, and printing in white on little red squares of "paper" as it goes. The screen does not clear, unless you have CLS within your program. If you do include CLS, the screen will clear — unless you specify another Paper colour, just like the Spectrum — to red, and the Ink defaults to white.

A clue to one of the features of SuperBasic is given if you examine the program listing carefully. Certain programming words are spelt in full within the listing, even if you only entered them as three letters. For example, if you include REM in your program, the QL will change it in the listing which appears at the top of the screen as REMark. This happens with many other commands, such as DIMension and DEFine PROCedure.

This leads neatly into a discussion of SuperBasic, the language supplied with the QL. The production models will have, as an extra added since the launch of the computer, what was described to me as turtle graphics, but no clues were given as how to access or implement these graphics.

Turtle graphics aside, the main thrust of SuperBasic is to encourage more structured programming than is usually the case with Basic. Although Goto and Gosub are provided in SuperBasic, the manual claims this is only to give some kind of compatibility with existing Basics. "They are not needed," we are told sternly.

The QL can be used more or less like a Spectrum, programming in Spectrum Basic, and getting roughly similar results. But to work in this way ignores the power of SuperBasic. For example, repetition — controlled by either a For/Next loop, or an endless loop which ends with a Goto back to the beginning, in "standard" Basic — can be controlled in SuperBasic by two "constructs" as follows each construct has to be indentified:

```
REPEAT identifier
  statements
END REPEAT identifier
FOR identifier = range
or
statements
END FOR identifier
```

These two sections of code are used together with another two words from SuperBasic's vocabulary.

```
NEXT identifier EXIT identifier
```

Processing a Next statement will either pass control to the statement following the appropriate For or Repeat statement, or if a For range has been exhausted, to the statement following the next. A table outlining the complete SuperBasic vocabulary is given in figure 1.

Tropical environment

After I'd been using the QL for a couple of hours — and I have no way of knowing how many hours it had been in use before I started on it — the plastic area above the Microdrives became very hot indeed. "A slight increase in warmth above the Microdrives is normal, and should not be cause for alarm," the manual reassures. However, the Microdrives continued to work happily, even in their tropical environment.

You will see that colour generated by the QL is crisp and clear on a monitor, and significantly better on a TV than that produced by Spectrum. Even stippled areas and lines did not show the dot crawl which became a trademark of Spectrum graphics. You have much more control of the screen than is the case with the Spectrum.

The QL allows you to specify the colour of the border, and its width. Windows can be created, with Lisa-like things happening apparently independently in different areas of the screen at the same time.

According to the published specifications, I thought the QL would in certain cases run about twice as fast in Basic than does the Spectrum, but it did not seem significantly quicker to me when doing such things as

(continued on page 69)

TERMINAL SOFTWARE



The Galaxy is under attack! You must destroy hostile forces such as Cosmic Kamikazes and Sausonic Raiders, and hazards like Space Minefields and Meteor Storms.
Reach the top rank of "Star Commando" and we'll send you a special "Star Commando" wings metal badge.
A fantastic 3-D perspective fast action game for the Commodore 64. Written by Reg Stevens. £7.95.

Terminal Software Games are available from –

International
Tial – Sweden
Aashima – Netherlands
Falck – Norway
ZXAfrica – S. Africa
Ozisoft – Australia
Alpine – New Zealand

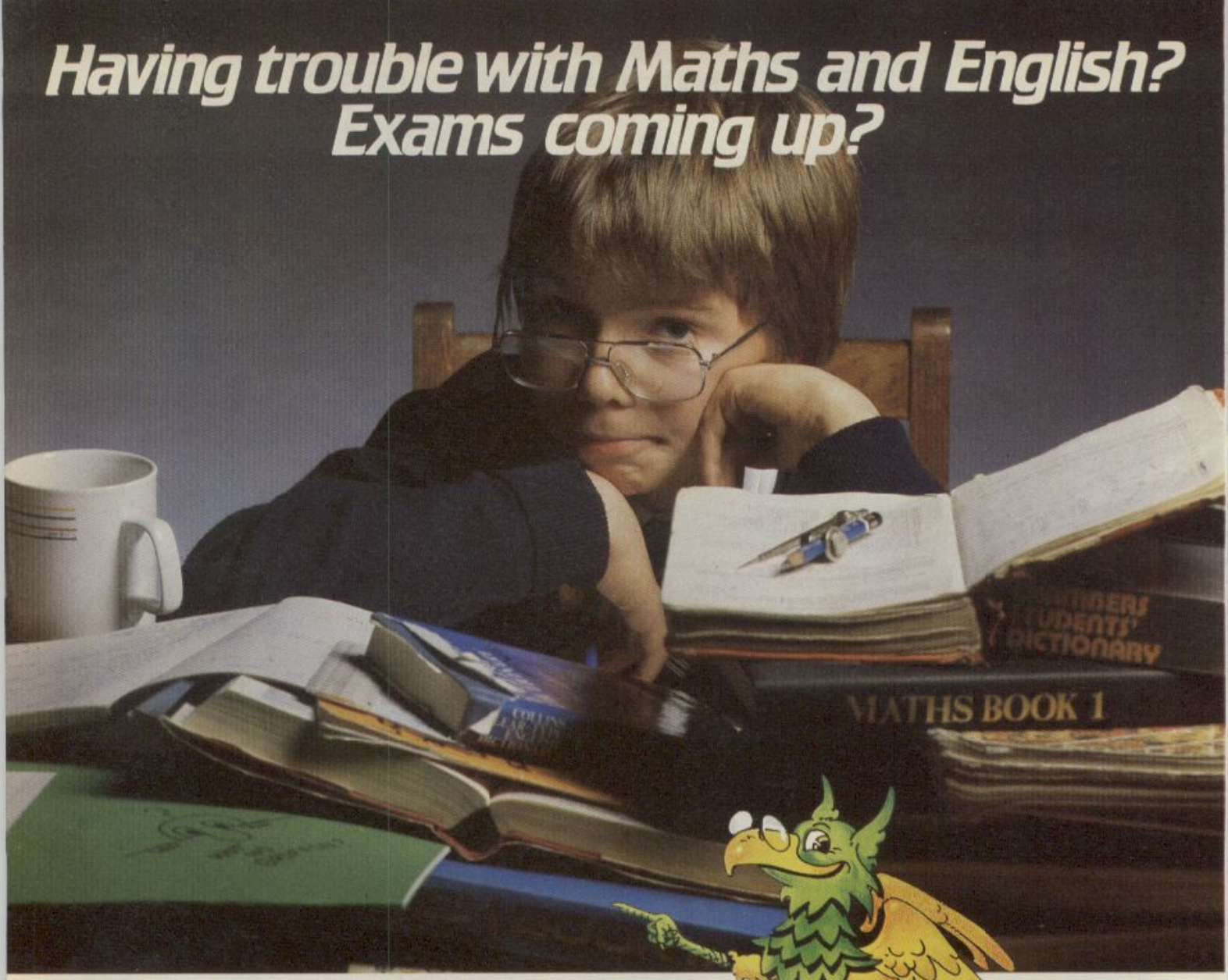
Retail
John Menzies
Dixons Software Express
Makro
Selected Lewis's &
Co-op Stores

Distributors
Bulldog
Centresoft
ESD Electronics
Ferranti & Davenport
Gordon Howson
Lightning
Micro Dealer
PCS
SDL
Softshop International
Solomon & Peres
Stage One
Tiger Distribution

TERMINAL

Terminal Software, Derby House, Derby Street, Bury BL9 0NW, Manchester, England. Tel. 061-761-4321

Having trouble with Maths and English? Exams coming up?



Don't worry, the new educational programs from Griffin Software can help. Each one provides a teaching and revision aid tailored to the standard school syllabus up to CSE/O level. Choose from Mathskills I & II and Englishskills I & II and enjoy learning!

Englishskills I—four programs which cover parts of speech, similes, meanings and proverbs.

Englishskills II—looks at metaphors, opposites, group terms and odd word out.

Mathskills I—concentrates on long multiplication, long division, highest common factor, lowest common multiple and fraction manipulation.

Mathskills II—six important topics are covered here: areas, perimeters, simple equations, percentages, sets and Venn diagrams.

All the programs are bright and colourful, and supplied with full instructions.

Available from larger branches of Boots, W.H. Smith and other computer shops everywhere.

Range suits 10-15 year olds.

Only £9.95 each to suit the ZX Spectrum 48K.
Only £11.95 each to suit the BBC Model B.



GRIFFIN SOFTWARE

-it's an education.

FOR ZX SPECTRUM 48K BBC MODEL B

Fisons plc Scientific Equipment Division

(continued from page 66)
running through loops and printing on the screen. I did not, however, have long enough with the QL to write any moving graphics games in Basic to see how such a program compared with its Spectrum counterpart.

The looseleaf manual is an enormous improvement on the manuals provided in the past with Sinclair products, and shows that Sinclair — probably under prompting from Psion — has at last recognised that it is almost impossible to give people too much information about the product they are buying.

The manual is divided into eight major sections — Beginner's Guide, Keywords, Concepts, QL Quill, QL Abacus, QL Archive, QL Easel and QL Information. The sections on Quill, Abacus, Archive and Easel contain comprehensive instructions for running the software.

QL coercion

Reading the manuals shows many areas where the designers of SuperBasic have been very clever. For example, SuperBasic embodies an action called "coercion". If the QL is expecting a string, and you give it a number, it will automatically turn it into a string. Similarly, if you try to add two numbers, and one of them is in the form of a string, it will convert the string to its numerical equivalent — in effect, Val the string — rather than crash with an error message.

This means the QL needs to know when you are dealing with strings, and when you mean numbers, so it uses the plus sign for adding numbers and the ampersand for adding strings. The following are valid in SuperBasic.

LET A = "3" + 4 (sets A equal to 7)
LET A$ = 6 & "32" (sets A$ to "632")

The use of Let, as in nearly every Basic in the world except the first three Sinclair Basics, is optional.

There are a number of other ways the designers of SuperBasic have worked to produce a better language for you. If you ask the QL to print a variable which has not been assigned, it does not respond by crashing or by assigning the value 0 — or the empty string — to this unknown variable. Instead, the QL prints an asterisk as a sign that you have requested an undefined variable. If you fail to specify a Next command, the computer will continue to process quite happily, but will ignore the For which is not followed by a Next.

Those who decried the faint Beep on the Spectrum will be pleased to hear the QL gives out a very healthy tone, much louder than that produced by the BBC Micro. The command Scroll is followed by two numbers. The scrolling can be positive or negative, and single display line — that is, pixel — scrolling is possible.

The QL contains a real-time clock — accessed as Dates — which is set to a random time and date on switch on. Despite the claims of the manual that Dates could be manipulated like any other string in Sinclair Basic the only effect of a slice was to change the time set on the clock, rather than to extract a section of it.

The QL comes with four software packs supplied on Microdrive, a word-processor — Quill; a spread-sheet claculator — Abacus; an intelligent database — Archive and one to produce business graphics such as bar charts — Easel.

I suspect that for many non-business owners of the QL, Quill will be the most popular program of the four. While many of us have little need to draw bar charts of such things as our steadily-increasing personal wealth, all of us tend to write letters, school essays or reports.

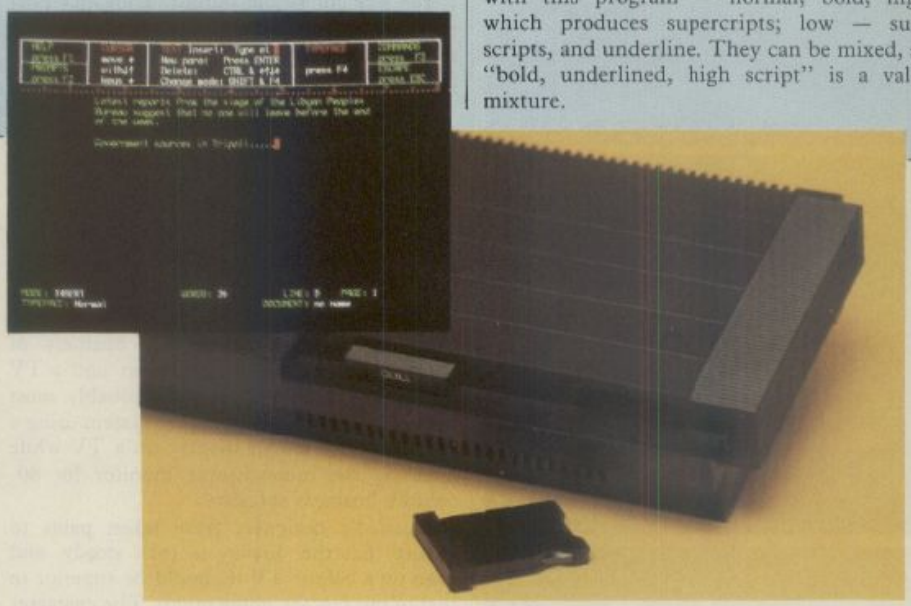
When you start with Quill, you have a red frame on the screen, on which you are typing in green. The start of each paragraph is automatically indented, without you doing anything. Above the red frame are printed many operation instructions, such as the one telling you to press function key 4 to change the typeface.

Rapid response

You do not need to worry about a word being split at the end of a line, as the QL automatically starts a new line when needed, and spaces out the words on the line which you've just completed so that the right- and left-hand margins both form straight lines. This happens without you needing to know anything. The system responds rapidly to typing. There is no appreciable delay when typing in on "clean paper".

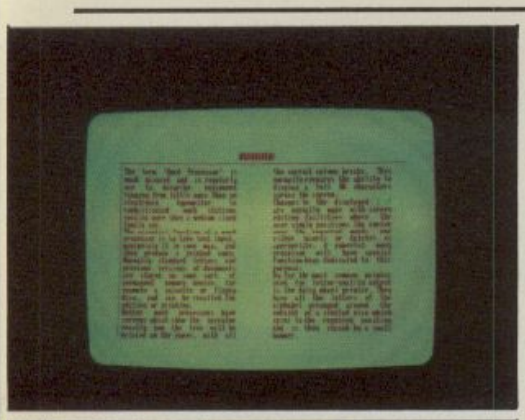
If, however, you wish to overwrite, the system slows down to an annoying extent. Despite this, the program really does live up to its claim that it can be used without reading the manual. Function key 1 is permanently assigned to help, so pressing it leads you into a series of sections designed to get you out of trouble. Once you exit the help mode, you will find yourself exactly where you were before you called for help, so you can continue from that point.

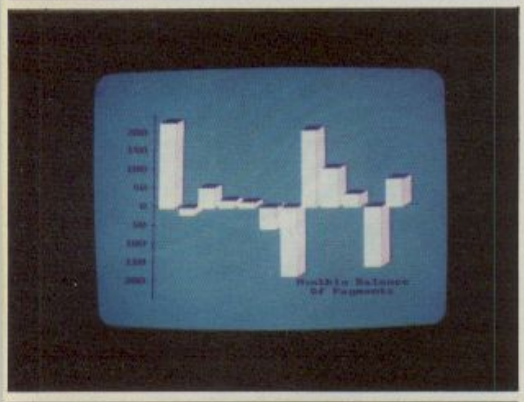
There are five kinds of typeface available with this program — normal; bold; high which produces supercripts; low — subscripts, and underline. They can be mixed, so "bold, underlined, high script" is a valid mixture.



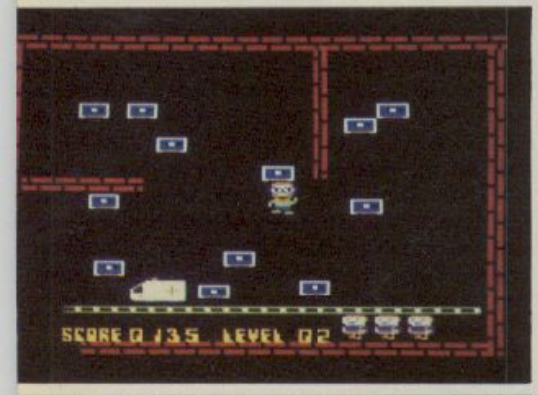
CONCLUSIONS

- You're going to like the QL. As with all Sinclair products, it may display quirks and annoyances which are not immediately obvious, and the slow access times of the Microdrives may annoy you, but overall it is a fascinating package.
- The colours are bright and clear and the multiple-colour, multiple-width border and windows will get a lot of exposure in coming games packages.
- Despite all its flashiness, the QL is an unproven machine. The Microdrives are unproven mass storage devices. I suggest it would be a brave business which would entrust essential data to Microdrives.
- It is hard to imagine it being adopted as a "business machine" by any but the smallest of companies. It makes a great home machine, and there is no doubt that many of the 750,000 Spectrum owners will upgrade.
- There is a slightly tacky feel to the machine, and I would hesitate to recommend it to someone who could be buying a BBC Micro — admittedly without mass storage, and without software packs — for the same price.
- The QL is certain to be a commercial success. Some brilliant software will be written. Lots of people will have lots of fun with the machine ... and yet I sense that the time for foisting unproven products on the market-place has gone.
- The QL may have been announced six months too soon to try and get the BBC to turn their favoured glance away from Acorn. The QL has, predictably, stretched the definition of "28 days" beyond the recognition of mortal men. ■











REVIEW

AMSTRAD

Is Amstrad's CPC-464 a treasure chest or a Pandora's Box? Simon Beesley plugs in and goes.

AMSTRAD MADE ITS mark in the hi-fi market by selling high-specification stereos, which could simply plug in and go, at a low price. Adapting the same formula to the home computer market the company is now offering a complete system for £229.

The Amstrad CPC-464 comes with a built-in cassette recorder and a monochrome monitor. With a colour monitor it will cost £329. These are recommended retail prices. By the time the machine appears in chains like Boots, Rumbelows and Dixons it will probably be selling at around £200 and £300. A disc package will follow in September comprising a three inch disc drive, disc controller, CP/M and Logo, all for £199.

The Amstrad computer is built around a Z-80A processor which runs at 4MHz. On board it carries 64K RAM and 32K ROM. By plugging an expansion board into the disc interface at the back you will be able to add alternative ROM or RAM cartridges, 16K at a time.

Along with the disc interface there is also a stereo jack for sound output, a joystick port and a parallel printer interface. At the side of the unit there is a power switch and volume control for the internal speaker.

The keyboard has 74 keys with a good springy feel to them. It includes a numeric keypad which also doubles up to provide function keys each capable of producing a string of 32 characters.

Amstrad is making the fact that the machine comes as an integrated system a prominent selling point. My own view is that the virtues of this feature have been overstated. After all most users do not find the business of connecting up a cassette recorder and a TV especially cumbersome. And probably most buyers will opt for the cheaper system using a modulator for colour display on a TV while retaining the monochrome monitor for 80-column business software.

Amstrad's designers have taken pains to ensure that the display is rock steady, and even on a colour TV it should be superior to that of the average home micro. The character typeface, incidentally, is an exceptionally clear one which uses two dots to form each vertical stroke.

What does make the built-in cassette recorder a welcome feature is that it should rule out the sort of loading and saving problems that bedevil almost every other micro. As an extra aid to reliable storage there is a choice of two data transmission rates, 1,000 baud and 2,000 baud.

Saving from Basic is also well catered for. As well as saving a program in its normal tokenised form you can also save it as an ASCII file or as a protected file. Once protected it can only be loaded with the Run command which should guarantee security. In addition there is a command to save any block of memory, equivalent to the Spectrum's Save Code or the BBC's *Save.

This spread of commands devoted just to tape storage is indicative of Locomotive Basic's scope. By allowing 16K each for the Basic interpreter and operating system as opposed to the more usual 8K the designers were able to make the ROM software both highly extensive and fast. As far as speed goes it is only a shade slower than the BBC micro.

Unlike the BBC ROMs Amstrad's 32K ROM does not limit the amount of RAM available. The screen memory occupies 16K of the 64K RAM and the operating system takes a further 5K for work space, leaving the user with just over 43K RAM.

People who are used to the idea that 8-bit micro have only 64K to share between ROM and RAM may find this puzzling. The way it works is by switching between ROM and RAM. When, for example, the display controller reads the screen memory in RAM the Z-80 processor goes into a wait state. It then switches to the Basic in ROM which occupies the same top 16K as the screen.

Similarly, the ROM-based operating system and Basic program area occupy the same space at the bottom of memory. The processor copes with this by alternatively turning ROM and RAM on and off.

Locomotive's Basic is a version of Microsoft, greatly enhanced by graphics and sound commands, and a number of other unique features. Thus Locate to position the text cursor and Print Using, which formats print output, are familiar enough; but After and Every are special to the Amstrad.

They give the Basic programmer a chance to use interrupt routines, a feature normally only available from machine code.

The Every command interrupts a program



at regular intervals and directs it to a subroutine.

EVERY 10 GOSUB 200

calls the subroutine at line 200 every 10/50s of a second. The After command does the same thing but only once.

Speed Key and Speed Ink are likewise unusual. The first sets the key repeat period while the second determines the rate at which colours flash. Key Def is another newcomer which redefines the keys so that, for example, you could convert the N key to print the question mark character.

Along with such novelties there is a particularly full set of programming aid commands and debugging features. These include Renumber, Delete, Trace and some extra error-trapping instructions, On Break Gosub and On Break Stop.

To force a break you need to press the escape key twice; pressing it once simply halts the program until you hit the space-bar — another useful feature not commonly found on home micros.

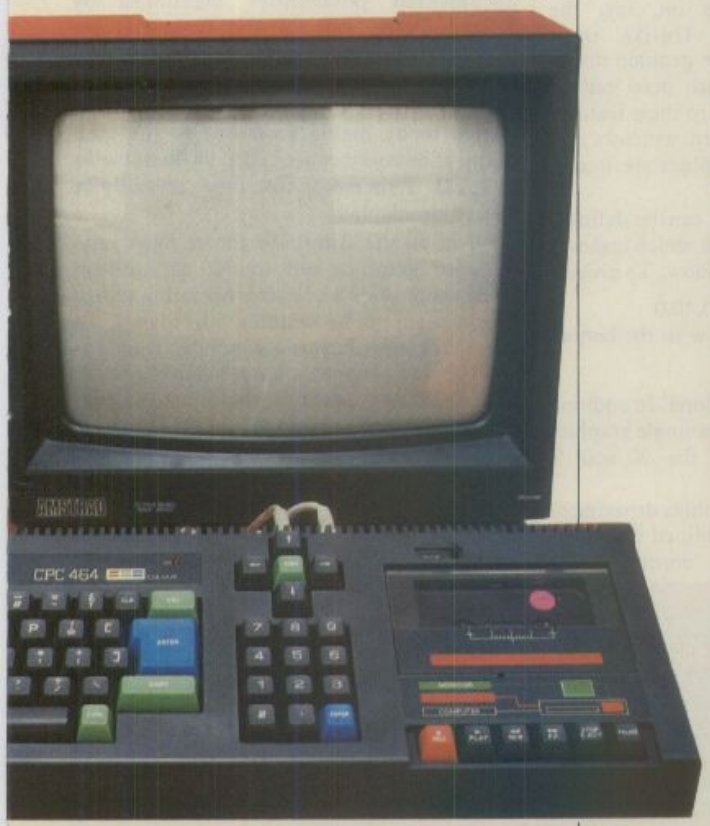
To edit a program you have a choice of using either the standard Microsoft line editor with its Edit command or the copy cursor. The latter is much easier and lets you move to any line and then copy part or all of it down to the bottom of the screen.

On the graphics front the Amstrad is particularly well favoured. There are three modes. Text and graphics can operate together in each of them. Mode 1 is standard and gives 40 columns by 25 rows of text or 320 by 200 pixels with a choice of four colours.

In Mode 2 the resolution drops to 20 by 25 and 160 by 200 but the choice of colours is increased to 16.

Mode 0 provides 80 columns by 25 and a

(continued on next page)







CONCLUSIONS

- ☐ A 64K computer complete with cassette recorder and monitor, all for £200, must be considered remarkable value.
- ☐ In addition CPC-464 boasts graphics which are superior to those on any other micro in this price range; while its sound facility is matched only by the BBC Micro and the CBM-64.
- ☐ Making use of these features is facilitated by an extensive and well thought out Basic.
- ☐ The machine seems assured of success and in consequence should receive strong software support. ■

(continued from previous page)

pixel resolution of 640 by 200, in two colours.

It will be seen that the screen modes are similar to the BBC's without the BBC's text-only modes. The similarity also extends to the way the Amstrad allows you to choose on-screen colours from a wide colour pallette.

In all there are 27 colours ranging from blue, mauve, yellow and green to lime, pink, pastel green and bright yellow. The idea is that in each mode there are a limited number of colour pens and these can be assigned any of the colours in the pallette.

Pen is the command which selects the current colour. Thus in Mode 2

```
PEN 3,10
```

activates Pen 3 and assigns to it colour 10 which is cyan. Any future text printed will be in cyan. As a further elaboration you can now use the Ink command to assign a different colour from the pallette to colour 10.

```
INK 10,12
```

causes colour 10 now to be associated with yellow and means that all text or graphics on screen which is in cyan will be instantly changed to yellow. You can also use Ink to create any combination of flashing colours.

Equivalent to the BBC's VDU 19 but easier to use, the Ink command is a powerful feature. As BBC owners have discovered pallette switching allows you to produce fast animated effects without leaving Basic.

For pixel plotting there are absolute and relative commands to plot points, draw lines and move the cursor — Plot and PlotR, Draw and DrawR, Move and MoveR. Test and TestR report the ink colour of a given pixel, while XPOS and YPOS return the position of the graphics cursor.

Again, as on the BBC, there is also a facility for setting the mode in which a pixel is plotted. By sending a control character before the Ink command you can cause the new colour to be logically Anded, Ored or Exclusive Ored with the old colour. This is highly useful for animation and plotting shapes without obliterating the background, making all sorts of sprite-like effects possible.

For text there is a corresponding option which allows you print in transparent mode. Here the characters are superimposed on the background rather than printed over it.

These commands alone make the Amstrad's graphics superior to those on, say, the Spectrum or the Oric. Unlike these machines you can also create genuine multi-coloured characters since each pixel can be given a separate colour. Add to these features the facility for creating screen windows and you have a micro whose graphics are second only to the BBC's.

Up to eight text windows can be defined. Each is linked to a text stream which makes it easy to print to a specific window. To give an example,

```
WINDOW #2,0,10,10,0
```

would set up a square window in the bottom left corner;

```
PRINT #2
```

directs text to that window alone. In addition the Origin command sets up a single graphics window as well as fixing the X and Y origins.

The final bonus in the graphics department is the ease with which user-defined characters can be created. Above the normal ASCII codes the character set is filled with pre-defined graphics characters. When the machine is turned on, the dot patterns for the top 16 characters are read into RAM.

These can be redefined by the command Symbol followed by the character code and a list of eight numbers making up the new pattern. In addition you can redefine the rest of the set from codes 32 onwards. You simply enter the Symbol After instruction, which reserves memory for the number of definitions you require.

Sound on the Amstrad is equally impressive. Once again the designers seem to have taken a leaf out of the BBC's book. The AY-3-8912 sound chip produces three voices which can either be output in mono through the internal speaker or sent in stereo to external speaker.

The Sound command can be used to produce a simple sound — either a musical note or white noise — where only the channel, tone, duration and volume are specified. Or it can be linked up with two Envelope commands to create much more complex sounds.

Env, the volume envelope command, allows you to divide a note up into a number of sections. In each you can specify how the volume is to rise or fall.

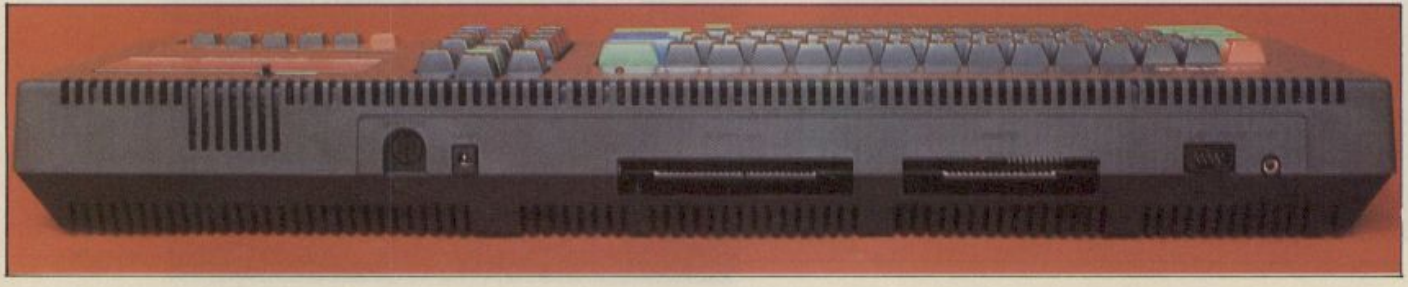
Ent, the tone envelope command, does the same thing for a note's tone. Between them you can define up to 15 envelopes, synthesising a variety of musical instruments. By setting parameters in the Sound and Release commands you can also arrange that notes on different channels are synchronised.

On top of the features described so far it is likely that the Amstrad has a good deal of untapped potential, particularly for the machine-code programmer. Two such undocumented possibilities mentioned by Roland Perry, one of the designers, are hardware induced sideways scrolling and setting up alternative screen memories.

Locomotive has designed the operating system to be highly accessible to the user. Many of its routines are called via jumpblocks in RAM. This means that they can easily be altered or adapted.

All in all the Amstrad's future looks rosy. Superior graphics and sound, an excellent Basic coupled with a flexible operating system would seem to be winning ingredients. Of course for most buyers a computer is only as good as the software that is available for it. But for a new machine the Amstrad looks likely to be well supported.

Already a number of best-selling titles have been converted, Harrier Attack and Bugaboo among them. The company's target sales figure of 200,000 machines by the end of the year stands a good chance of being realised.



Kuma

PROGRAM FEATURE

BC BASIC (Commodore 64) £57.50

At last the ultimate has arrived under the name of BC Basic. This is a complete 9K Extension supplied in a Rom pack. Over 97 new or modified commands wihtout affecting the speed or operation. Main areas of enhancement are: Hi-res, Sprites, Text Graphics, UDG, Sound, Machine Code Aids, Structured programming, I/O and more.

TERMS: Please add £1.00 post and packing to orders under £20.00 carriage free on all cash, cheque or credit card orders over £20.30 in the U.K. Telephoned credit card orders accepted on our 24 hour ansaphone service.
All prices include VAT

sinclair SPECTRUM

LOGO £9.95
The 'Turtle' Graphics language

ZEN Editor/Assembler £12.50
A must for the serious programmer

SUPERCHESS 3.0 £8.95
The strongest Chess program yet

FOOTBALL FORECAST £15.00
Written by Professor Frank George

HOME BUDGET £6.95
Home Accounting System

MAP OF U.K. £11.95
Educational U.K. Geography

HORSE RACE FORECAST £15.00
The Serious Punter's Aid

HISOFT PASCAL Compiler £25.00
Compiling Pascal

VEGETABLE CRASH £6.95
Exciting Arcade game in M/C

FROG SHOOTER £6.95
Exciting Arcade game in M/C

PINBALL WIZARD £5.95
Fast-action graphics and sound

BRIDGE PLAYER £8.95
Pit your wits against the Spectrum

BACKGAMMON £5.95

commodore 64

HOME BUDGET £9.95
Home Accounting System

DATABASE £24.50
360 pages at 10 lines/page

BC BASIC £57.50
Complete 9K Extension in ROM pack

SIMPLE ACCOUNTS £24.50
Non-VAT accounting system

PAINTPIC £19.50
Drawing/Painting using multi-colour bitmap

HORSE RACE FORECAST £19.95
The Serious Punter's Aid

POOL PERM £17.25
Improve your pools winning chances

FOOTBALL FORECAST £19.95
Written by Professor Frank George

SHARP MZ 700

NEW

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

PAKMAN/MILLIPEDE £9.95
Superb sound and graphics

EPSON HX-20

DESKMASTER 2 £33.93
Word Processor

DESKMASTER 2/D £56.93
Word Processor for disc TF-20

DESKMASTER 3 £33.93
Spreadsheet Calculator. 16K

DESKMASTER 3.5 £45.43
Spreadsheet Calculator for expanded HX-20

DESKMASTER 5 £45.43
The Editing Terminal

DESKMASTER 6 £22.43
Decision Maker

DESKMASTER 7 £22.43
Editor Assembler

DESKMASTER 8 £22.43
Mail Lister

DESKMASTER 9 £33.93
RAM Database

DESKMASTER 10 £22.43
Labeller

DESKMASTER 17 £56.93
Pert and Critical Path Analysis

DESKMASTER 20 £68.43
Viewdata

PASCAL Compiler £45.43
True object code

FFOSSWRITER £109.25
Wordprocessor

CASH EXCHANGE £22.43

USER DEFIN GRAPHICS £20.13
A useful asset for the HX-20 user

HOME BUDGET £22.43
Home Accounting System

HORSE RACE FORECAST £28.17

sirius 1 apricot

KUMA FORTH £207
Full Fig Forth

BASIC TOOLKIT £97.75
Ten major subroutines

ISLES OF ARTUAN £22.43
Extensive adventure game

OTHELLO £22.43
With fine graphics

MAZE RUNNER £16.68
Thinking Mans' Maze Game

PHONE NOW (073 57) 4335 or SEND FOR DETAILS

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

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

Hardware	Software	Hardware	Software	Hardware	Software
☐ SHARP PC-5000	☐	☐ SHARP 3541	☐	☐ NEWBRAIN	☐
☐ SIRIUS	☐	☐ SAGE	☐	☐ COMMODORE 64	☐
☐ SHARP PC 1500	☐	☐ APRICOT	☐	☐ ELECTRONIC MAIL	☐
☐ SHARP 700	☐	☐ EPSON HX-20	☐	☐ PRINTERS	☐
☐ SHARP A	☐	☐ EPSON QX-10	☐	SPECTRUM	☐

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

..... POST CODE .....

I use a ..... micro-computer.

Choice

1. AVOID THUNDERSTORMS.
By linking into Prestel, you could call up detailed weather reports at any time of day or night.

2. CHECK THE SPELLING OF EVERY WORD YOU WRITE—INCLUDING THE TECHNICAL ONES.
If you're not too sure of your spelling, the Spellcheck program will put you right in seconds.

5. STOP WORLD WAR III BEFORE IT STARTS.
Naturally, there are literally hundreds of computer games to while away the extra spare time your GEC Dragon 64 has created for you.

6. FIND A CURE FOR INSOMNIA.
Instead of lying awake worrying about the business, get the GEC Dragon 64 to keep it all under control.

8. SEND REPORTS OVER THE PHONE.
You can send urgent messages or information through Prestel to the GEC Dragon 'Mailbox', for collection by other computer users.

9. SPEND SUNDAY MORNING IN BED.
The biggest benefit of them all if you're in business on your own. By taking care of all the details, the GEC Dragon lets you concentrate on the more important things in life.

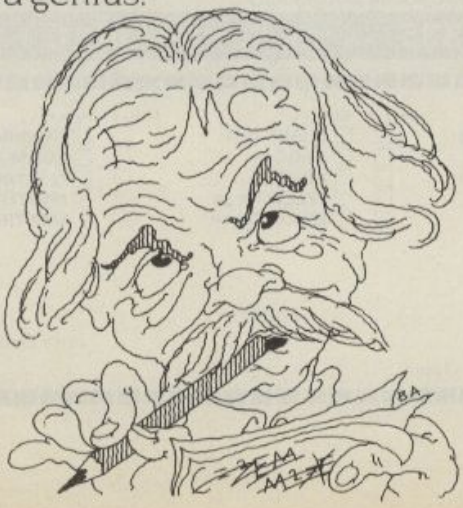
"What would I do with a GEC Dragon 64?"



3. WORK OUT HOW MANY TINS OF CAT-FOOD YOU HAVE IN STOCK.
And work out which are the fastest and most profitable lines.

4. CONTACT EVERY ONE OF YOUR CUSTOMERS.
Many businesses use GEC Dragon's Mailmerge program to type the same letter, personalised to suit every one of thousands of customers. All you do is write the basic letter, give it the names and addresses, then sit back and wait for the replies.

7. CHECK THAT EINSTEIN GOT IT RIGHT.
When it comes to advanced maths and formulae, the GEC Dragon is little short of a genius.



10. WORK OUT WHAT YOU'LL BE WORTH WHEN YOU RETIRE.

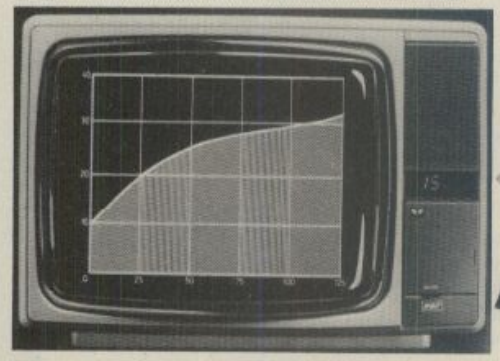


Play the investment and insurance companies at their own game and work out EXACTLY how big your nest egg will be when the great day arrives.

11. SPEND AN EVENING WITH NEIL DIAMOND.

With a little help from Prestel, you can book seats at almost any show or theatre without even leaving your armchair.



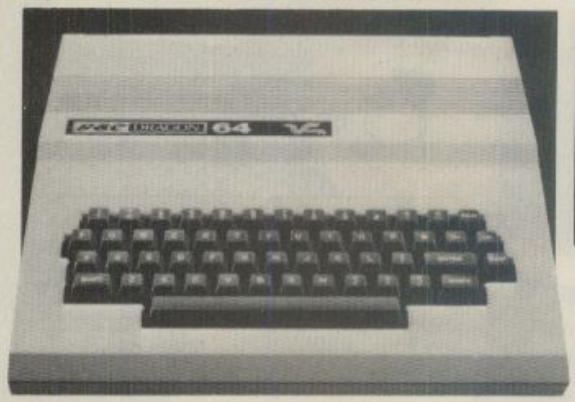




13. WRITE A THESIS.

If you're not very good at typing, or keep changing your mind, the GEC Dragon word processing program lets you edit, change, add extra pieces and delete. Then when your masterpiece is finally ready to type, just press a button and sit back.







14. CLAIM YOUR FORTUNE ON THE POOLS.

The GEC Dragon 64 also gives you immediate access to a mass of sports information available through Prestel.

15. BOOK YOUR HOLIDAYS.

Check the availability of practically any holiday you care to think of. Then make a reservation on the one you like best.



But that's just for starters. Later, we'll show you lots more ways the GEC Dragon 64 can make life simpler.

You can buy the GEC Dragon computer and a wide range of accessories and software from the better computer shops, major stores and GEC dealers.

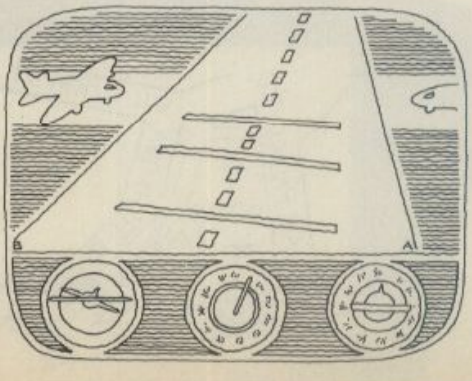
It's proof that, now GEC and Dragon have got together, we're really going to start turning it on for the small business and serious computer user.

And to whet your appetite still further, we've produced a 12-page colour brochure that tells you how to get the most out of a GEC Dragon 64. It's called 'Your passport to professional software.'

It's yours free in exchange for the coupon below.

12. LEARN TO FLY A PLANE.

We even know someone who has created their own program to simulate the controls of a light aircraft.



GEC DRAGON COMPUTERS

To: GEC Dragon Customer Services, Tripsgate House, Gladstone Drive, Staple Hill, Bristol BS16 4RU.
Please send me a copy of 'Your Passport to Professional Software.'

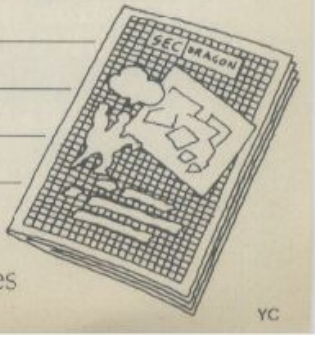
Name

Address

Postcode

Or if you would like information on the rest of our products – please tick the appropriate box.

☐ Dragon 32 ☐ Dragon 64 ☐ Dragon Accessories



YC

MICRO ANSWERS

Demonstrations

Increase your fire power!

The delta 14b from Voltmace, a superb joystick and a keypad for the price of either one. Plus the software to integrate it into the computer's system. One handset will work on it's own in the A/D port of the BBC micro as a joystick and two fire buttons, which is then immediately compatible with Acornsoft and similar software. By using the Voltmace A/D/User port interface the full keypad is used giving a total of 24 user definable keys, and can also be used as a splitter for the A/D port to take two items at the same time, e.g. joystick and lightpen.

This and other Voltmace products will be demonstrated every Monday night.

INSTANT IMAGE TRANSFER

The high resolution colour graphics of the ZX Spectrum permit accurate presentation of complex or irregular images—maps etc. Entering individual co-ordinates for unusual shapes can be tedious and time-consuming. The RD DIGITAL TRACER cuts out tedious plotting. It provides instart transfer from original to display file—for screen display, ZX printer printout, or retention on cassette.

The RD DIGITAL TRACER will be demonstrated every Friday night.





THE INDUSTRY STANDARD INTERFACE

At last you can have real print performance from your ZX Spectrum with the Kempston Centronics Interface E. As the interface allows you to link your ZX Spectrum to any of a vast number of printers with an industry standard centronics input, you can choose the printer that suits your needs—from high speed dot matrix to professional letter quality printers.

THE WORD PROCESSOR

Your Spectrum becomes a professional word processor with TASWORD TWO. TASWORD TWO gives you an amazing 64 characters per line on your screen. This is ideal for standard A4 paper and TASWORD TWO prints your text just as it appears on your screen. TASWORD TWO is readily adapted for the microdrives to give super-fast saving and loading of both program and text.

TASWORD TWO drives the Kempston Interface E and both products will be demonstrated every Wednesday night.

Come and join us in an out-of-working-hours demonstration of these and other products for your micro computer.

Micro Answers
70-71 Wilton Road
London SW1V 1DE

Telephone 01 630 5995

Monday to Friday 10am-8.30pm
Saturday 10am-7pm



AMSTRAD competition



Amstrad's new micro comes with screen and tape. So all you need is the software. Amsoft — Amstrad's software house — is giving us two CPC-464s as prizes. Win one in this month's competition.

CPC 464

RULES

- ☐ The winners of the competition will be the people who number the games features correctly and enter the most original name for a computer game in the view of the editor.
- ☐ The name of the winners will be printed in the August issue of *Your Computer*.
- ☐ All entries must arrive at the *Your Computer* offices by the last working day in June 1984.
- ☐ Each person may enter the competition only once.
- ☐ Entries to the competition cannot be acknowledged.
- ☐ No employees of Business Press International or their relatives may enter the competition.
- ☐ The decision of the editor is final.
- ☐ No correspondence on the result of the competition will be entered into.
- ☐ Business Press International assumes no responsibility or liability for any complaints arising from this competition.

AMSTRAD competition

- ☐ **Easy loading**
- ☐ **High resolution graphics**
- ☐ **Different screens**
- ☐ **Sound effects**
- ☐ **Quick reactions**
- ☐ **Problem solving**
- ☐ **User definable controls**
- ☐ **Realism**

Put a 1 against your favourite feature of computer games, a 2 against your second favourite and so until you have filled all the boxes. Now think of an original title for a computer game and send this coupon to *Your Computer*, L-221, Quadrant House, Sutton, Surrey SM2 5AS.

Title.....

Name_____

Address_____

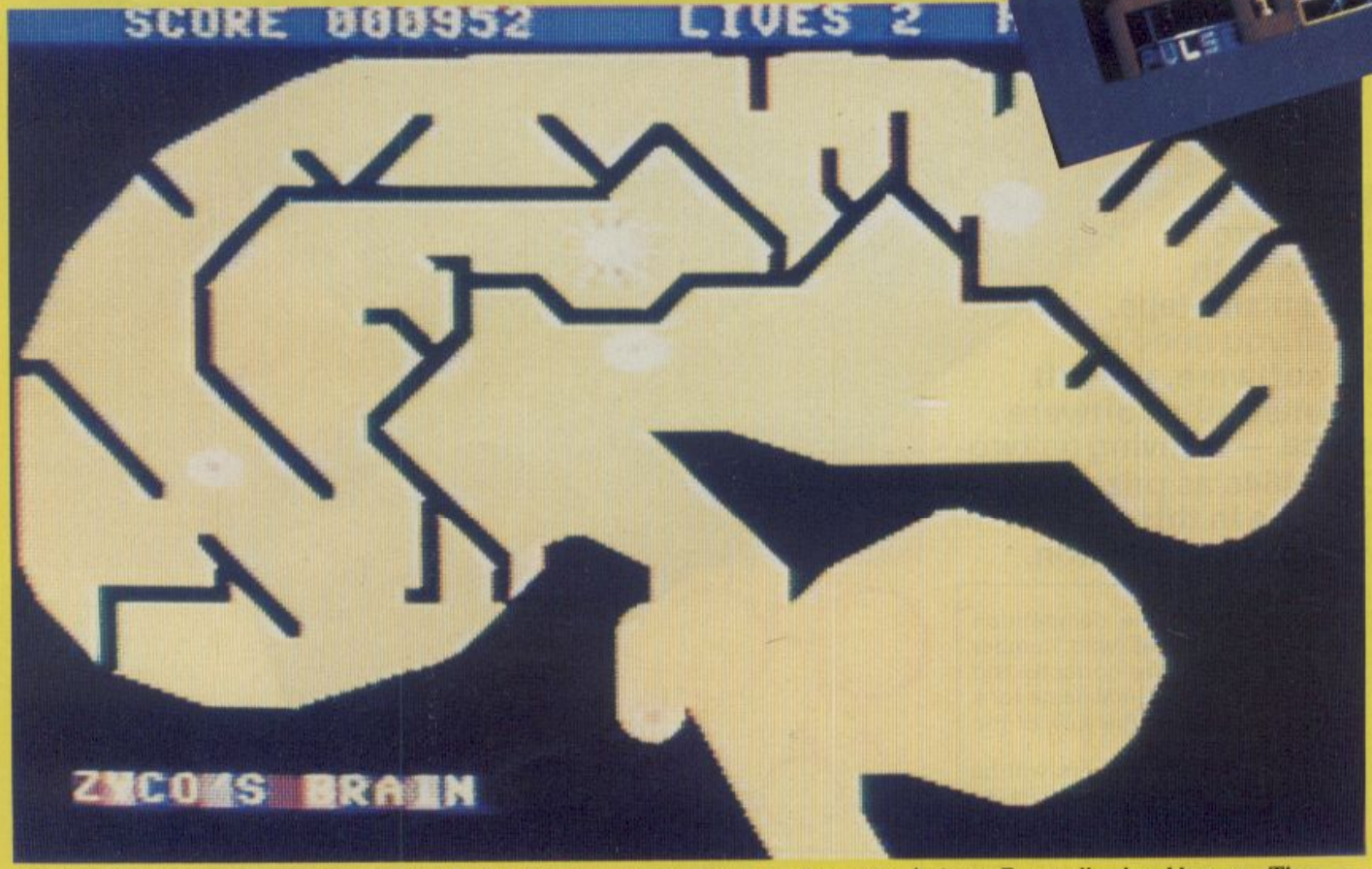
_____

SURVEY

CBM-64 SOFTWARE

Paul Bond destroys the nasties and enjoys the music.





SIGNIFICANTLY FOR a computer with such a large memory — 64K of onboard RAM — one of the more original games programs for the Commodore machine features a sidelong slice of the cerebellum as its screen display. Zyco is an alien enslaving the human race. The goal of Ace's Mind Control maze game is to steer through the cortical convolutions until you reach Zyco's nerve centre.

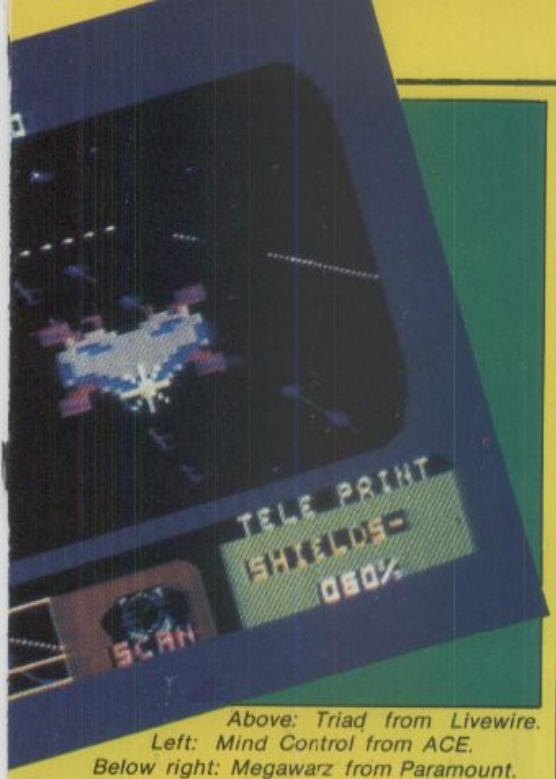
You have to dodge the white blood corpuscles and avoid bumping into cell walls otherwise you will revert to human size and die. It's a scenario straight out of that science-fiction phantasmagoria The Fantastic Voyage which should be remembered if only for the fact that it succeeded in cramming Raquel Welch into a mini-sub.

The game is a little like that reflex-testing game, sometimes encountered at small country fetes where you have to move a wire along a complex wire loop without touching it and making the bulb light up. Taxing but potentially tedious. Anyway, if you de-minaturised accidentally wouldn't you kill Zyco?

Bach's Toccata and Fugue in D minor (Schmieder number BWV 565). Can you dig it? CBM-64 programmers certainly can as it appears in two of the games programs I looked at for this issue. Perhaps that old SID chip has sympathetic vibrations with the classics.

Paramount's Megawarz is good solid shoot 'em-up space trip stuff. Waves of aliens attack in threes as you pump endless shells into them. Eventually they blow up. Then you have to rescue astronauts floating around in space. But you must be snappy or else they mutate into weird flapping mutants rather like commuters who have just been told that the 8.30 train has been cancelled.

On the third screen there is a terrible melee of aliens and astronauts and the potential for carnage would be unbelievable, except that you can't kill your own spacemen. When you warp from screen to screen you also get a quick blast of Richard Strauss's Also Sprach Zarathustra, which was such a big hit for the lad when it was used as theme music for Kubrick's 2001: A Space Odyssey. If you score more than 50,000 you join the mega-mortals. The screen graphics are stolid rather



Above: Triad from Livewire.
Left: Mind Control from ACE.
Below right: Megawarz from Paramount.

than exciting as is, ultimately, the game itself. But I loved the sound.

Bach's Toccata etcetera makes a comeback in Livewire's Triad. No relation to the Chinese secret society dedicated to the overthrow of the Ching dynasty, it nevertheless shows promise. What might be described by more fanciful software companies as a 3D game confronts you with wave after wave of smiling triads leering all the way up to the external reception apron of your starship as you zap away at them. Then you clear a path through a meteor storm. You get promoted. And so it goes — but once again the music is excellent.

Troopa Truck from Rabbit Software is a simple but colourful game, well-implemented and quite addictive. You drive a six-wheeled lunar buggy over rocky terrain backed by a diorama-style 3D landscape.

Defender in underpants

There are large black boulders to be disintegrated, red landmines and chasms to hop over and also unfriendly flying objects which shoot at you and generally do their best to discourage Bank Holiday traffic. The buggy makes a good chugging sound, there is incessant music but Bach is not responsible. You can naturally shoot down said UFOs.

But if driving trucks is not your bag, you'll believe a man can fly with Ace's Krypton. In this you are cast as a superhero — no names, no pack-drill — and you have to destroy the enemy superbeings. You also have to try and save your girlfriend — who is ridiculously small at this resolution — from falling off a skyscraper. It's Defender in red underpants — and watch out for the mobile ground control pod which shoots lumps of kryptonite at you. An enjoyable enough game but not really very original apart from the fancy-dress.

Also not very original in concept is the Q-bertesque Slinky from US Gold. But this program, which I reviewed on disc, is a very sophisticated and colourful implementation indeed making full use of the 64's sound and graphics capacities. You steer a slinky spring around cubes arranged in a pyramid. As the spring touches the faces of the cubes they change colour. When you have changed all the cubes you get a blast of classical music — no, not Bach but Tchaikovsky! The 1812 Overture without the cannons — a great opportunity missed here, I feel. An interesting contrast with the menacing HM riff which introduces the five threats to Slinky's progress.

More exciting, and likewise available on disc from US Gold is Aztec Challenge. This has a rather lurid cover showing a doe-eyed Indian maiden being pursued by a chap in Quetzalcoat look-alike gear, but as far as I could get with the game it all seemed to be good clean fun, if running the gauntlet of spears, rock-strewn stairways and booby-trapped hallways is your idea of a healthy pastime, that is.

Music soundtrack for this game is once again excellent. The first screen display presents you with a view of an Aztec runner from the back running between two lines of warriors stretching away into the distance, ending at the base of a pyramid. The primitive pulse of native drums accompanies you as you run the gauntlet of deadly spears. Press joystick forwards to duck, pull back to jump. The spears whizz over at head-height or leg-level. You have five lives, but if you get caught once you usually get caught three or four times.

Anyway, you get sent all the way back to the beginning of the twin file of Indians. This is maddening. Eventually, you get to the foot of the temple steps. Far from encouraging a congregation the local preachers chuck cube-shaped rocks down the steps at those with temerity enough to mount them. You dodge the blocks. Once inside, trap-doors open up beneath your feet, spears fall from the roof and vertical saws spring up from the floor. Heard of high tech? Well, this is Az-tec. Full marks all round for a program that points the way for CBM-64 programming. It even has piranhas.

Forbidden Forest, also on disc from US Gold, is certainly very promising indeed. You, as an archer, have wandered into a dangerous area of the forest. Coming under attack from the residents which include giant spiders, bumblebees, and bouncing frogs you have to put an arrow in your bow — press fire button once — and fire it — press fire button again.

Even this is not very easy when a 10-ton tarantula is about to chew you up. Which they do — you struggle helplessly, and vast amounts of claret are spilled all over the forest floor. Not a game for those with a nervous disposition, especially if they are arachnophones. The graphics, if somewhat grisly, are certainly gripping.

Bugs in bugs game

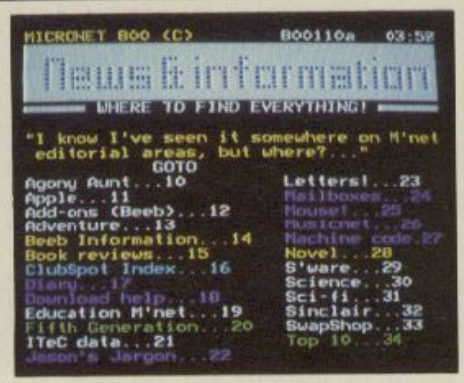
Entomology rules the day in Mogul Software's Fire Ant as well. As the last free ant you must rescue the queen ant from her scorpion prison. Oviparous scorpions lay eggs all over the maze; gobble these, grab the golden keys and move from screen to screen. There are still a few bugs of the other sort in this program, even in the production version: for example, when you press Y to get instructions, you don't get any instructions.

Another criticism is documentation: there are lots of things to pick up which give you different sorts of immunity and ways to get through barriers to achieve the eighth screen. If accessing the instructions on the computer is impossible on some of the copies, as would seem to be the case, Mogul should have explained more about the game on the cassette inlay. Nevertheless, a challenging and absorbing game. ■

Program	Company	Price
Mind Control	ACE	£6.99
Megawarz	Paramount	£7.50
Triad	Livewire	£8.95
Troopa Truck	Rabbit	£5.99
Krypton	ACE	£6.99
Slinky	US Gold	£9.99 (cassette) £12.99 (disc)
Aztec Challenge	US Gold	£9.99 (cassette) £12.99 (disc)
Forbidden Forest	US Gold	£9.99 (cassette) £12.99 (disc)
Fire Ant	Mogul	£7.95









PLUG IN TO REALITY

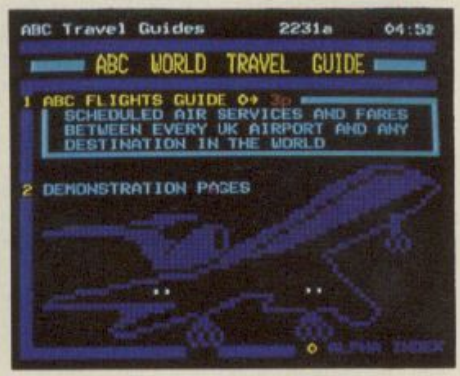


Inside your tame home micro a monster is struggling to break out and take over the world. A £50 modem will let you plug into Prestel, dip into databases and still do some tele-shopping and stave off World War III before tea time. Richard Lambley delves deep into this unleashed potential.





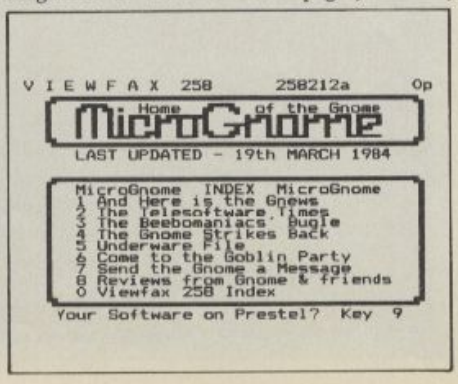




WITHOUT A DOUBT, a modem is one of the most worthwhile additions your computer can have. It can cost far less than a disc drive or a printer and yet it can transform your system. With a modem, you can exchange software over the telephone, conduct your financial affairs, bombard your friends with electronic mail and go adventuring in multi-megabyte databases.

All you need to use a modem is a telephone plus a computer with an RS-232 serial port. If yours doesn't have one of these, or something like it, don't lose heart — it's quite possible to get one fitted.

Having seen to that, what is there to dial up? To most micro owners, modems mean, if anything, Micronet 800. Micronet is a section of British Telecom's Prestel service, offering its subscribers a sort of computing magazine by telephone. There are thousands of pages, covering all the subjects you would find in a printed magazine. It includes news pages, reviews,

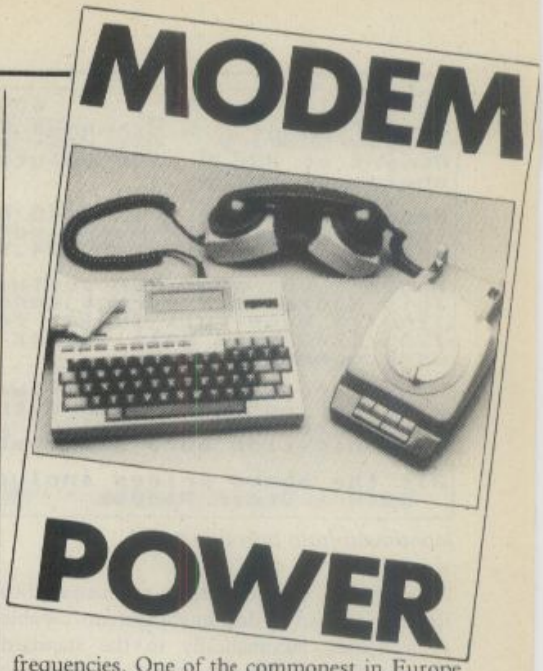


technical advice, software, some of it free, club bulletins, mail and advertising.

Certain sections of Prestel are, like Micronet itself, the preserve of closed user groups and so are barred to outsiders. But Prestel's other microcomputing database, Viewfax 258, is available to all, with more news, gossip, tele-shopping and telesoftware.

From most parts of the country, Prestel can be accessed at local telephone call rates. Outside business hours there is no charge for using the computer. So it's possible to make extensive use of your modem without running up an enormous phone bill.

But beyond Prestel is a growing network of computer bulletin-board systems, run by private enthusiasts rather than businessmen. These fascinating systems are in some ways like




```
**************************
*                        *
*     CBBS(R) SURREY     *
*                        *
*       OPERATOR         *
*                        *
*      MIKE PARKER       *
*                        *
**************************

Other CBBS's
+----------------------+
I  CUMBRIA             I
I                      I
I                      I
I                      
```







(continued from previous page)

standards.

The picture has now begun to change, with the introduction of dual-mode systems capable of switching automatically to the standard adopted by the caller. But the introduction of a modem chip capable of handling all common signalling standards is bringing to the shops a crop of universal modems suitable for whatever applications the hobbyist is likely to find. The complex filtering needed to achieve reliable generation and detection of the tones is all dealt with on the chip, so the new modems are relatively simple in construction and competitive in price.

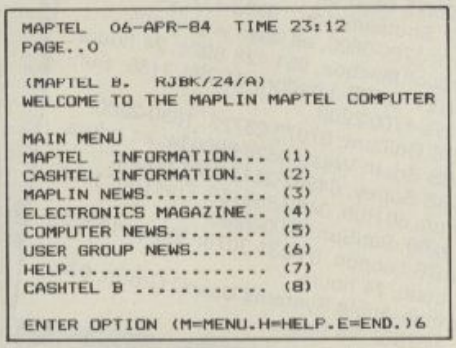
Here we meet the issue of acoustically-coupled modems versus the direct-coupled type. Acoustic modems have been popular with home users because they're portable, simple to use and involve no electrical connection with the telephone line. Having dialled your call, you just wait for the answering tone and press the telephone handset into the rubber cups on the modem. Then they squawk to each other. Unfortunately, noise from the room can be picked up and mixed in with the data, so errors may occur. So you may prefer to use a direct-connect modem, which plugs straight in to your telephone socket, eliminating this source of interference.

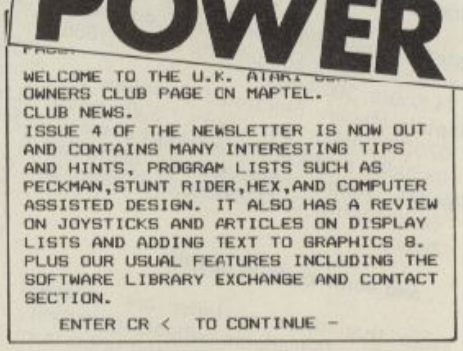
Many direct-connect modems are now available for the home user, although not all of them are smiled upon by the telephone authorities. Equipment to be connected to telephone lines has to be submitted by the manufacturer for approval; and obtaining a certificate can be a slow and expensive business. Some modems on the market do not have this approval, even though they may be perfectly sound technically. Potential users should be warned that, despite recent relaxation of many of the restrictions surrounding our telephone system, it's now actually an offence to connect unauthorised equipment to it.

Although British Telecom can withdraw the service from malefactors it finds, or invoke legal proceedings, it has no easy way of catching them. And so, where no harm is being done, it may be be content merly to sit back and collect the extra revenue.

To use a modem, you need software. A bare-bones program would first set up your serial port to operate at the appropriate speed. Then it would route characters typed at your keyboard to the serial port and would send incoming data from the port to your screen.

A practical program needs to be a little more complicated. For one thing, it has to cope with possible variations in the make-up of the data word.





Before each byte, a start-bite is sent to indicate that data is to follow. Then afterwards, there may be either one or two stop-bits. In the middle, the length of the byte itself may vary: Prestel, for example, gets by with only seven bits instead of eight. There may also be a parity bit as an insurance against errors in transmission, and it can be either odd or even. So you can see that many different permutations are possible.

To show what you are typing, your own input must be echoed back to you. If the computer at the other end does not give an echo, you will want to provide your own. Another option you may want incorporated in your software is reprogramming of some of the characters sent by your keyboard. For example, your delete key may produce strange results on some systems and it helps if you can alter its effect to suit the other computer.

It is often desirable to be able to halt the flow of data from the remote computer while you perform some background task — saving something to disc, perhaps, or answering the doorbell. For this you can use the so-called Xoff and Xon signals, Ctrl-S and Ctrl-Q.

If you want to download program or text files, you will need a buffer in memory into which each block of data can be loaded as it arrives, ready for saving when the file is complete. Some software packages offer elaborate techniques for ensuring accurate file transfer. A widely-used standard is the Xmodem or Christiensen protocol, by which the receiving computer calls for a repeat of any block of data found to be corrupt.

Source of modems

For Prestel users, a ready source of modems and terminal software is Micronet 800, which can provide 'communications packs' to suit a range of popular micros. Software for 300 baud modems is available from a variety of sources. Maplin Electronic Supplies, who offer a modem construction kit at less than £45, can also supply serial interfaces and software for the Dragon, Oric, Vic-20, Commodore-64, ZX-81 and Spectrum.

Best served, perhaps, are the long-established TRS-80 and the BBC Micro. Users of the BBC Micro have a choice of two excellent ROM packages: Communicator 16K from Computer Concepts and Commstar 8K, from Pace Software Supplies. The latest version of Commstar includes a Prestel mode which allows telesoftware downloading. ■

Useful addresses

Buzzbox 300 baud: Scicon, Brick Close, Kiln Farm, Milton Keynes MK11 3EJ, 0908-567567.
Minor Miracles: Miracle Technology, PO Box 48, Ipswich IP4 2AB, 0473-50304.
Grapevine, Commstar ROM: Pace Disc Systems, 92 New Cross Street, Bradford ED5 8BS, 0274-729306.
Micronet: Prism Microproducts, 18/29 Mora Street, London EC1V 8BT, 0274-729306.
Tandata: Tandata Marketing, Albert Road North, Malvern, Worcestershire WR14 2TL, 337617; Prestel page 799.
Maplin 300 baud kit, interfaces and software: Maplin Electronic Supplies, P.O. Box 3, Rayleigh, Essex SS6 8LR, 0702-554155.
Software for the TRS-80: Molimerx, 1 Buckhurst Road, Town Hall Square, Bexhill-on-Sea, East Sussex, 0424-220391.
Communicator ROM: Computer Concepts, 16 Wayside, Chipperfield, Hertfordshire WD4 9JJ, 09277-69727.
Micronet 800: Scriptor Court, 155 Farringdon Road, London EC1R 3AD, 01-278 3143.

FREE CHIPS WITH EVERY RENAULT 9.

Buy any new Renault 9 between April 1st and May 31st and we will give you a Sinclair Spectrum 48K home computer, complete with software pack.†

It's a gift that perfectly complements the high-tech features of the new Renault 9 GTX. Like aerodynamic styling and a five speed gearbox to save fuel!†† And infinitely adjustable monotrace seating to make driving more of a pleasure.

Electric front windows, centralised door locking and all-round tinted glass are available as an optional Custom Pack.

There are six Renault 9s from 1100 cc to the new 1.7 litre model, including diesel and automatic versions, plus the new Special Edition Renault 9 Avenue.

All you have to do is choose. And, if you choose soon, the chips are on us.



FROM £4,645.* WITH FREE SINCLAIR SPECTRUM HOME COMPUTER.

†Offer limited to one Sinclair ZX Spectrum and software pack (Philips tape drive unit and a selection of software packages) per customer and applies to all new Renault 9s ordered and registered between 1st April and 31st May, 1984. ††Government test figures. Renault 9GTX, 56 mph 55.4 mpg (5.1L/100 km), simulated urban cycle 32.1 mpg (8.8L/100 km), 75 mph 40.4 mpg (7.0L/100 km). *Price refers to Renault 9 TC (correct at time of going to press) and includes 15% VAT, Car Tax and front seat belts. Number plates and delivery extra. Car featured Renault 9 GTX. **RENAULT recommend elf lubricants.**

HISOFT PASCAL DEVPAC

Quality ZX SPECTRUM* Software

HISOFT PASCAL 4T

"... 'I haven't seen any other compiler that could match Hisoft's Pascal'" ... *Using the Spectrum Micro — Autumn 1983*
"This is a very impressive product ... of benefit to any Spectrum programmer ..." *David Bolton ZX COMPUTING Aug/Sept 1983*
Just two comments from full length reviews of our powerful and virtually full implementation of Standard Pascal. The advantages of using Pascal are well-known — fast, self-documenting, and above all, structured programs and now, with Hisoft Pascal, you can reap all these benefits on a wide range of home computers, including the 48K Sinclair Spectrum!
Hisoft Pascal produces programs that run typically 40 times faster than equivalent ZX BASIC programs and, sometimes, up to 1,000 times faster!
Hisoft Pascale supports FOR ... DO, WHILE ... UNTIL, CASE ... OF, INTEGERs, REALs, CHARacters, RECORDs, POINTERs, SETs, ARRAYs etc. etc. — it is not a Tiny Pascal but a virtually full implementation of the language allowing the user to develop true high-level language skills while attaining execution speed close to that of machine code. Complete with a 70-page manual.
Hisoft Pascal is also available in a variety of disk formats, including sequential FILE handling.

HISOFT DEVPAC 3

"... DEVPAC is most highly recommended. The documentation is first class." *Your Computer May 1983*
"... if you write programs in machine code, buy DEVPAC — it is the best currently on the market." *Adam Denning, ZX SOFT in Which Micro September 1983*
Two comments from reviews of earlier versions of DEVPAC — **now** we have DEVPAC 3 available: a powerful Z80 assembler with conditional assembly, assembly from tape (to enable generation of very large code files), ORG, EQU, DEFB, DEFS, DEFW, DEFM, labels of any length — in fact all you need for fast (3,000 line per minute) and powerful assembly programming. But it doesn't stop there: DEVPAC 3 also includes an incredible debugger/dis-assembler giving you a 'front panel' display of the Z80 system and allowing extensive debugging of your machine-code program, including single-stepping programs **EVEN IN ROM!!** Open up the secrets of low-level programming with DEVPAC 3.

Prices:
Hisoft Pascal 4T (ZX SPECTRUM) £25 inclusive
(NewBrain, SHARP MZ700 etc) £35 plus VAT
Hisoft Pascal 4D, many disk formats £46 inc.
Hisoft DEVPAC 3 (ZX SPECTRUM) £14 inclusive
(NewBrain) £25 inclusive
STOP PRESS Hisoft Pascal for the SPECTRUM now comes complete with a Turtle Graphics package allowing fast and easy production of complex graphic displays.
Hisoft Pascal and Hisoft Devpac also available on ZX Microdrive please write for details

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

*and others

TOP SAVINGS

PRINTERS	EX VAT	INC VAT
BROTHER HR 15	349.00	401.35
TRACTOR	68.00	78.20
SHEETFEEDER	195.00	224.25
KEYBOARD	142.00	163.30
EPSON RX80T	215.00	247.25
EPSON RX80F/T	242.00	278.30
EPSON FX80P/T	329.00	378.35
EPSON MX100F/T	375.00	431.25
EPSON FX100F/T	430.00	494.50
FX80 TRACTOR	30.00	34.50
JUKI 6100	345.00	396.75
MANNESMANN TALLY MT 80	199.00	228.85
OKI MICROLINE 80AP	180.00	207.00
OKI MICROLINE 82A	289.00	332.35
OKI MICROLINE 83A	435.00	500.25
OKI MICROLINE 92P	395.00	454.25
SEIKOSHA GP100A	175.00	201.25
SHINWA CP80	175.00	201.25
STAR GEMINI 10X	199.00	228.85
COMPUTERS		
COMMODORE 64	156.51	179.99
COMMODORE 1541 DISK	165.21	189.99
COMMODORE C2N CASSETTE	36.51	41.99
INTFACE 64-PAREL	59.50	68.43
APRICOT 2*D+MON	1575.00	1811.25
SANYO MBC555	799.00	918.85
EPSON QX10	1600.00	1840.00

MAYFAIR MICROS
362 YORK ROAD, LONDON SW18 1SP
01-870 3255

NEW



SPECIAL OFFER for CBM64

80-COLUMN/GRAFICCARD

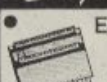
- Digital clock
- Mixpossibility of 80-column screen with Hires CBM64-screen (also in colour)
- Grafic pictures; can be switched to background
- Upper line can be locked (for comments etc.)
- Adjustable line spacing for greater clarity on text screens

FREE ADDED!: Sophisticated Wordprocessor with extended manual

£ 59.95

★ Warning: Beware of (inferior) imitations of ZERO-products!

...Surprising Bargains for VIC 20 and CBM 64



EXPANSION UNIT with 2 slots **£ 5.95**



EPROM CARD two 2k/4k EPROM sockets. Addresses are changeable **£ 5.95**

● 40/80 COLUMN CARD Turn your VIC 20 into a professional computer. 40 or 80 columns instead of 22, very sharp and stable picture. Try it out without obligation! **£ 55.95**

● EPROM PROGRAMMER for 2716, 2732 2764, 27128, 2532 EPROMS. Can be easily connected to your computer. Control software in EPROM **£ 6.50** **£ 31**

● 64 k RAM + 2 k EPROM With software for RAM-files. Easily connected. **£ 55.95**

● EPROM-ERASER erases 4 EPROMS simultaneously **£ 26.50**

● EXPANSION UNIT With 5 slots, fully buffered, switches for deselecting slots, and on-board power supply



VIC 20 £ 29.95 ✳ CBM64 £ 36.95

● MACH3 PRINTER BUFFER

	16 k	32 k	48 k
par. input - par. output	£ 86	£ 98	£ 109
serial input - par. output	£ 94	£ 109	£ 123

for all our products. Dealer inquiries invited.

zero ELECTRONICS

- All prices exclude VAT. Shipping costs £ 1.50
- Supplier to schools, universities and government departments.
- We have good documentation of all our products, free of charge.
- All equipment can be tried out without obligation; if returned undamaged within 10 days, you only pay postage and packing costs.

149 KINGSTREET + GT.YARMOUTH NR30 2PA + TEL.:(0493) - 2023
(NASH HOUSE)

MODEM POWER



TUNE IN TO BBC

John Dawson looks at Commstar — a communications program for the BBC.

THE COMMSTAR PACKAGES from Pace Software Supplies is the third link in a communications chain between two computers. When you have a modem connected to a telephone line, and a microcomputer connected to the modem, you only need a program to control the computer to put you in business.

Commstar is a communications program which will allow you to use your BBC Micro as either a dumb terminal to a remote computer, or as an intelligent machine, able to send and receive files with full error checks to ensure accuracy.

Computers using the CP/M operating system can use the Peripheral Interface Program (PIP) to transfer a file of information out to the paper-tape punch or in from the paper-tape reader. These obsolete terms conceal the fact that a modem can act as both a reader and punch.

But that is terribly clumsy, allows no conversation with the remote computer and has no error-checking capacity. It is a little like standing in a dark room, shouting into the silence and hoping that someone will hear you.

Proper CP/M communications programs are not particularly new and there are a number of more or less unfriendly packages that have been available for some time. ASCOM, BSTAMS and BSTMS are all designed to link two computers for the purpose of transferring files. Most of them will only handle ASCII text files because the ASCII control codes are used, as they should be, for various control purposes in the course of data transmission.

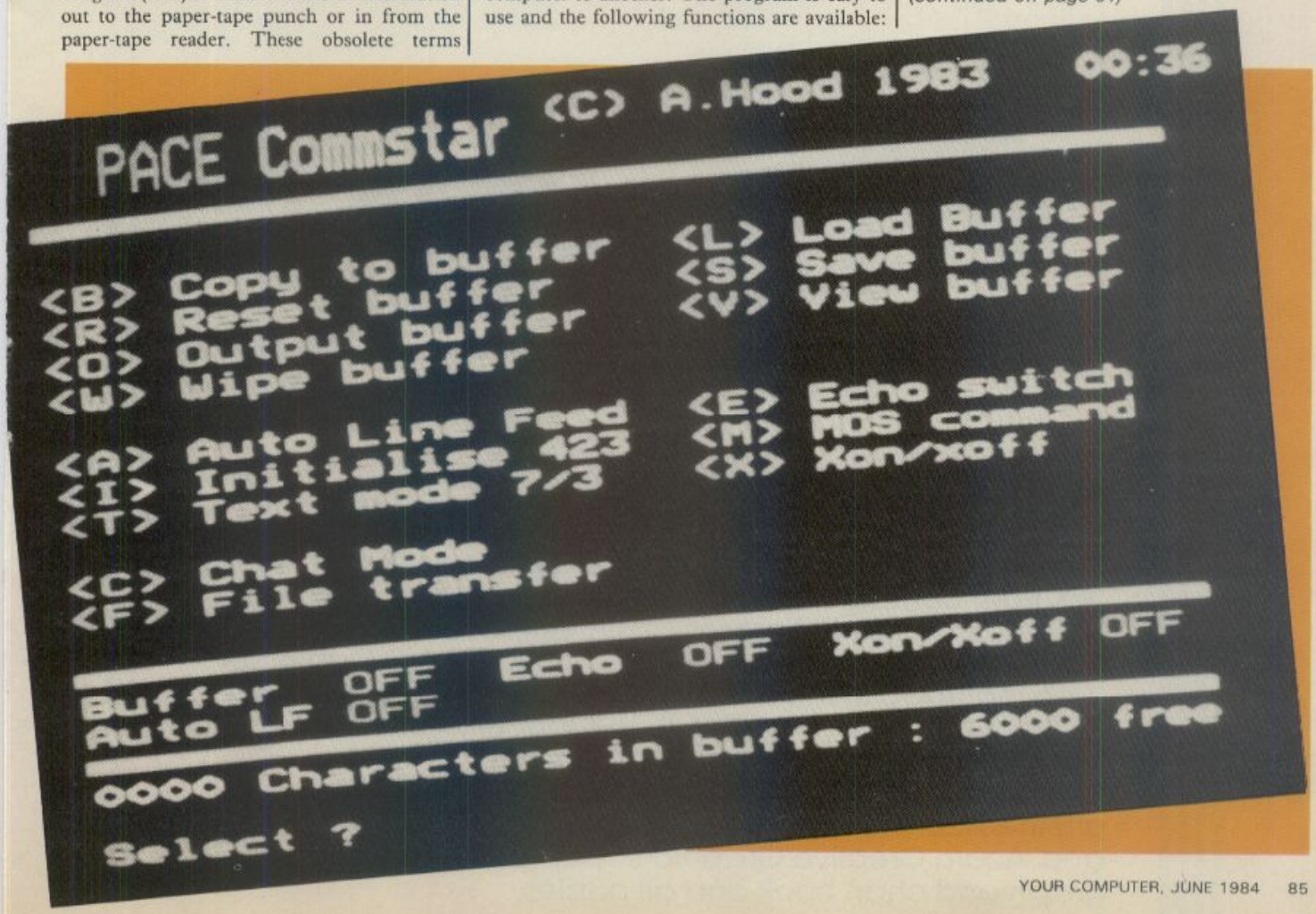
Commstar changes all that, providing instead a friendly, orderly and effective means of transferring information from one computer to another. The program is easy to use and the following functions are available:

1 Initialise the BBC Micro RS-423 interface.
2 Chat to a remote computer.
3 Store incoming data in a buffer area of memory.
4 Save the buffer on tape or disc.
5 Load the buffer from tape or disc.
6 Output the buffer to the remote computer.
7 View the buffer on screen and copy it to a printer with a Centronics interface.
8 Transfer files from one computer to another using the Xmodem standard.

In addition to these main functions, Commstar has the following facilities:

- ☐ Elapsed time clock
- ☐ 40-or 80-column display
- ☐ XOn/XOff protocol
- ☐ Screen display can be switched on or off
- ☐ Auto line feed can be switched on or off
- ☐ MOS commands can be executed from within Commstar

(continued on page 91)



LOW PRICES - BEST SERVICE

Up to £1,000 instant credit. Write for details

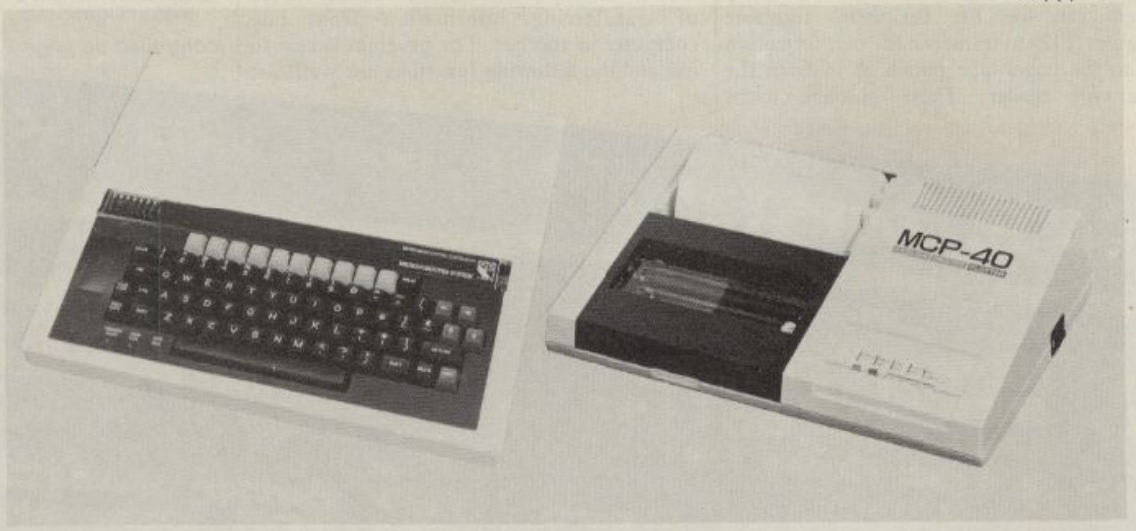
★ Europe's No 1 group of retail outlets

★ Check our multi-national network for your nearest dealer

★ Backed by an after-sales service second to none

This months special feature from the BIG

You will also get the Acornsoft Creative Graphic Cassette and Acorn Creative Graphic Book plus graph and chart book and all cables.



BBC MODEL 'B' PACK ①

The heart of the system will be the BBC Model B with its full colour 32K Rom computer with text and graphics and 80 column text screen, extended Microsoft basic, built-in assembler 1 MHZ tube interface sideways, ROM and RS 423 A/D Converter. Also included in this package will be the MCP40 printer — the world's No. 1 printer. It uses four different colour pens to achieve its plotting facilities and gives you four colour printing capabilities. You will also get the Acornsoft Creative Graphic Cassette and Acorn Creative Graphic Book plus graph and chart book and all cables.

All this for just £538

⑫ MODEMS

available for Spectrum Apple BBC and other RS232 Computers. Special software available for the above models.

From £99.95

⑬ NEW DOUBLE DENSITY DISK CONTROLLER FOR THE BBC MICRO

Up to 2 MB on line storage. Auto internal format programs for 5¼in and 3in drives. Acorn compatible runs Basic, wordwise, BCPL, view, Forth etc. 25% faster than Acorn DFS on file access. Auto 40-80 track switching. Quickly installed — no soldering required. Low power consumption. Compatible with .9 DFS view and sideways ROM. Complete with 80 page manual. Available limited quantities.
Available **NOW** at your Big M dealer.

£120

£5 Gift Vouchers

Want to buy a present but don't know exactly what to get? Big 'M' Gift Vouchers are the answer in £5, £10 and £20 denominations. Available at your local Big 'M' dealer — check out list for your local store.

⑭ SOFTWARE



⑮ BBC Hardware



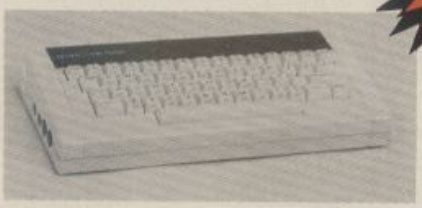
Price Model B £399

A full colour 32K ROM computer with text and graphics modes up to 640 x 256 graphics and 80 column text screen, extended Microsoft basic, built-in assembler 1 MHZ and tube interface, sideways ROM, RS 423 A/D converter.

⑯ Electron

Son of BBC at selected BIG M dealers now!

£199



Manufactured by the same company as the BBC, who have used their experience and knowledge to great effect to produce another winning computer. Many BBC programs are compatible with the Electron



⑰ The Apple IIe Business Package

The heart of the system is the Apple IIe Microcomputer. This package includes Disk Drive with Controller plus a second Disk Drive, a suite of Business Software which includes Sales Ledger, Sales Invoicing, and Purchase Ledger by Peachtree Software International, TV Modulator, £25 Apple Software Rebate Voucher, Certificates, Micronett/Prestel Discount Software Certificates and a catalogue of Hardware and Software

Normal recommended retail price £2668

BIG M PRICE, JUST £1449

⑱ Atari 600XL 800XL



A fully expandable home computer. Ideal for the first time user. With cassette recorders, disk drives, printer, joysticks and other add-on peripherals. 2000 software titles readily available. All peripherals for the Atari 600XL are completely compatible with the Atari 400 and 800 machines already on the market.

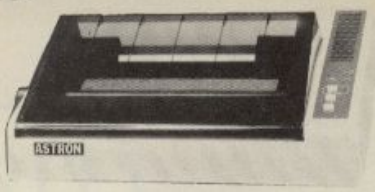
16K £159.99 64K £249.99

£3 OFF PURCHASES OVER £75

Use this coupon to get even better value at your local Big 'M' dealer. Check our list for your nearest dealer. This coupon can be used at any official Micro Management dealer. The bearer is entitled to a £3 reduction on purchases over £75. Only one coupon per person can be redeemed. Valid until June 30th 1984.
Micro Management 16 Princes Street, Ipswich, Suffolk.

special opportunity

② ASTRON JP80

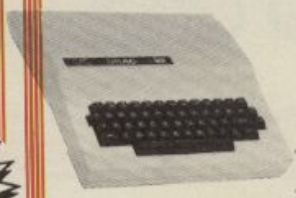


The high speed printer 80 column high speed dot matrix printer. This inexpensive and very versatile printer is ideal for the home and small business user.

£199

③ DRAGON 32

32K RAM, colour, extended basic, sound 5 octaves 255 tones, vast software range, typewriter keyboard, standard cassette drive, high resolution graphics 256 x 192, text 16 + 32.



DRAGON 32 £174.99
DRAGON 64 £225.00

④ TORCH Z80 DISK PACK 800K.



Dual disk drive complete with Z80 second processor and CPM to run on the BBC. Gives BBC 64K of usuable RAM. Ideal for a small business machine with CPM giving access to a huge range of software currently available on CPM machines.

£839.50

⑤ Sinclair ZX Spectrum



16K and 48K basic, colour and text and graphics. Vast range of software, including educational. Many add-ons now available.

16K £99.95
48K £129.95

⑥ Commodore Vic 20

The Big M Starter Pack
Special offer pack comprising Vic 20 Computer, Cassette Unit, Introduction to Basic Part 1 plus Blitz, Type-A-Tune, Hopit

Great Value at £139.99

⑦ COMMODORE SX Portable Computer



9" full colour screen, Commodore 64 compatible. Built in Disk drive, Easy Scrip, Future Finance, Easy File and High Flier.

£895

⑧ Commodore 64 Pack

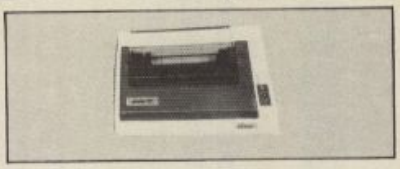
This special package will include a Commodore 64 computer with its colour sophisticated ROM/RAM user, full business applications, sound, UHF/composite video. Proven basic language, high resolution graphics, disk drive MPS PRINTER, easy script, easy file, Introduction Part 1 basic on disk plus a 6 games disk.



+ Printer, Disk Drive and Software

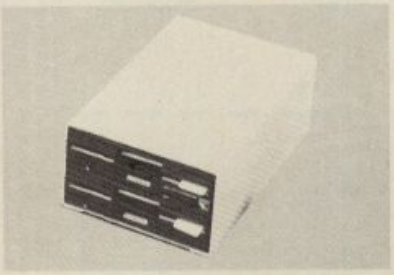
For an incredible price of just £629

⑨ PRINTERS



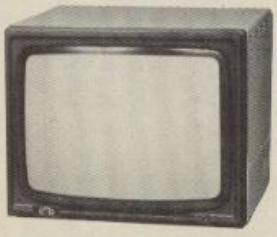
SEIKOSHA GP100	£199.00
SEIKOSHA GP250	£276.00
EPSON MX100	£460.00
EPSON RX-80 PRINTER	£314.00
EPSON FX-80 PRINTER 160cps	£399.00
SMITH CORONA D/WHEEL	£511.75
TEC STARWRITER (40cps)	£1265.00
RIBBONS	Price on application
MCP40 (Colour Printer)	£171.35
JUKI6100 (Daisywheel)	£430.00
SEIKOSHA GP-700A (Colour Printer)	£488.75
ASTRON JP80	£199.00

⑩ DISK DRIVES



DISK DRIVE 100K SINGLE	£201.25
DISK DRIVE 200K SINGLE	£241.50
DISK DRIVE 400K SINGLE	£396.75
DISK DRIVE 800K DUAL	£711.85
1 DRIVE CABLE FOR ABOVE	£12.65
2 DRIVE CABLE FOR ABOVE	£17.25
TORCH Z80 DISK PACK	£839.50

⑪ MONITORS



RGB COLOUR MONITOR STD/RES	£247.25
RGB COLOUR MONITOR H/RES	£632.50
PLINTH FORRGB MONITOR	£8.63
RGB CABLE	£5.75
12" GREEN MONITOR	£99.00
12" AMBER MONITOR	£120.75
FIDELITY MTV 1400 Monitor/T.V.	£247.25

The Big M International Dealer Network

Altringham
Pharmacy Computer Systems
37 Stamford New Road
Altringham
Cheshire
061 928 0087

Ashford
Tollgate Video
249 Beaver Road
Ashford
Kent
0233 37187

Beverley
Beverley Computer Centre
1 Windmill Passage
55 Lairgate
Beverley
N. Humberside 0482 881911

Birmingham
Micro Centre
1756 Pershore Road
Cotteridge
Birmingham
021458 4564

Bishops Stortford
County Computer Stores
95A South Street
Bishops Stortford
Herts
0279 506801

Bolton
Selecta Video
5 Belmont Road
Astley Bridge
Bolton
Lancs.
0204 52804

Braintree
Braintree Computer Centre
Masefield Road
Braintree
0376 24922

Bridgend
Automation Services
42 Dunraven Place
Bridgend
Mid Glam
0656 3550

Brighton
Gamer
24 Gloucester Road
Brighton
Sussex 0273 698424

Brixham
Computer Systems (Torbay)
Pump Street
Brixham
Devon
08045 6565

Bromley
Data Store
6 Chatterton Road
Bromley
Kent 01-460 8991

Bury
Entertainment in Leisure
88 The Rock
Bury 061 797 3463

Cambridge
GCC Cambridge Ltd
66 High Street
Sawston
Cambridge 0223 835330

Canterbury
Canterbury Software Centre
9 The Friars
Canterbury
Kent 0227 53531

Cardiff
Steves Computer Centre
Castle Arcade
Cardiff
0222 41905

Chelmsford
Essex Computer Centre
216 Moulsham Street
Chelmsford
Essex
0245 358702

County Antrim
Everyman Computers
80 Charlotte Street
Ballymoney
Co. Antrim
N. Ireland
02656 62116/62658

Croydon
Concise Computer
Consultants Ltd
1 Carlton Road
South Croydon
Surrey
01-681 6842

Dartford
Anirog Computers
29 West Hill
Dartford Kent
0322 92513

Derby
First Byte Computers
10 Castlefields
London Road
Derby
0332 365280

Dover
Dover International
Computer Centre
18/19 The Charlton Arcade
High Street
Dover Kent
0304 212433

Dyfed
Computer Centre
18 Riverside Market
Haverford West
Dyfed
0437 2776/68228

Evesham
Evesham Micro Centre
Crown Courtyard
Bridges Street
Evesham Worcs.
0386 49641

Hastings
The Computer Centre
37 Die Robertson Street
Hastings
East Sussex
0424 439190

Harlow
County Computer Stores
5A West Square
Harlow
Herts
0279 414692

Harpenden
Hobbyte
153 Grove Road
Harpenden
Herts
0587 3542

Heckmondwike
Thoughts and Crosses
37 Market Street
Heckmondwike
West Yorkshire
0924 402 337

Hemel Hempstead
Faxminster Ltd
25 Market Square
Hemel Hempstead
Herts.
0442 55044

High Wycombe
South Bucks Computer Centre
120/123 Oxford Road
High Wycombe
Bucks.
0494 442311

Hornchurch
Comptel Computer Systems
112a North Street
Hornchurch
Essex
04024 46741

Horsham
The Micro Store
13b West Street
Horsham
W. Sussex
0403 52297

Horsham
Orchard Business Systems Ltd
34 East Street
Horsham
W. Sussex
0403 68461

Ipswich
Brainwave
24 Crown Street
Ipswich
Suffolk
Ipswich 50965

Lerwick
Tomorrow's World
20 Commercial Road
Lerwick
Shetland Isles
0595 2145

London
Computers of
Wigmore Street
87 Wigmore Street
London
01-486 0373

London
Matmos
14/16 Childs Place
Earls Court
London
01-373 5000/6607

London
Henry's Computer
Department
301 Edgware Road
London
01-836 9373

Maidenhead
Chiswick Organs
45 Nicholsons Walk
Maidenhead
0628 31765

Marlow
Citybench
2/4 Eton Place
Marlow
Bucks
06284 75244

Merseyside
Source Computers
4 Cross Lane
Newton-Le-Willows
Merseyside
092 524394

Milton Keynes
Micro Land
Weatherburn Court
Brunel Centre
Bletchley
Milton Keynes
0908 368018

Norwich
Abacus
12a Pottersgate
Norwich
Norfolk
0603 614441

Peterlee
General Northern Computing
8 Whitworth Road
South West Ind. Estate
Peterlee
Durham
0783 860314

Preston
Format Computing
67 Friar Gate
Preston
Lancs.
0772 561952

Scunthorpe
Ashby Computer Centre
186 Ashby High Street
Scunthorpe
S. Humberside
0724 871756

Skipton
Skipton Computer Systems
16 Swadford Street
Skipton
N. Yorkshire
0756 68192

Southend
The Home Computer Centre
261 Victoria Avenue
Southend
Essex
0702 43568

Southall
Twilstar Computers
17 Regina Road
Southall
Middx.
01-574 5271

St. Austell
Computavision
4 Market Street
St. Austell
0726 5297

Stirling
Micro Store
38 The Arcade
King Street
Stirling
Central Region
0786 64571

Stoke On Trent
Town Computer Store
30 Town Road
Hanley
Stoke On Trent
0782 287540

Stoneleigh
Diamond Duel Records
75 The Broadway
Stoneleigh
Surrey
01-393 4944

Stroud
The Model Shop
22 High Street
Stroud
Glos.
04536 5920

Taunton
Sinewave Computer Services
Corporation Street
Taunton
Somerset
0823 57526

Tewkesbury
Sabre Consultants Ltd
103 High Street
Tewkesbury
Gloucester
0684 298866

Truro
Truro Micro Ltd
Unit 1 Bridge House
New Bridge Street
Truro
Cornwall
0872 40043

Uxbridge
J.K.L. Computers
7 Windsor Street
Uxbridge
Middlesex
0895 51815

Welling
North Kent Computer Centre
52/54 Bellgrove Road
Welling
Bedley
Kent
01-301 2677

Whitley Bay
Video & Home Computers Centre
3 Roxburgh House
Park Avenue
Whitley Bay
Tyne & Wear
0632 534725

Wolverhampton
Wolverhampton Computer Centre
17/19 Lichfield Street
Wolverhampton
0902 29907

Worthing
Worthing Computer Centre
32 Liverpool Road
Worthing
W. Sussex
0903 210861

For your nearest European Dealer telephone Belgium or Holland

Belgium
Micro Management
Belgium
Ballaerstraat 75
2018 Antwerp
Belgium
03-238 9284

Holland
Micro Management
Nederlands
Raad Huisstraat 98 2406
Ah Alphen-aan-den-rijn
01720 – 72580

There are still franchise outlets available in some areas of the U.K.
Contact Micro Management Head Office
16 Princes Street, Ipswich, Suffolk
Telephone: 0473 219461

CHECK WITH YOUR LOCAL DEALER FOR SPECIAL BARGAINS AND NEW PRODUCT RELEASES

(All products normally in stock but to prevent a wasted journey phone your local dealer first before calling. All prices inclusive of VAT)

Please rush me details of product numbers

☐ ☐ ☐ ☐

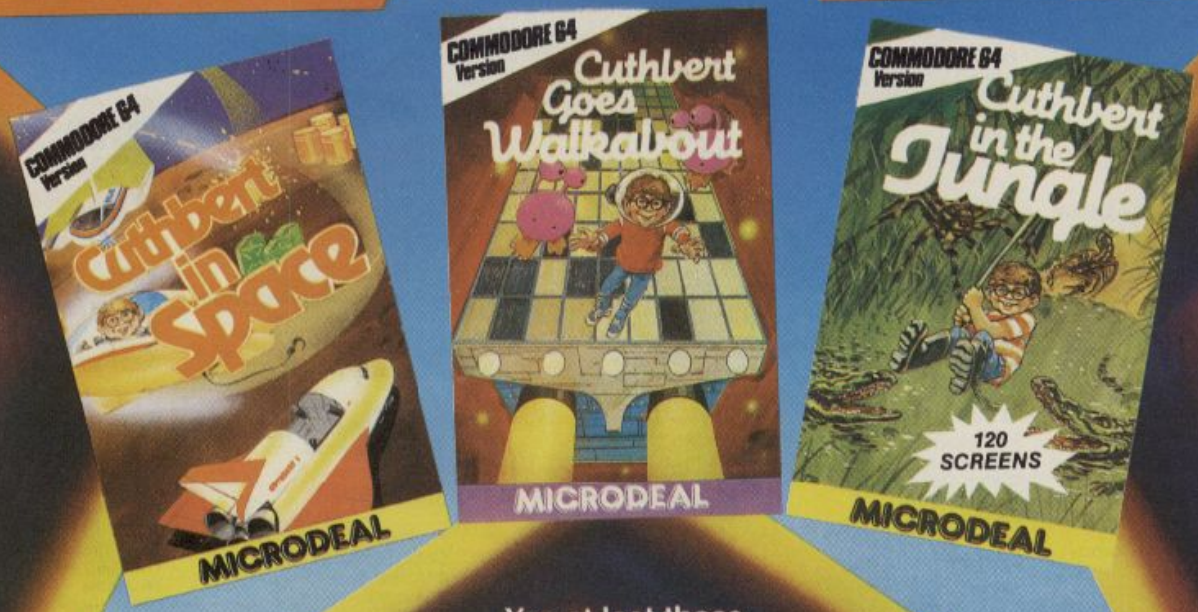
Name .....

Address .....

Mail coupon to the Big M Head office.

NOW AT LAST!

Cuthbert ON THE Commodore 64



Yes at last those fantastic top selling games for the Dragon are now available for your Commodore 64. Avoid those Marauding Moronians in "Cuthbert Goes Walkabout". Fight for survival in "Cuthbert in the Jungle" or plunder the Moronians planet in "Cuthbert in Space". These great games are a "must" for your software collection.

CASSETTE £8 EACH DISK £9.95 EACH

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

Credit Card Sales
Phone 0726 3456



Dealers Contact
MICRODEAL DISTRIBUTION
0726-3456
or WEBSTERS SOFTWARE
0483 62222

MICRODEAL

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

John Menzies Stores and Boots

MODEM POWER



```
   Word   Parity   Stop          02:55

0   7      Even     2
1   7      Odd      2
2   7      Even     1
3   7      Odd      1
4   8      None     2
5   8      None     1
6   8      Even     1
7   8      Odd      1

<R>eceive   300   <S>end   300

Select ?_
```

(continued from page 85)

There is a menu for initialising the RS-423 interface. You can select one of the word length — stop bit — parity patterns by typing one of the numbers in the left-hand column and the baud rates shown at the bottom of the screen can be altered by typing either R or S.

The receive or send rate steps through the usual selection of rates from 75 baud to 9,600 baud each time one of the keys is pressed. Setting up the interface is very easy.

When you dial a number with your computer connected to the telephone line and somebody or something answers at the far end you may want to do any one of several things. If it is a friend on the line, you will probably want to talk to him or her before using your computer to send messages or programs down the line.

Hear answering tone

If you are connected to British Telecom's Packet Switched Network, you will hear only the answering tone of a modem at the far end. In this case you will have to identify yourself to the remote computer, and to do this the communications package you are using must allow you to type on the keyboard, sending the characters to the remote computer which will echo them back to your machine for display on your VDU.

Commstar calls this the Chat mode because you can hold a dialogue with the remote computer where keystrokes on either machine will show up on your terminal — you can Chat with someone at the far end.

While you are chatting with the remote computer you may wish to send a message that you have already prepared and stored in a file. Equally likely, you may want to receive a program or file from the remote computer, storing this in the memory of your machine until you can save it on tape or disc.

You can access the transmit and receive file functions from Chat mode without having to return to the main menu. Commstar will not load a file from tape or disc while in Chat mode but will send the current contents of the buffer to the remote computer or load material from the remote machine into the buffer.

You can then return to the main menu and save the buffer to the current filing system. This structure for the Commstar program works well and is really the only possible architecture for a computer that may be used with a tape-filing system.

Sending the contents of the buffer to the RS-423 port is a way of uploading a file to the remote computer. Some systems respond to a set of buffer control codes — Forum 80 is an example — and Commstar has an option that will automatically open the buffer in the remote machine and close it again when the file transfer is complete.

If the buffer in your machine fills up while material is being transmitted from the remote machine, Commstar will issue an XOff character to try and halt the flow. At the same time the copy-to-buffer operation is switched off and you can save the buffer to tape or disc.

After wiping the buffer, you may turn on the copy-to-buffer option and send an XOn signal to resume the halted transmission. If you are using a cassette tape recorder running at 1,200 baud it will take you about three and a half minutes to save the 24K buffer.

That is not going to do your telephone bill any bood but it is unlikely to happen often as it will take nearly 15 minutes continuous reception to fill the buffer at 300 Baud.

Obviously a disc system will save the buffer much more quickly and you can reckon to download a file of any size from the remote computer if you have discs at your end.

Using the 80-column screen reduces the size of the buffer to about 9,000 characters, which is still adequate for many of the transactions you are likely to make.

The file-transfer section of Commstar is the most sophisticated section of the program. Data is sent down the line using Ward Christiensen protocols and handshaking. The data is automatically broken up into 128-byte blocks and each block is sent with its own number and checksum.

If the remote computer signals an error, the block will be retransmitted up to 10 times to try to overcome the corruption. As the manual says: "This system virtually assures perfect data transfer even under extreme conditions such as temporary loss of carrier signal, excessive line noise or even temporary disconnection of the modem."

It is necessary, of course, for the remote computer to use compatible software. Communications between two BBC Micros using Commstar should be very easy under most line conditions. With the BT packet switched network I have experienced little trouble both in London and the country using the ordinary buffer output and copt-to-buffer options.

Commstar will send and receive both ASCII text files and binary-coded programs. Some machine-code or Basic instructions can look liek control codes to many communications programs and Commstar overcomes this problem by translating the buffer contents into expanded ASCII files before transmission or back into binary codes before the buffer is stored on tape or disc.

The transfer of programs

This option is enormously useful as it allows the transfer of machine-code programs just as easily as letters, patients' records or sales reports.

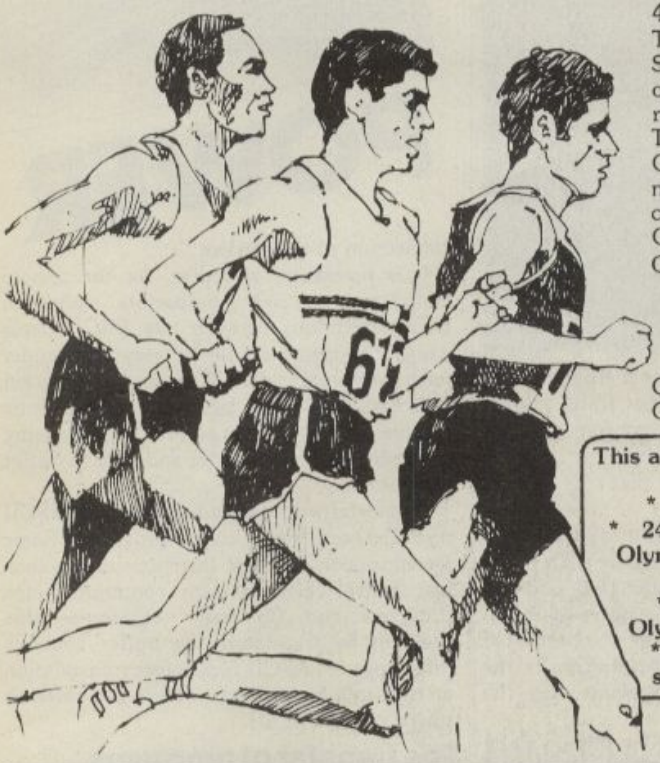
The Commstar chip is supplied with a 37-page manual which includes a glossary of telecommunications terms and a good index. The manual is clearly written and laid out. A registration postcard is included in the front of the manual which offers follow-up information and program updates to genuine purchasers of the package.

Each section of the manual is easy to understand and if Commstar is the first additional ROM chip you fit to your BBC computer, you will have little difficulty if you work through the instructions in the manual.

Apart from very slight lapses, the Commstar manual is a model for others to imitate. It would have been helpful, for example, for the manual to have confirmed that files produced by Commstar are compatible with Wordwise and View — they are. Similarly, you can prepare a text file with one of the BBC word processors and then upload it to a remote computer using Commstar.

Pace Software Supplies has an excellent reputation for backing-up sales. Commstar is a super piece of software, allowing you to communicate with microcomputers and mainframes; receiving and transmitting text, data and programs. The package works well and offers excellent value for money, I expect to see it used widely in university laboratories, homes, schools and doctors' surgeries. ■

OLYMPICS 84



48k ZX Spectrum

To celebrate this summer's Olympic Games in Los Angeles, STORM SOFTWARE offers you an unique "two program" package. Crammed full of facts and figures - OLYMPICS '84 - gives great flexibility in looking at results.

The first program details the medal winners, by country, in every current Olympic event since 1896. The second program enables you to record the name and nationality of each medal winner in Los Angeles; this information can be analysed and compared with the full result in the previous two Olympic Games.

OLYMPICS '84 offers many extra features:

* Bar-charts to compare performances over the years, in any event, including Men versus Women.
* Medal tables, for any Year, Sport or Event.
* Ability to find a country's best sports and events.

OLYMPICS '84 package includes an amusing review of the Summer Olympic Games, from Athens 1896 to a preview of Los Angeles 1984.

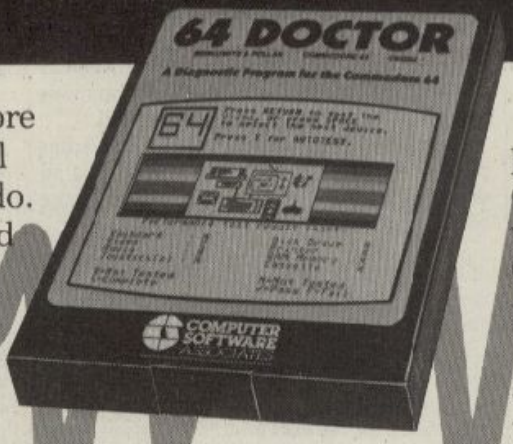
This attractive package includes:
*** TWO programs**
*** 24pp History of the Olympic Games, with original sketches**
*** Every Summer Olympics since 1896**
*** A MUST for all sports enthusiasts**

storm OLYMPICS 84

Available from all good computer shops. In the event of difficulties, order direct at £14.95+50p P&P (inc. VAT). Dealers contact: Amanda Ralph on 0935 813528

Storm Software
Winchester House
Sherborne, Dorset
DT9 4DL

HEALTHCARE FOR YOUR HARDWARE



When your Commodore 64 seems distinctly unwell it's hard to know what to do.

Which is why you need 64 Doctor.

This special program will find the fault by a series of short diagnostic tests. And tell you exactly where the problem lies.

Included are tests for RAM, keyboard, disc-drive, joysticks, datacassette, printer, audio and video displays.

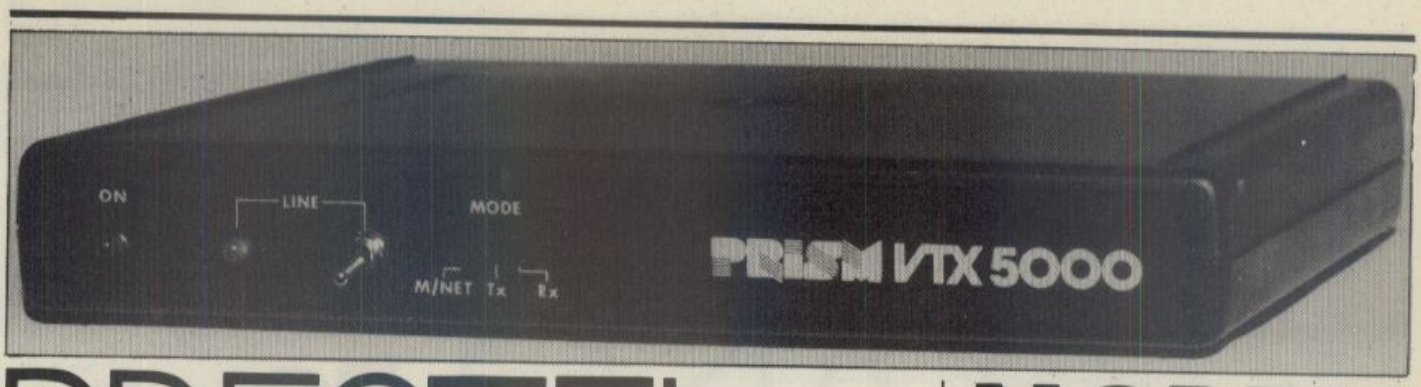
So as well as saving you pounds in having someone check through the whole system for a fault, 64 Doctor will give you peace of mind.

You can give your system a check-up by visiting any good computer store including selected branches of Laskys, W. H. Smith and Boots.

64 Doctor. Tape £17.95 inc. VAT. Disc £19.95 inc. VAT

PRACTICORP

Practicorp, Goddard Road, Whitehouse Industrial Estate, Ipswich IP1 5NP. Tel: 0473 462721



PRESTEL ADAPTORS

MODEM POWER



Jack Russell reviews adaptors for the Spectrum, BBC and ZX-81 micros.

THIS REVIEW COVERS several packages available for the popular BBC Micro and ZX Spectrum computers which allow them to operate as viewdata terminals. This means that services such as Prestel can be accessed without having to buy a special terminal.

The VTX 500 ZX Spectrum adaptor consists of a flat black plastic box containing the modem which fits under the computer. There is a ribbon cable and connector which plugs into the back of the Spectrum and further devices such as a printer can be connected on to a spare connector on the ribbon cable. There is a telephone type cable out of the VTX 5000 which will plug into a standard British Telecom wall socket.

Your telephone then plugs back into a socket on the back of the adaptor, allowing you to use the phone normally. The BBC system supplied had a slightly larger box which attached to the computer via a cable into the RS-423 connector. This box could then be placed under the telephone. In addition the BBC adaptor had an EPROM chip which had to be fitted into one of the spare "sideways" ROM sockets in the computer.

When the Spectrum is switched on a start up screen appears inviting you to press any key. When this is done the Main Menu is displayed. To get to this stage on the BBC Micro the comamnd.

*MIC.

needs to be typed. It is from this menu that all the features of the package can be controlled. Items on the menu include: log on, temrinal operation, save/view frames, print frames, download and mailbox editor.

To use Prestel it is necessary to log on to the system. When the menu option to do this is selected the program prompts for your ID number. This is then sent to Prestel when a connection is established. Upon dialling up the Prestel phone number and flipping the swich on the modem to on line the screen is cleared and the Prestel sign-on frame appears.

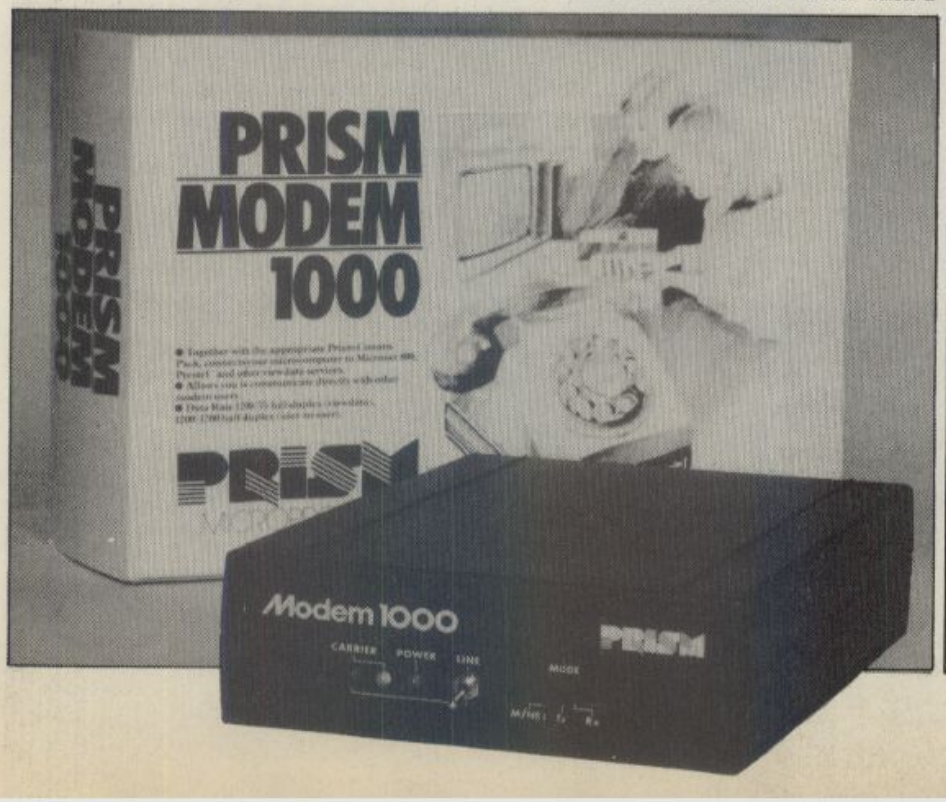
All normal Prestel facilities can then be used. Frames can be read just by pressing the number keys and the special keys * and £. To return to the menu the keys Caps Shift and Enter on the Spectrum or Tab on the BBC are used. This allows the use of other functions in the package such as saving frames on tape or disc, printing and so on.

Everything appeared to work correctly so next I tried downloading a 'free' telesoftware program. The downloading operation seemed to work well but I was not too impressed with the quality of the 'free' programs on offer. On the Spectrum it is neccessary to restart the terminal program after downloading because the support program gets overwritten by the downloaded one. When this restart function is performed the main menu is displayed again and selecting the Terminal option takes you back to Prestel.

The final function provided was an editor to prepare mailbox frames while offline. I was not impressed by this part of the package as only one line at a time can be edited and it is not possible to correct errors in earlier lines; the whole message must be retyped from the start. I'm sure that improvements could be made here. However, I think that the Mailbox facility is one of the most exciting things about Prestel.

The modem hardware worked well and I had no trouble downloading some software. The Spectrum package in particular was impressive in being able to produce a 40 column full colour Prestel display.

(continued on next page)



(continued from previous page)

MODEM POWER



THE ZX-81 AND PRESTEL

THE ONLY Sinclair ZX-81 Prestel adaptor on the market is sold by Microcomputer Resources Ltd. It can operate with either acoustic coupled or direct connect modems which are now available from several sources.

The adaptor consists of a small black box similar to a 16K RAMpack. The ZX-81 expansion bus is connected right through the box allowing the continued use of other peripherals such as a ZX Printer. To use the Prestel adaptor a 16K RAM pack is required.

40 column display

Upon plugging everything together and powering up the normal cursor appears. The documentation I had was marked preliminary but it was quite comprehensive and covered all the adaptor functions in some depth. To start the adaptor a Rand USR 8192 command is typed. The display that then appears has 40 columns instead of the usual 32.

Unfortunately, it is not possible to read all 40 columns at once on a standard TV screen. However, there are some function keys provided that cause the whole screen display to scroll sideways. I found this feature inconvenient to use especially when trying to read Prestel screens, as on things like news stories the complete 40 column screen width is used.

The Prestel double height and graphics modes are fully supported by the adaptor — quite a programming feat by the software writer. Facilities missing are flash, conceal/reveal, and all the colour features. I got used to the lack of these things after a few minutes.

Other facilities provided by the adaptor are the ability to save Prestel frames in memory and to recall them for later viewing. If necessary the frames can be written on to tape using the fast cassette interface provided. I found saving and recalling frames easy but the tape playback level had to be set very carefully. It is possible to download telesoftware from Prestel which can then be saved and run in the normal way. Any program line that is garbled or does not comply with ZX-81 Basic is headed by a Rem statement for later editing by the user.





It is also possible to use the adaptor in 'local' mode where Prestel-like frames can be composed by typing characters on the keyboard. It is a very time consuming process as to make for example a double height line it is necessary to press Shift and Newline simultaneously followed by E to send an ASCII 'Escape' character, followed by Shift M to go into double height mode. To use the Prestel graphics character set requires a similar feat of key pressing.

Once a frame has been composed on the screen it can be stored on cassette, in memory or even transmitted to Prestel. In this way mailbox messages can be prepared off-line then sent to their destination in one burst, minimising telephone charges. I tried sending some mailboxes using this method and it worked very well.

To add even more versatility into this adaptor design, it can be used to access other databases which do not use the special Prestel characters, but instead require a "dumb" terminal. This allows use of, for example, many of the bulletin board services now operating. The same facilities of frame storage, printing and so on are still available in this mode.

In conclusion, the adaptor is a very impressive piece of work when considered against the limitations of the ZX-81 display and keyboard. It certainly offers the lowest cost way of accessing Prestel as well as other databases. It costs £29.95 and is available from: Microcomputer Resources, 1 Branch Road, Park Street Village, St Albans, Hertfordshire. ■

THE CHALLENGE IS WITHIN YOUR GRASP



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

NEW

PRO 1000

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

PRO 3000

NEW

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

PRO 5000

Again all the winning features of the Pro 1000 but incorporating true craftsmanship plus large 1¼" control knob for comfortable play * Unique tapered shaft for maximum sensitivity * Dual independent fire buttons * Nylon covered steel shaft for maximum robustness

KEMPSTON JOYSTICK INTERFACE FOR THE ZX SPECTRUM

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

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



SEE US ON STAND 135
AT THE COMPUTER FAIR – LONDON



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

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

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

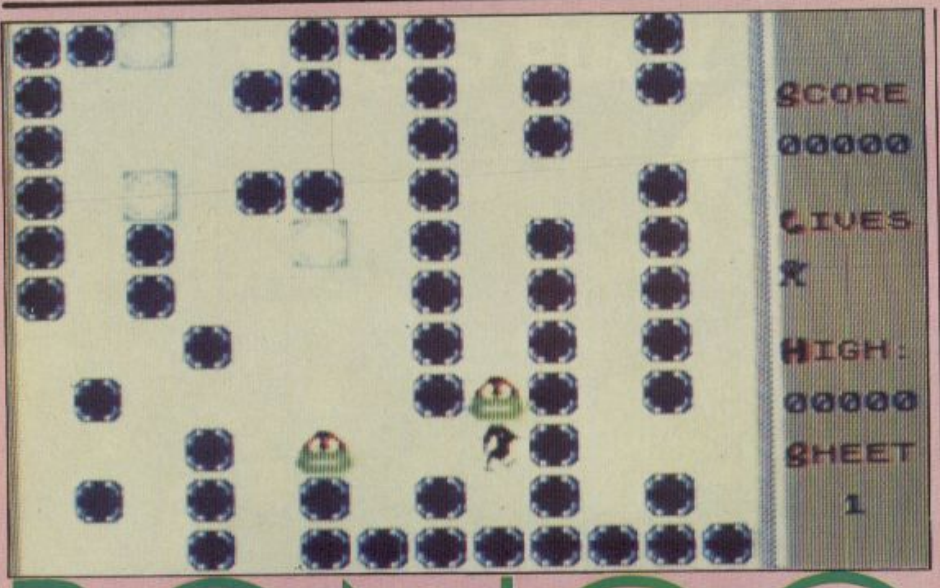
ALL £4.95 each

TRADE ENQUIRIES WELCOME

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

KEMPSTON MICRO ELECTRONICS LTD

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



PONGO

J. Ward and A. Neve try to avoid the snow bees with a Spectrum.

PONGO THE PENGUIN must be guided around the ice mazes and try to make a row of three diamond blocks.

Pongo can kill the chasing snow-bees by squashing them with the ice-blocks; use 0.

If both Pongo and a snow-bee are against the right hand wall then Pongo can stun the bee by pushing against the wall. When stunned Pongo can kill the bees by passing over them.

While hatching, the snow-bees can also be

```
    0>REM        PONGO
          By J.WARD & A.NEVE
               K1983
   1 OVER 0: POKE 23658,8
   2 BORDER 0: PAPER 0: INK 7: B
RIGHT 1: RESTORE
   3 CLEAR 49999: PRINT AT 10,10
; FLASH 1;"PLEASE WAIT": GO SUB
9000: LET Z=USR (USR "E"+4): CLS
   4 RESTORE 9000: CLS : POKE 23
607,251: POKE 23606,89
   5 FOR F=65039 TO 65361: READ
A: POKE F,A: NEXT F
   10 LET HI=0: GO SUB 9700
   15 LET FRE=1: LET LIVES=3: LET
SC=0: LET SHEET=1
   16 RESTORE 9200+(20*INT (RND*5
))
   17 BORDER 7: INPUT 1: PAPER 7:
BRIGHT 1: INK 1
   19 LET A$="abababababababababa
bababab": LET B$="cdcdcdcdcdcdcd
dcdcdcdcdcdcd"
   20 PRINT AT 0,0;: FOR F=0 TO 2
1 STEP 2: BEEP .01,F: BEEP .01,1
0: BEEP .01,-F
   30 PRINT INK 1;A$; INK 0; BRIG
HT 0; INK 1; BRIGHT 1;B$; BRIGHT
0; INK 0;
   40 NEXT F
   50 INK 0
   60 READ A: FOR F=1 TO A
   70 READ X,Y,Z
   80 FOR N=X TO Y STEP 2
   90 PRINT AT N,Z;"  ";AT N+1,Z;
"  ": NEXT N
   100 NEXT F
   110 READ A: FOR F=1 TO A: READ
X,Y: PRINT AT X,Y;"  ";AT X+1,Y;
"  ": NEXT F
   120 FOR F=1 TO 3: READ X,Y: PRI
NT INK 5, FLASH 1;AT X,Y;"ab";AT
X+1,Y;"cd": NEXT F
   130 LET H$="00000": PRINT BRIGH
T 0; INK 2;AT 3,27;"SCORE";AT 8,
27;"LIVES";AT 13,27;"HIGH:";AT 1
7,27;"SHEET": INK 0;AT 5,27;H$;A
T 15,27;H$;AT 10,27;"£££££"( TO
LIVES)
   140 LET H$=STR$ HI: LET BON=1:
LET TIME=INT (RND*SHEET*5)+2: PR
INT AT 19,29; BRIGHT 0;SHEET: PO
KE 23673,0: LET BR1=0: LET BR2=0
   LET KILLS=0: POKE 23673,0
   150 LET A=10: LET B=12
   151 IF ATTR (A,B)=253 THEN LET
A=A+2: IF ATTR (A,B)=253 THEN GO
TO 151
   155 GO SUB 9995: GO SUB 9997
   160 LET G=2
   170 PRINT AT C1,D1;"  ";AT C1+1
,D1;"  ";AT C,D; FLASH (NOT NOT
LI1); INK 2;"ef";AT C+1,D; INK 4
;"gh"; FLASH 0;AT E1,F1;"  ";AT
E1+1,F1;"  ";AT E,F; FLASH (NOT
NOT LI2); INK 2;"ef";AT E+1,F; I
NK 4;"gh"
   172 IF BI1 THEN PRINT AT C,D; I
NK 1;"ab";AT C+1,D;"cd"
   173 IF BI2 THEN PRINT AT E,F; I
NK 1;"ab";AT E+1,F;"cd"
   175 IF KILLS=TIME THEN GO TO 7
100
   180 IF A=C THEN IF B=D THEN IF
LI1+BI1 THEN POKE 65419,0: POKE
65421,7: GO SUB 9900: LET SC=SC+
10: LET KILLS=KILLS+1: GO SUB 99
95
   185 IF A=E THEN IF B=F THEN IF
LI2+BI2 THEN POKE 65419,0: POKE
65421,7: GO SUB 9900: LET KILLS=
KILLS+1: LET SC=SC+10: GO SUB 99
97
   190 IF A=C THEN IF B=D THEN IF
NOT LI1 THEN GO SUB 2000
   195 IF A=E THEN IF B=F THEN IF
NOT LI2 THEN GO SUB 2000
   200 LET A$=INKEY$: IF A$="6" TH
EN LET G=2: LET AT=ATTR (A+2,B):
IF AT<>121 THEN IF AT<>253 THEN
IF A<20 THEN PRINT AT A+1,B;"
";AT A,B;"  ": LET A=A+2
   210 IF A$="7" THEN LET G=3: LET
AT=ATTR (A-1,B): IF AT<>121 THE
N IF AT<>253 THEN IF A>0 THEN PR
INT AT A+1,B;"  ";AT A,B;"  ": L
ET A=A-2
   220 IF A$="8" THEN LET G=4: LET
AT=ATTR (A,B+2): IF AT<>121 THE
N IF AT<>253 THEN IF B<24 THEN P
RINT AT A+1,B;"  ";AT A,B;"  ":
LET B=B+2
   230 IF A$="5" THEN LET G=1: LET
AT=ATTR (A,B-1): IF AT<>121 THE
N IF AT<>253 THEN IF B>0 THEN PR
INT AT A+1,B;"  ";AT A,B;"  ": L
ET B=B-2
   235 LET PUSH=(IN 61438)/2=INT (
IN 61438/2)
   240 IF G=1 THEN PRINT AT A,B;"n
m";AT A+1,B;"po": IF PUSH THEN L
ET AT=ATTR (A,B-2): IF AT=121 OR
AT=253 THEN GO SUB 3000
   250 IF G=2 THEN PRINT AT A,B;"u
v";AT A+1,B;"wx": IF PUSH THEN
LET AT=ATTR (A+2,B): IF AT=121
OR AT=253 THEN GO SUB 6000
   260 IF G=3 THEN PRINT AT A,B;"q
r";AT A+1,B;"st": IF PUSH THEN L
ET AT=ATTR (A-1,B): IF AT=121 OR
AT=253 THEN GO SUB 5000
   270 IF G=4 THEN PRINT AT A,B;"i
j";AT A+1,B;"kl": IF PUSH THEN L
ET AT=ATTR (A,B+2): IF AT=121 OR
AT=253 THEN GO SUB 4000
   290 IF SC>HI THEN LET HI=SC: LE
T H$=STR$ HI
   300 PRINT AT 5,32-LEN S$; BRIGH
T 0;S$;AT 15,32-LEN H$;HI
   305 IF BI1 THEN LET BI1=BI1-1
   310 IF BI2 THEN LET BI2=BI2-1
   320 IF LI1 THEN LET LI1=LI1-1
   330 IF LI2 THEN LET LI2=LI2-1
   390 IF BR1 THEN LET BR1=BR1-1
   400 IF BR2 THEN LET BR2=BR2-1
   410 IF NOT LI1+BR1+BI1 THEN LET
D1=C: LET D1=D: LET C=C+2+((C<A
)-(C>A) AND RND>.6): LET D=D+2*(
(D<B)-(D>B) AND RND>.6): IF ATTR
(C,D)=121 THEN PRINT OVER 1;AT
C,D; INK 2;"\/";AT C+1,D;"/\": B
EEP .1,-40: LET BR1=3
   415 IF ATTR (C,D)=253 THEN LET
C=C1: LET D=D1
   420 IF NOT LI2+BR2+BI2 THEN LET
E1=E: LET F1=F: LET E=E+2+((E<A
)-(E>A) AND RND>.6): LET F=F+2+(
(F<B)-(F>B) AND RND>.6): IF ATTR
(E,F)=121 THEN PRINT OVER 1;AT
E,F; INK 2;"\/";AT E+1,F;"/\": B
EEP .1,-40: LET BR2=3
   425 IF ATTR (E,F)=253 THEN LET
E=E1: LET F=F1
   500 IF SC>9999 THEN IF LIVES<5
THEN IF FRE THEN LET LIVES=LIVES
+1: LET FRE=NOT FRE: BEEP .1,40:
BEEP .1,40: BEEP .2,40: PRINT A
T 10,LIVES+26; FLASH 1;"£": FOR
Z=1 TO 50: BEEP .003,Z: NEXT Z:
PRINT AT 10,LIVES+26; BRIGHT 0;"
£"
1000 GO TO 170
2000 BEEP .5,-40: PRINT AT 10,LI
VES+26; BRIGHT 0;" "; BRIGHT 1;
INK 3;AT A,B;"yz";AT A+1,B;"xo";
#1;TAB 10;"TUFF LUCK"
2005 LET L=USR (USR "B"+4): FOR
L=127 TO 7 STEP -8: BEEP .1,L/2:
POKE 22528,L: LET P=USR USR "A"
: NEXT L: LET L=USR USR "D": BEE
P .5,-20: LET LIVES=LIVES-1: INP
UT 1: IF LIVES<1 THEN GO SUB 720
0
2010 PRINT AT C,D;#1;"   READY W
HEN YOU ARE": PAUSE 0: PRINT AT
C,D;"  ";AT C+1,D;"  ";AT E,F;"
";AT E+1,F;"  ": INPUT 1: GO TO
150
3000 IF ATTR (A,B-4)=121 OR ATTR
(A,B-4)=253 OR B=2 THEN IF AT<>
253 THEN BEEP .2,30: PRINT AT A,
B-2;"dc";AT A+1,B-2;"ba": BEEP .
1,40: PRINT AT A,B-2;"  ";AT A+1
,B-2;"  ": LET SC=SC+1: RETURN
3001 LET X=B
3005 IF A=C THEN IF X=D THEN LET
D=D-2
3006 IF A=E THEN IF X=F THEN LET
F=F-2
3009 LET X=X-2
3010 LET AT=(ATTR (A,X+2)=253):
IF ATTR (A,X)<>121 THEN IF ATTR
(A,X)<>253 THEN IF X>=0 THEN PRI
NT AT A,X; INK 1+4+AT; FLASH AT;
"ab";AT A+1,X;"cd": PRINT AT A,X
+2;"  ";AT A+1,X+2;"  "
3016 IF NOT X OR ATTR (A,X-2)=12
1 OR ATTR (A,X-2)=253 THEN GO TO
3060
3050 GO TO 3005
3060 IF A=E THEN IF X=F THEN LET
KILLS=KILLS+1: PRINT AT E,F;("£
" AND G=1)+(" £" AND G=4);AT E+
1,F;("|  " AND G=1)+(" |" AND G=4
): BEEP .5,10: LET Z=USR USR "B"
: PRINT INK 1+4+AT; FLASH AT;AT
E,F;"ab";AT E+1,F;"cd": LET SC=S
C+50: GO SUB 9997
3070 IF A=C THEN IF X=D THEN LET
KILLS=KILLS+1: PRINT AT C,D;("£
" AND G=1)+(" £" AND G=4);AT C+
1,D;("|  " AND G=1)+(" |" AND G=4
): BEEP .5,10: LET Z=USR USR "B"
: PRINT INK 1+4+AT; FLASH AT;AT
C,D;"ab";AT C+1,D;"cd": LET SC=S
C+50: GO SUB 9995
3080 IF AT THEN IF BON THEN LET
A1=A: LET B1=X: GO SUB 7500
3100 RETURN
4000 IF B=24 THEN GO TO 9500
4002 IF ATTR (A,B+4)=121 OR ATTR
(A,B+4)=253 THEN IF AT<>253 THE
N BEEP .2,30: PRINT AT A,B+2;"dc
";AT A+1,B+2;"ba": BEEP .1,40: P
RINT AT A,B+2;"  ";AT A+1,B+2;"
": LET SC=SC+1: RETURN
4004 LET X=B
4005 IF A=C THEN IF X=D THEN LET
D=D+2
4006 IF A=E THEN IF X=F THEN LET
F=F+2
4009 LET X=X+2
4010 LET AT=(ATTR (A,X-2)=253):
IF ATTR (A,X)<>121 THEN IF ATTR
(A,X)<>253 THEN PRINT AT A,X; IN
K 1+4+AT; FLASH AT;"ab";AT A+1,X
;"cd": PRINT AT A,X-2;"  ";AT A+
1,X-2;"  "
4020 IF ATTR (A,X+2)=121 OR ATTR
(A,X+2)=253 THEN GO TO 3060
4050 GO TO 4005
5000 IF ATTR (A-4,B)=121 OR ATTR
(A-4,B)=253 OR A=2 THEN IF AT<>
253 THEN BEEP .2,30: PRINT AT A-
2,B;"dc";AT A-1,B;"ba": BEEP .1,
40: PRINT AT A-2,B;"  ";AT A-1,B
```

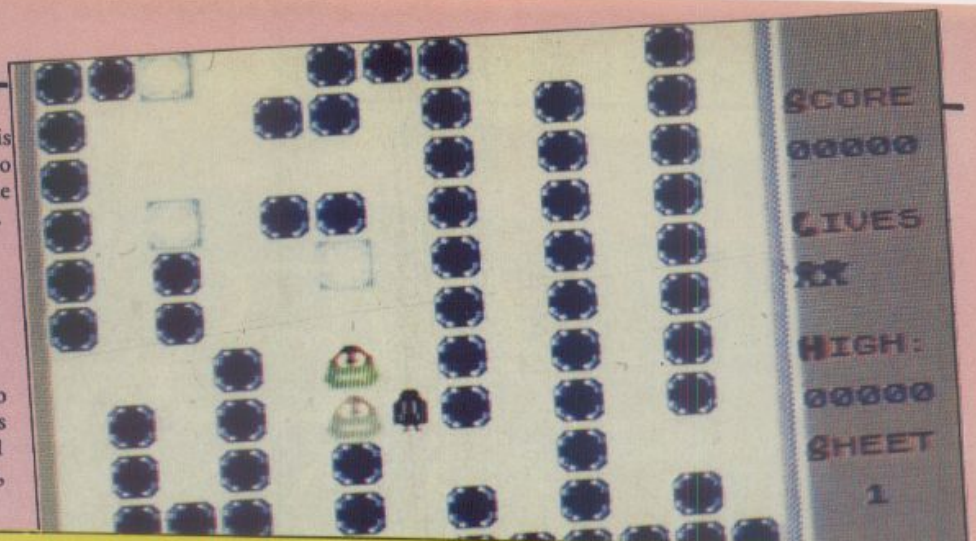
killed by being pushed.

There are six machine-code routines in this game. The first transfers data from ROM into high-memory. The next four handle the screen and the last is used for sound affects.

Poke 65418 with PITCH
65419 with SPAN
65421 with DURATION
65440 with 28 for up or 29 for down.

The sound routine is called by:
PRINT USR USR "G".

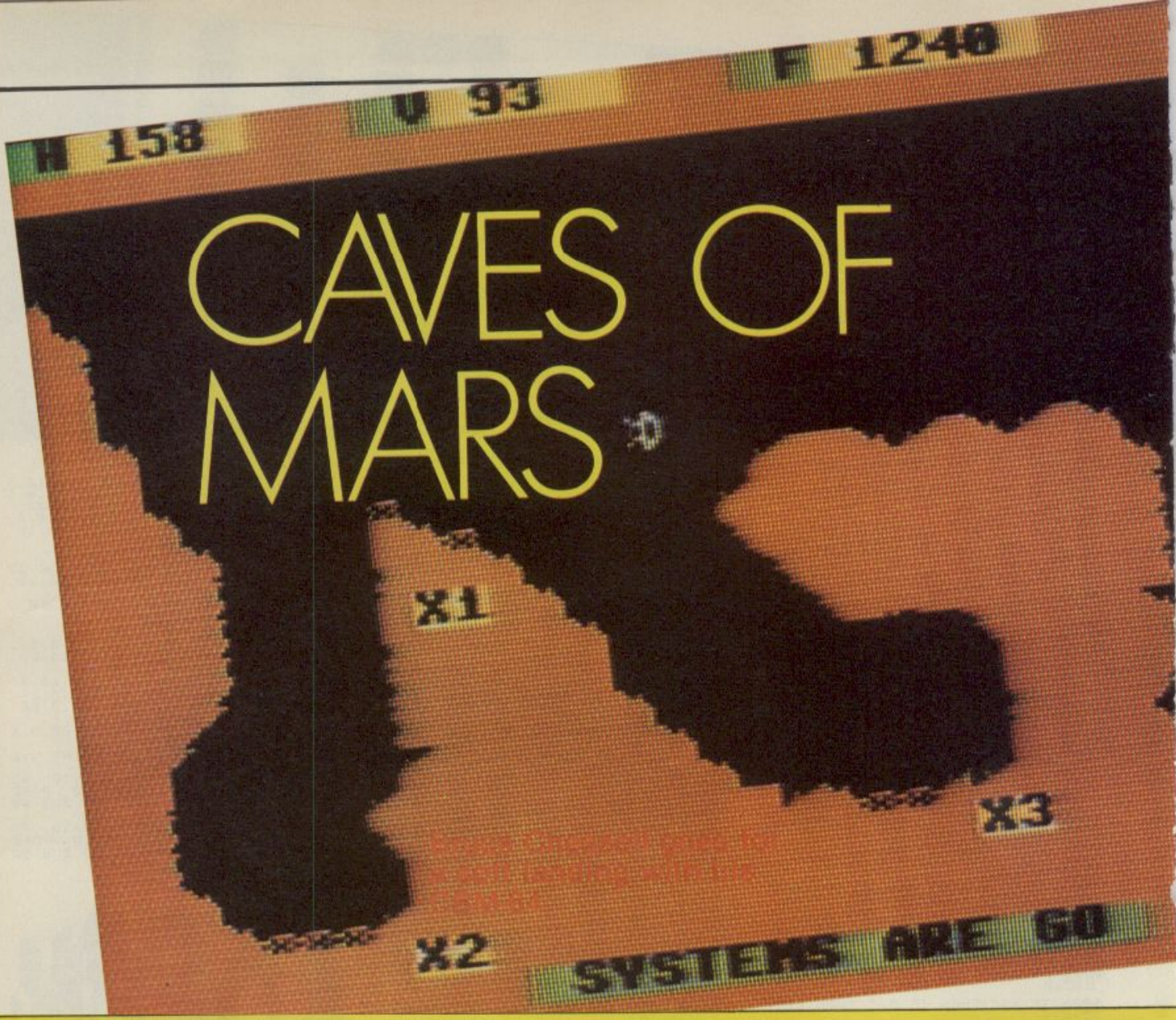
Pongo is available on cassette for those who rather not write it in from the listing. It is available from: Ultream Software, 1 Beaconstone, Beacon Road, Crowborough, East Sussex, TN6 1AZ.



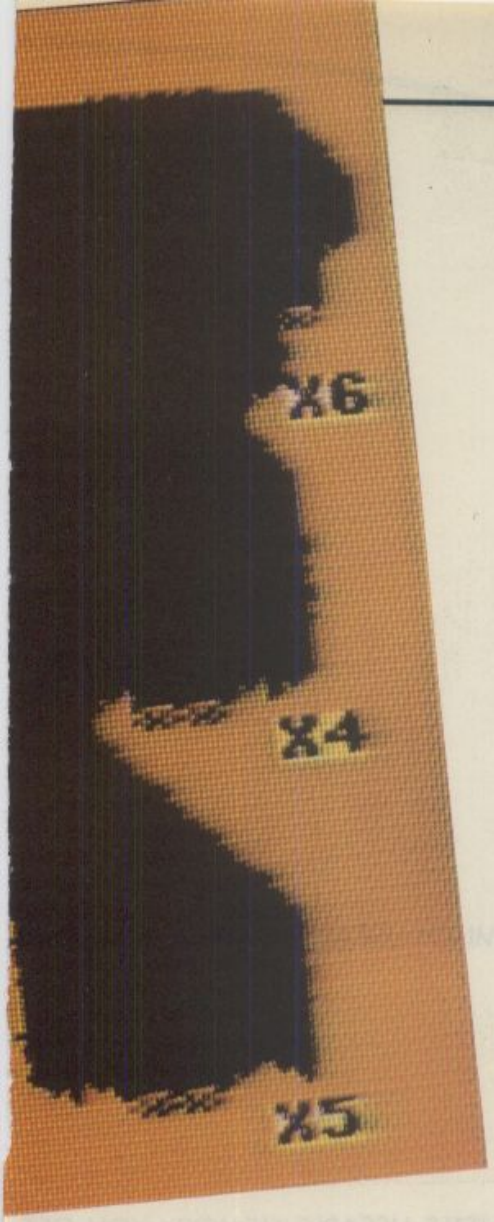

```
;"  ": LET SC=SC+1: RETURN
5004 LET X=A
5005 IF X=C THEN IF B=D THEN LET
 C=C-2
5006 IF X=E THEN IF B=F THEN LET
 E=E-2
5009 LET X=X-2
5010 LET AT=(ATTR (X+2,B)=253):
IF ATTR (X,B)<>121 THEN IF ATTR
(X,B)<>253 THEN IF X>=0 THEN PRI
NT AT X,B; INK 1+4*AT; FLASH AT;
"ab";AT X+1,B;"cd": PRINT AT X+2
,B;"  ";AT X+3,B;"  "
5020 IF X=0 OR ATTR (X-2,B)=253
OR ATTR (X-2,B)=121 THEN GO TO 5
060
5050 GO TO 5005
5060 IF X=C THEN IF B=D THEN LET
 KILLS=KILLS+1: PRINT AT C,D;("
  AND G=2)+("yz" AND G=3);AT C+
1,D;("yz" AND G=2)+("  " AND G=3
): BEEP .5,10: LET Z=USR USR "G"
: PRINT INK 1+4*AT; FLASH AT;AT
C,D;"ab";AT C+1,D;"cd": LET SC=S
C+50: GO SUB 9995
5070 IF X=E THEN IF B=F THEN LET
 KILLS=KILLS+1: PRINT AT E,F;("
  AND G=2)+("yz" AND G=3);AT E+
1,F;("yz" AND G=2)+("  " AND G=3
): BEEP .5,10: LET Z=USR USR "G"
: PRINT INK 1+4*AT; FLASH AT;AT
E,F;"ab";AT E+1,F;"cd": LET SC=S
C+50: GO SUB 9997
5080 IF AT THEN IF BON THEN LET
A1=X: LET B1=B: GO SUB 7500
5100 RETURN
6000 IF ATTR (A+4,B)=121 OR ATTR
 (A+4,B)=253 OR A=18 THEN IF AT
>253 THEN BEEP .2,30: PRINT AT A
+2,B;"dc";AT A+3,B;"ba": BEEP .1
,40: PRINT AT A+2,B;"  ";AT A+3;
B;"  ": LET SC=SC+1: RETURN
6004 LET X=A
6005 IF X=C THEN IF B=D THEN LET
 C=C+2
6006 IF X=E THEN IF B=F THEN LET
 E=E+2
6009 LET X=X+2
6010 LET AT=(ATTR (X-2,B)=253):
IF ATTR (X,B)<>121 THEN IF ATTR
(X,B)<>253 THEN PRINT AT X,B; IN
K 1+4+AT; FLASH AT;"ab";AT X+1,B
;"cd": PRINT AT X-1,B;"  ";AT X-
2,B;"  "
6015 IF X=20 OR ATTR (X+2,B)=121
 OR ATTR (X+2,B)=253 THEN GO TO
5060
6050 GO TO 6005
7000 CLS : PRINT AT 10,10;"OK YO
U WIN": BEEP 1,-40: BEEP .1,30:
PRINT USR 0
7100 FOR X=1 TO 2: PRINT AT C,D;
"\/";AT C+1,D;"/\";AT E,F;"\/";A
T E+1,F;"/\": BEEP .1,10: OVER 1
: NEXT X: OVER 0: CLS : PRINT AT
 10,10;"WELL DONE";TAB 10;"NEW S
HEET": LET SHEET=SHEET+1: LET B=
PEEK 23673
7110 FOR X=1 TO 15: BEEP .02,13:
 BEEP .02,39: NEXT X: PRINT AT 1
7,10;INT (B/12);" MINUTE"+("S" A
ND INT (B/12)<>1);TAB 10;B-(12
*(INT (B/12)));" SECONDS": LET B
=280-B: PRINT TAB 10;"BONUS=";B:
 LET SC=SC+B: BEEP .2,20: BEEP .
3,30: GO TO 16
7200 PRINT AT 10,7; FLASH 1;" GA
ME OVER ": POKE 65440,29: POKE 6
5421,100: POKE 65419,200: LET Z=
USR USR "G": POKE 65440,28: POKE
 65421,2: POKE 65419,100: PRINT
AT 10,7; FLASH 1; INK 2; PAPER 6
;"ANOTHER GO ?"
7210 LET Z=USR USR "G": LET A$=I
NKEY$: IF A$="Y" THEN : GO SUB 9
900: GO TO 15
7220 IF A$="N" THEN PRINT USR 0
7230 GO TO 7210
7500 REM  DIAMOND ALLIGNMENT
7520 LET U=ATTR (A1+2,B1)=253
7530 LET X=A1>0 AND ATTR (A1-2,B
1)=253
7540 LET Y=ATTR (A1,B1+2)=253
7550 LET Z=B1>0 AND ATTR (A1,B1-
2)=253
7560 IF X THEN IF (U OR (ATTR (A
1-4,B1)=253 AND A1>2)) THEN GO T
O 7700
7570 IF U THEN IF ATTR (A1+4,B1)
=253 THEN GO TO 7700
7580 IF Z THEN IF (Y OR (ATTR (A
1,B1-4)=253 AND B1>2)) THEN GO T
O 7700
7590 IF Y THEN IF ATTR (A1,B1+4)
=253 THEN GO TO 7700
7600 RETURN
7700 BEEP .5,40: BEEP .4,50: LET
 BON=10+(INT (RND*100)): LET LI1
=15: LET LI2=15
7710 LET Y=USR (USR "B"+4): FOR
Y=0 TO 127: BEEP .003,Y/2: POKE
22528,Y: LET L=USR USR "A": NEXT
 Y: LET L=USR USR "D"
7720 FOR Y=BON TO 0 STEP -10: PR
INT AT 10,9;"BONUS:";Y;" ": LET
 SC=SC+10: LET S$=STR$ SC: PRINT
 AT 5,32-LEN S$; BRIGHT 0;S$;AT
15,32-LEN S$;(S$ AND SC>HI): BEE
P .02,20
7725 NEXT Y
7730 LET L=USR USR "D": LET BON=
0: RETURN
8020 RESTORE 8000: FOR F=USR "A"
TO USR "K"+7
8030 READ A
8040 POKE F,A
8050 NEXT F
8060 RETURN
8100 DATA 33,0,88,17,1,88,1,0,3,
237,176,201
8110 DATA 17,80,195,33,0,64,1,0,
27,237,176,201
8120 DATA 33,80,195,17,0,64,1,0,
27,237,176,201
8130 DATA 33,0,61,17,89,252,1,0,
2,237,176,201
8140 DATA 243,17,200,100,38,10,5
8,72,92,31,31,31,14,254,238,15,2
37,121,67,18,254,37,32,244,28,21
,32,232,251,201
8150 DATA 0,0,60,66,189,161,161,
189,66,60
9000 DATA 102,231,231,255,255,23
1,231,102
9010 DATA 56,120,112,96,96,102,6
3,30,28,54,98,102,120,190,70,124
,56,85,170,124,56,40,68,198
9020 DATA 0,31,51,111,95,95,127,
127,0,248,204,246,250,250,254,25
4,127,127,95,95,111,51,31,0,254,
254,250,250,246,204,248,0
9030 DATA 0,0,3,7,15,25,49,51,0,
0,192,224,240,152,140,204,121,12
7,127,255,240,255,127,63,158,254
,254,255,15,255,254,252
9050 DATA 0,3,7,7,15,12,12,8,0,1
92,224,240,184,254,240,224,9,11,
11,7,4,4,8,14,224,224,224,192,13
6,80,32,0
9060 DATA 0,192,224,224,240,48,4
8,16,0,3,7,15,29,127,15,7,144,20
8,208,224,32,32,16,112,7,7,7,3,1
7,10,4,0
9070 DATA 0,3,7,7,15,29,29,29,0,
192,224,224,240,184,184,184,29,2
7,27,31,23,2,6,0,184,216,216,248
,232,64,96,0
9080 DATA 0,3,5,6,10,22,23,23,0,
192,160,96,80,232,232,232,23,23,
23,31,23,2,6,0,232,232,232,248,2
32,64,96,0
9090 DATA 15,127,249,243,255,224
,127,15,224,126,159,207,255,7,25
4,224
9100 DATA 60,126,126,126,126,219
,219,219,255,191,153,229,126,126
,126,60
9110 DATA 168,84,168,84,168,84,1
68,84
9120 DATA 168,84,42,21,21,42,84,
168
9200 DATA 13,0,18,0,0,4,4,8,12,4
,16,20,4,0,4,8,8,12,8,4,8,10,0,4
,12,8,20,12,0,20,18,0,4,20,8,14,
20,2,18,24
9210 DATA 12,12,2,4,6,8,6,16,6,2
0,8,20,10,14,14,4,18,8,18,18,20,
10,22,18,22
9215 DATA 2,22,2,2,2,2,12
9220 DATA 7,2,18,2,6,18,6,10,18,
10,2,18,14,2,10,18,14,18,18,2,14
,22
9230 DATA 16,8,0,18,8,18,12,18,1
6,18,20,18,22,8,4,2,6,2,8,2,10,2
,12,5,8,6,10,6,12,8,16,10,22
9235 DATA 10,4,6,4,8,12
9240 DATA 11,0,18,2,0,4,6,4,12,8
,16,18,8,0,4,10,4,20,12,0,4,14,8
,16,16,0,4,18,16,18,18,0,18,22
9250 DATA 13,12,4,18,4,8,6,12,6,
16,6,16,10,4,12,8,14,20,14,4,16,
8,18,12,18,16,20
9255 DATA 4,18,2,16,18,18
9260 DATA 9,12,20,0,2,12,2,12,16
,4,0,8,6,8,20,8,2,18,12,0,18,16,
0,18,20,0,18,24
9270 DATA 8,20,2,20,4,4,8,4,10,0
,8,16,14,0,18,16,22
9275 DATA 0,4,6,4,8,10
9280 DATA 10,0,20,2,0,20,6,0,6,1
0,18,20,10,0,20,14,0,6,18,18,20,
18,6,14,22,0,4,24,16,20,24
9290 DATA 18,10,0,0,4,20,4,10,8,
14,8,10,10,12,14,12,10,16,14,
16,10,18,10,20,14,20,2,22,18,22
9295 DATA 8,4,12,4,10,18
9500 FOR N=0 TO 21: PRINT AT N,2
6; INK 0;"  ": NEXT N
9600 FOR N=0 TO 21: PRINT AT N,2
6; INK 1;"  ": NEXT N
9610 IF D=24 THEN LET LI1=10: PO
KE 65419,65: POKE 65421,10: POKE
 65440,28: BEEP .1,20: GO SUB 99
00
9620 IF F=24 THEN LET LI2=10: PO
KE 65419,65: POKE 65421,10: POKE
 65440,29: BEEP .1,20: GO SUB 99
00
9630 GO TO 180
9700 LET A$="
```



```
9710 FOR N=31 TO 2 STEP -1
9720 FOR F=0 TO 12 STEP 3: BEEP
.01,-F: PRINT AT F,N-2;"ef"; INK
 4;A$((32*F)+N); AT F+1,N-2; INK
7;"gh"; INK 4;A$((32*F)+N+32);AT
 F+2,N;A$((32*F)+64+N): NEXT F
9730 NEXT N
9740 FOR F=12 TO 0 STEP -3: FOR
N=F TO 15+(F/3): PRINT AT N,0;"
";AT N+1,0;"ef";AT N+2,0;"gh";
BEEP .01,N: NEXT N: BEEP .1,-40:
 PRINT AT N,0;"  ";AT N+1,0;"yz"
: NEXT F
9750 FOR F=0 TO 19: BEEP .01,19-
F: PRINT INK 5;AT F-1,0;"  ";AT
F,0;"ab";AT F+1,0;"cd": NEXT F
9760 LET B$=" PRESS ANY KEY TO P
LAY ": FOR F=27 TO 2 STEP -1
: BEEP .01,F: BEEP .01,F+2: PRIN
T AT 20,F;"rm  ";AT 21,F;"po ";B$
( TO 28-F): NEXT F
9770 PRINT AT 0,1;A$: PRINT AT 1
7,8;"BY JONATHAN WARD";AT 18,8;"
& ANDREW NEVE";AT 19,13;"(1983)":
 FOR F=1 TO 10: PRINT OVER 1; IN
K 7;AT 0,1 A$: NEXT F
9780 PAUSE 1: PAUSE 0
9790 RETURN
9900 LET Z=USR USR "G": POKE 554
19,100: POKE 65421,10: POKE 5544
0,28: RETURN
9995 LET B1=10: LET C=2*INT (RN
D*11): LET D=2*INT (RND*13): LET
 C1=C: LET D1=D: LET LI1=0: IF A
TTR (C,D)=253 OR (C=A AND D=B) T
HEN GO TO 9995
9996 RETURN
9997 LET B2=10: LET E=2*INT (RN
D*11): LET F=2*INT (RND*13): LET
 E1=E: LET F1=F: LET LI2=0: IF A
TTR (E,F)=253 OR (E=A AND F=B) T
HEN GO TO 9997
9998 RETURN
```




```
100 PRINT"■":FORD=1TO1000:NEXT:PRINT
110 PRINT"■■■■■  COMMODORE 64   CAVES OF MARS  ■"
120 PRINT"■■■■■■■■RAPHICS FORMING UNDER PROGRAM          CONTROL":PRINT
130 PRINT"■■■■PLEASE WAIT"
200 REM CHARACTER SET TO RAM - LOCATION 12288
210 PRINTCHR$(142)
220 POKE52,48:POKE56,48:CLR
230 POKE56334,PEEK(56334)AND254
240 POKE1,PEEK(1)AND251
250 FORI=0TO519:POKE I+12288,PEEK(I+53248):NEXT
260 FORI=1024TO1543:POKEI+12288,PEEK(I+53248):NEXT
270 POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)OR1
280 POKE53272,(PEEK(53272)AND240)OR12
300 REM GENERATE 26 NEW CHARACTERS - LOCATIONS 12504 AND 12760
310 FORI=1TO168:READX:POKE12503+I,X:NEXT
320 FORI=1TO40:READX:POKE12759+I,X:NEXT
330 DATA255,254,252,248,240,224,192,128,255,127,63,31,15,7,3,1
340 DATA0,1,3,7,15,31,63,127,0,128,192,224,240,248,252,254
350 DATA102,24,204,19,48,195,24,198
360 DATA0,0,0,0,0,0,0,0,156,222,123,91,91,123,222,156
370 DATA60,126,195,255,255,96,126,195,57,123,222,218,218,222,123,57
380 DATA1,3,6,12,12,6,3,1,195,102,48,24,0,0,0,0
390 DATA128,192,96,48,48,96,192,128,3,12,48,192,192,48,12,3
400 DATA195,195,102,102,60,60,24,24,192,48,12,3,3,12,48,192
410 DATA255,255,255,255,255,255,255,255,0,0,0,0,126,219,102,219
420 DATA0,3,55,63,127,255,255,255,195,24,3,124,60,6,224,27
430 DATA0,192,236,252,254,255,255,255,127,31,15,31,7,3,3,0
440 DATA255,255,255,255,255,255,255,216,255,255,127,127,127,255,255,127
450 DATA254,248,240,252,240,224,192,0,252,255,254,254,254,255,255,254
460 DATA51,204,48,230,3,120,6,108
470 DIMSC$(10),SC(10):FORX=1TO10:SC$(X)="::: ::: ::: :::":SC(X)=0:NEXTX
500 REM TITLE PAGE
510 PRINT"■":POKE53280,0:POKE53281,0:LO=0:MO=0:FL=0
520 PRINT:PRINT:PRINT"■          ■  ■  ■  ■■  ■■ ■■  ■ ■■  ■■"
530 PRINT"          ■■    ■■■  ■■  ■■■■■    ■■"
540 PRINT"          ■■    ■■  ■■■■■  ■■■■  ■■ ■■"
550 PRINT"          ■■    ■   ■■■■■  ■■    ■■"
560 PRINT"          ■■  ■■■■  ■■  ■■  ■■ ■■  ■■"
570 PRINT:PRINT:PRINT"     ■■  ■■  ■■   ■■  ■■  ■■  ■■  ■■  ■■"
580 PRINT"     ■■  ■■■■■      ■■■■■■■■■■■■■■  ■■  ■■"
590 PRINT"     ■■  ■■■■■  ■■  ■■■■■■■■■■■■■■  ■■  ■■"
600 PRINT"     ■■  ■■■■■      ■■■■■■■■■■■■■■  ■■  ■■"
610 PRINT"     ■■  ■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■"
620 PRINT:PRINT:PRINT:PRINT:PRINT"■          BY BRUCE CHESSELL 1983"
630 FORD=1TO5000:NEXT
700 REM INSTRUCTIONS
710 PRINT"■■■■■■ MISSION INSTRUCTIONS ":PRINT:PRINT
720 PRINT"■  YOU ARE IN CONTROL OF A MISSION TO":PRINT
730 PRINT"  LAND SUPPLIES INSIDE THE CAVES OF MARS":PRINT
740 PRINT"  LIMITED FUEL REPLENISHMENT IS":PRINT
750 PRINT"  AVAILABLE IF YOUR MODULE LANDS SAFELY":PRINT:PRINT
760 PRINT"  ■ MODULE CONTROLS ":PRINT
770 PRINT"        DIRECTION    THRUST     LANDING"
780 PRINT"                                AREAS"
790 PRINT"  ■KEYS  X  C  V     F5 F7":PRINT
800 PRINT"        ■■  ";CHR$(34);"  #     X  <       .++," :PRINT
810 PRINT"        ■■ HIT ANY KEY TO CONTINUE "
820 K=PEEK(197):IFK=64THENLO=LO+1:IFLO=700THENGOTO 4010
830 IFK<>64THEN850
840 GOTO820
850 PRINT"■■■■■ SCORING "
860 PRINT:PRINT"■  POINTS AND EXTRA FUEL GIVEN FOR EACH    SUCCESSFUL LANDING"
870 PRINT:PRINT"■      VERTICAL     POINTS     EXTRA"
880 PRINT"          SPEED        GIVEN      FUEL"
890 PRINT:PRINT"■      UNDER 5        300        100"
900 PRINT"          6 TO 9         200         50"
910 PRINT"         10 TO 20        100         20"
920 PRINT"         OVER  20     MODULE DESTROYED"
930 PRINT:PRINT"       POINTS AND FUEL ARE MULTIPLIED"
940 PRINT"       BY X FACTORS FOR LANDING AREAS"
950 PRINT:PRINT"■■■■ DISPLAYED DURING FLIGHTS "
960 PRINT:PRINT"■     H : HORIZONTAL SPEED     F : FUEL"
970 PRINT"                                  LEFT"
980 PRINT"     V : VERTICAL SPEED"
990 PRINT:PRINT"          ■■ HIT ANY KEY TO START "
1000 REM START GAME
1010 K=PEEK(197):IFK=64THENMO=MO+1:IFMO=2000THENGOTO4010
1020 IFK<>64THEN1110
1030 GOTO1010
1100 REM SET MAIN VARIABLES
1110 F=2000:SC=0
1120 VX=36:VY=0:X=0:Y=3:SP=1104:J=SP:E=3:M=34:V=40:H=3:S=2:T=32:O=1.6
1200 REM SET SOUND REGISTERS
1210 VO=54296:W=54276:AD=54277:SR=54278:HF=54273:LF=54272
1220 GOSUB3010
1300 REM MODULE MOVEMENT LOOP - TO 1590
1310 K=PEEK(197):IFK=64THENM=0:B=0:D=32:POKEW,0:GOTO1460
1320 IFF<1THEN1420
1330 IFK=23THENM=33:E=1:V=-1:GOTO1400
1340 IFK=31THENM=35:E=2:V=1:GOTO1400
1350 IFK=20THENM=34:E=3:V=40:GOTO1400
1360 IFK=3THENS=2:H=3:GOTO1400
1370 IFK=6THENS=4:H=6:GOTO1410
1380 A=0:B=0:D=32:POKEW,0:GOTO1460
1390 REM JET SOUND
1400 IFS=2THENPOKEVO,7:POKEW,129:POKESR,240:POKEHF,212:POKELF,230
1410 IFS=4THENPOKEVO,14:POKEW,129:POKESR,240:POKEHF,26:POKELF,156
1420 IFE=1THENA=5:B=0
1430 IFE=2THENA=-5:B=0
1440 IFE=3THENA=0:B=-5
1450 D=M+H
1460 IFF>0THEN1490
1470 A=0:B=0:D=32:POKEW,0
1480 PRINT"■■■■■■■■■■■■■■■■■■■
```



MAKE AS MANY landings as possible inside the caves of Mars to provide the exploration parties with supplies. You have limited fuel so use it sparingly. Each successful landing gains points and extra fuel but select your landing areas carefully according to pilot skill and the amount of fuel you have left. The more difficult the landing area, the more points and fuel gained.

Remember that gravity alone will cause your downward speed to increase, which can only be reduced by expending precious fuel. Sideways speed will remain constant unless you alter this by using your thrusters. Module controls are:

Direction of Thrust

Key X — left
C — downward
V — right

Jet power

Key F5 — minimum
F7 — maximum

The softer the landing the more points scored and the more fuel taken on board, so keep your speed down at impact. Fine control is available using minimum jet power. Watch your speed dials closely and try to keep your touch down speed under 5. Anything over 20 at impact and your module is destroyed — but do not give up! As long as fuel remains you will be provided with another machine to fly.

The program contains full instructions and will auto start a demonstration routine if left to its own devices. However, you can take control at any time during the demonstration and the game will start after you land or crash!

This is an addictive game and as there is a scoreboard which records the names and points achieved by the 10 best players, it offers lots of opportunity to compete with your friends.

Although there are 26 special graphic characters created and used, the program is written entirely in Basic, so you might learn quite a lot from studying how it works. There are plenty of Rem statements to help you understand the logic.

The main sequences are as shown below:

Lines

200-280	move two sections of ROM character set to RAM to enable the creation of new characters.
300-460	generates 26 new graphic characters.
470	sets up array of 10 highest scores.
500-620	provides title page.
700-990	provides game instructions.
1100-1210	sets main variables and sound registers.
1300-1590	module movement loop.
1600-1690	module landed or crashed assessment.
1700-1780	crashed module explosion and sound.
1800-1920	points and extra fuel assessment.
2000-2130	scoring routine.
2200-2320	display score table and start new game.
2400-2470	end game sequence to reset computer to normal graphics.
3000-3260	sub routine to create screen display.
4000-4040	sub routine to auto start game.

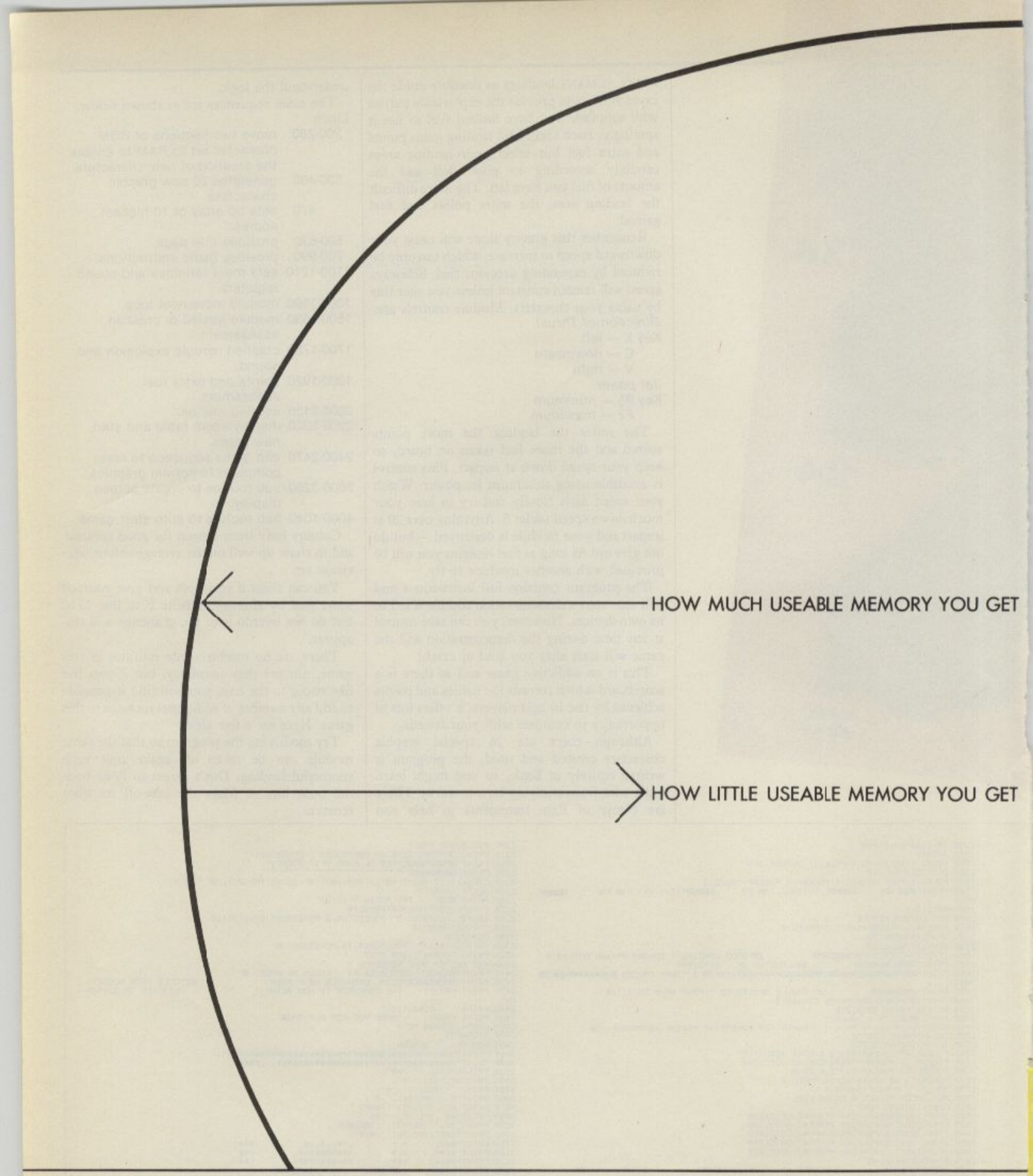
Colours have been chosen for good contrast and to show up well on the average colour television set.

You can cheat if you wish and give yourself more fuel by altering variable F in line 1110 but do not overdo it or the challenge will disappear.

There are no machine-code routines in this game, nor are they necessary, but if you feel like rising to the bait, you will find it possible to add any number of additional routines to this game. Here are a few ideas.

Try modifying the program so that the same module can be taken off again after each successful landing. Don't forget to Poke back the little bits of Mars the take-off jet blast removes.

```
1530 SP=1104+DX+DY*40
1540 J=SP+V
1550 POKEZ,T:POKEN,32:T=PEEK(J):U=PEEK(SP)
1560 IFU<>32THEN1610
1570 POKEJ,D:POKEJ+54272,8:POKESP,M:POKESP+54272,3
1580 PRINT"■■■ H■      ■■■■■";INT(VX),"■■ V■      ■■■■■";INT(VV),"■■ F■      ■■■■■
■";F
1590 GOTO1310
1600 REM LANDED MODULE
1610 POKESP,M:POKESP+54272,3:POKEW,0
1620 IFU<>43THEN1660
1630 IFVV>20THEN1660
1640 IFVV<5THENPRINT"■■■■■■■■■■          ■■ GOOD LANDING ":PO=300:PF=100:GOTO1810
1650 PRINT"■■■■■■■■■■■■          ■■ LANDING OK ":GOTO1680
1660 PRINT"■■■■■■■■■■■■
```



■ If you saw a computer labelled 32K, 48K or 64K you'd assume it had a large memory. Right?

Wrong. These figures bear little relationship to the actual amount of useable memory left once the computer is performing functions like text, colour, sound and even more importantly, high resolution graphics.

The Commodore, for instance, claims an "elephantine" 64K memory, yet uses up 26K producing high resolution graphics.

Under the same conditions, the Dragon 32K leaves 24K of useable memory, the Lynx 48K just 14K.

And the BBC Micro and Acorn Electron leave the operator a miserly 9K to play with.

However, there is one computer specifically designed to cope with these normal working functions as a matter of course.

The new Oric Atmos 48K.

Why, even when you add peripherals like the new micro disc drive unit and colour printer (see technical details overleaf), its useable memory is never less than a healthy 37K.

Which not only caters for all the standard applications you'd expect from any home computer, but also for advanced

WITH THE NEW ORIC ATMOS.

WITH OTHER HOME COMPUTERS.

programming and very sophisticated games.

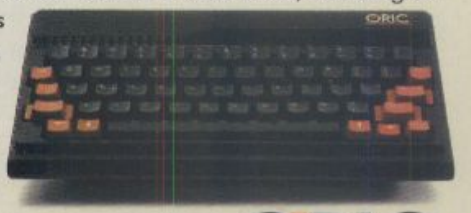
Talking of games, the new Oric Atmos starts off with a major advantage over most new computers, since it takes most of the software already written for the Oric-1.

And like the Oric-1, it has a powerful loudspeaker and amplifier inside its case.

The same unit, in fact, that prompted "Which Micro" (November) to quote... "At full volume this machine can compete with most arcade games. Its sound facilities have more in common with the £400 Beeb, than the rather pathetic beep of the Spectrum..."

Yet the Oric Atmos 48K costs a modest £170, including all the leads and adaptors you need to get it going.

But then what else would you expect from a British Company recognised for offering so much for so little?



The new Oric Atmos 48K. ORIC

Now we've whetted your appetite, here's something to get your teeth into.

Printer Technical Specifications

Printer/ Plotting system	Ball Point Pen, 4 colour
Plotting speed: (horizontal) (vertical)	52 mm/sec (2.05ips) 73 mm/sec (3.08ips)
Printer Speed	12 characters per second
Resolution	0.2 mm/step (0.00787 inch)
Effective plotting range	96 mm (3.804 inch) x axis, divided into 480 steps. (No limit in y direction)
Characters per line	80 or 40 text mode (determined by software in graphics mode)
Characters per line	INT (480/n+1) *6) for 0=n=15
Accuracy (repetition) (movement) (distance)	0.2 mm max 0.3 mm max 0.5% max (x–axis) 1% (y–axis)
Pen life	250 metres (825 feet)
Parallel interface	8–bit parallel Uses STROBE and ACKNOWLEDGE
Temperature range storage	18.3 to 35°C (65 to 96°F) –40 to 71°C (.40 to 160°F)
Humidity range	10% to 80% relative non-condensing
Power supply	Switching power supply input 100–120 VAC 200–240 VAC
Dimensions	10¾" wide 6⅞" deep 2½" high

Atmos Technical Specifications

CPU	6502 A
Memory	Choice of 16K or 48K RAM
Memory (48K Model)	Minimum 48K RAM, max 64: 16K ROM external control signals allow use of full 64K RAM or maybe used externally to increase ROM/RAM
Language	Extended Microsoft basic
Keyboard	Typewriter style and pitch, 57 keys, standard computer layout, additional cursor control keys, autorepeat facility, tactile and acoustic feedback
Display	Output for B&W or colour TV, RGB output for colour monitor.
Text format	40 line x 28 rows
Character set	Similar to Teletext format, standard ASCII double height, flashing, 80 user definable characters
Graphics	240 x 200, 8 colours
Graphic Facilities	Points, lines, circles
Sound	Internal loudspeaker and amplifier. 3-Channel sound synthesiser envelope control, amplitude control 8 octaves, noise channel
Storage	Most cassette recorders via DIN socket 300 or 2400 BAUD. Disc Drive.
Interface	Centronics, expansion port, Hi-fi, RGB Monitor, UHF TV, cassette recorder
Other	Warm reset to regain control without clearing program or data

Micro Disc Technical Specifications

Formatted Capacity	160K bytes per side (double density as standard)
No. of Tracks	40 (80 available as option at a future date)
No. of Sectors	16
Bytes per Sector	256
Transfer Rate	250K Bits/Sec

Supports up to 599 files per side, four drives single or double sided, 40 or 80 track. User definable configuration allows mixing of drive types including 5 ¼" (five and a quarter inch)
Extensive wild card facilities
Copy allows merging of basic and machine code files

Utilities

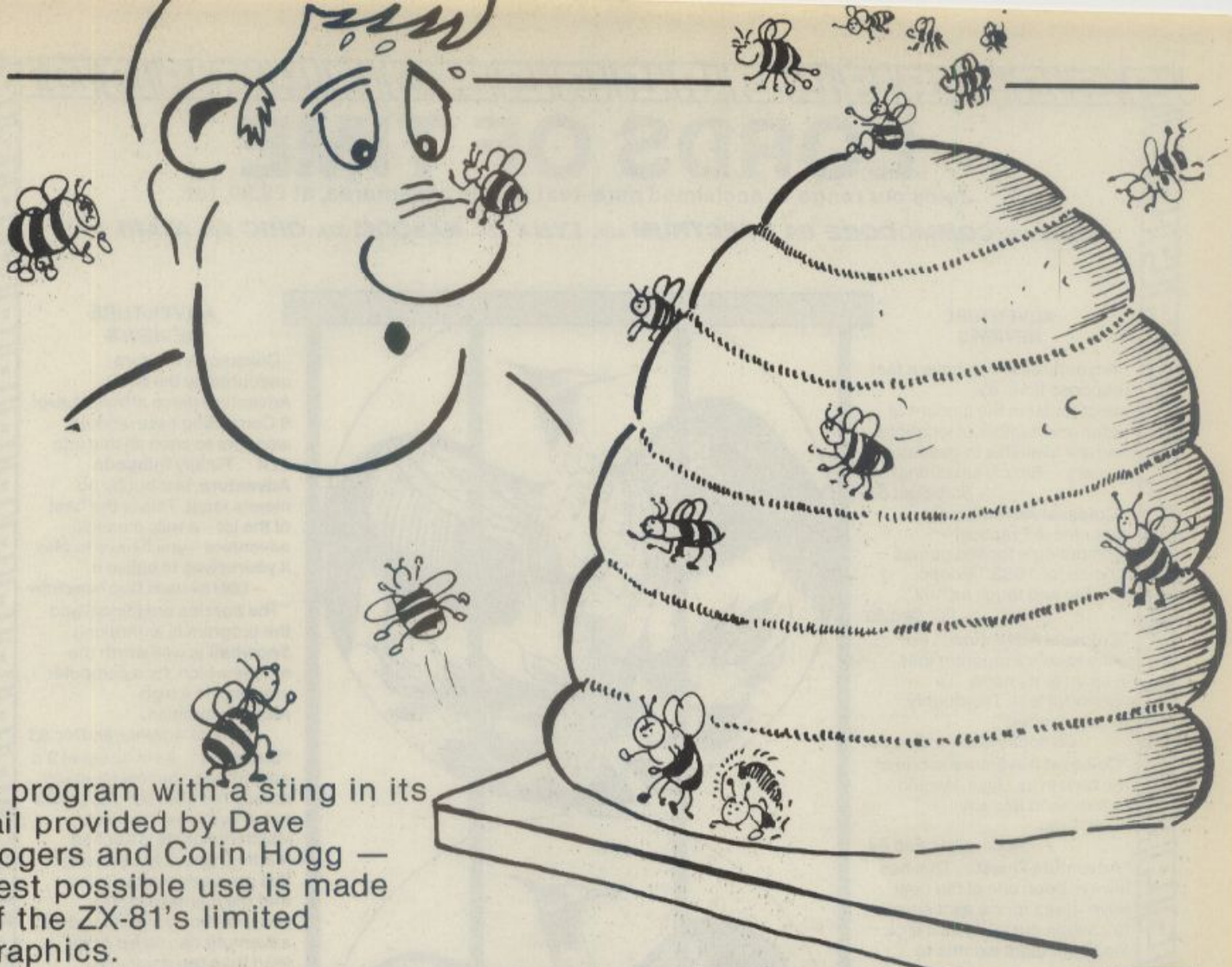
The Utilities are as follows:

1. Backup	Copy a whole disc
2. Copy	Copy a file to another
3. Del	Delete a file allowing wildcards
4. Dir	Display directory listing
5. Drv	Set the default drive number
6. Format	Format and initialise a disc
7. Load	Load a file (code data or basic)
8. Protect	Change protect status of file
9. Recall	Recall a basic array from a file
10. Ren	Rename a file
11. Save	Save a file (code, data or basic)
12. Store	Store a basic array as a data file
13. Sys	Change system configuration

Prices and data correct at time of going to press.
Specifications on the above models may change without notice.

Available at Allders, Currys, Dixons, Greens, Harrods, Laskys, Rumbelows, Spectrum and Zappo Computer Centres.





A program with a sting in its tail provided by Dave Rogers and Colin Hogg — best possible use is made of the ZX-81's limited graphics.

HIGH-RISE HIVE

FOR ANY ZX-81 owners who are feeling forgotten and unsupported, Hi-Rise-Hive provides a professional quality, fast, and addictive game, featuring progressive difficulty from easy to almost impossible and up to 20 independently roaming bees.

The player is also cast as a bee, but one that is trying to monopolise the honey by taking it from the cells of a multi-storey hive. The other bees of course, being the socially responsible creatures that they are, are busy, constantly refilling the empty cells, but are understandably peeved about having to do this and so will 'sting' you given the opportunity.

Behaviour is realistic

The movement alrorithm has been designed to make their behaviour as realistic as possible, for example if you are near one and sit still it may just go away, on the other hand one may decide to chase you quite a distance along a gallery, forcing you to jump off. Note that you can always jump off or slide down the outside of the hive but the only way *up* is via the internal ladders.

In fairness to Nature we wouldn't want to induce Apiaphobia in anybody, especially any younger readers, so don't forget that bees will not normally bother you if you don't bother them. If you are unlucky enough to encounter the subspecies 'Adansonii' this may not apply but fortunately this aggressive strain is not native to Britain.

The hive is almost five screens in size, one third of which is underground labyrinth. It is all held in *one* rather huge string, so you will only ever see a certain section at a time starting at the top, but those with ZX printers can cheat and see the whole lot simply by typing

LPRINT H$

If you can clear out every cell on a given screen then you proceed to the next section, the hive becoming wider and more and more bees appearing at each successive level. By the time you reach the underground section, the maximum of 20 bees will have been reached and the screen will be literally a hive of activity.

If you should manage to clear the final screen you then start at the top of the mega-hive, and we really do not envisage any player being able to clear more than a few screens of this — in the rare event of completing the mega-hive you will go on to an even wider mega-mega-hive and so on.

For variety, the layout of honey cells is random each game you play, but it is designed to tend towards more interesting structures. For example, there will often be clusters of cells where bees can enter, and by depositing 'honey' behind them, trap themselves in. These situations are of course somewhat dodgy to try and clear out since the entombed bee, although it *looks* dormant, is in fact bursting to get out! You may *have* to let it out sooner or later to clear the screen.

Crash can occur

Essential addresses in this program are:

Spare byte 16508 — This is used to store the character of whichever square the player next intends to move onto. It is used by *both* the Basic and the machine code, for replacing characters when the man moves (line 30) or is hit by a bee (hex 410F).

Spare byte 16417 — Holds the number of active bees, from zero up to 20. It is Poked by line 510 to vary the number of bees flying on different screens. Beware: a crash can occur if it is Poked much above 20.

USR 16514 — Sets up bees in their start positions at top of the screen.

USR 16546 — Moves each active bee on space, does 'screen cleared' scan and checks if player has been hit. Normally returns to Basic

(continued on page 105)

LORDS OF TIME

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

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

ADVENTURE REVIEWS

"Adventures which have a fast response time, are spectacular in the amount of detail and number of locations, and are available to cassette owners . . Simply smashing!"
– Soft, Sept 83

"**Colossal Adventure** is included in Practical Computing's top ten games choice for 1983: "Poetic, moving and tough as hell."
– PC, Dec 83

"**Colossal Adventure** . . For once here's a program that lives up to its name . . a masterful feat. Thoroughly recommended"
– Computer Choice, Dec 83

"**Colossal Adventure** is one of the best in its class. I would recommend it to any adventurer."
– Acorn User, Feb 84

"**Adventure Quest** . . This has always been one of the best adventures for me as it seems to contain the lot. In all it took me about eight months to solve."
– PCW, 18th Jan 84

"To sum up, **Adventure Quest** is a wonderful program, fast, exciting and challenging. If you like adventures then this one is for you" *– NILUG issue 1.3*

"Colossal Adventure is simply superb . . For those who want to move onto another adventure of similar high quality, **Dungeon Adventure** is recommended. With more than 200 locations, 700 messages and 100 objects it will tease and delight!"
– Educational Computing, Nov 83



ADVENTURE REVIEWS

"Colossal Adventure . . undoubtedly the best Adventure game around. Level 9 Computing have worked wonders to cram all this into 32K . . Finally **Dungeon Adventure**, last but by no means least. This is the best of the lot – a truly massive adventure – you'll have to play it yourselves to belive it."
– CBM 64 Users Club Newsletter

"The puzzles are logical and the program is enthralling. **Snowball** is well worth the money which, for a computer program, is a high recommendation."
– Micro Adventurer, Dec 83

"**Snowball** . . As in all Level 9's adventures, the real pleasure comes not from scoring points but in exploring the world in which the game is set and learning about its denziens . . this program goes to prove that the mental pictures conjured up by a good textual adventure can be far more vivid than the graphics available on home computers."
– Which Micro?, Feb 84

"**Lords of Time.** This program, writen by newcomer Sue Gazzard, joins my favourite series and is an extremely good addition to Level 9's consistently good catalogue . . As we have come to expect from Level 9, the program is executed with wonderful style – none of those boring "You can't do that" messages! Highly recommended."
– PCW, 1st Feb 84

MIDDLE EARTH ADVENTURES

1: COLOSSAL ADVENTURE
A complete, full size version of the classic mainframe game "Adventure" with 70 bonus locations added.

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

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

THE FIRST SILICON DREAM ADVENTURE

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

THE LORDS OF TIME SAGA

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

Price: £9.90 each (inclusive)

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

LEVEL 9 COMPUTING

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

(continued from page 103)

with line number 10, but returns with line number 600 if the player has been hit, or with 300 if the screen has been cleared. The Basic then 'goes to' one of these lines.

USR 16749 — This routine is equivalent in Basic to:

```
Let score = score +2
Print at 23, 15; score
Goto 50
```

It is however, much faster *and* it formats the printing with leading zeros to allow a rapid count-up visual effect. The score is held *only* on the screen, not in a variable, and screen positions (23,15) to (23,20) must start off as six zeros.

Listing includes hex loader

The main listing *includes* the hex loader, so type in all the Basic first, *not* forgetting the first four Rem lines as detailed below. Then Run 9000 and enter the Hex data one line at a time, including the check figures but not the spaces.

Line 1 must be typed in as Rem followed by *exactly 103 characters,* any will do. The line number of this is then edited to 2, 3 and 4 to produce four identical lines, making available a total of 432 bytes for the machine code. You only actually have to type in 280 of these via the hexloader, the remainder are left for use as 'stores' where the machine code routine will eventually hold information on individual 'bees'.

The self-checking hexloader given is as near foolproof as you can get, it simply will not let you enter wrong data or lines in the wrong order. The check figures consist of the sum of each line of hexdata plus 20 times the line number. It is statistically highly improbable that exactly equal-but-opposite errors would occur, cancel out, and admit incorrect data. When finished, the loader will remind you to tape a back-up copy of the program, in case it crashes when Run.

Once you are satisfied that the program is working properly the hexloader lines can be deleted and some final copies taped. Remember that the ZX-81 Saves its variables along with the program and H$ is rather a huge string to unnecessarily save on tape! So always use Goto 9990, as this includes a 'clear' before autosaving, reducing save/load time by over two minutes.



Importance of graphics

It is most important to realise the importance of the graphics characters used, particularly the greys. The grey on key A is Outside Grey in which bees are triggered to move diagonally for four moves — or until they hit something — then change direction, giving an erratic bee-in-flight motion. The player however will *fall* through outside grey until another object is hit. The grey on key H is Inside Grey and in this the bees are triggered to move horizontally and vertically so as to wander along the passageways. The player can move freely through inside grey.

(continued on next page)

Main variables

S	Screen position of player.
IP	Intended position (players next move).
DK	Deck level of hive (0 to 60).
MC	Machine code subroutine calls.
STGS	Strings (0 to 30).
H$	Hive string.
E$	Empty string — actually contains spaces and minuses.
SDF	Start of display file.

Hive construction variables.

A$	Assembly string in which lines are built up before being added to hive string.
U$	Utility string. (general purpose).
TY	Type of line to be added e.g., honey cells, empty cells, passageway.
HW	Half-width (no, not half-wit!), determines slope to sides of hive. Increases with T anc N so hive gets wider on successive levels.
K	Ladder positions.
G$	Used in construction of underground section.
T$	
B$	

Main listing.

```
    7 IF PEEK 16544<>238 THEN RUN
 9000
    8 RUN 9995
    9 REM -----MAIN LOOP--------->
   10 LET IP=S-(INKEY$>"U")+(INKE
Y$="C")+33*((INKEY$="N")-(INKEY$
="J"))
   20 IF PEEK IP<134 THEN GOTO
(70)+(30 AND PEEK IP=23)+(130 AN
D PEEK IP=8)
   30 POKE S,PEEK 16508
   40 POKE 16508,PEEK IP
   50 POKE IP,61
   60 LET S=IP
   70 GOTO USR 16546
  100 REM ----PICK-UP-HONEY----->
  110 POKE S,PEEK 16508
  120 POKE IP,189
  130 POKE 16508,137+(11 AND RND<
0.4)
  140 GOTO USR 16749
  200 REM -----FALL-OFF-LOOP---->
  210 POKE S,PEEK 16508
  220 LET MC=USR 16546
  230 POKE 16508,PEEK IP
  240 POKE IP,59
  250 LET S=IP
  260 LET IP=IP+33
  270 IF PEEK IP<10 THEN GOTO 210
  280 GOTO 20
  300 REM ----CLEARED-SCREEN---->
  310 LET U$="CLEARED,BONUS="+STR
$ (DK*4)+" PRESS ""P"" WHEN REA
DY FOR NEXT DECK >>>>>>>"
  320 FOR N=1 TO 64 STEP 3
  330 PRINT AT 7,0;(U$( TO N)+E$+
E$)( TO 64)
  340 IF INKEY$<>"P" THEN NEXT N
  350 IF N>61 THEN GOTO 300
  360 FOR B=1 TO DK+DK
  370 LET MC=USR 16749
  380 NEXT B
  400 REM -----NEXT-DECK--------->
  410 IF DK>60 THEN GOSUB 4000
  420 FOR N=DK TO DK+7+RND*4
  430 PRINT AT 0,0;H$( N*32+1 TO
)( TO 704)
  440 NEXT N
  450 LET DK=N-1
  460 PRINT AT 22,0;"[illegible]
[illegible]";TAB 5;("0"
 AND DK<10);DK
  470 FOR T=SDF+2 TO SDF+31
  480 IF PEEK T>8 THEN POKE T,173
  490 POKE SDF+743,61+RND
  500 NEXT T
  510 POKE 16417,4+DK/2+(16-DK/2
AND DK>32)
  520 LET MC=USR 16514
  530 LET S=SDF+743
  540 POKE 16508,152
  550 GOTO 10
  600 REM -----MAN-HIT/END------>
  610 FOR N=1 TO 12
  620 POKE S,CODE ".*X*.X*.X*.▚"(
N)
  630 PRINT AT 23,22+ABS (N-6.5)
;"[illegible]STRINGS"(N)
  640 NEXT N
  650 LET STGS=STGS+1
  660 PRINT AT 23,31-(STGS>9);STG
S
  670 IF STGS<30 THEN GOTO 630
  680 PRINT AT 1,0;E$+E$+(E$ AND
RND>.7);AT 1,7;"**---GAMEOVER---
**";AT 3,3;"PRESS ""P"" TO PLAY
AGAIN **>>"
  690 IF INKEY$<>"P" THEN GOTO
      680
  700 REM --------SET-UP--------->
  710 FAST
  720 LET S=0
  730 LET IP=0
  740 LET U$=""
  750 RAND
  760 LET H$=CHR$ 8
  770 FOR N=1 TO 8
  780 LET H$=H$+H$
  790 NEXT N
  800 FOR T=0 TO 3
  810 FOR N=2+(5 AND T>0) TO 21 S
```

(listing continued on next page)

(continued from previous page)

Please double-check the following lines:

870 Inside grey (key H)
940 Outside grey (key A)
950 Outside grey (key A)
9999 Outside grey (key A)
630 inverse word 'strings' (backwards!)
830 various combinations of *graphic shift G* and inverse spaces; "is, 2gg, 2is, gg, 3is, 4gg, 2is, 2gg, 3is, 3gg, 2is, gg, 2is"
890 inverse H's
950 'Outside' grey and inverse H
960 inverse H, three inverse spaces, graphic Shift V, three inverse spaces, graphic Shift V, three inverse spaces, graphic H.
980 graphic H's
992 six graphic Shift V's. Second string contains graphic H's and g. Shift V's.
1040 g. Shift H, three g. Shift F's, (4 g. Shift G, 4 g. Shift F) x 3, 3 g. Shift G, g. Shift H.
460 g. Shift V's.

Line 9999 *must* contain 32 letters, then 64 graphic shift A's.

Check figure is sum of hex data plus 20 × line number.

```
        ┌──────HEX-DUMP──────┐ CHECK
F 2A 0C 40 11 E5 FF 19 EB 899
F 21 97 41 06 14 36 00 23 404
F 36 01 23 36 08 23 23 23 317
F 73 23 72 23 13 10 EE C9 853
F 2A 0C 40 01 D6 02 3E 17 520
F ED B1 01 2C 01 C8 FD 7F 1151
F 21 21 97 41 11 3C 40 01 564
F 07 00 F5 C5 E5 D5 ED B0 1464
F CD DB 40 E1 D1 C1 F1 ED 1773

F B0 EB 3D 20 E7 01 0A 00 946
F FD CB 43 16 D0 01 56 02 1064
F C9 FD 35 3D CC 2A 41 FD 1372
F 7E 3E 2A 41 40 ED 4B 3F 994
F 40 77 09 7E 0E 80 FE 08 1002
F 28 28 FE 88 28 26 FE 89 1239
F 28 1C FE AD 28 1E FE 3D 1200
F 28 0B FE 76 28 22 2A 41 944
F 40 36 06 18 1B FD 36 43 909
F 60 FD 7E 7C 18 06 3E 17 1126

F 18 02 0E 00 FD 77 3E 22 908
F 41 40 36 06 FD 71 3C C9 1236
F FD 36 3D 04 2A 32 40 E5 1197
F D1 29 29 29 19 29 29 29 940
F 19 22 32 40 7C FD 46 3C 1160
F CB 10 38 17 21 DE FF 17 1331
F 30 07 17 38 1A 2E E0 18 974
F 18 21 08 00 17 CB 15 CB 1053
F 15 18 0C 17 ED 62 CB C5 1375
F 17 38 04 7D EE 20 6F 22 1203

F 3F 40 C9 06 02 0E 32 3E 1062
F 25 2A 0C 40 11 0C 03 19 832
F BE 20 05 36 1C 2B 18 F8 1264
F 34 10 EE 3E 02 32 6E 41 1255
F C9 FE FE AD B4 AC B7 B4 2277
F AC B5 B7 B4 AC 24 20 C9 1857
```

Note trigger characters

Note that Colons (Shift Z) are used as *trigger* characters in lines 1070, 1090, 1130 and 1150, there should be six colons in total.

Line 10 The first check uses 'greater than' but the rest use equals. This is to allow the use of either key 'Z' or key 'X' for 'left' so as to be comfortable on both original and full size ZX-81 keyboards.



If you don't feel like typing the program in, the authors can supply a good quality taped version. Send £2.50 to: 1 Carnarvon Road, Walton, Liverpool L9 1EB. ■

```
9140 IF H$(N)>"F" THEN GOTO 9060
9150 LET X=16506+INT (N/2)+8*L
9160 POKE X,16*CODE H$(N)+ CODE
H$(N+1)-476
9170 LET SUM=SUM+PEEK X
9180 NEXT N
9190 IF STR$ (SUM+L*20)<> H$(17
TO ) THEN GOTO 9060
9200 IF L>1 THEN IF PEEK 16524<>
65 THEN PRINT "HEXLOADER TYPED I
N WRONG";UU
9210 NEXT L
9220 PRINT "OK.PRESS P WHEN READ
Y TO SAVE"
9230 GOTO 9230+(INKEY$="P")
9240 CLS
9990 REM -------AUTOSAVE------>
9991 CLEAR
9992 SAVE "HRH"
9993 PRINT "TURN TAPE OFF:PRESS
A KEY:WAIT"
9994 PAUSE 4E4
9995 FAST
9996 POKE 16420,100
9997 LIST 9990
9998 RUN 700
9999 REM THIS LINE IS ESSENTIAL-
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
```

```
4000 REM -------MEGA-HIVE------>
4010 LET DK=0
4020 LET A$=A$+"MEGA-"
4030 PRINT AT 7,0;"WELL DONE, YO
U REACHED THE END. PLEASE WAIT -
 FOR THE "+A$+"HIVE>"
4040 FOR N=1 TO (LEN H$-64) STEP
 32
4050 LET H$(N TO N+31)=CHR$ 173+
 H$(N+3 TO N+17)+H$(N+13 TO N+27
)+CHR$ 173
4060 NEXT N
4070 RETURN
9000 REM ----HEXLOADER,ETC----->
9010 IF PEEK 16944<>118 THEN PRI
NT "REM5 WRONG LENGTH";UU
9020 POKE 16510,0
9030 POKE 16511,176
9040 POKE 16512,1
9050 FOR L=1 TO 35
9060 PRINT ;;"OK ENTER LINE ";L
9070 GOTO 9090
9080 PRINT "■■■■RETYPE LINE ";L
9090 INPUT H$
9100 CLS
9110 IF LEN H$<17 THEN GOTO 9080
9120 LET SUM=0
9130 FOR N=1 TO 16 STEP 2
9135 PRINT H$( TO N+1)
```

(listing continued from previous page)

```
TEP 1+(T=0 OR T=2)
 820 LET TY=N-(5*INT (N/5))
 830 LET U$=("■■■■
```

HEROES
APPLY WITHIN.

QUICKSILVA

All Titles available mail order from:
QUICKSILVA MAIL ORDER P.O. Box 6, Wimborne, Dorset BH21 7PY. Tel: (0202) 891744.

FRED



SPECTRUM 48K
£6.95
COMMODORE 64
£7.95
(Available soon)

SNOWMAN



SPECTRUM 48K
£6.95

BOOGABOO



COMMODORE 64
£7.95
SPECTRUM 48K
£6.95

ULTISYNTH



COMMODORE 64
£14.95

ANT ATTACK



SPECTRUM 48K
£6.95

MINED OUT



ELECTRON £6.95
BBC £6.95
LYNX £6.95
SPECTRUM 48K £4.95
ORIC/ATMOS £6.95
(Available soon)

Available at:

Boots · John Menzies · WHSMITH

and leading multiple retailers and specialist computer stores.

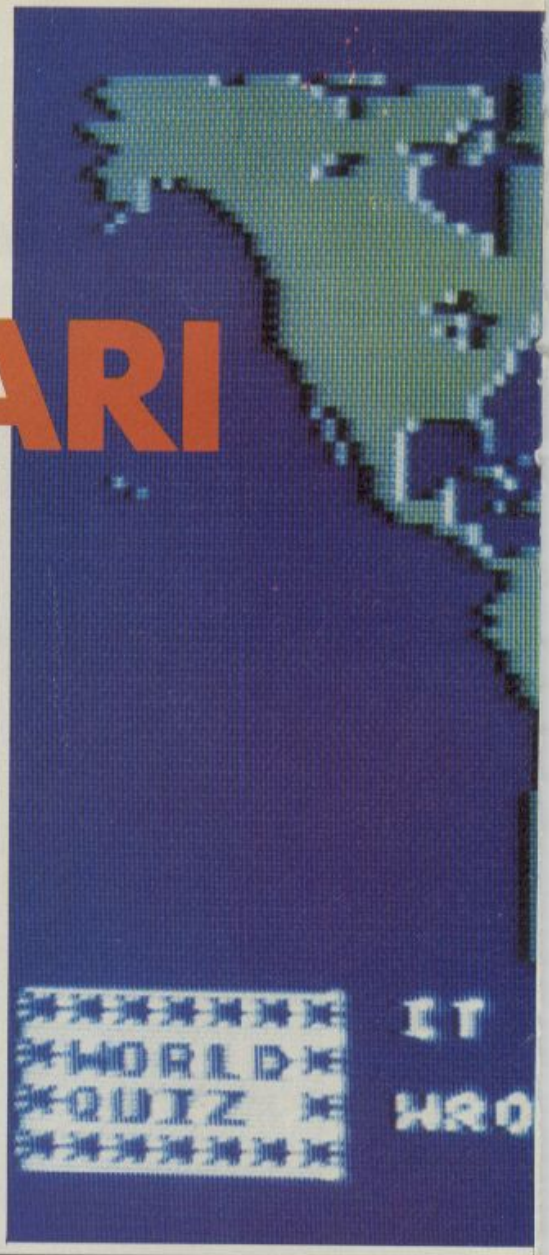
GSH

HAVE YOU JOINED THE GAME LORDS YET?
Send S.A.E. for details and catalo

WARNING: These programs are sold according to QUICKSILVA Ltd's terms of trade and conditions of sale, copies of which are available on request.

WORLD QUIZ

ATARI



THIS PROGRAM, FOR any Atari, plots a map of the world in green on a blue background. A particular country, continent or other feature is then highlighted and you are asked to choose from four alternative answers. Press 1 to 4 as appropriate — ensure that you are not in lower case or inverse video otherwise and answers will be ignored.

Your answers will be marked correct/wrong and the highlighted area will be returned to its original colour. After 10 questions your score will be displayed and pressing Start will cause another 10 questions to be presented. The variables used in the program are:

X, Y, L — The map is plotted as a series of horizontal lines. X, Y are the start co-ordinates and L is the line length.
I — Loop variable.
R — Random question line number.
Q — Array of already asked questions to prevent repeats.
SP1$, SP2$ — Empty strings used for blanking other strings or text areas.
T — Total questions asked in round.
S — Score in round.
A1$-A4$ — Four alternative answers.
A — Correct answer.
K — Keyboard response.

The program is structured as follows:

Line	Function
1-10	Title plus skip over sub-routines.
100-120	Subroutine to plot selected.
200-240	Subroutine to randomly select question and check not asked this round.
300	Subroutine to clear centre and right text areas of screen.
400	Subroutine to clear centre text area of screen.
1000-1110	Initial run processing — plots world, prints title, dimensions arrays, opens keyboard.
1150-1160	Initial round processing — sets score, turn, question array to zero.
1200-1520	Turn processing — selects question, restores appropriate data statement, reads and prints question, plots selected area, accepts and checks answer, restores question data again and replots area in original colour.
1800-1890	End of round processing — prints score after 10 questions and waits for start key to be pressed.
4100-10000	Data statements.

```
1 REM ************************
2 REM ***** WORLD QUIZ *****
3 REM ***** M.P.LORD   *****
4 REM ***** MAR 1984   *****
5 REM ************************
10 GOTO 1000
100 READ Y:IF Y=-1 THEN RETURN
110 READ X:READ L
120 PLOT X,Y:DRAWTO X+L-1,Y:GOTO 100
200 R=INT(RND(0)*28)*100+4100
210 I=0
220 I=I+1:IF R=Q(I) THEN 200
230 IF Q(I)<>0 THEN 220
240 Q(I)=R:RETURN
300 FOR I=0 TO 3:POKE 656,I:POKE 657,8:PRINT SP1$;
SP2$;:NEXT I:RETURN
400 FOR I=0 TO 3:POKE 656,I:POKE 657,8:PRINT SP1$;
:NEXT I:RETURN
1000 GRAPHICS 7:POKE 752,1:POKE 712,128:POKE 708,1
66:POKE 709,26:POKE 710,128
1010 DIM A1$(20),A2$(20),A3$(20),A4$(20),SP1$(8),S
P2$(23),Q(10)
1020 SP2$="                              ":SP1$=SP2$
1040 OPEN #1,4,0,"K:"
1050 POKE 656,0:POKE 657,0:? "********";
1060 POKE 656,1:POKE 657,0:? "*WORLD*";
1070 POKE 656,2:POKE 657,0:? "*QUIZ *";
1080 POKE 656,3:POKE 657,0:? "********";
1100 RESTORE 5100:COLOR 1
1110 READ A1$:IF A1$<>"***" THEN READ A2$:READ A3$
:READ A4$:READ A:GOSUB 100:GOTO 1110
1150 T=0:S=0
1160 FOR I=1 TO 10:Q(I)=0:NEXT I
1200 GOSUB 300:T=T+1:IF T>10 THEN GOTO 1800
1210 A1$=SP2$:A2$=SP2$:A3$=SP2$:A4$=SP2$
1300 GOSUB 200:RESTORE R:READ A1$:READ A2$:READ A3
$:READ A4$:READ A:COLOR 2:GOSUB 100
1310 POKE 656,0:POKE 657,8:? " IS THIS 1.";A1$;
1320 POKE 656,1:POKE 657,8:? "      OR 2.";A2$;
1330 POKE 656,2:POKE 657,8:? "      OR 3.";A3$;
1340 POKE 656,3:POKE 657,8:? "      OR 4.";A4$;
1350 GET #1,K:IF K<49 OR K>52 THEN GOTO 1350
1360 K=K-48:GOSUB 400
1370 POKE 656,K-1:POKE 657,8
1380 IF K=A THEN ? "CORRECT>";:S=S+1:GOTO 1500
1390 ? "WRONG =>";
1400 POKE 656,A-1:POKE 657,8
1410 ? "IT IS =>";
1500 FOR I=1 TO 1500:NEXT I
1510 RESTORE R:READ A1$:READ A2$:READ A3$:READ A4$
:READ A:COLOR 1:GOSUB 100
1520 GOTO 1200
1800 POKE 656,0:POKE 657,10:? "YOU SCORED ";S;" OU
T OF 10";
1810 A1$="TERRIBLE              "
1820 IF S>1 THEN A1$="NOT SO GOOD"
1830 IF S>4 THEN A1$="NOT TOO BAD"
1840 IF S>7 THEN A1$="VERY GOOD  "
1850 IF S>9 THEN A1$="EXCELLENT  "
1860 POKE 656,1:POKE 657,12:? "THAT'S ";A1$;
1870 POKE 656,3:POKE 657,8:? "PRESS START FOR ANOT
HER TURN";
1880 IF PEEK(53279)=6 THEN GOTO 1150
1890 GOTO 1880
4100 DATA ANDES,ROCKY,HIMALAYAN,ATLAS MTS,4
4110 DATA 28,69,4,29,68,3,30,68,2,31,67,2,-1
4200 DATA ANDES,ROCKY,HIMALAYAN,ATLAS MTS,3
4210 DATA 27,102,5,28,103,5,29,104,5,30,106,5,31,1
07,5,-1
4300 DATA SAHARA,KALAHARI,GIBSON&SIMPSON,GOBI DESE
RT,1
4310 DATA 32,71,12,33,70,14,34,69,16,35,68,18,36,6
8,18,37,69,16,38,70,14,-1
4400 DATA SAHARA,KALAHARI,GIBSON&SIMPSON,GOBI DESE
RT,2
4410 DATA 57,77,4,58,78,4,59,78,3,60,78,2,-1
4500 DATA SAHARA,KALAHARI,GIBSON&SIMPSON,GOBI DESE
RT,3
4510 DATA 57,120,8,58,119,10,59,119,10,60,120,8,-1
4600 DATA CHILE,ARGENTINA,PERU,BRAZIL,1
4610 DATA 55,44,2,56,44,2,57,44,2,58,44,2,59,44,2,
60,44,2,61,44,2,62,43,2,63,43,2,64,43,2,65,43,2
4615 DATA 66,43,2,67,43,2,68,43,2,69,43,2,70,43,2,
71,43,2,72,43,2,73,43,2,74,43,2,75,43,2
4620 DATA 76,43,2,77,44,1,78,45,1,-1
4700 DATA CHILE,ARGENTINA,PERU,BRAZIL,2
4710 DATA 57,45,2,58,45,3,59,45,4,60,45,6,61,45,5,
62,44,5,63,44,4,64,44,4,65,44,4,66,44,3,67,44,3
4715 DATA 68,44,3,69,44,3,70,44,3,71,44,2,72,44,2,
73,44,3,74,44,2,75,44,1,76,44,1,77,45,1,78,46,1,-1
4800 DATA CHILE,ARGENTINA,PERU,BRAZIL,4
4810 DATA 43,46,2,44,46,2,44,51,1,45,44,4,45,49,3,
46,44,10,47,44,12,48,42,16,49,42,16,50,43,15
4815 DATA 51,46,11,52,47,10,53,48,9,54,49,8,55,49,
7,56,49,7,57,50,5,58,50,4,59,50,3,60,49,4
4820 DATA 61,49,4,62,50,2,-1
4900 DATA SCANDINAVIA,RUSSIA,ICELAND,HOLLAND,1
4910 DATA 0,80,4,1,79,5,2,78,5,3,78,6,4,77,7,5,77,
4,5,83,1,6,76,5,6,82,2,7,75,6,7,82,2
4915 DATA 8,74,5,8,81,4,9,74,6,10,74,5,11,74,2,11,
77,2,12,77,2,13,77,1,-1
5000 DATA CANARY ISLANDS,JAPAN,BRITISH ISLES,ENGLA
ND,3
5010 DATA 11,70,1,12,70,2,13,68,1,13,70,2,14,67,2,
14,71,2,15,67,2,15,72,3,16,69,3,-1
5100 DATA NEW ZEALAND,AUSTRALIA,JAPAN,MADAGASCAR,2
5110 DATA 52,124,3,52,129,1,53,124,3,53,129,1
5115 DATA 54,122,4,54,128,3,55,121,10,56,118,14
5120 DATA 57,117,15,58,117,16,59,118,15,60,118,16
5125 DATA 61,118,16,62,118,16,63,118,5,63,126,7
5130 DATA 64,117,3,64,126,7,65,128,4,66,128,4
5135 DATA 67,129,2,69,130,2,70,131,1,-1
5200 DATA NEW ZEALAND,AUSTRALIA,JAPAN,MADAGASCAR,1
5210 DATA 64,141,1,65,142,1,66,142,2,67,141,2
5215 DATA 68,140,1,68,142,1,69,140,1,70,139,2
5220 DATA 71,138,2,72,138,1,-1
5300 DATA BRAZIL,CENTRAL AMERICA,CHILE,SOUTH AMERI
CA,4
5310 DATA 41,42,3,42,41,7,43,41,8,44,41,11,45,40,1
2,46,39,15
5315 DATA 47,40,16,48,39,19,49,40,18,50,41,17,51,4
1,16,52,42,15
5320 DATA 53,42,15,54,43,14,55,44,12,56,44,12,57,4
4,11,58,44,10
5325 DATA 59,44,9,60,44,9,61,44,9,62,43,9,63,43,8,
64,43,7
5330 DATA 65,43,6,66,43,6,67,43,6,68,43,5,69,43,4,
70,43,4
5335 DATA 71,43,3,72,43,3,73,43,4,74,43,3,75,43,2,
```




```
76,43,2
5340 DATA 77,44,2,78,45,2,-1
5400 DATA U.S.A.,MEXICO+CENT.AMERICA,FLORIDA,CUBA,
2
5410 DATA 28,25,2,29,25,1,29,27,3,30,26,1,30,28,3,
31,26,1,31,28,4,32,27,1,32,29,4
5415 DATA 33,27,1,33,29,4,34,30,3,35,30,3,35,36,1,
36,30,3,36,35,2
5420 DATA 37,31,6,38,32,5,39,33,4,40,37,2,41,38,2,
42,39,2,-1
5500 DATA WEST INDIES,EAST INDIES,CANARY ISLES,BAL
EARIC ISLES,1
5510 DATA 33,42,1,34,38,3,34,44,1,35,40,2,36,43,2
5515 DATA 37,40,1,37,42,3,37,46,1,38,47,1,39,49,1,
40,47,1,-1
5600 DATA CANADA,MEXICO,U.S.A.,ALASKA,3
5610 DATA 0,7,9,1,6,10,2,7,9,3,8,8,4,5,11,5,6,10,6
,8,8,7,7,9,8,6,10,9,7,4,9,12,1,9,14,2
5615 DATA 10,7,4,10,16,1,11,9,2,11,17,1,12,8,1,12,
18,1,13,7,1,13,19,1,35,8,1,36,10,1
5620 DATA 19,22,12,20,22,13,21,22,16,21,45,1,22,22
,14,22,37,1,22,41,3,23,22,16,23,39,4,24,23,19
5625 DATA 25,24,18,26,24,17,27,25,15,28,27,12,29,3
0,9,30,31,3,30,38,2,31,32,1,31,39,1,32,39,1,-1
5700 DATA CANADA,MEXICO,U.S.A.,ALASKA,1
5710 DATA 0,16,1,0,19,5,0,26,5,0,42,3,1,16,10,1,33
,6,1,42,3,2,16,12,2,29,11,2,42,4,3,16,12,3,29,11
5715 DATA 3,42,6,4,16,22,4,42,6,5,16,21,5,38,2,5,4
1,5,6,16,17,6,37,3,6,43,3,7,16,11,7,29,6,7,33,2
5720 DATA 7,37,2,8,16,10,8,28,6,8,41,4,9,16,18,9,4
1,4,10,17,17,10,41,4,10,46,1,11,18,17,11,41,6
5725 DATA 12,19,17,12,41,7,13,20,18,13,41,8,14,20,
20,14,41,9,15,20,20,15,41,9,16,21,20,16,41,7
5730 DATA 17,21,26,17,49,1,18,22,24,18,49,1,19,34,
3,19,38,7,19,48,3,20,38,8,20,48,3
5735 DATA 21,40,4,21,46,2,22,39,2,-1
5800 DATA CANADA,GREENLAND,NORWAY,ICELAND,2
5810 DATA 0,51,11,1,52,9,2,52,8,3,51,7,4,51,5,5,51
,5,6,51,4,7,52,3,8,52,3,9,54,1,-1
5900 DATA CANADA,GREENLAND,NORWAY,ICELAND,4
5910 DATA 4,62,1,4,66,1,5,62,5,6,62,4,7,63,2,-1
6000 DATA JAPAN,KOREA,PHILIPPINES,NEW ZEALAND,1
6010 DATA 20,129,1,21,128,3,23,128,1,24,128,1,25,1
27,2,26,125,3,27,124,3,28,124,1,-1
6100 DATA MADAGASCAR,CANARY ISLES,JAPAN,PHILIPPINE
S,1
6110 DATA 52,91,1,53,90,2,54,89,3,55,89,3,56,89,2,
57,89,2,58,90,1,-1
6200 DATA EGYPT,SOUTH AMERICA,MADAGASCAR,AFRICA,4
6210 DATA 26,73,3,27,69,1,27,71,5,29,68,7,29,67,10
,29,80,1,30,67,11,30,80,5,31,67,18
6215 DATA 32,66,20,33,65,21,34,65,22,35,65,22,36,6
6,22,37,66,22,38,65,23,39,65,24
6220 DATA 40,66,23,40,91,1,41,66,26,42,67,24,43,68
,4,43,74,16,44,76,14,45,76,13,46,76,9,46,86,2
6225 DATA 47,77,11,48,77,11,49,77,11,50,78,11,51,7
7,12,52,77,11,53,76,11,54,76,10,55,77,8
6230 DATA 56,77,8,57,77,9,58,78,8,59,78,7,60,78,7,
61,79,6,62,79,5,63,79,4,-1
6300 DATA EUROPE,SCANDINAVIA,RUSSIA,FRANCE,1
6310 DATA 11,70,1,12,70,2,13,68,1,13,70,2,14,67,2,
14,71,2,15,67,2,15,70,3,16,69,3
6315 DATA 0,80,4,1,79,5,2,78,5,3,78,6,4,77,7,5,77,
4,5,83,1,6,76,5,6,82,2,7,75,6,7,82,2
6320 DATA 8,74,5,8,81,4,9,74,6,10,74,5,11,74,2,11,
77,2,12,77,2,13,77,1
6325 DATA 13,75,1,14,75,2,15,75,2,16,74,7,17,73,8,
18,70,11,19,70,11,20,71,12,21,71,12
6330 DATA 22,68,5,22,76,2,22,79,5,23,68,5,23,77,2,
23,80,2,23,83,7,24,68,4,24,75,1
6335 DATA 24,78,1,24,80,1,24,83,7,25,68,4,25,78,1,
25,81,1,25,83,7,26,69,2,26,77,1
6340 DATA 27,82,1,27,84,1,-1
6400 DATA EUROPE,SCANDINAVIA,RUSSIA,FRANCE,3
6410 DATA 0,99,37,1,84,1,1,96,2,1,99,45,2,83,4,2,9
6,2,2,99,46,3,83,5,3,89,1,3,91,55
6415 DATA 4,84,1,4,86,2,4,90,37,5,84,2,5,88,61,6,8
4,2,6,88,57,6,146,2,7,84,59,8,85,50,8,137,4
6420 DATA 9,85,1,9,87,47,9,137,2,10,82,52,10,136,2
,11,81,47,11,135,3,12,81,46,12,134,4
6425 DATA 13,81,45,13,134,3,14,81,47,14,134,2,15,8
0,48,15,129,1,15,134,2,16,81,39,16,122,6
6430 DATA 16,129,1,16,134,1,17,81,31,17,113,7,17,1
23,5,17,129,1,18,81,26,18,123,4,18,129,1
6435 DATA 19,81,26,19,124,4,20,83,23,20,126,2,21,8
3,1,21,85,1,21,87,4,21,93,3,21,97,8
6440 DATA 21,125,2,22,88,3,22,92,3,22,97,7,22,124,
2,23,89,3,23,94,10,24,94,7,25,96,2,-1
6500 DATA TIBET,CHINA,INDIA,MONGOLIA,4
6510 DATA 17,112,1,18,107,12,19,108,12,20,109,10,2
1,109,9,22,110,7,-1
6600 DATA TIBET,CHINA,INDIA,MONGOLIA,2
6610 DATA 16,120,2,17,120,3,18,119,4,19,107,1,19,1
20,4,20,106,3,20,119,7,21,105,4,21,118,7
6615 DATA 22,104,6,22,117,7,23,104,16,23,121,2,24,
101,18,25,101,20,26,102,18,27,103,17
6620 DATA 28,104,16,29,104,16,30,106,15,31,108,13,
32,110,11,33,111,9,34,112,7,35,115,3,36,116,1,-1
6700 DATA TIBET,CHINA,INDIA,MONGOLIA,3
6710 DATA 29,102,3,30,101,3,31,101,9,32,109,7,32,1
08,2,33,100,7,33,109,1,34,99,8,35,100,7
6715 DATA 36,101,5,37,101,4,38,102,2,39,102,2,40,1
02,1,-1
6800 DATA WEST INDIES,EAST INDIES,CANARY ISLES,BAL
EARIC ISLES,2
6810 DATA 43,109,1,44,110,1,45,111,2,46,111,2,47,1
12,2,48,112,1
6815 DATA 49,113,3,49,117,1,49,119,1,50,121,1
6820 DATA 43,118,2,44,117,2,45,116,4,46,116,3,47,1
17,2
6825 DATA 37,120,1,38,120,1,39,120,2,41,119,1,41,1
21,1,42,121,2,43,122,1
6830 DATA 45,120,3,45,124,1,46,120,1,46,126,2,47,1
20,2,47,127,1,47,129,1
6835 DATA 48,120,1,48,124,1,48,127,4,49,128,5,50,1
29,2,50,132,1,51,132,2
6840 DATA 48,133,1,49,135,1,50,136,1,51,137,1,-1
9000 DATA OTHERS,X,X,X,1
9010 DATA 32,107,1,33,107,2,34,107,2,23,123,2,24,1
23,1,25,123,2,26,124,1,41,104,1,33,121,1,34,121,1
9015 DATA 24,90,2,25,86,18,26,86,18,27,86,18,28,86
,18,29,86,18,30,85,21,31,86,6,31,93,11,32,87,5
9020 DATA 32,96,8,33,87,6,33,94,1,33,97,7,34,88,8,
35,88,7,36,89,5,37,89,4,38,90,2,39,90,1
9025 DATA 31,104,8,32,104,8,33,104,8,34,104,12,35,
109,5,36,110,4,37,111,4,38,111,5
9030 DATA 39,111,1,39,113,3,40,111,1,40,114,2,41,1
11,1,41,114,1,42,111,1,43,112,1,44,113,1,-1
10000 DATA ###
```

The CDS experience,



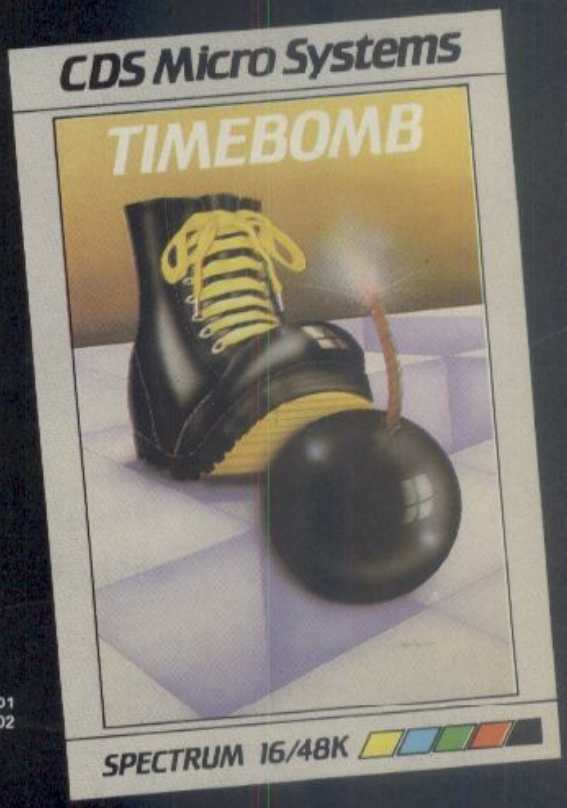
CDS Micro Syste

ONLY £5·95 each at W.H.Smiths, *Boots, Joh
Send Cheque or P.O. To CDS 10, Westfield Cl

more action.... more adventure....

....and now the ultimate challenge 'COLOSSUS CHESS 2·0', the finest chess program ever written. Available for the Commodore 64 *£9·95

new.... Spectrum Arcade action

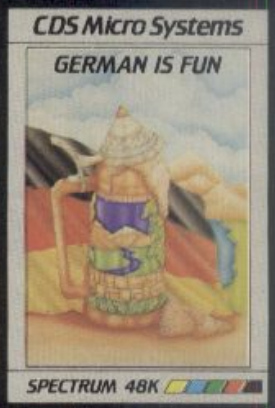


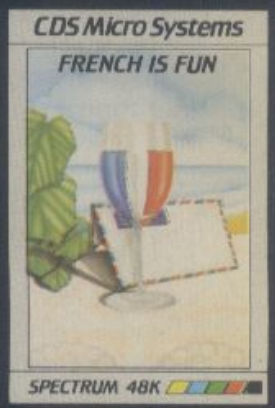
SPECTRUM			ZX81			ORIC		
GOBBLE A GHOST	XXX	1001	DODGEMS/CONNECT 4	XXX	2001	BOZY BOA	XXX	3001
CATERPILLAR	XXX	1002	CASTLE ADVENTURE	XXX	2003	REVERSI	XXX	3002
LEAPFROG	XXX	1003	BREAKOUT	XXX	2004			
REVERSI	XXX	1004	BRICK-STOP	XXX	2005			
3 D PAINTER	XXX	1005	REVERSI	XXX	2006			
BOZY BOA	XXX	1006						
POOL	XXX	1007						











ms....*Commodore 64, Spectrum, Oric 1....

n Menzies and other leading Computer Stores, or... Available direct from CDS Micro Systems
ose, Tickhill, Doncaster DN11 9LA. Tel: (0302) 744129. (Trade enquiries welcome) * Selected titles only

The first program in Software Farm's HIGH-RES RANGE!

FORTY NINER the ZX-81 BREAKTHROUGH!

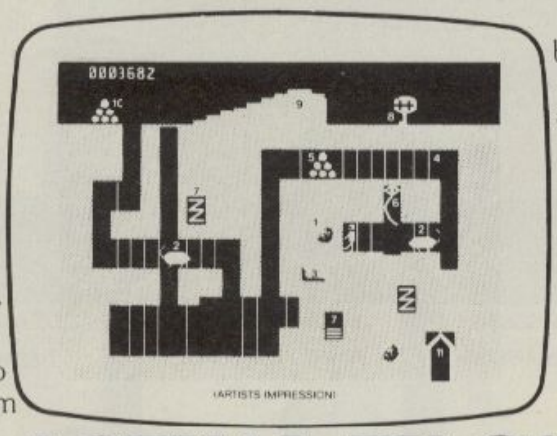
ONLY PROGRAM OF IT'S KIND IN THE WORLD!

ZX-81 Resolution identical to the SPECTRUM without any additional hardware!!

In 1849 the Great American Gold rush started. Almost everyone who could, sold up everything and dashed to the west coast to look for this precious metal – including YOU!

You must dig for those nuggets (1) – But watch out for the giant rats (2) They burrow through the earth (3) to get into your tunnel. You can delay them for a while by knocking down a support (4) which causes a small cave-in (5) to block their way, but you can only destroy them by releasing a snake (6) from it's nest (7), when it heads straight for the surface, destroying everything in it's way.

All the time the Gremlin (8) is busy digging it's way through your waste earth pile (9) to reach the entrance to your mine. Once it does you have no escape!! – so you must stop it getting there by returning to the surface to replenish the main mound (9) with the smaller pile of earth which appears on the surface as you dig (10). The deeper you dig the more points you score – but the further you have to go to replenish that mound! Once all nuggets have been collected, a cave opens (11) allowing you to pass through to the next stage – if you can reach it! This gives you more rats – but less snakes to destroy them with!!

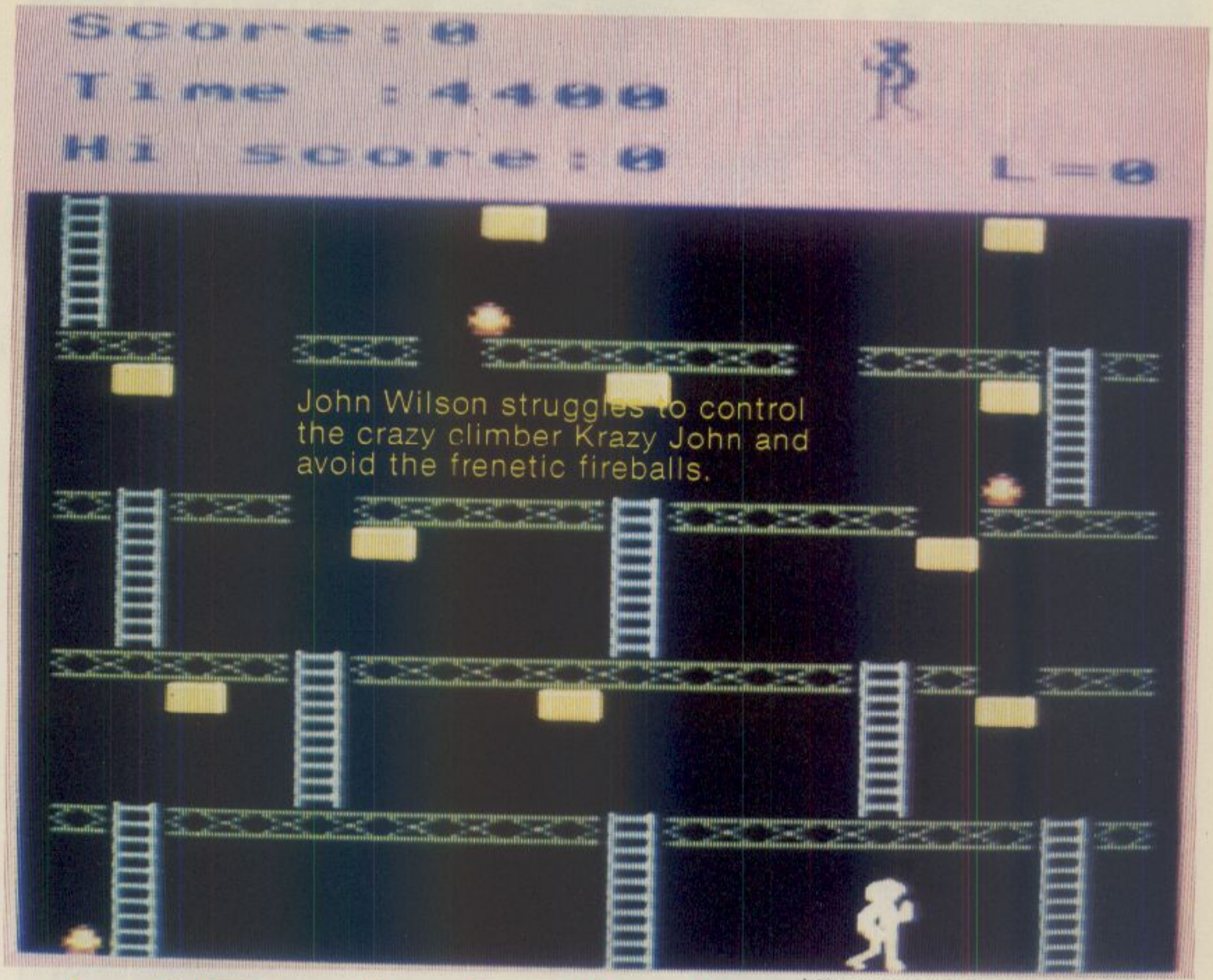


ACTUAL ZX-81 SCREEN DISPLAY

Skill levels
Extra man every 10,000 points
Hall of Fame
Define your own keys for ease of play or use with any joystick
Fantastic and unique graphics on a ZX-81 (with 16K)
Only £5.95 – No more than many ordinary programs
A truly interesting and exciting game that no ZX81 owner can afford to be without

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)C, Bristol BS8 2YY

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



John Wilson struggles to control the crazy climber Krazy John and avoid the frenetic fireballs.

KRAZY JOHN

KRAZY JOHN IS A program for the BBC Micro Model B or Model A with 32K. The program makes extensive use of BBC Basic and machine code to give a fast arcade-type game. Before I go into how the program works, I will give a brief description of how to play the game.

You take control of Krazy John, the foolhardy climber, and must try to climb the high rise building before your time runs out. You must climb up the ladders and run along the girders, jumping the fireballs that spread along the floor, jump the gaps and collect the yellow blocks on your way to the top. In order to collect a block, you must jump up underneath one. Once this has been done, you are awarded some points, and the final elevator is lowered. To complete the screen, you must collect all the yellow blocks, and climb up the final ladder in

(continued on page 115)

```
   10REM
   20REM    Krazy  John
   30REM
   40REM    by  J.R.Wilson
   50REM
   60ONERRORRUN
   70MODE7
   80PROCL(3,3,CHR$132+CHR$157+CHR$134+"K R A Z Y  "+C
HR$156)
   90PROCL(17,7,CHR$132+CHR$157+CHR$134+"J O H N  "+CH
R$156)
  100PROCL(8,12,CHR$129+"by"+CHR$130+"J.R.Wilson")
  110PROCL(3,18,"Do you want instructions ?")
  120A$=GET$
  130IFA$="Y"THENPROCinstructions:GOTO150
  140IFA$<>"N"THEN120
  150ENVELOPE1,5,1,0,0,10,1,1,126,-1,-2,-3,126,120
  160CLS
  170ENVELOPE2,3,0,0,0,0,0,0,126,-1,-2,-5,126,80
  180VDU23,224,0,0,56,108,60,60,24,152
  190VDU23,225,188,172,246,54,54,38,44,60
  200VDU23,226,40,40,40,40,36,34,33,98
  210VDU23,227,0,0,28,54,60,60,24,25
  220VDU23,228,61,53,111,108,108,100,52,60
  230VDU23,229,20,20,20,20,36,68,132,70
  240VDU23,230,0,0,0,1,135,143,252,15
  250VDU23,231,0,0,2,130,231,245,29,247
  260VDU23,232,1,2,1,0,65,51,15,3
```

(listing continued on page 115)


CLEVER CLOGS™
It's ARRIVED!
— the next generation of
EARLY LEARNING SOFTWARE
EARLY LEARNING GAMES
Games that make fun out of learning
Hand-built by teachers, played by children
JUNGLE JUMBLE (5+)
WHIZZ QUIZ (7+)
STAR TRUCKER (9+)
PARTY TIME (3+)
SHIPSHAPES (3+)
SAM SAFETY (5+)
MUSIC (7+)
BLOCKBUSTER (7+)
Available for Spectrum, BBC and Commodore 64 computers
APS
SOFTWARE RETAILER
Available at W.H. Smith and other leading software outlets
FROM
Computertutor: A member of the Argus Press Software Group
No 1 Golden Square, London W1R 3AB.

(listing continued from page 113)

```
270VDU23,233,192,192,192,128,192,224,32,208
280VDU23,234,3,3,3,3,3,7,32,16
290VDU23,235,236,224,192,224,56,14,4,8
300VDU23,236,3,3,3,3,3,7,4,27
310VDU23,237,128,64,128,0,130,204,240,192
320VDU23,238,35,3,3,7,28,112,32,16
330VDU23,239,192,192,128,224,48,25,14,4
340VDU23,242,0,255,36,66,129,66,36,255
350VDU23,243,66,66,66,66,66,66,66,102
360VDU23,244,60,60,60,60,60,60,60,60
370VDU23,245,126,153,153,189,189,189,153,129
380VDU23,246,66,126,66,66,66,126,66,66
390VDU23,247,0,255,255,255,255,255,255,255
400VDU23,248,0,24,60,60,60,61,61,25,25
410VDU23,249,61,126,188,188,188,188,188,188
420VDU23,250,36,36,36,36,36,32,32,32
430PROCm_code
440CLEAR
450mode=2351:poke=2304:P=2452:YP=2472:DI=2492
460RIDE2
470VDU23;8202;0;0;0;
480S%=0:W%=0:M%=3:CH=.02
490PROCscreen
500PROCbarrel:PROCtime:IFPOINT(X1%+8,Y1%-104)=0ANDPOINT(X1%+55,Y1%-104)=0PROCfall
510AX=POINT(X1%,Y1%-90):BX=POINT(X1%+63,Y1%-90):CX=POINT(X1%-8,Y1%-48):DX=POINT(X1%+63,Y1%-48):EX=POINT(X1%,Y1%):FX=POINT(X1%+64,Y1%):GX=POINT(X1%,Y1%-16):IX=POINT(X1%+64,Y1%-16):JX=POINT(X1%+32,Y1%-90)AND8
520IFAX=10RBX=10RCX=10R9X=10REX=10RFX=10R8X=10RIX=10RAX=30RBX=30RCX=30RDX=30REX=30RFX=30R8X=30RIX=30RJX=10RJX=3PROCdead
530IFINKEY-74PROCjump:GOTO500
540KX=0:IFINKEY-98PROCleft:KX=1
550IFINKEY-67PROCright:KX=1
560IFINKEY-105PROCdown:KX=1
570IFINKEY-73PROCup:KX=1
580IFY1%=896THENPROCnext_screen
590IFKX=0PROCdelay(10)
600GOTO500
610DEFPROCB:VDU24,32;32;1245;800;:ENDPROC
620DEFPROCscore:COLOUR133:COLOUR4:PRINTTAB(7,1);B%:COLOUR128:ENDPROC
630DEFFNP(X%,Y%):VDU31,;%,Y%:AX=135:Z%=((USR&FFF4)AND&FFF)DIV256:IFZ%>127Z%=Z%OR224
640=Z%
650DEFPROCscreen
660VDU26:COLOUR133:CLS
670PROCB:GCOL0,128:CLS
680COLOUR4:PRINTTAB(1,1);"Score:"
690PRINTTAB(1,3);"Time :"
700PRINTTAB(1,5);"Hi score:";H%
710FOR1=1TO25
720PRINTTAB(12+I*2,1);
730VDU224,10,8,225,10,8,226
740NEXT
750PRINTTAB(16,5);"L=";W%
760PROCscore
770GCOL0,128:VDU5
780FOR1=1170265TEP5
790PRINTTAB(1,I);STRING$(18,CHR$242)
800NEXT
810COLOUR6
820FOR1=1TO5
830PRINTTAB(2,25+I);CHR$246
840PRINTTAB(17,25+I);CHR$246
850PRINTTAB(10,25+I);CHR$246
860PRINTTAB(5,20+I);CHR$246
870PRINTTAB(14,20+I);CHR$246
880PRINTTAB(2,15+I);CHR$246
890PRINTTAB(10,15+I);CHR$246
900PRINTTAB(17,10+I);CHR$246
910IFI>1PRINTTAB(1,5+I);CHR$246
920NEXT
930VDU19,15,7,0,0,0
940EX=WX:IFEX>7THENEX=7
950PRINTTAB(3,11);" "
960FOR1=1TOEX*2+5
970Y=RND(5)*5+6
980X=RND(16)*1
990IFFNP(X,Y)<>242ORFNP(X-1,Y)<>242ORFNP(X+1,Y)<>242THEN970
1000IFFNP(X,Y-1)=246THEN970
1010PRINTTAB(X,Y);" "
1020NEXT
1030COLOUR8:VDU19,8,3,0,0,0
1040RESTORE1050
1050DATA3,22,16,22,9,22
1060DATA6,17,15,17
1070DATA2,12,16,12,10,12
1080DATA16,7,8,7
1090FOR1=1TO10
1100READX,Y:PRINTTAB(X,Y);CHR$247;
1110NEXT
1120UX=224:LX=10
1130X1%=512:Y1%=128:PROCman
1140CLX=0
1150FOR1=0TO19:I?YP=0:NEXT
1160FOR1=0TO19
1170IFRND(1)>.15THEN1230
1180I?XP=RND(60)+10:I?YP=RND(5)*5+5
1190IFI?YP=30ANDA88(I?XP -30)<10THEN1180
1200DX=RND(3)-2:IFDX=0THEN1200
1210I?DI=DX
1220?&80=YP?I:?&81=XP?I:CALLpoke
1230NEXT
1240PROCdelay(100)
1250DLOUR133:PRINTTAB(12+MX*2,1);" ";CHR$10;CHR$8;" ";CHR$10;CHR$8;" "
1260DLOUR128
1270T1ME=0
1280ENDPROC
1290DEFPROCdelay(AX):AX=TIME+AX:REPEATUNTILTIME>AX:ENDPROC
1300DEFPROCman:GCOL3,7:MOVEX1%,Y1%:VDU5,U%:MOVEX1%,Y1%-32:VDU4:L=MOVEX1%,Y1%-64:VDU4:2,4:ENDPROC
1310DEFPROCleft:IFCL%ORX1%<=32ENDPROC
1320PROCman:IFU%<>224UX=224:PROCman:ENDPROC
1330X1%=X1%-32:PROCman:ENDPROC
1340DEFPROCright:IFCL%ORX1%>=1184ENDPROC
1350PROCman:IFU%<>227UX=227:PROCman:ENDPROC
1360X1%=X1%+32:PROCman:ENDPROC
1370DEFPROCup:IFPOINT(X1%+8,Y1%-96)<>&ANDNOTCL%ENDPROC
1380CL=TRUE:IFPOINT(X1%+8,Y1%-80)<>&CL%=0
1390I?POINT(X1%+32,Y1%+8)=1PROCdead:ENDPROC
1400PROCman:Y1%=Y1%-16:U%=248:PROCman:ENDPROC
1410DEFPROCdown:IFPOINT(X1%+8,Y1%-100)<>&ANDNOTCL%ENDPROC
1420CL%=TRUE:IFPOINT(X1%+8,Y1%-100)<>&CL%=0:ENDPROC
1430PROCman:Y1%=Y1%-16:U%=248:PROCman:ENDPROC
1440DEFPROCjump:IFCL%ORX1%>=1184ENDPROC ELSESOUND&11,-1,10,5:IFINKEY-98ANDX1%>32PROCjump_left:ENDPROC ELSEIFINKEY-67ANDX1%<1184PROCjump_right:ENDPROC
1450PROCman:X1%=X1%-32:FORY1%=Y1%TOY1%+32STEP8
1460IFPOINT(X1%+64,Y1%+8)=80RPOINT(X1%+32,Y1%+4)=8PROChit
1470IFU%=224PROCmanJL ELSEPROCmanJR
1480PROCbarrel:IFU%=224PROCmanJL ELSEPROCmanJR
1490NEXT:FORY1%=Y1%TOY1%-32STEP-8
1500IFU%=224PROCmanJL ELSEPROCmanJR
1510PROCbarrel:IFU%=224PROCmanJL ELSEPROCmanJR
1520NEXT
1530X1%=X1%+32:PROCman:ENDPROC
1540DEFPROCjump_left:PROCman:U%=224:FORY1%=Y1%TOY1%+32STEP8
1550IFPOINT(X1%+64,Y1%+4)=80RPOINT(X1%+32,Y1%+4)=8PROChit
1560X1%=X1%-8:PROCmanJL:PROCbarrel:PROCmanJL:NEXT
1570FORY1%=Y1%TOY1%-32STEP-8:IFPOINT(X1%+64,Y1%+4)=80RPOINT(X1%+32,Y1%+4)=8PROChit
1580X1%=X1%-8:PROCmanJL:PROCbarrel:PROCmanJL:NEXT:X1%=X1%-16:PROCman:ENDPROC
1590DEFPROCmanJL:GCOL3,7:MOVEX1%,Y1%:VDU5,232,233:MOVEX1%,Y1%-32:VDU234,235,4:ENDPROC
1600DEFPROCmanJR:GCOL3,7:MOVEX1%,Y1%:VDU5,236,237:MOVEX1%,Y1%-32:VDU238,239,4:ENDPROC
1610DEFPROCjump_right:PROCman:U%=227:FORY1%=Y1%TOY1%+32STEP8
1620IFPOINT(X1%+64,Y1%+4)=80RPOINT(X1%+32,Y1%+4)=8PROChit
1630X1%=X1%+8:PROCmanJR:PROCbarrel:PROCmanJR:NEXT
1640FORY1%=Y1%TOY1%-32STEP-8:IFPOINT(X1%+64,Y1%+4 =80RPOINT(X1%+32,Y1%+4)=8PROChit
1650X1%=X1%+8:PROCmanJR:PROCbarrel:PROCmanJR:NEXT:X1%=X1%+15:PROCman:ENDPROC
1660DEFPROCbarrel:CALLmove:IFRND(1)>CH THENENDPROC ELSEA%=RND(20)-1:IFYP?A%>0ENDPROC
1670Y?A%=RND(5)*5+5:IFRND(1)>.5THENXP?A%=2:DI?A%=1ELSEXP?A%=74:DI?A%=255
1680I%=XP?A%/8%80+YP?A%:CALLpoke:ENDPROC
1690DEFPROCfall:VX=5:PROCman:U%=243:REPEAT:Y1%=Y1%-VX:PROCman:PROCman:VX=VX+1:UNTIL POINT(X1%+8,Y1%-104)<>0ORPOINT(X1%+55,Y1%-104)<>0
1700PROCman:PROCdead:ENDPROC
1710DEFPROChit:SOUND&13,2,20,5:L%=LX+1:X%=X1%DIV64:Y%=32-Y1%DIV32
1720KX2%=0:Y2%=0
1730IFFNP(X%+2,Y%-1)=247THENX2%=2:Y2%=-1:GOTO1770
1740IFFNP(X%+1,Y%-1)=247THENX2%=1:Y2%=-1:GOTO1770
1750IFFNP(X%,Y%-1)=247THENY2%=-1:GOTO1770
1760ENDPROC
1770X%=X%+X2%:Y%=Y%+Y2%:GCOL3,8:MOVEX%+64,(32-Y%)*32-4:VDU5,247,4
1780S%=S%+100:PROCscore
1790GCOL0,0:MOVE230,1090-L%*20:VDU5,242:GCOL0,2:MOVE230,1070-L%*20:VDU242,4:GCOL0,15:MOVE262,1100:DRAW262,1070-L%*20:MOVE254,1100:DRAW254,1070-L%*20:ENDPROC
1800DEFPROCnext_screen:SOUND3,2,10,5:W%=W%+1:CH=CH+.02:FORI=TX1TO0STEP-100:COLOUR133:COLOUR4:PRINTTAB(7,3);I;" ";:B%=B%+100:PROCscore:SOUND&12,20,100,3:PROCdelay(20):NEXT:PROCscreen:ENDPROC
1810DEFPROCtime:T%=5000-(TIME DIV300)*100:COLOUR133:COLOUR4:PRINTTAB(7,3);T%;" ":COLOUR128:IFT%<=0PROCdead
1820ENDPROC
1830DEFPROCLIFE(X%,Y%,A$):PRINTTAB(X%,Y%);CHR$141;A$;TAB(X%,Y%-1);CHR$141;A$:ENDPROC
1840DEFPROCdead:PROCman
1850FOR1=1TO8
1860SOUND&10,17,2,2:U%=224:PROCman:PROCman
1870SOUND&10,17,3,2:U%=227:PROCman:PROCman
1880NEXT
1890MDVEX1%,Y1%-60:GCOL3,7:VDU5,230,231,4:SOUND&10,2,6,6:PROCdelay(200):M%=M%-1:IFM%>0PROCscreen:ENDPROC
1900VDU22,7
1910PROCL(3,3,"Your final score was "+STR$S%)
1920IFS%>=H%THENH%=S%:PROCL(5,8,"The high score !!");GOTO1940
1930PROCL(0,8,"But the high score is still at "+STR$H%)
1940PROCL(10,15,"Another game ?")
1950A$=GET$:IFA$="Y"THEN440
1960IFA$="N"THENCLS:END
1970GOTO1950
1980DEFPROCm_code
1990T%=0
2000RESTORE2010:FORI%=&900TO&977:READA%:?I%=A%:T%=T%+A%:NEXT
2010DATA 32,18,9,160,0,177,,12,89,124,9,145,112,200,192,24,208,244,96,164,128
2020DATA 185,208,9,133,113,,85,240,9,133,112,160,8,24,165,112,101,129,133,112,144
2030DATA 2,230,113,136,208,242,96,169,0,133,130,166,130,189,160,9,133,128,201,0
2040DATA 208,9,230,130,165,130,201,20,208,237,96,189,148,9,133,129,32,0,9,165
2050DATA 129,201,2,208,8,169,1,157,188,9,76,102,9,201,74,208,5,169,253,157
2060DATA 188,9,24,165,129,125,188,9,133,129,157,148,9,32,0,9,76,62,9,76
2070FORI%=0TO31:READA%,B%:T%=T%+A%+B%:I%?2512=A%:I%?2544=B%:NEXT
2080DATA48,0,50,128,53,0,55,128,58,0,60,128,63,0,65,128,68,0,70,128,73,0,75,128,78,0,80
2090DATA128,83,0,85,128,88,0,90,128,93,0,95,128,98,0,100,128,103,0,105,128,108,0,110,128
2100DATA113,0,115,128,118,0,120,128,123,0,125,128
2110FORI%=0TO23:READA%:T%=T%+A%:I%?&97C=A%:NEXT
2120DATA0,1,1,3,7,3,1,1,3,3,15,15,15,15,3,3,0,2,2,3,1,1,3,2,2
2130IFT%<>18624THENPRINT"Error in data":END
2140ENDPROC
2150DEFPROCinstructions
2160CLS
2170PRINT"   You are Krazy John , the foolhardy"
2180PRINT"climber, and must try to climb the high"
2190PRINT"rise building before your time runs out."
2200PRINT"Climb up the ladders and run along the"
2210PRINT"girders avoiding the fireballs that"
2220PRINT"spread along the floor. Jump the unsafe"
2230PRINT"girders that are flashing and try to"
2240PRINT"reach the top of the screen before your"
2250PRINT"time runs out. Collect points on the"
2260PRINT"way by collecting the blocks that lower"
2270PRINT"the elevator. Gain bonus points by"
2280PRINT"climbing the final ladder ."
2290PRINTCHR$130;"Press SPACE BAR to continue..";
2300REPEAT UNTIL GET=32
2310CLS
2320PRINT"   To control your man use the following"
2330PRINT"keys : -"
2340PRINTTAB(15);CHR$130;"Z _ LEFT"
2350PRINTTAB(15);CHR$130;"X _ RIGHT"
2360PRINTTAB(15);CHR$130;"/ _ DOWN"
2370PRINTTAB(15);CHR$130;": _ UP"
2380PRINTTAB(10);CHR$130;"RETURN _ JUMP"
2390PRINT"   One final note, becareful near the"
2400PRINT"edges of the girders as fireballs are"
2410PRINT"likely to appear there as the fire"
2420PRINT"spreads throughout the building."
2430PRINTCHR$130;"Press SPACE BAR to continue..";
2440REPEAT UNTIL GET=32
2450ENDPROC
```

(continued from page 113)

the top right hand corner. As the game progresses, more and more fireballs appear, and must be avoided at all costs. To move your man, use the following keys: Z left; X right; : up; / down; Return jump.

As the program uses many of the special features of the BBC Micro, it would be difficult to convert to any other computer. For those of you who are interested in modifying the program, I will give a brief description of what the main parts do.

Lines	Description
60	Trap any errors in the program
70 to 100	Print the title
110 to 140	Print instructions if required
150 to 170	Define sound envelopes
180 to 420	Define user characters
430	Read in machine code
450	Set up main variables for machine code
470	Make cursor invisible
480	Set up main variables for game
490	Print screen
500	Move fireballs
510 to 520	Have you stepped on a fireball?
530 to 570	Move your man
610	Define graphics window
620	Update score
630 to 640	Read character at given co-ordinates
650 to 1780	Print screen
780 to 800	Print girders
810 to 920	Print ladders
950 to 1020	Put gaps in girders
1090 to 1110	Add yellow blocks to screen
1130 to 1230	Set up fireballs
1290	Delay loop
1300	Plot man
1310 to 1330	Move man left
1340 to 1360	Move man right
1370 to 1400	Move man up
1410 to 1430	Move man down
1440 to 1530	Jump up
1540 to 1580	Jump to left
1590	Plot man jumping to left
1600	Plot man jumping to right
1610 to 1650	Jump to right
1660 to 1680	Move fireballs
1690 to 1700	Fall down a gap
1710 to 1790	Collect a yellow block
1800	Go on to next screen
1810 to 1820	Update bonus timer
1830	Print in double height writing
1840 to 1890	Your man has died
1900 to 1930	Print your score and the high score
1940 to 1970	Play another game if required
2000	Read in machine code from data
2010 to 2100	Machine code in data
2130	Check for no errors in data
2150 to 2450	Print instructions

The main variables used in the program are as follows:

A$	General input
move	Pointer to machine code to move fireballs
poke	Pointer to machine code to Poke fireballs on screen
XP	Pointer to x positions of fireballs
YP	Pointer to y positions of fireballs
DI	Pointer to movement directions of fireballs
S%	Your score
W%	Screen number
M%	Number of men left
CH	Chance of a new fireball appearing
X1%	Your x position
Y1%	Your y position
k%	Whether a key has been pressed
U%	Character to be printed for the man
L%	Number of yellow blocks left

To save memory, I have removed all unnecessary spaces from the program, so when typing in the program, do not add extra spaces. I also stored the machine code in pages 9 and 10. These pages are only used occasionally, so it is quite safe for a temporary store of machine code.

I have managed to test the program on both the 0.1 O.S. and the 1.2 O.S., with success, so the program should, hopefully, work on all versions. One final note, I have included a test in line 2130 to trap any errors in the data, before it is too late. I suggest that you include this line, otherwise the program could be overwritten by the machine code. ■

Learning is fun with Ollie Octopus

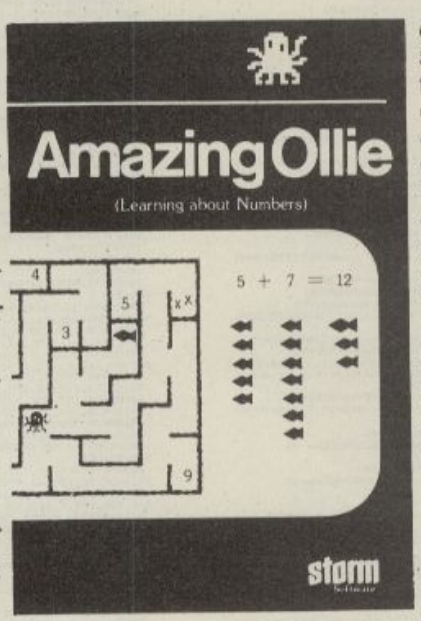
Top quality educational software

Widely used in schools

Ideal for 4-8 year olds

BBC Model B and 16K/48K ZX Spectrum

FREE badge with every program



Ollie Octopus' Sketchpad. Drawing tablet to stimulate children's creative abilities, 8 colours. 8 directions of movement. Build triangles, squares and circles to enlarge, reduce and shade in. With simple On-Screen instructions.

Amazing Ollie. Entertaining program to improve numerical skills and hand-eye co-ordination. Move Ollie Octopus through maze to catch fish, with options for basic recognition and counting of numbers, addition and "Beat-the-Clock!"



storm

Available from selected branches of Boots, and all leading computer shops. Trade availability from Websters Software Directory. In case of difficulties, order direct, at £6.95+40p P&P (inc. VAT), from:

Storm Software,
Winchester House,
Sherborne, Dorset.
0935 813528

Self Adhesive Cassette Labels

- ★ IDEAL FOR THE SOFTWARE COMPANY
- ★ AVAILABLE IN ROLL OR SHEET FORMAT
- ★ NEW RANGE OF TINTED LABELS
- ★ 24 Hr SERVICE FROM STOCK
- ★ 48 Hr SERVICE ON CUSTOM PRINTED LABELS

CASSETTE LABELS ON A4 SIZE SHEETS
White only, suitable for small offset printing or photocopying

100 Labels	£3.50
200 Labels	£6.00
300 Labels	£8.25
400 Labels	£10.00
500 Labels	£12.00

CASSETTE LABELS ON ROLLS
Complete with tractor feed perforations to allow use in most computer printers. Now available in white or tinted blue, pink, green or yellow.
Minimum order 500 labels

	500 labels	1000 labels	2000 labels
WHITE	£14.66	£20.70	£31.05
TINTED	£16.90	£24.15	£37.95

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

HIRE SPECTRUM SOFTWARE

CHOOSE FROM OUR VAST RANGE

FREE 26 page CATALOGUE with full details of our range of over 280 different programs for the ZX SPECTRUM. All hired with the consent of the publishers. Whether you prefer to ZAP aliens, get lost in an ADVENTURE game, EDUCATE your children, CALCULATE the family finances or COMPILE machine code programs WE HAVE THE RIGHT TAPES FOR YOU TO HIRE.

FAST SERVICE

We stock up to 60 manufacturers' original copies of each tape (over 3000 tapes in stock), and can normally despatch your tapes the day we receive your order, and we always use first class post.

LOWEST PRICES

We believe our prices are the lowest of any library, yet we offer the LARGEST range of titles. Hire up to 3 tapes at a time, for 2 weeks, for only £1.07 each (inc. VAT & p&p).

FREE TAPE HIRE

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



NATIONAL SOFTWARE LIBRARY

200 Mulgrave Road,
Cheam, Surrey SM2 6JT

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

Name _____

Address _____

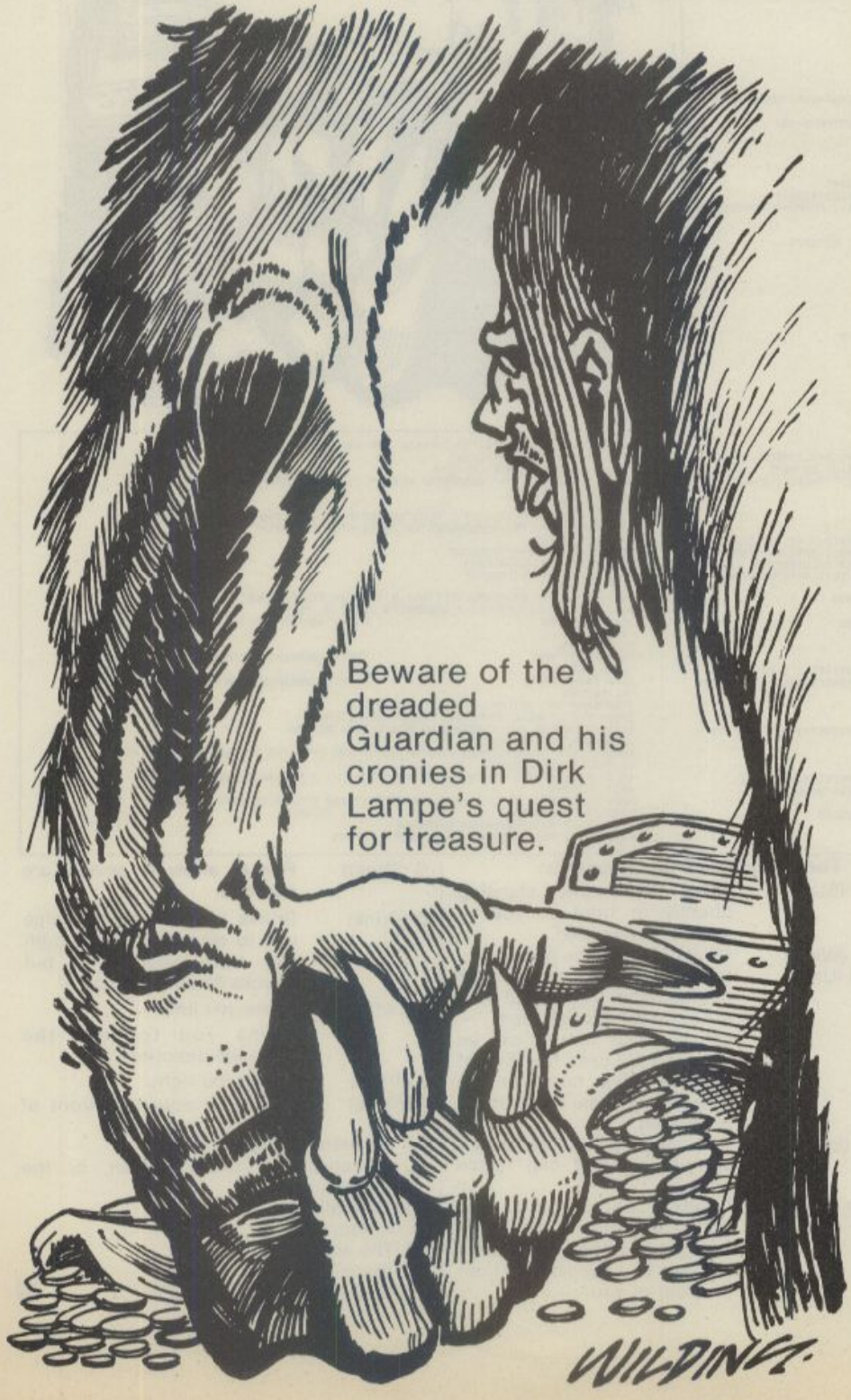
_____

YC6

THE GUARDIAN

```
1 POKE649,1:M=RND(-TI:
10 DATACLOAK OF INVISIBILITY,SWORD OF INVINCIBILITY,GLASS OF PROPHESY,RING OF ST
RENGTH
20 DATARING OF HEALING,KEY OF TREASURE,STAFF OF WISDOM,SHIELD OF DEFENCE
30 DATAHELMET OF SIGHT,MASK OF POWER
40 DATAGOBLIN,VAMPIRE,TROLL,GIANT,WIZARD,THE GUARDIAN
50 DATA20,50,100,150,300,5,30,200,2,2,10,30,25,75,10
110 INPUT"DIFFICULTY";D:NM=10*D+INT(RND(1)+1)+11:FORI=1TO5:CC$=CC$+CHR$(RND(1)*1
0+48)
120 NEXT:DIMM$(5),T$(9),C(5),T(9,2),M(NM+1,1),S(5),P$(9),W(9),D(5,3)
130 FORI=0TO9:READT$(I):NEXT:FORI=0TO5:READM$(I):NEXT:FORI=0TO4:READS(I):NEXT
135 FORI=0TO9:READW(I):NEXT
140 S=100:AA=20:EL=10:LE=1:SS=PEEK(648)*256:PO=SS+7*22+10:CL=30720-(SSC)7680:*30
72
150 FORI=0TO9:T(I,0)=(INT(RND(1)*5)+1:M(I,0)=T(I,0):T(I,1)=INT(RND(1)*10)
160 M(I,1)=T(I,1):NEXT:FORI=0TO9:T(I,2)=SS+7*22+5+INT(RND(1)*12)*22+INT(RND(1)*1
2):NEXT
165 FORI=10TONM:M(I,0)=INT(RND(1)*5)+1:M(I,1)=INT(RND(1)*10):NEXT
170 A=114:WT=80:T(7,0)=5-INT(RND(1)+.5)
180 M(7,0)=T(7,0)
200 PRINT"[CLR][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN]";
250 PRINTTAB(4)"[RVS] [OFF]
260 FORI=1TO12:PRINTTAB(4)"[RVS] [OFF]":NEXT
270 PRINTTAB(4)"[RVS] [OFF]
275 FORI=0TO9:IFT(I,0)<>LEORT(I,1)<>RMTHEN279
276 C=T(I,2)
277 IFPEEK(648)*256+161ORC=POTHENT(1,2)=T(I,2)+1:GOTO276
278 POKET(I,2),42
279 NEXT
280 IFRM<7THENPRINT"[DOWN]"TAB(10)"X"
290 IFRM<0ANDRM<>3ANDRM<>6ANDRM<>9THENPRINT"[RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][OFF]"TAB(17)"X"
300 IFRM>2THENPRINT"[RVS][RVS][RVS][RVS][RVS][RVS][RVS][OFF]"TAB(10)"X"
310 IFRM<>0ANDRM<>1ANDRM<>4ANDRM<>7THENPRINT"[RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][RVS][OFF]"TAB(4)"X"
320 IFRM=0THENPRINT"[RVS][RVS][RVS][RVS][RVS][RVS][RVS][OFF]"TAB(5)"UP":IFLE=1THENPRINT"[DOWN]"TAB(5)"U "
330 IFLE=5ANDRM=0THENPRINT"[DOWN]"TAB(5)" D"
340 IFLE=5ANDRM=7THENPRINT"[DOWN]"TAB(5)"D+++D"
361 PRINT"[RVS]LEVEL"LE:PRINT"[DOWN]"TAB(10)"ROOM  "RM
370 GOSUB3650:GOSUB3660:GOSUB3670
376 IFV=9ANDLE=5THENV=0:GOSUB9900:PRINT"[RVS][RVS][RVS][RVS][RVS][RVS][OFF]MIDDLE M0S "MID$(CC$,2,3)
```

(listing continued on next page)



DEEP IN AN immense, dark and unexplored jungle, far away in another Galaxy stands a house who's unearthly builders have long since been forgotten. Rumours ooze forth from the house, rumours of horror and oppressing terror — and consistently, a tale of incalculable wealth and treasure trove of wisdom hidden deep within the evil recesses of the house.

The treasure is guarded by a completely evil and merciless creature — the Guardian — who need never sleep or rest, and watches constantly over the safe containing the treasure. You have learnt also that the safe is on the fifth floor of the house, and even that it is in room seven of that floor.

In the house lie 10 other treasures which may help you in your quest for the treasure, but each treasure is guarded by a servant of the Guardian — goblins, vampires, trolls, giants and wizards in increasing order of strength and power — who must be killed before the treasure they guard can be stolen.

The house itself is made up of five floors of 10 rooms, organised as follows:

		0
1	2	3
4	5	6
7	8	9

There are 10 items of treasure, as already mentioned, scattered around the house, which may be of use to you. They are:

0 Cloak of Invisibility	No goblin, vampire, troll or giant can see you when this is worn.
1 Sword of Invincibility	Helps kill your adversaries.
2 Glass of Prophecy	Tells you the first number of the safe's combination.
3 Ring of strength	Reinvigourates you.
4 Ring of healing	Heals your wounds.
5 Key of treasures	In combination with the safe combination, will open the safe.
6 Staff of wisdom	Glows when enemies are present on your floor.
7 Shield of defence	Protects you from your foe's blows.
8 Helmet of Sight	If used within 30 seconds of the Guardian's death in the

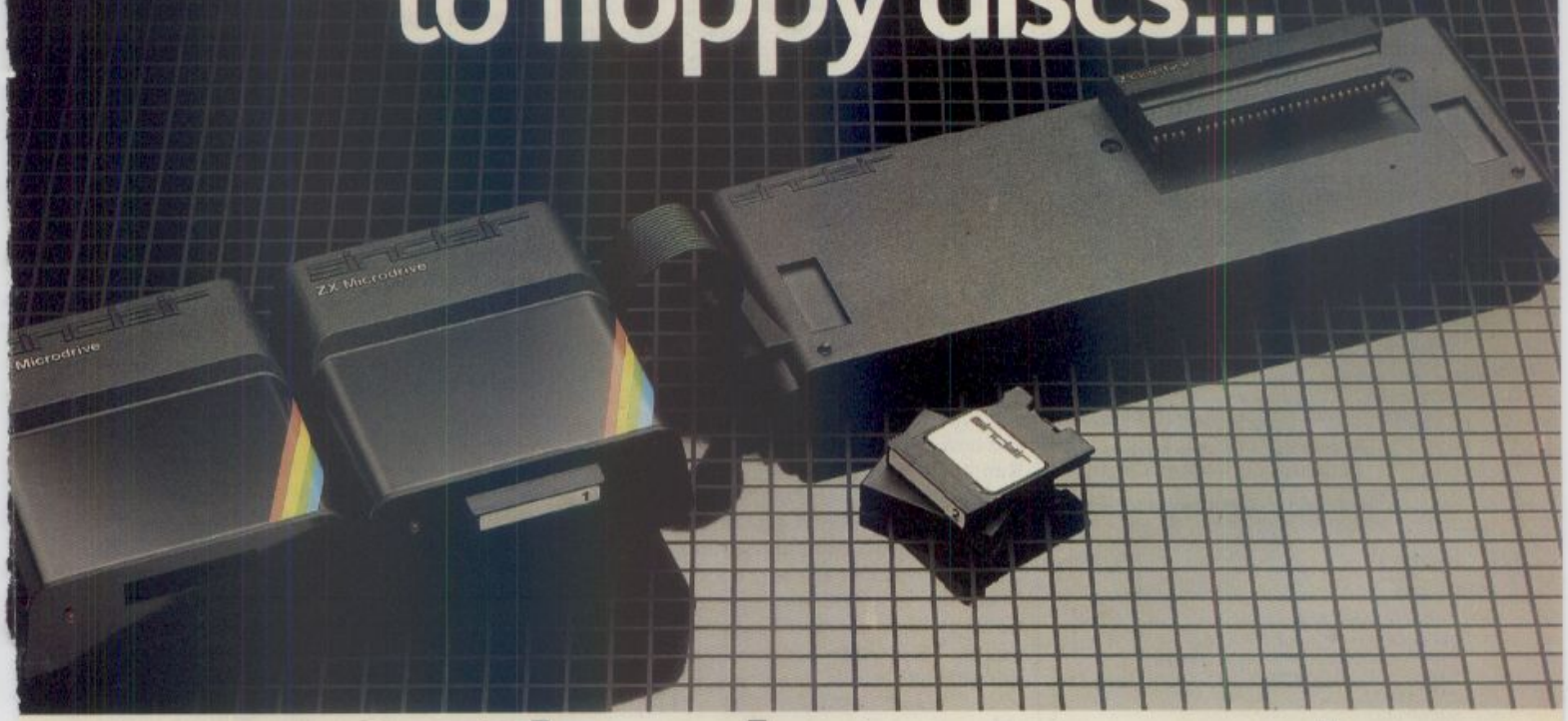
(continued on next page)

(listing continued from previous page)

```
380 REM
381 IFWD100THENSTOP
382 IFSG20*RND(1)OR(D>80+20*RND(1)THEN1000
384 IFOG$="DEAD"ANDT!$)"000030"THENSTOP
385 B=-(((A=107)*1)+((A=113)*-22)+((A=114)*22)+((A=115)*-1))
386 A$=RIGHT$(T1$,1):IFINT(ASC(A$)/3)=ASC(A$)/3THEN389
387 IFU=0THENFORI=10TONM:IFM(I,0)<>0THENM(I,0)=INT(RND(1)*5)+1:M(I,1)=INT(RND(1)
*10)
388 IFU=0THENNEXT
389 GETA$:IFA$=""THEN1000
390 IFA$<>"I"THEN410
400 FORI=0TO9
402 GOSUB9900:PRINT"■■■■■■"P$(I);:FORJ=1TO1500*((P$(I)="")+1):NEXT:NEXT
410 IFA$<>";"THEN430
420 A=-(((A=107)*114)+((A=113)*107)+((A=114)*115)+((A=115)*113))
430 IFA$<>"L"THEN450
440 A=-(((A=114)*107)+((A=107)*113)+((A=115)*114)+((A=113)*115))
450 IFA$<>":"THEN470
460 A=-(((A=107)*115)+((A=113)*114)+((A=114)*113)+((A=115)*107))
470 P=0:IFA$<>"1"THEN510
490 P=1:IFPEEK(PO+B)=32THENPOKEPO,32:PO=PO+B:GOTO1000
495 IFPEEK(PO+B)=21ORPEEK(PO+B)=4THEN4000
500 W=W+1:GOSUB9000:GOSUB3650
510 IFA$<>"U"THEN570
520 T1$="000000"
530 GETA$:IFA$=""ANDT!$("000001"THEN530
540 IFA$=""THEN570
550 IFP$(VAL(A$))=""THEN570
560 ONVAL(A$)+1GOSUB3000,3100,3200,3300,3400,3500,3600,3700,3800,3900
570 IFA$<>"G"THEN610
580 IFPEEK(PO+B)<>42THEN610
590 FORI=0TO9:IFPO+B=T(I,2)ANDT(I,0)=LEANDT(I,1)=RMTHENC=I:I=9
595 NEXT
600 POKEPO+B,32:GOSUB9900:PRINT"■■■■■■"T$(C);P$(C)=T$(C):WT=WT+W(C):T(C,0)=0:GOS
UB3660
610 IFA$<>"P"THEN690
620 T1$="000000"
630 GETA$:IFA$=""ANDT!$("000001"THEN630
640 IFA$=""THEN680
650 IFP$(VAL(A$))=""THEN680
655 C=VAL(A$)
660 IFPEEK(PO+B)<>32THEN680
670 POKEPO+B,42:P$(C)="":T(C,2)=PO+B:T(C,0)=LE:T(C,1)=RM:WT=WT-W(C):GOSUB3660
680 IFA$<>"D"ORELC1THEN720
690 EL=EL-1:S=S+INT(RND(1)*10)+20:SC=SC-50:GOSUB3660:IFS>100THENS=100
700 W=W+INT(RND(1)*10)-20:IFW<0THENW=0
710 GOSUB3670
720 IFA$<>"O"ORU<>0THEN760
730 IFPEEK(PO+B)<>86THEN760
735 PO=PO-SS:I$="":MA$="":SH$="":IN$="":U=0:IFOG$="A"THENOG$=""
740 PO=-(((PO=406)*164)+((PO=269)*200)+((PO=164)*406)+((PO=200)*269))
750 C=(((PO=406)*3)+((PO=269)*-1)+((PO=164)*-3)+((PO=280)*1)):PO=PO+SS:RM=RM+C:G
OTO200
760 C=PO:IFA$<>"S"ORAA<1THEN790
770 C=C+B:IFPEEK(C)=32THENPOKEC,46:FORJ=1TO50:NEXT:POKEC,32:GOTO770
780 IFPEEK(C)=65THENPOKEC,32
785 AA=AA-1:GOSUB3670
790 IFA$<>"A"THEN1000
800 S=S-2*RND(1):A$="SWOOSH":IFPEEK(PO+B)=65THENA$="THWUNK"
810 GOSUB9900:PRINT"■■■■■■"A$
820 IFPEEK(PO+B)=65THENPOKEPO+B,32
1000 POKEPO,A:POKEPO+CL,6
1002 W=W-RND(1)/5:S=S+RND(1)/5:S=S+(P=1)*(WT-80)/25*RND(1)/5
1004 IFW<0THENW=0
1006 IFS>100THENS=100
1011 GOSUB3650
1015 IFU<>0THEN1060
1020 FORI=0TONM:IFRM=M(I,1)ANDLE=M(I,0)THEN1025
1024 GOTO1030
1025 U=U+1:D(U,0)=1
1030 NEXT
1040 IFU=0THEN1155
1050 FORI=1TOU:C=INT(RND(1)*5):GOSUB9950:PRINTM$(C);D(I,1)=C:D(I,2)=S(C):V=C
1055 D(I,3)=SS+159+INT(RND(1)*12)*22+INT(RND(1)*12):POKED(I,3),65:NEXT
1060 FORI=1TOU:IFPEEK(D(I,3)<>65THEND(I,2)=D(I,2)/2:IFIN$<>""THEND(I,2)=D(I,2)/
2
1061 NEXT
1062 FORI=1TOU:IFI$<>""ANDD(I,1)<4THEN1150
1063 IFMA$<>""ANDD(I,1)<3THEN1150
1065 X=D(I,3):IFPO-X>11ANDPEEK(X+22)=32THENPOKEX,32:D(I,3)=D(I,3)+22:GOTO1089
1070 IFPO-X<=11ANDPEEK(X+1)=32ANDPO-X<0THENPOKEX,32:D(I,3)=D(I,3)+1:GOTO1089
1085 IFPO-X<=11ANDPEEK(X-22)=32THENPOKEX,32:D(I,3)=D(I,3)-22:GOTO1089
1087 IFPO-X<0ANDPO-X>=-11ANPEEK(X-1)=32THENPOKEX,32:D(I,3)=D(I,3)-1:GOTO1089
1089 POKED(I,3),65:X=D(I,3)
1090 C=0:FORJ=-1TO1:IFPEEK(X+J)>106ANDPEEK(X+J)<160THENC=999
1091 NEXT
1092 FORJ=-21TO-23:IFPEEK(X+J)>106ANDPEEK(X+J)<160THENC=999
1093 NEXT
1094 FORJ=21TO23:IFPEEK(X+J)>106ANDPEEK(X+J)<160THENC=999
1095 NEXT
1100 IFC=999ANDSH$<>""THENS=S-(RND(1)+.25)*2*D(I,1):W=W+RND(1)*D(I,1)/2
1110 IFC=999ANDSH$=""THENS=S-(RND(1)+.25)*4*(D(I,1)+1):W=W+RND(1)*4*(D(I,1)+1)*(
D+1)
1150 NEXT
1155 IFU<>0ORLE<>5ORRM<>7ORO0$<>""THEN1159
1156 U=1:D(1,0)=NM+1:D(1,1)=5:D(1,2)=200000:D(1,3)=SS+337:GOSUB9950:PRINTM$(5):V
=5:OG$="A"
1157 GOTO1000
1159 IFU=0THEN380
1160 C=0:FORI=1TOU:IFD(I,2)<10THENN(D(I,0),0)=0:GOSUB9950:PRINTM$(V)" DEAD."
1170 IFD(I,2)<10ANDI=UTHENC=999:IFD(I,1)=5THENOG$="DEAD":T1$="000000"
1180 IFD(I,2)<10ANDI<>UTHENC=100
1190 IFD(I,2)<10THENPOKED(I,3),32:SC=SC+(D(I,2)+1)*10:GOSUB3660
1200 NEXT:IFC=999THENU=U-1:GOTO380
1210 IFC=0THEN380
1220 FORI=1TOU:POKED(I,3),32:NEXT:U=0:GOTO380
3000 I$="INVISIBLE":RETURN
3100 IN$="INVINCIBLE":RETURN
3200 GOSUB9900:PRINT"■■■■■■THE NUMBER IS "LEFT$(CC$,1):RETURN
3300 S=100:RETURN
3400 W=0:RETURN
3500 IFRM<>7ORLE<>5ORO0$<>"DEAD"ORPEEK(PO+B)<>171THENRETURN
3510 GOSUB9900:PRINT"■■■■■■ENTER COMBINATION":A$(0)=""
3520 FORI=1TO5
3530 GETA$:IFA$=""THEN3530
3540 A$(0)=A$(0)+A$:NEXT
3550 IFCC$=A$(0)THENSTOP
3560 RETURN
3600 A$="NO":FORI=0TONM:IFLE=M(I,0)THENA$="STAFF GLOWS"
3610 NEXT:GOSUB9900:PRINT"■■■■■■"A$:PRINT"■";:RETURN
3650 PRINT"■■                    ";:PRINT"■■STRTH"INT(S)"TWOUNDS
"INT(W)
3655 RETURN
3660 PRINT"■■■                   ";:PRINT"■■■GHT "WT:PRINT":"TAB(10)"SCORE"IN
T(SC):RETURN
3670 PRINT"■■■■                  ";:PRINT"■■■■RROW"AA:PRINT":"TAB(10)"ELIXIR
"EL:RETURN
3700 SH$="ON":RETURN
3800 IFRM<>7ANDLE<>5ANDOG$<>"DEAD"THENRETURN
3810 GOSUB9900:PRINT"■■■■■■RIGHT$(CC$,1):RETURN
3900 MA$="ON":RETURN
4000 IFPEEK(PO+B)=21THENPRINT"■":GOSUB3600:IFA$="NO"THENLE=LE+1:RM=0:PO=PO+1:A=1
14:B=22:Y=9:GOTO200
4010 IFPEEK(PO+B)=4THENLE=LE-1:RM=0:PO=PO-1:A=114:B=22:S=S-1:GOTO200
4020 GOTO380
9000 POKE36878,15:POKE36877,230:FORI=1TO100:NEXT:POKE36877,0:RETURN
9900 PRINT"■■■■■■                ";:RETURN
9950 PRINT"■■■■■■
```

Sinclair ZX Microdrives and ZX Interface 1

The affordable alternative to floppy discs...



...in the shops, now!

The unique ZX Microdrive system sets the ZX Spectrum apart from all other computer systems.

At a fraction of the cost of floppy discs, it gives fast access to 85K of program and data on Microdrive cartridges. And it opens up exciting possibilities through an RS232 interface and local area network.

ZX Microdrives – the fast way to save or load 85K of program and data. £49.95

ZX Microdrives are controlled by ZX Interface 1.

For their compact size, they're massively powerful. Each interchangeable Microdrive cartridge stores at least 85K of program and data!

You can create up to 50 files on the cartridge – identified by titles of your own choice.

And when you want to display the data again, Microdrives give you lightning-fast access:

- Just 3.5 seconds to access a typical file.
- Only 9 seconds to LOAD a typical 48K program.

ZX Microdrives use the Spectrum's own power supply.

Your first Microdrive is connected to Interface 1 by a Microdrive lead. Then, up to 7 more Microdrives can be added using Microdrive connectors. That gives you a minimum of 680K bytes of on-line capacity.

With memory like that, the possibilities are limitless – stock control, word-processing, even huge adventure games!

With each Microdrive, you'll receive a Microdrive connector and Microdrive demonstration cartridge. Blank Microdrive cartridges cost £4.95 each. They are available in packs of 4 (with a free cartridge wallet) or singly.

ZX Interface 1 – the multi-purpose controller. £49.95

ZX Interface 1 is a multi-purpose device. It controls up to 8 Microdrives. And it adds file-handling and communication facilities to your Spectrum.

So in one low-priced unit, you also get these two built-in features:

- **RS232 interface** This industry standard interface allows you to link your Spectrum with full-size printers, communicate with other computers employing RS232, and transmit data over telephone lines via modems.
- **The ZX Net** Now you and your friends can transfer programs and data on a local area network – or even play computer games together.

The ZX Net makes it easy, and fast!

It links between 2 and 64 Spectrums, transmitting at 10,000 characters per second. (So a full screen is transferred in around 3 seconds!) With the ZX Net, only one person need type in a program. And a Microdrive or printer can be shared by everyone in the network!

ZX Interface 1 offers you all these facilities, and retains the same peripheral port as the Spectrum itself.

With each ZX Interface 1, you'll receive a connecting lead for the first Microdrive; a ZX Net lead with jack plugs, plus a comprehensive manual.

An RS232 lead is available as an optional extra at £14.95.

Available from: larger branches of Boots • WH Smith Computer Stockists • Greens Computer Centres • Spectrum Computer Stores • and larger branches of John Menzies • Dixons • Laskys • Currys • John Lewis Partnership • Rumbelows • British Home Stores • House of Fraser and many other good computer stockists nationwide.

Find out more – in your local shop!

The best way to evaluate ZX Microdrives and Interface 1 is to see them for yourself.

There is a full range of ZX peripherals – including ZX Interface 2 for joystick and ROM Cartridge capability, alongside the only computer that supports them – the ZX Spectrum!

For more information, telephone Sinclair Research Ltd, on 0276 685311.

™ Sinclair, ZX, ZX Spectrum, ZX Microdrive, ZX Net and ZX Interface are trade marks of Sinclair Research Ltd.

sinclair

Listing 1.

```
10PIX1=&80:PIX2=&81:BYTE=&82:MEM1=&8A
20FORI%=0 TO3 STEP3
30P%=&C20
40[OPTI%
50LDX #4:STA MEM1
60LDA #0:STA BYTE
70.LOOP
80LSR PIX2:BCC L1
90LDA MEM1:ORA BYTE:STA BYTE
100.L1
110ASL MEM1:LSR PIX1:BCC L2
120LDA MEM1:ORA BYTE:STA BYTE
130.L2
140ASL MEM1:DEX:BNE LOOP
145RTS:]
150NEXT
160VDU23,224,16,32,64,254,254,64,32,16
170VDU23,225,24,60,90,90,24,24,24,24
180VDU23,226,24,24,24,24,90,90,60,24
190VDU23,227,0,126,66,90,90,66,126,0
```

Listing 2.

```
   OREM LEFT SCROLL
  10SCRFROM=&70:SCRTO=&72:MEM1=&78:M
EM2=&79:MEM3=&7A
  20FORI%=0 TO2 STEP2
  30P%=&D25
  40[OPTI%
  50LDA &7:STA SCRTO+1:STA SCRFROM+1
  60LDA &6:STA SCRTO:LDA #32:CLC
  70ADC &6:STA SCRFROM:BCC L8
  80INC SCRFROM+1
  90.L8
 100LDA #8:STA MEM2
 110.L6
 120LDX #224
 130LDA #0:STA MEM1
 140.L1
 150LDY MEM1
 160LDA (SCRFROM),Y
 170STA (SCRTO),Y
 180INC MEM1
 190DEX:BNE L1
 200LDA #128:CLC:ADC SCRFROM:STA SCR
FROM:BCC L5:INC SCRFROM+1
 210.L5:INC SCRFROM+1:INC SCRFROM+1
 220LDA #128:CLC:ADC SCRTO:STA SCRTO
:BCC L7:INC SCRTO+1
 230.L7:INC SCRTO+1:INC SCRTO+1
 240DEC MEM2:BNE L6
 250RTS
 260]:NEXT
```

Listing 3.

```
   OREM RIGHT SCROLL
  10SCRFROM=&70:SCRTO=&72:
   MEM1=&78:MEM2=&79:MEM3=&7A
  20FORI%=0 TO2 STEP2
  30P%=&D75
  40[OPTI%
  50LDA &7:STA SCRTO+1:STA SCRFROM+1
  60LDA &6:STA SCRFROM:LDA #32:CLC
  70ADC &6:STA SCRTO:BCC L8
  80INC SCRTO+1
  90.L8
 100LDA #8:STA MEM2
 110.L6
 120LDX #224
 130LDA #223:STA MEM1
 140.L1
 150LDY MEM1
 160LDA (SCRFROM),Y
 170STA (SCRTO),Y
 180DEC MEM1
 190DEX:BNE L1
 200LDA #128:CLC:ADC SCRFROM:STA
       SCRFROM:BCC L5:INC S
       CRFROM+1
 210.L5:INC SCRFROM+1:INC SCRFROM+1
 220LDA #128:CLC:ADC SCRTO:STA
       SCRTO:BCC L7:INC SCRTO+1
 230.L7:INC SCRTO+1:INC SCRTO+1
 240DEC MEM2:BNE L6
 250RTS
 260]:NEXT
```

Listing 4.

```
  OREM SWAP
 10DAT=&70:NCHR=&72:LP=&74:MEM1=&76
 20FORN%=0 TO3 STEP3:P%=&DC5
 30[OPTN%
 40LDA #246:STA DAT:LDA #13:STA DAT+1
 50LDY #2:STY LP:INY:STY LP+1
 60LDY #0
 70.LOOP1
 80LDA (NCHR),Y:TAX:LDA (DAT),Y
 90STA (NCHR),Y:TXA:STA (DAT),Y
100INC NCHR:BNE L1:INC NCHR+1
110.L1
120INC DAT:BNE L2:INC DAT+1
130.L2
140DEC LP:BNE LOOP1
150DEC LP+1:BNE LOOP1
160RTS
170]:NEXT
```

THIS PACKAGE, which is comparable to any on the market today, allows you first to define characters for Mode 2 — using all 16 colours — up to 21 by 21 pixels in size and then use these as interrupt-controlled sprites — they move independently of any programs also Running — which may be animated with up to 20 frames, be enlarged and shrunk to create 3D effects and which support full collision detection whereby a sprite may go into a termination sequence of frames, for example, on hitting another sprite.

If you have discs then you must revert to tapes as the disc memory space is used heavily by the system.

To type in the character definer first enter listing 1 and check it carefully. Save the program and Run it. If all is well type New as a direct command — do not perform a hard reset or switch off the computer — and enter, Save and Run listing 2. Type New and continue this process until listing 6. After Running this program type as a direct command

*SAVE"CODE" C00 + 1FF

Type New and type in listing 7 and Save it after checking. Run the program and save the code it produces using

*SAVE"CHARPRT" 1600 + FF

as a direct command. Now type New and enter listing 8. Save it and make a copy of Code and Charprt in that order just after it. Press Break and type in listing 9. Save this after Charprt and now the character definer is complete. To Run it Chain it from listing 8.

Now press Break and type

PAGE = &2000

and New as direct commands prior to typing in listing 10 which is the actual sprites routine. Check this very carefully, Save it and Run it. Now type New and enter listing 11, Save it and Run it. To save the code produced by these two programs use as direct commands:

*SAVE"SPRITES" E00 + 4FF

and

*SAVE"CHARVIEW" C00 + 30

Type New and enter and Save listing 12. After it make a copy of Sprites and Charview and the sprite definer is complete.

Follow the instructions on the screen to get the grid on which to draw the character. The movement keys — Z, X, / and : — move the cursor over the grid and the commands Fill — F — and Delete — D — cause the pixel under the cursor to take on the cursor's colour or become blank.

SCROLL: If your character is larger than 8 by 8 you can draw on the rest of the character by pressing S and using the movement keys to move the 8 by 8 window over the relevant part of the character.

TURN: This rotates the character a quarter of a revolution anticlockwise but only if the character has equal height and width. If not this command does nothing

REFLECT: If vertical half is selected this command copies the left half of the character on to the right and if horizontal half is selected the top half of the character is copied on to the bottom. If vertical whole is chosen the character inverts about a line vertically through its centre and if horizontal whole is chosen the character inverts about a line horizontally through its centre.

SWAP: Up to four characters may be held in memory simultaneously. Character 0 is the one you see and may alter but to operate on the other characters you may swap character 0 with characters 1 to 3.

When swapping always swap the character back to where it originated or you will lose track of it. For example, to operate on character 1 and then on character 2: Swap 0 and 1 — operate on character 1; Swap 0 and 1; Swap 0 and 2 — operate on character 2; Swap 0 and 2.

SAVE: Uncompiled — this saves character 0 so that it may be loaded using the program's Load routine so that it may be operated on later. Compiled — this saves the character in the shorter form used by the routine to print on to a Mode 2 screen. It also strips the character of any blank rows and columns before saving so it is always worth using a square character larger than needed to allow Turning so that you know excess rows and columns will not be saved with the compiled character.

After saving your characters note the order they are on the tape because when loading you will not be able to see the filename.

LOAD: This loads uncompiled code only into next free character space i.e., the one after the last one used. If all the characters are being used you will be prompted to enter which one you wish to overwrite, if any.

You are always prompted for the filename of the data to be loaded so always note this when saving a character.

QUIT: This quits on the current character

Listing 8.

```
10MODE7
20PRINTTAB(9,1)CHR$130;STRING$(18,"_")
30FORNX=2 TO3:PRINTTAB(7,NX)CHR$141"
Character definer.":NEXT
40PRINTTAB(9,4)CHR$130;STRING$(18,"_")
45VDU28,11,22,30,20
50*LOAD"" C00
60*LOAD"" A00
70PAGE=&1700:CHAIN""
```

Listing 7.

```
  OREM CHARACTER PRINT
 10LB=&70:HB=&71:HT=&72:WD=&73
 20XC=&74:YC=&75:CRDAT=&76
 30MEM1=&78:MEM2=&79:MEM3=&7A:MEM4=&7B
 40MEM5=&7C
 50FORI%=0 TO3 STEP3:P%=&1600
 60[OPTI%
 70LDA 3574:STA WD:LSR WD:LDA 3575:STA HT
 80LDA #248:STA CRDAT:LDA #13:STA CRDAT+1
 90LDA #44:STA XC
100LDA #7:STA YC
110\ LD HIMEM
120LDA 6:STA LB:LDA 7:STA HB
130LDA #0:STA MEM1
140ASL XC:BCC L1
150INC MEM1
160.L1:ASL MEM1:ASL XC:BCC L2
170INC MEM1
180.L2:ASL MEM1:ASL XC:BCC L3
190INC MEM1
200.L3:LDA XC:CLC:ADC LB
210STA LB:BCC L6:INC MEM1
220.L6
230LDA MEM1:CLC:ADC HB:STA HB
240LDA YC:STA MEM1
250LSR MEM1:LSR MEM1:LSR MEM1
260LDA MEM1:STA MEM2
270LSR MEM2
280BCC M1
290LDA #128:CLC:ADC LB
300STA LB:BCC M1
310INC HB
320.M1:LDA MEM2:CLC:ADC HB
330STA HB:ASL MEM1
340LDA MEM1:CLC:ADC HB:STA HB
350LDA YC:AND #7
360CLC:ADC LB:STA LB:BCC L4
370INC HB
380.L4
390LDY #0:LDX HT
400STX MEM1:STY MEM2
410.N1:LDY #0:STY MEM3:LDX WD
420.N2:LDY MEM2
430LDA (CRDAT),Y:STA &80
440INY:LDA (CRDAT),Y:STA &81
450INC MEM2:INC MEM2
460BNE N6:INC CRDAT+1
```

and allows you to redefine its height and width.

After defining and saving your characters use the following commands after switching the machine on to enter the program that allows you to define sprites.

```
PAGE = &2000
NEW
LOAD"listing 12"
*LOAD"SPRITES"
RUN
```

This program first loads in the character data that you saved using the previous program so after typing Run — as shown above — place the cassette with the character data on it into your tape player and press play. The program will say at what location in memory it is going to load the character so note this next to the character's filename.

After loading a character the program will ask you if you wish to load any more characters or stop. Continue loading until you have all the characters you are going to use and then stop. You should now have a list like the one below:

FILENAME	ADDRESS
Alien 1	4864
Ship	4900
Fruit	4950
etc . . .	

Once you have finished loading you may enter lines which control the sprite. This is done by entering Data lines starting at line no. 2 and going up in increments of two, the last data line being DATA 100 ie.,

```
2 DATA . . .
4 DATA . . .
6 DATA . . .
8 DATA 100
```

Data lines may extend up to line 48 which, if used, must be Data 100.

The Data lines consist of numbers separated by commas each of which controls a particular aspect of the sprite's motion. Each Data line controls one sprite — see figure 1.

After number 20 enter in the order you wish to be displayed the addresses of characters that will make up the sprite followed by the addresses of the characters that will make up the termination sequence. Up to 20 addresses in total may be entered after number 20.

After entering the Data lines type as a direct command Goto 50. This will make code you may *Save which on *Loading later will give you your sprites ready to use in your own program.

After typing Goto 50 you will be prompted for a start address at which to place the code that controls the sprites. After you loaded the

(continued on next page)



A sneak preview of the full sprite arcade game from next month's Bobby Rao article.

BBC SPRITES

Full collision detection, animation and independent movement in part 1 of Bobby Rao's sprites package.

Listing 5.

```
LOAD
   OREM COMPILE
  10DAT=3574:CRDAT=&76:CRDAT1=&78
  20HT=&72:WD=&73:WD1=&74
  30DIS1=&70:CNT=&71
  40PXBT=&C20
  50PIX1=&80:PIX2=&81:BYTE=&82
  60DIS2=&85
  70FORN%=0 TO3 STEP3
  80P%=&C46
  90[OPTN%
 100LDA #248:STA CRDAT:STA CRDAT1::
  LDA #13:STA CRDAT+ 1:STA CRDAT1+1
 110LDA #2:STA CNT
 120LDA #0:STA DIS1
 130.L1
 140LDA #0:STA DIS2
 150.L2
 160LDY DIS2
 170LDA (CRDAT),Y:STA PIX1
 180INY:LDA (CRDAT),Y:STA PIX2
 190JSR PXBT
 200LDY DIS1:LDA BYTE:STA (CRDAT1),Y
 210INC DIS1
 220INC DIS2:INC DIS2:BNE L2
 230INC CRDAT+1
 240DEC CNT
 250BNE L1
 260LSR DAT
 270RTS
 280]:NEXT
```

Listing 6.

```
   OREM SHORTEN
  10HT1=&85:CRDAT=&76
  20HT=&72:WD=&73:WD1=&74
  30WDS=&78:WDF=&79:HTS=&7A:HTF=&7B
  40DIS1=&70
  50FORN%=0 TO3 STEP3
  60P%=&C83
  70[OPTN%
  80LDA 3574:STA WD1:LDA 3575:STA HT1
  90LDA #248:STA CRDAT:LDA #13:STA CRDAT+1
 100LDA #0:STA WDS:STA HTS
 110LDA WD1:STA WDF:LDA HT1:STA HTF
 120LDY #0
 130LDA HT1:STA HT
 140.J2
 150LDA WD1:STA WD
 160.J1
 170LDA (CRDAT),Y:BNE N1
 180INY:DEC WD:BNE J1
 190INC HTS:DEC HT:BNE J2
 200.N1
 210LDY #255
 220LDA HT1:STA HT
 230.K1
 240DEC HTF
 250LDA WD1:STA WD
 260.K2
 270LDA (CRDAT),Y:BNE N2
 280DEY:DEC WD:BNE K2
 290DEC HT:BNE K1
 300.N2
 310LDY #0:STY DIS1
 320LDA WD1:STA WD
 330.L1
 340LDY DIS1
 350LDA HT1:STA HT
 360.L2
 370LDA (CRDAT),Y:BNE N3
 380TYA:CLC:ADC WD1:TAY
 390DEC HT:BNE L2
 400INC DIS1
 410INC WDS:DEC WD:BNE L1
 420.N3
 430LDY WD1:DEY:STY DIS1
 440LDA WD1:STA WD
 450.M1
 460DEC WDF
 470LDY DIS1
 480LDA HT1:STA HT
 490.M2
 500LDA (CRDAT),Y:BNE N4
 510TYA:CLC:ADC WD1:TAY
 520DEC HT:BNE M2
 530DEC DIS1
 540DEC WD:BNE M1
 550.N4:RTS
 560]:NEXT
```

```
 470.N6
 480STX MEM5
 490JSR &C20:LDA &82
 500LDX MEM5
 510LDY MEM3:STA (LB),Y
 520LDA #8:CLC:ADC MEM3:STA MEM3
 530DEX:BNE N2
 540INC YC:BNE R1:LDA HB:SEC:SBC #77:STA HB
       N5:DEC HB:BNE N5
 550LDA LB:SEC:SBC #135:STA LB:BCS
 560.R1:LDA #7:AND YC
 570BNE N3
 580LDA #121:CLC:ADC LB
 590STA LB:BCC N4
 600INC HB
 610.N4:INC HB
 620INC HB:BNE N5
 630.N3
 640INC LB:BNE N5
 650INC HB
 660.N5
 670DEC MEM1:BNE N1
 680RTS
 690]:NEXT
```

(continued from previous page)

code for the characters the program will have told you the next free address so enter this here. Also you will be prompted to enter the number of the first sprite so enter 1 here. To view your sprites use Goto 100 as a direct command.

Next month I will explain how sprites may be implemented in your own Basic programs and will give the listing for the fast arcade game shown on page 120. If you cannot be bothered to type in all the listings, they are available — together with the game — for £3.50 from B Bao, 12 Parkstone Close, Mowsbury Park, Bedford MK41 8BD.

Figure 1.

Position of number in Data line	Significance of number
1	Sets inital X-co-ordinate of sprite. This number can be between 0 — left-hand edge of screen — and 79 — right-hand edge of screen.
2	Sets constant X-axis displacement of sprite — i.e., distance it moves each time. Can be between −4 — left fast — and 4 — right fast.
3	Sets initial Y-co-ordinate of sprite. Can be between 0 — top of screen — and 255 — bottom.
4	Sets constant Y-axis displacement of sprite. Can be between −4 — up fast — and 4 — down fast.
5	Number of frames of animation of normal sprite. Must be 1 or more.
6	Number of frames of animation of sprite's termination sequence. Must be 1 or more. The above two numbers concern a facility that allows different characters to be displayed one after the other allowing animation.
7	Used internally. Set to 150.
8	Used internally. Set to 0.
9	Width magnification. Can be between 1 — normal width — and 4. When using this facility — i.e., when the number is larger than 1 — ensure that starting from the left ecge of the character every pair of pixels is of the same colour.
10	Internal use — set to 0.
11	Height magnification. Can be between 1 and 4. Works with any character — the restrictions for width magnification do not apply.
12	Internal use — set to 0.
13	Magnification increment. This sets by how much the width and height magnifications will increase every time the sprite moves. If set to 0 the sprite stays the size it was initially. If set to 1 the sprite doubles in both dimensions each frame. If set to 2 the sprite quadruples in both dimensions each frame. If the value is 128+ increment, when the width or height magnifications exceed 4 the value for the increment becomes negative so the sprite grows smaller again.
14	X- and Y-axis bounce. This controls the action of the sprite when it reaches the screen's edge.

X-axis	Y-axis	Action
0	0	Crosses edge to reappear on other side — wrap-round
1	4	bounces off edge like a ball
2	8	stops at edge
3	16	goes into termination sequence

Hence if the value here is 9 the sprite bounces off vertical — X-axis — edges and stops at horizontal — Y-axis — edges as 9 = 1 + 8.

15	X-axis random displacement. This may be set between 0 — no random displacement — and 3 — large random displacement — and determines how large a random number should be added to the constant X-axis displacement each frame.
16	Y-axis random displacement. May be between 0 and 3.
17	Hit colours. May be set between 0 and 255 and controls which colours a sprite may crash into and which it may just pass through. If set to 0 a sprite goes through every colour but if 255 it goes into termination sequence on touching any colour except black. The best way to use this facility is to set it to 192 which causes the sprite to crash into any flashing colour but pass through the rest.
18	Termination sequence duration. When a sprite is in termination this value tells it how long to go on repeating its termination frames before disappearing. The value must be greater than 128 so to make a sprite repeat three frames 20 times as its termination sequence set this value to 128 + (3 × 20) = 188.
19	Internal use — set to 0.
20	Internal use — set to 0.
21	Set this to the address of the character to be displayed first i.e., frame one of the sprite.
22	This may either be set to the character that is displayed second — frame two — or if the sprite only has one frame to the address of the first frame of the termination sequence.

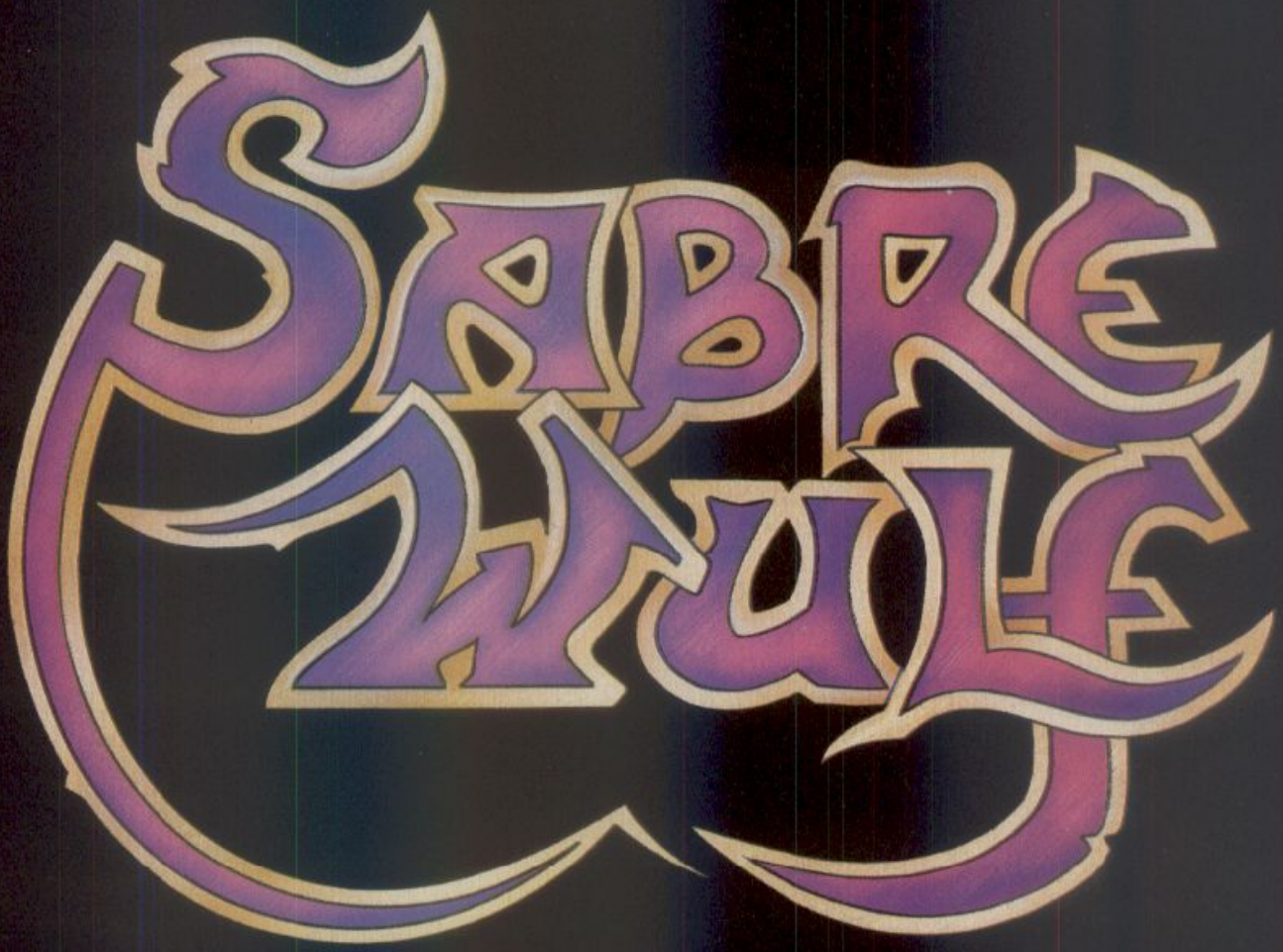
Listing 9.

```
    SHEN CHARACTER DEFINER
  10*FX220,0
  30DAT=3574:CHAR=3576:FREX=4088:FORNX=3576 TO5629 ST
EP4:!NX=0:NEXT
  70MODE7
  90PRINTTAB(8,1)CHR$141" Character definer."TAB(8,2)
CHR$141" Character definer."TAB(9,3)CHR$133;STRING$(18
,"_")
  110PRINTTAB(0,5)"     Please enter EVEN WIDTH only."

  130PRINTTAB(0,7)SPC(40)TAB(0,7)"Char. width (2 to 64
) <RETURN> ";:INPUTWDX
  150IFWDX<2 ORWDX>64 ORWDX AND1 GOTO130
  170PRINTTAB(0,9)SPC(40)TAB(0,9)"Char. height (1 to "
;!LL%=1513/WDX):IFLL%>64 LL%=64
  190PRINT;LL%") <RETURN> ";:INPUTHT%:IFHT%<1 ORHT%>LL
% GOTO170
  200PRINTTAB(0,11)"Sound on (Y or N)?";REPEAT:?0%=32:
A$=GET$:UNTIL A$="Y" ORA$="N"
  210IFA$="Y" SO%=-10 ELSESO%=0
  230?DAT=WDX:DAT?1=HT%
  250MODE2:VDU23;8202;0;0;0;
  260WD%=?DAT:HT%=DAT?1:PROCMATRIX:PROCPIC
  290CX%=0:CY%=0:CL%=0:SW%=0:CX0%=0:CY0%=0:CL0%=0:CCLO
%=0:PX%=0:X%=0:Y%=0
  310PROCLIN
  390REPEAT:PROCCURSOR:PROCKEY:COLOUR128:PRINTTAB(0,28
);BPC(40);:UNTILSW%
  470ON SW% GOTO70,250
  490DEFPROCMATRIX
  530FORNX=0 TO7:PRINTTAB(8,!X)CHR$(49+NX)TAB(N%,8)CHR
$(65+NX):NEXT
  550PRINTTAB(0,12);"Pixl";TAB(0,14);"Curs":PROCAROWCO
L(0):PRINTTAB(4,13)CHR$227:FORNX=1 TO15:COLOURNX+128:P
RINTTAB(NX+4,13);" ":NEXT:COLOUR128:COLOUR6
  630PRINTTAB(1,16)"+-Up /-Down 0-Quit"TAB(3,18)"Z-Lef
t X-Right"TAB(2,20)"F-Fill  C-Delete"TAB(2,22)"W-Swap
 C-Colour"TAB(1,24)"R-Reflect S-Scroll"TAB(0,26)"T-Turn L-Load V-Save"
  690GCOL0,6:MOVE704,960-HT%*4:DRAW704,988-HT%*4:MOVE6
96+WD%*8,960-HT%*4:DRAW696+WD%*8,988-HT%*4:MOVE712+WD%
*8,992:DRAW752+WD%*8,992:MOVE712+WD%*8,996-HT%*4:DRAW7
52+WD%*8,996-HT%*4
  750ENDPROC
  770DEFPROCGRID
  810FIX=7:FZ%=7
  830IFWD%<8 FIX=WD%-1
  850IFHT%<8 FZ%=HT%-1
  870BT%=FNBT:FORNX=0 TOFZ%:FORMX=0 TOFIX
  890COLOUR128+BT%?MX:PRINTTAB(MX,MX)" ":NEXT:BT%=BT%+
WD%:NEXT
  910COLOUR128:COLOUR7
  930ENDPROC
  950DEFPROCLIN
  970GCOL3,7
  1010PLX=704+X%*8:MOVEPLX,10:2:DRAWPLX,1000:MOVEPLX+56
,1012:DRAWPLX+56,1000:PLX=992-YX*4:MOVE664,PLX:DRAW688
,PLX:MOVE664,PL%-28:DRAW688,PL%-28
  1050ENDPROC
  1070DEFPROCPIC
  1090PROCGRID
  1130CALL &A00:ENDPROC
  1170DEFPROCUP
  1210VDU28,0,7,7,0:PRINTTAB(0,0);CHR$11:VDU28,0,31,19,
0:YX=YX-1:BOTX=FNBT
  1290FORNX=0 TO7:COLOUR128+BOTX?NX:PRINTTAB(NX,0);" ":
NEXT
  1310ENDPROC
  1330DEFPROCDOWN
  1350VDU28,0,7,7,0:PRINTTAB(0,7):VDU28,0,31,19,0:YX=YX
+1:BOTX=FNBT+WD%*7
  1450FORNX=0 TO7:COLOUR128+BOTX?NX:PRINTTAB(NX,7);" ":
NEXT
  1470ENDPROC
  1490DEFPROCLEFT
  1530IXX=XX-1:BOTX=FNBT:CALL &D75
  1570FORNX=0 TO7:COLOUR128+BOTX?(NX*WDX):PRINTTAB(0,NX
)" ":NEXT
  1590ENDPROC
  1610DEFPROCRIGHT
  1650XX=XX+1:BOTX=FNBT+7:CALL &D25
  1690FORNX=0 TO7:COLOUR128+BOTX?(NX+WDX):PRINTTAB(7,NX
)" ":NEXT
  1710ENDPROC
  1730DEFPROCCURSBL
  1750COLOUR128:PRINTTAB(9,CY0%);" "TAB(CX0%,9);" "TAB(
CL0%+4,14);" "TAB(CCL0%+4,12);" ":COLOUR128+PX%:PRINTT
AB(CX0%,CY0%);" "
  1790ENDPROC
  1810DEFPROCCURSOR
  1830PROCCURSBL:PROCAROWCOL(CL%)
  1870PRINTTAB(9,CY%);CHR$224;TAB(CX%,9);CHR$225;TAB(CL
%+4,14);CHR$225;TAB(0,14);"Curs"
  1930COLOUR128+?FNBYTE:IFCL%=0 COLOUR135:COLOUR?FNBYTE
  1970PRINTTAB(CX%,CY%);CHR$227:CCL%=?FNBYTE:PROCAROWCO
L(CCL%):PRINTTAB(CCL%+4,12);CHR$226;TAB(0,12);"Pixl"
  2050COLOUR128:COLOUR7:CX0%=CX%:CY0%=CY%:CL0%=CL%:CCLO
%=CCL%

  2070ENDPROC
  2090DEFPROCAROWCOL(C%)
  2130IFC%? COLOUR128 ELSECOLOUR135
  2150COLOURC%:ENDPROC
  2190DEFFROCKEY
  2210B$='ZX:/OFDSRTWLVQ"
  2230REPEAT
  2250?0%=32:*FX15,1
  2270A$=GET$
  2290UNTILINSTR(B$,A$)>0
  2310PRINTTAB(0,28);:PX%=?FNBYTE
  2320SOUND1,SO%,(XX+CX%)*4,1:SOUND1,SO%,(Y%+CY%)*4,1
  2350IFA$="Z" ANDCX%>0 CX%=CX%-1:ENDPROC
  2370IFA$="X" ANDCX%<WD%-1 ANDCX%<7 CX%=CX%+1:ENDPROC
  2390IFA$=":" ANDCY%>0 CY%=CY%-1:ENDPROC
  2410IFA$="/" ANDCY%<HT%-1 ANDCY%<7 CY%=CY%+1:ENDPROC
  2430IFA$="O" PROCCL:ENDPROC
  2450IFA$="F" ?FNBYTE=CL%:PROCPLT(CL%):ENDPROC
  2470IFA$="D" ?FNBYTE=0:PROCPLT(0):ENDPROC
  2490IFA$="S" PROCSCR:ENDPROC
  2510IFA$="R" PROCREF:ENDPROC
  2530IFA$="T" PROCTURN:ENDPROC
  2550IFA$="W" PROCSWAP:ENDPROC
  2570IFA$="L" PROCLD:ENDPROC
  2590IFA$="V" PROCSV:ENDPROC
  2610IFA$<>"Q" ENDPROC
  2615PRINT" You sure (Y or N)?";:REPEAT:?0%=32:A$=GET$:
IF A$="Y" FORNX=3574 TO4087:?NX=0:NEXT:SW%=1:ELSE UNTI
LA$="N"
  2620ENDPROC
  2670DEFPROCCCL
  2710PRINT"Use 'Z' and 'X' keys 'C' to return."
  2730REPEAT:?0%=32
  2750*FX15,1
  2760A$=GET$:SOUND1,SO%,CL%*16,1
  2770IFA$="Z" ANDCL%>0 CL%=CL%-1
  2790IFA$="X" ANDCL%<15 CL%=CL%+1
  2810PROCCURSOR
  2830UNTILA$="C"
  2850ENDPROC
  2870DEFPROCSCR
  2890PRINT" Use Z , X , : , /"'"   'C' to return.":PR
OCCURSBL
  2930REPEAT:?0%=32:A$=GET$:*FX15,1
  2950PROCLIN:SOUND1,SO%,(XX+CX%)*4,1:SOUND1,SO%,(Y%+CY
%)*4,1
  2970IFA$="Z" ANDX%>0 PROCLEFT
  2990IFA$="X" ANDX%<WD%-8 PROCRIGHT
  3010IFA$=":" ANDY%>0 PROCUP
  3030IFA$="/" ANDY%<HT%-8 PROCDOWN
  3050PROCLIN
  3070UNTILA$="C"
  3090PROCGRID:ENDPROC
  3130DEFPROCREF
  3170COLOUR7:PRINTTAB(0,28)"Horizontally (H) or   Vert
ically (V)?      'C' to return.":REPEAT:?0%=32:A$=GET$:
UNTILA$="H" ORA$="V" ORA$="C":IFA$="C" ENDPROC
  3190PRINTTAB(0,28)SPC(59)TAB(0,28)"Whole(W) or Half(H
)?":REPEAT:?0%=32:C$=GET$:UNTILC$="W" ORC$="H"
  3210PRINTTAB(0,28)SPC(40)TAB(0,28);:COLOUR2:IFC$="W"
PRINT"Whole ";ELSEPRINT"Half ";
  3230IFA$="V" GOTO3290
  3250COLOUR2:PRINT"Horizontally.":FORNX=0 TOHT%/2-1:BQ
1%=CHAR+NX*WD%:BQ2%=CHAR+(HT%-NX-1)*WD%:FORMX=0 TOWD%-
1:IFC$="W" BQX=BQ1%?MX:BQ1%?MX=BQ2%?MX:BQ2%?MX=BQX:ELS
E BQ2%?MX=BQ1%?MX
  3270NEXT:NEXT:GOTO3330
  3290COLOUR2:PRINT"Vertically (V)":FORNX=0 TOWD%/2-1:B
Q1%=CHAR+NX:BQ2%=CHAR+(WD%-NX-1):FORMX=0 TO(HT%-1)*WD%
 STEPWD%:IFC$="W" BQX=BQ1%?MX:BQ1%?MX=BQ2%?MX:BQ2%?MX=
BQX:ELSE BQ2%?MX=BQ1%?MX
  3310NEXT:NEXT
  3330PROCPIC:GOTO3170
  3350DEFPROCTURN
  3370IFWD%<>HT% COLOUR1:PRINT"Character not square":A$
=INKEY$(100):ENDPROC
  3390TBX=CHAR:WD1%=WD%:TX%=WD1%-1
  3410PRINTSPC(6)"Turning."
  3430REPEAT:!FX=TX%-1
  3450FORNX=0 TOTFX:?(&900+NX)=!FX?NX:NEXT
  3470FORNX=0 TOTX%:TBX?NX=?(TBX+TX%+NX*WD1%):NEXT
  3490FORNX=1 TOTX%:?(TBX+TX%+N%*WD1%)=?(TBX+TX%*WD1%-T
X%-NX):NEXT
  35101FTF%<1 GOTO3550
  3530FORNX=1 TOTFX:?(TBX+TX%*WD1%+NX)=?(TBX+NX*WD1%):N
EXT
  3550FORNX=0 TOTFX:?(TBX+(TFX-%X+1)*WD1%)=?(&900+NX):N
EXT
  3570TBX=TBX+WD1%+1:TX%=TX%-2:UNTILTX%<1
  3590PROCPIC:ENDPROC
  3630DEFPROCSWAP
```

(continued on page 124)



ULTIMATE
PLAY THE GAME

48K SINCLAIR ZX SPECTRUM

£9.95

(Listing 9 continued from page 122)

```
3650SWX=1:PRINT"Which character to  swap with (0 to 3
)?"
3670REPEAT:?0X=32:NX=GET:UNTILNX>47 ANDNX<52:FRX=DAT+
(NX-48)*514
3690PROCDOK(&72,FRX):CALL&DC5
3710IF?DAT SWX=2
3730XX=0:YX=0:ENDPROC
3750DEFPROCLD:FRI%=0
3790IFFREX<5600 GOTO3810 ELSEPRINT"Over which char(0
to 3 or 4 to return)":REPEAT:FRX=GET:UNTILFRX>47 ANDFR
X<53
3800IFFRX=52 ENDPROC ELSEFREX=DAT+(FRX-48)*514:FRI%=1
3810PROCDOK(&72,FREX):CALL&DC5
3820FORN%=0 TO&FF:?(&900+N%)=?(&A00+N%):NEXT
3830X=OPENUPFNNME:FORN%=3574 TO4087:?N%=BGET#(X):NEXT
:CLOSE#X
3840FORN%=0 TO&FF:?(&A00+N%)=?(&900+N%):NEXT
3850PROCDOK(&72,FREX):CALL&DC5:SW%=2
3870IFFRI% FREX=5700 ELSEFREX=FREX+514
3890ENDPROC
3910DEFPROCSV
3950PRIN"SAVE compiled (C) oruncompiled (U)?"
3970REPEAT:?0X=32:A#=GET$:UNTILA#="C" ORA#="U":PRINTT
AB(0,28)SPC(60);:IFA#="U" GOTO4050
3990?&8A=(WDX/2+HTX)-1:CALL &C46:IF?&7A>?&7B ENDPROC
4010X=OPENOUTFNNME:BPUT#X,?&79-?&7B+1:BPUT#X,?&7B-?&7
A+1:FORN%=?&7A TO?&7B:FORM%=?&70 TO?&79:BPUT#X,?(CHAR+
(N%+WDX/2)+M%):NEXT:NEXT:FORN%=3574 TO4087:?N%=0:NEXT:
SW%=1:GOTO4055
4050X=OPENOUTFNNME:FORN%=3574 TO4087:BPUT#X,?N%:NEXT
4055CLOSE#X:ENDPROC
4060DEFFNNME:PRINTTAB(0,28)SPC(59)TAB(0,28)"Enter fil
ename (max.10 chars.) <RETURN>.";:VDU28,0,31,19,30:REPE
AT:INPUT$8=UNTIL$>"";:VDU28,0,31,19,0
4070PRINTTAB(0,28)SPC(60)TAB(0,28);:=MID$(B$,0,10)
4100DEFPROCPLT(CX)
4110GCOL0,CX:PLOT69,704+(X%+CI%)*8,992-(Y%+CY%)*4:END
PROC
4150DEFFNBYTE=FNBT+CX%+WDX*CY%
4190DEFFNDEK(DK%)=?DK%+256*DK%71
4230DEFPROCDOK(DKX,KX):?DK%=KIMOD256:DKX?1=KXDIV256
4240ENDPROC
4290DEFFNBT=CHAR+X%+Y%*WDX
```

Listing 10.

```
   10B=&D00:ST=&E00
   30LB=&70:HB=&71:HT=&72:WD=&73:XC=&74:YC=&75:C=&76:M
EM1=&78:MEM2=&79:MEM3=&7A:MEM4=&7B
   50TEMP=&7C:TEMP1=&7D:LB1=&7E:HB1=&7F:XC1=&80:YC1=&8
1:HT1=&82:WD1=&83:XXT=&84:YXT=&85:YXT1=&86
   70XTWD=&87:XTHT=&88:XD=&89:F=&8A:RX=&8B:RY=&8C:CNT=
&8D:FRQ=&8E:SRN=&8F
   907F=1:?CNT=0:?SRN=0:?FRQ=10
   110FORIX=0 TO3 STEP3:PX=ST
   130!OPTIX
   150LDA S+19:STA C+1:LDA S+18:SEC:SBC #2:STA C
   170BCS W10:DEC C+1
   190.W10
   210JSR DMN
   230LDA S+10:STA YXT
   250LDA S+6:CMP #150:BNE ABC2
   270JMP ABC5
   290.ABC2
   310STA XC:LDA S+7:STA YC
   330LDA S+9:STA XXT:LDA S+11:STA YXT
   350LDA S+16:STA TEMP
   370LDA #0:STA S+16
   390JSR ORT
   410LDA TEMP:STA S+16
   430LDA S+17:BNE W20
   450LDA #128:STA MEM1:RTS
   470.W20:LDA S+12:AND #254:BEQ W1:BMI W2
   490.W3
   510ASL S+8:ASL S+10
   530JMP W1
   550.W2:LSR S+8:LSR S+10
   570BNE W1
   590LDA #1:STA S+8:STA S+10
   610LDA S+12:AND #1:BEQ W1
   6300RA #3:STA S+12
   650JMP W3
   670.W1
   690.ABC5
   710LDA S+17:AND #128:BNE ABC7
   730DEC S+17:LDA S+4:CLC:ADC S+4
   750LDY F:ASL F:CLC:ADC F:TAX:LDA S+18,X
   770STA C:INX:LDA S+18,X:STA C+1
   790INY:STY F
   810LDA S+5:CMP F
   830BCS ABC6
   850LDA #1:STA F:JMP ABC6
   870.ABC7
   890ASL F:LDX F:LDA S+18,X
   910STA C:INX:LDA S+18,X:STA C+1
   930INX:STX F:LDR F
   950LDA S+4:CMP F
   970BCS ABC6
   990LDA #1:STA F
  1010.ABC6
  1030JSR DMN
  1040LDA C:STA S+18:LDA C+1:STA S+19
  1050LDA &FE69:AND S+14:STA MEM4
  1070LDA &FE68:AND S+14
  1090CLC:ADC S+1:SEC:SBC MEM4:STA XD
  1110LDA S+8:STA XXT:LDA S+10:STA YXT
  1130LDA #0:TAX:STA MEM3
  1150.F1
  1170CLC:ADC WD:INX
  1190CPX XXT:BNE F1
  1210STA XTWD:STA MEM1
  1230CMP #31:BCC W4
  1250LDA #1:STA MEM3
  1270LDA S+12:AND #254:BMI W4
  1290LDA S+12:AND #1:BEQ W5
  1310ORA #128:STA S+12
  1330JMP W4
  1350.W5:AND #1:STA S+12
  1370.W4
  1390LSR MEM1
  1410LDA WD:STA MEM2:LSR MEM2
  1430LDA MEM2:SEC:SBC MEM1:STA TEMP1
  1450LDA S:CLC:ADC XD
  1470CLC:ADC TEMP1
  1490.F9
  1510STA S
  1530ASL S:STA S:BCC F1
  1550CLC:ADC #80:STA S
  1570.F1
  1590LDA S
  1610CMP #160:BCS F2
  1630CMP #79:BEQ F2:BCC F2
  1650SEC:SBC #80:STA S
  1670.F2
  1690\ X BOUNCE
  1710LDA S+13:AND #3:BEQ ABC3
  1730LDA XD:BEQ ABC3
  1750LDA S:CLC:ADC #4
  1770CMP #78:BCS B3
  1790LDA S:CLC:ADC XTWD:CMP #80:BCS B3
  1810JMP ABC3
  1830.B3
  1850LDA S:SEC:SBC XD:STA S
  1870LDA S+13:AND #3:CMP #2:BNE J1
  1890JSR +&7
  1910LDA S:JMP F9
  1930.U1
  1950CMP #3:BNE U2
  1970JSR TERM
  1990BNE ABC3
  2010.U2
  2030LDA S:SEC:SBC XD:STA S
  2050LDA #0:SEC:SBC S+1:STA S+1
  2070LDA S:JMP F9
  2090.ABC3
  2110LDA &FE69:AND S+15:STA MEM4
  2130LDA &FE68:AND S+15
  2150CLC:ADC S+3:SEC:SBC MEM4:STA XD
  2170LDA #0:TAX
  2190.P2
  2210CLC:ADC HT:INX
  2230CPX YXT:BNE P2
  2250STA XTHT:STA MEM1
  2270CMP #63:BCC W7
  2290LDA MEM3:BNE W7
  2310LDA S+12:AND #1:BEQ W6
  2330ORA #128:STA S+12
  2350JMP W7
  2370.W6:ORA #1:STA S+12
  2390.W7
  2410LSR MEM1
  2430LDA HT:STA MEM2:LSR MEM2
  2450LDA MEM2:SEC:SBC MEM1:STA TEMP
  2470LDA S+2:CLC:ADC XD
  2490CLC:ADC TEMP
  2510STA S+2
  2530\ Y BOUNCE
  2550LDA S+13:AND #12:BEQ ABC1
  2570LDA XD:BEQ ABC1
  2590LDA S+2
  2610CLC:ADC #4
  2630BCS B1
  2650LDA S+2
  2670CLC:ADC XTHT:BCS B1
  2690JMP ABC1
  2710.B1
  2730LDA S+2:SEC:SBC XD
  2750STA S+2
  2770LDA S+13:AND #12:CMP #8:BNE U3
  2790JSR +L7:JMP ABC1
  2810.U3
  2830CMP #12:BNE U4
  2850JSR TERM
  2870BNE ABC1
  2890.U4
  2910LDA S+2:SEC:SBC XD:STA S+2
  2930LDA #0:SEC:SBC S+3:STA S+3
  2950.ABC1
  2970LDA S+8:STA XXT:STA S+9
  2990LDA S+10:STA YXT:STA S+11
  3010LDA S:STA XC:STA S+6
  3030LDA S+2:STA YC:STA S+7
  3050JSR ORT
  3070LDA S+2:SEC:SBC TEMP
  3090STA S+2
  3110LDA S:SEC:SBC TEMP1
  3130STA S
  3150LDA #0:STA MEM1:RTS
  3170.ORT
  3190LDA YC:STA YC1:LDA XC:STA XC1
  3210BPL LO:LDA #0:STA XC
  3230LDA S+2:SEC:SBC XD:SEC:SBC XD:STA S+2
  3250LDA #0:SEC:SBC S+2:STA S+2
  3270.LO
  3290\ LD HIMEM
  3310LDA 6:STA LB:LDA 7:STA HB
  3330LDA #0:STA MEM1
  3350ASL XC:BCC L1
  3370INC MEM1
  3390.L1:ASL MEM1:ASL XC:BCC L2
  3410INC MEM1
  3430.L2:ASL MEM1:ASL XC:BCC L3
  3450INC MEM1
  3470.L3:LDA XC:CLC:ADC LB
  3490STA LB:BCC L6:INC MEM1
  3510.L6
  3530LDA MEM1:CLC:ADC HB:STA HB
  3550LDA YC:STA MEM1
  3570LSR MEM1:LSR MEM1:LSR MEM1
  3590LDA MEM1:STA MEM2
  3610LSR MEM2
  3630BCC M1
  3650LDA #128:CLC:ADC LB
  3670STA LB:BCC M1
  3690INC HB
  3710.M1:LDA MEM2:CLC:ADC HB
  3730STA HB:ASL MEM1
  3750LDA MEM1:CLC:ADC HB:STA HB
  3770LDA YC:AND #7
  3790CLC:ADC LB:STA LB:BCC L4
  3810INC HB
  3830.L4
  3850LDA HT:STA HT1
  3870LDA #0:STA MEM1
  3910.N11:LDA YXT:STA YXT1
  3930.N1
  3950LDA #0:STA MEM2
  3970LDA LB:STA LB1:LDA HB:STA HB1
  3990LDA WD:STA WD1
  4010LDA XC1:STA XC
  4030.N10
  4050LDX XXT
  4070.N2
  4090LDA XC:CMP #80:BNE N5
  4110LDA LB1:CLC:ADC MEM2:STA LB1
  4130BCC N7:INC HB1
  4150.N7
  4170LDA LB1:SEC:SBC #128:STA LB1
  4190LDA HB1:SBC #2:STA HB1
  4210LDA #0:STA MEM2
  4230.N5
  4250LDY MEM1
  4270LDA (C),Y
  4290STA MEM4
  4310BEQ H1
  4330LDA S+16:BEQ H1
  4350LDY MEM2:AND (LB1),Y
  4370BEQ H1
  4390LDA S+17:AND #127
  4410BEQ H2
  4430JSR TERM
  4450BNE H1
  4470.H2
  4490JSR HLT
  4510.H1
  4530LDA MEM4
  4550LDY MEM2
  4570EOR (LB1),Y:STA (LB1),Y
  4590TYA:CLC:ADC #8:STA MEM2
  4610BNE N8:INC HB1
  4630.N8
  4650INC XC
  4670DEX:BNE N2
  4690INC MEM1
  4710DEC WD1:BNE N10
  4730.N4
  4750INC YC1:BNE N14
  4770LDA LB:SEC:SBC #135:STA LB
  4790LDA HB:SBC #77:STA HB
  4810JMP N4
  4830.N14:LDA #7:AND YC1
  4850BNE N3
  4870LDA LB:CLC:ADC #121:STA LB
  4890LDA HB:ADC #2:STA HB
  4910BNE N4
  4930.N3
  4950INC LB:BNE N4
  4970INC HB
  4990.N4
  5010DEC YXT1:BEQ N12
  5030LDA MEM1:SEC:SBC WD:STA MEM1
  5050JMP N1
  5070.N12
  5090DEC HT1
  5110BEQ RT
  5130JMP N11
  5150.RT
  5170RTS
  5190.DMN:LDY #0:LDA (C),Y:STA WD:INY:LDA (C),Y:STA HT
  5210LDA C:CLC:ADC #2:STA C:LDA C+1:ADC #0:STA C+1:RTS
  5230.TERM:LDA S+17:CMP #128:BCS T1:RTS
  5250.T1:AND #127:STA S+17:JSR H.T:LDA #1:STA F:RTS
  5270.HLT:LDA #0:STA S+1:STA S+3:STA S+14:STA S+15:RTS
  5410J:NEXT
```

Listing 11.

```
   10B=&A0:ST=&124F
   30LB=&70:HB=&71:HT=&72:WD=&73:XC=&74:YC=&75:C=&76:M
EM1=&78:MEM2=&79:MEM3=&7A:MEM4=&7B
   50TEMP=&7C:TEMP1=&7D:LB1=&7E:HB1=&7F:XC1=&80:YC1=&8
1:HT1=&82:WD1=&83:XXT=&84:YXT=&85:YXT1=&86
   70XTWD=&87:XTHT=&88:XD=&89:F=&8A:RX=&8B:RY=&8C:CNT=
&8D:FRQ=&8E:SRN=&8F
   907F=1:?SRN=0
   110FORIX=0 TO3 STEP3:PX=ST
   130!OPTIX
   150.HND:STX RX:STY RY:DEC CNT:LDA CNT:BNE Z5:LDA FRQ
:STA CNT:LDA &03F:CMP &03E:BEQ Z5
   170LDA SRN:STA MEM2:INC SRN:LDA SRN:CMP &03E:BCC Z2:
LDA #0:STA SRN
   190.Z2:ASL MEM2:ASL MEM2:LDY MEM2:LDA &D40,Y:CMP #12
8:BCS Z5
   210.Z1:AND #127:TAX:LDA &B41,Y:STA C:LDA &D42,Y:STA
C+1:LDA &D43,Y:STA F:LDY #0
   230.Z3:LDA (C),Y:STA &D00,Y:INY:DEX:BNE Z3
   250LDA MEM2:PHA
   270JSR &E00:PLA:TAY:LDA F:STA &D43,Y:LDA &D40,Y:ORA
MEM1:STA &D40,Y:AND #127:TAX
   290LDA &B41,Y:STA C:LDA &D42,Y:STA C+1:LDY #0
   310.Z4:LDA &D00,Y:STA (C),Y:INY:DEX:BNE Z4
   330LDA MEM1:CMP #128:BNE Z5:INC &D3F
   370.Z5:LDA #0:STA &FE6B:LDA #10:STA &FE69
   390LDX RX:LDY RY:LDA &FC:RTI
   410!P%=&C00
   430!OPTIX
   450.PRT:LDY #0:LDA (C),Y:STA WD:INY:LDA (C),Y:STA HT
   470LDA C:CLC:ADC #2:STA C:BCC PR1:INC C+1
   490.PR1:LDA XC:STA &D00:LDA YC:STA &D02
   510LDY #1:STY &D10:STY &D11:STY &D7:STY YXT
   530JSR &1C89:RTS
   5501:NEXT
```

Listing 12.

```
   49PROCLD:PRINT"Now enter lines of DATA starting wit
h   lines 2,4,...and ending with DATA100":STOP
   50IFIX<&1300 IX=&1300
   51REPEAT:INPUT"Start address for sprite data="DX
   52UNTILDX>=IX ANDDX<&170:SX=DX
   53REPEAT:INPUT"First sprite no."DX:UNTILDX>0 ANDDX
<48:DX=DX-1
   54CX=0
   55RESTORE(2+CX*2):?(&D41+DX*4)=SX MOD256:?(&D42+DX*
4)=SX DIV256:BX=SX
   60FORNX=0 TO19:READAX:?(SX+NX)=AX:NEXT
   65SX=SX+NX
   70READAX:IF AX<256 GOTO80
   75?SX=AX MOD256:SX?1=AX DIV256:SX=SX+2:GOTO70
   80?(&D40+DX*4)=SX-BX:?(&D43+CX+DX*4)=1:DX=DX+1:CX=C
X+1:IFAX<>100 GOTO55
   90?&D3E=DX:?&D3F=0
   91PRINT"No. of sprites used="DX
   92PRINT"Next free address="SX
   95PRINT"Now use the following line to SAVE your spr
ites.""'"*SAVE'<filename>' D3E "+~SX'
   97STOP
  100?&8A=1:?&8F=0:?&8E=1
  110MODE2
  120?&FE6E=&1F:?&FE6D=&E0:?&FE6E=&E0
  130?&FE6B=(?&FE6B)AND&BF
  140?&FE68=0:?&FE69=30
  150?&206=&4F:?&207=&12
  160REPEAT:UNTIL?&D3F=?&D3E ORINKEY(-99)
  170?&FE6E=?&FE6E AND127:STOP
  180DEFPROCLD
  190IX=&1300
  200REPEAT:PRINT"Loading at ";IX
  210X=OPENUP""":REPEAT:?IX=BGET#X:IX=IX+1:UNTILEOF#X:C
LOSE#X
  220PRINT"Waiting-any key to load more,'@' to stop"
  230G=GET:UNTILG=64
  240PRINT"Stopped - next address after character  dat
a=";IX
  250ENDPROC
```

CheetahSoft

Soft we're not

FOR SPECTRUM 48K



CONQUEST

CONQUEST A tactical game which even veteran players will find both challenging and rewarding.

Mediterranean Europe is divided into grid squares. Your aim, as Emperor, is to gain 100 squares of territory as quickly as possible – at the same time dealing with Barbarian counter-attacks, plagues, civil war and rival Emperors.

5 levels of skill, plus a continuous 'Conquest' game where all the difficulty levels are thrown in together.

3D BAT ATTACK An all action, 3 dimensional maze game where you gather up blocks of gold, at the same time pitting your wits against vicious vampire bats whose only purpose in life is to locate, hunt and kill you.

4 levels of skill. At each level the game gets faster and more complicated, and the vampires more dangerous.

CheetahSoft

Soft we're not

FOR SPECTRUM 48K



3D BAT ATTACK

AFTER THESE, THE REST IS KIDS STUFF.

Are you ready for CheetahSoft? There's only one way to find out. But be warned: these vampire bats know a good meal when they see one. And our friend with the scythe has had years of experience . . .

So don't play unless you're ready to play the game for real. Because you'll find there's one sure thing about CheetahSoft: Soft we're not.

£6.95 at all good stores.

CheetahSoft

Soft we're not

Can you meet Laserwarp's infinite Challenge?

Be a real game lord – imagine the quest for the ultimate high score!



At last – a real challenge for the arcade ace: Laserwarp, the most exciting arcade-style game around, in full, high-res graphics. It's got everything – fight your way through the ramships, space mines, homing droids, hyperspace chickens, interstellar pogos, and more, till you challenge the Master. Can you beat him? Can anybody beat him? Comes complete with Hall of Fame, coded verifiable high score – send yours in and see if you can win the £100 Mikro-Gen are offering every month (full details in instructions)

High scorers names will be published in a Hall of Fame in the computer press – and they will be invited to join in a Battle of the Champions.

£100 EACH & EVERY MONTH for Laserwarp highest score!

NB – If you have the earlier version of Laserwarp, Mikro-Gen will replace it with the new version – FREE!

FOR 48K SPECTRUM

LASERWARP £6.95

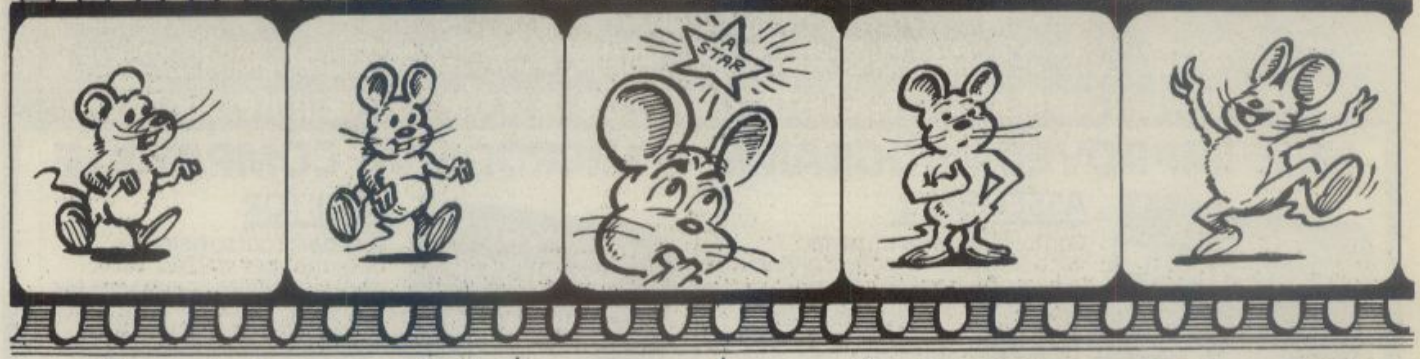
* Genesis II * *

the adventure game that understands plain English!

The colony ship Genesis II has been hijacked by space pirates – and you're the only crewman left! Only you can save the cargo – an entire forest, full of animals, destined to populate a new world. This exciting

(Monitor listing continued from previous page)

```
280 'N     9   0   3   5   7   9
290 '-------------------------
300 '0000      X
310 '0200  X   X
320 '0400
330 '0600  X
340 '0800      X   X
350 '0A00  X   X   X
360 '0C00          X
370 '0E00  X       X
380 '1000      X       X
390 '1200  X   X       X
400 '1400              X
410 '1600  X           X
420 '1800      X   X   X
430 '1A00  X   X   X   X
440 '1C00          X   X
600 '3C00          X   X   X
610 '3E00  X       X   X   X
620 '4000      X                   X
630 '4200  X   X                   X
640 '4400                          X
650 '4600  X                       X
660 '4800      X   X               X
670 '4A00  X   X   X               X
680 '4C00          X               X
690 '4E00  X       X               X
700 '5000      X       X           X
710 '5200  X   X       X           X
720 '5400              X           X
730 '5600  X           X           X
740 '5800      X   X   X           X
750 '5A00  X   X   X   X           X
760 '5C00          X   X           X
770 '5E00  X       X   X           X
```



ANIMATOR

Using the Dragon's SAM chip Derek Gladding produces computer animation.

THE SAM IN THE Dragon orchestrates the running of the computer. By Poking into the Sam, various effects can be caused outside of the normal design concept of the machine.

The locations 65478 through to 65491 control the video display and by manipulation can extend the usefulness of the Dragon computer by making available more than the one single text page already provided.

The locations in question are paired so that for example 65479, when Poked with any number, switches on while to switch off Poke 65478. This applies to all the locations but, since the screen display for the Dragon starts at address hex 0400, address 65481 is already set. The effect of cancelling the address by Poking 65480 has the effect of setting the screen start address to 0.

Try this one line program:

```
10 POKE 65480,0: GOTO 10
```

You will now see the first 512 locations of the computer displayed on your screen. The other interesting aspect is that these locations are shown in real time ie, while the computer is still running and therefore any update of these locations is displayed before your eyes. You might like to press the keys to see the effect.

Now try this short program:

```
10 POKE 65480,C: POKE 65479,0: SKIPF
```

If you insert one of your Basic game tapes into your cassette and run this program you will observe the incoming program entering the cassette buffer. To show the use to which this facility can be used I have included two programs. The first is a monitor of the full Dragon memory which is controlled by the + and − keys to increase or decrease through the memory.

Appended to this program is a list of screen start addresses and the revelent addresses to be Poked. These locations can be used in one line

(continued on page 129)

Listing 1.

```
10 PCLEAR8:CLEAR200,32600
20 DATA"1",0,"2",1,"3",2,"4",3,"Q",4,"W",5,"E",6,"R",7
,"A",8,"S",9,"D",10,"F",11,"Z",12,"X",13,"C",14,"V",15
30 CLS0
40 GOSUB950
50 EXEC32745
60 PRINT@448,"INSTRUCTIONS (Y/N)"
70 A$=INKEY$
80 IFA$="Y" THEN GOSUB1450 :GOTO100:ELSEIFA$="N"THEN10
0
90 GOTO70
100 CLS0
110 OP=&H0600:CO=128:CU=1
120 POKE&H302,&H06:POKE&H303,0:EXEC32630
130 PO=OP
140 BA=PEEK(PO)
150 POKEPO,CU
160 FORT=1 TO 50:NEXTT
170 POKEPO,BA
180 FORT=1 TO 30:NEXTT
190 CLS0
200 A$=INKEY$:IFA$="" THEN150
210 IFA$=CHR$(94) THENPO=PO-32
220 IFA$=CHR$(95) THENPO=PO-128
230 IFA$=CHR$(10) THENPO=PO+32
240 IFA$=CHR$(91) THENPO=PO+128
250 IFA$=CHR$(9) THENPO=PO+1
260 IFA$=CHR$(93) THENPO=PO+4
270 IFA$=CHR$(8) THENPO=PO-1
280 IFA$=CHR$(21) THENPO=PO-4
290 IFPO<OP THENPO=OP
300 IFPO>OP+&H1FF THENPO=OP+&H1FF
310 IFA$="M" GOSUB1760
320 IFA$="I" GOSUB1450:GOSUB1090
330 IFA$=CHR$(75) GOSUB1290
340 IFA$<>CHR$(12) THEN480
350 PRINT@448,"COLOUR NO. OR r TO RETURN"
360 C$=INKEY$:IFC$="" THEN360
370 IFC$="R" THEN GOSUB1080:GOTO470
380 IFC$=<"8" THEN390 ELSE360
390 CL=VAL(C$):IFCL=0 THENCL=128:GOTO410
400 CL=CL*16+127
410 POKE32601,CL
420 B$=HEX$(OP)
430 IFLEN(B$)<4 THENB$="0"+B$
440 B=VAL("&H"+LEFT$(B$,2))
450 POKE32603,B:POKE32608,B+2
460 EXEC32600
470 GOSUB1080
480 IFA$=" " GOSUB1100:GOSUB1080
490 IFA$<>"+" THEN510 ELSE OP=OP+&H200:IFOP=&H3600 THE
NOP=&H600:POKE&H302,&H34
500 CU=CU+1+(CU=24)*24:GOTO520
510 IFA$<>"-" THEN570 ELSEOP=OP-&H200:CU=CU-1+(CU=1)*-
24:IFOP=&H400 THENOP=&H3400:POKE&H302,&H06
520 B$=HEX$(OP)
530 IFLEN(B$)<4 THENB$="0"+B$
540 B=VAL("&H"+LEFT$(B$,2))
550 POKE&H302,B
560 GOSUB1080:GOTO130
570 IFA$<>"P" THEN660
580 OP=&H600:POKE&H302,&H06:PRINT@448,"PRESS LAST PAGE
 LETTER"
590 TW$=INKEY$:IFTW$="" THEN590 ELSETW=ASC(TW$)-64
600 IFTW<1 ORTW>24 THEN590
610 PRINT@448,"SELECT SPEED (1 TO 9)"
620 SP=VAL(INKEY$):IFSP<1 OR SP>9 THEN620
630 CLS0
640 FORDE=1 TO SP*40:NEXTDE:GOSUB1080:OP=OP+&H200:POKE
&H302,PEEK(&H302)+2:IF OP=&H600+(&H200*TW) THEN650 ELS
E640
650 FORDE=1 TO 2000:NEXT:GOTO110
660 IFASC(A$)>32 ANDASC(A$)<41 THEN CO=(ASC(A$)-32)*16
+112
670 FORT=1 TO 16
680 READZ$,Z:IFZ$=A$ THENPOKEPO,CO+Z:PO=PO+1:GOTO690:E
LSENEXT
690 RESTORE
700 IFA$=CHR$(63) GOSUB810
710 IFA$<>"*" THEN800 ELSEST=&H600:TW=&H400:L=1
720 FORT=0 TO 31:POKETW+T,PEEK(ST+T):NEXT
730 PRINT@96,"DATA--LINE NO.";L
740 FORT=0 TO 31:PRINTPEEK(ST+T);:NEXT
```

(listing 1 continued on page 129)

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, DEFM, EQU, DEFL. (Microdrive and Centronics facilities only operate with 48K machines.)

£8.50
INCL. VAT & P&P.



MONITOR

The ideal tool to help the beginner get started, yet it contains all the commands for the experienced programmer to run and de-bug machine code programs. Inspect and alter memory contents in Hex or ASCII. Breakpoints and full Register display. NOW WITH SINGLE STEPPING through RAM or ROM. Disassemble any part of memory, RAM or ROM. Dec-Hex-Dec number converter. Printer output to ZX printer or via RS232 (with interface 1) or customise to most Centronics printer interfaces. General memory management commands include Hex dump, Insert, Delete, Fill and Move. Can reside in memory with the Assembler (48K machines only) to give a complete Machine Code programming system.

£7.50
INCL. VAT & P&P.

Programs supplied on cassette with option to Save onto Microdrive (cartridge not supplied)

Existing owners can obtain the new programs by returning the **cassette only** to Picturesque, along with a cheque/PO for **£1.50 per program** (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.

PICTURESQUE
PICTURESQUE
PICTURESQUE
PICTURESQUE

SUPER SAVERS

SPECTRUM	R.R.P.	OUR PRICE
OMEGA RUN	£7.95	£6.95
GLUG GLUG	£5.95	£5.20
OLYMPICS	£5.95	£5.20
JUNGLE FEVER	£6.90	£6.10
SKULL	£6.95	£6.15
BARRELDROP	£5.95	£5.20
CHUCKIE EGG	£7.90	£6.95
KAMAKAZI	£6.90	£6.10
BLADE ALLEY	£5.95	£5.20
LIGHT CYCLE	£5.95	£5.20
KONG	£5.95	£5.20
SLAP DAB	£5.95	£5.20
MOON BUGGY	£5.95	£5.20

COMMODORE 64	R.R.P	OUR PRICE
FLIGHT SIMULATOR	£9.95	£8.70
OMEGA RUN	£7.95	£6.95
BUMPING BUGGIES	£6.99	£6.15
FLYING FEATHERS	£6.99	£6.15
WHEELIN WALLY	£7.00	£6.15
CHINA MINER	£7.00	£6.15
GET OFF MY GARDEN	£7.00	£6.15
BURGER TIME	£7.00	£6.15
FABULOUS WANDA	£7.95	£6.95
CHUCKIE EGG	£7.90	£6.95
SPACE PILOT	£7.95	£6.95
FLIGHT PATH 737	£7.95	£6.95
CYBOTHRON	£7.95	£6.95

VIC 20		
SLAP DAB	£5.95	£5.20
DOTMAN	£5.95	£5.20
FALCON FIGHTERS	£5.95	£5.20
FROG RUN	£5.95	£5.20

VIC 20 + 16K		
BONGO	£7.95	£6.95
SKRAMBLE	£7.95	£6.95
THE PITZ	£6.00	£5.25
THE DUNGEONS	£5.95	£5.20

POST & PACKING FREE SEND CHEQUE/P.O. TO

FOR COMPREHENSIVE CATALOGUE Send SAE to

LAWTON LIMITED
16 COATES CLOSE
BRIGHTON HILL
BASINGSTOKE
RG22 4FE

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 screens colours (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
EDIT 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
LIST/LLIST line TO line
USED (used 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)
BIN£ decimal to binary
CHAR£ number to 2 characters
CODE fast coarse
DEC hexadecimal to decimal
DPEEK double PEEK
FILLED filled area
HEX£ decimal to hexadecimal
INSTRING string search
MEM free memory
MEMORY£ all of memory as a string
MOD modulus
NUMBER 2 characters to number
OR (bit-by-bit)
RND# fast RND
SCRN£ recognises user graphics
SINE fast sine
STRING£ 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.

(continued from page 127)

programs as the previous examples show, but if used within a program they would have to be reset to return to the text screen.

The simple way to reset any of the addresses is to insert the command Print. The second program uses the same routine to switch pages but converted to machine code in order to prevent screen flashing when the screen addresses are incremented in quick succession.

The Dragon graphics pages have been used to provide 24 text pages. The program contains many commands which are listed for reference at any time during operation. With these 24 pages available you now have the means to store information such as spreadsheet type data and, as suggested with the program title, cartoon animation.

In brief the facilities provided with the program are as follows:

- Direct entry to the screen of any of the Dragon graphic characters by selected keys, as detailed in the instructions.
- Graphic colours can be changed at any time using Shift and the appropriate colour number.
- By pressing the Dragon abbreviated print symbol ? you enter the text mode which gives you a choice of normal or reverse field writing on all characters.
- The screen can be cleared to any colour using the clear key followed by the colour number.
- Elaborate introductory program pages can be designed and saved from within the program as a machine-code file.
- Pages of graphics can be copied to any other page so that complicated pictures do not have to be redrawn when working on animations.
- Any size of graphics block can be marked and repositioned on the screen.
- Each page has its own cursor code letter.
- The cursor can be moved anywhere on the screen using the arrow keys. If greater cursor movement is required using the shift key will move the cursor four squares at a time in the appropriate direction.
- Any animations can be saved to tape
- If you require to draw out small sections of graphics, such as large letter titles, then you can select the graphic data for any line down of the first page.
- To see your pictures come to life, by pressing P, you can play them on your screen
- As in the monitor program, by pressing the + or − keys you may flick through the pages to view your work.

In order to make use of your title pages, save the screen picture to tape immediately prior to your program for which it was designed. To load your program into the computer from tape you will need a Basic line:

10 CLOADM : CLOAD.

When you run this line your title page will be displayed on the screen while the rest of the program is loading.



(listing 1 continued from page 127)

```
750 PRINT:PRINT:PRINT"PRESS '+' FOR NEXT LINE OR r TO
RETURN"
760 E$=INKEY$:IFE$="" THEN760
770 IFE$="R" THEN800
780 IFE$<>"+" THEN760
790 L=L+1:ST=ST+32:IFST<>&H800 THEN 720
800 GOSUB1080:GOTO140
810 PRINT@448,STRING$(32,143);
820 PRINT@448,;
830 LINEINPUT"MESSAGE:-";M$
840 PRINT@448,"NORMAL/REVERSE FIELD (N/R)";:INPUTTY$
850 GOSUB1080
860 IFTY$="N" THENTY=64:GOTO870 ELSEIFTY$="R" THENTY=6
3 ELSE840
870 FORT=1 TO LEN(M$)
880 IFTY=64 THEN900
890 POKEPO,ASC(MID$(M$,T,1))ANDTY:GOTO910
900 POKEPO,ASC(MID$(M$,T,1))ORTY
910 PO=PO+1
920 NEXT
930 TY=0
940 RETURN
950 DATA&H8000,65491,&H4000,65489,&H2000,65487,&H1000,
65485,&H800,65483,&H200,65479
960 READZ$,Z:IFZ=15 THEN970 ELSE960
970 FORT=1 TO 6:READA(T),B(T):NEXT
980 DATA86,8F,8E,04,00,A7,80,8C,06,00,26,F9,39,8E,06,0
0,10,8E,04,00,A6,80,A7,A0,8C,08,00,26,F7,39
990 DATA7F,FF,D2,7F,FF,D0,7F,FF,CE,7F,FF,CC,7F,FF,CA,7
F,FF,C9,7F,FF,C6,FC,03,02,10,83,80,00,25,06,83
1000 DATA80,00,7F,FF,D3,10,83,40,00,25,06,83,40,00,7F,
FF,D1,10,83,20,00,25,06,83,20,00,7F,FF,CF,10,83,10,00,
25,06,83,10,00,7F,FF,CD,10
1010 DATA83,08,00,25,06,83,08,00,7F,FF,CB,10,83,06,00,
26,03,7F,FF,C7,10,83,02,00,26,06,7F,FF,C7,7F,FF,C8,10,
83,00,00,26,03,7F,FF,C8,39
1020 DATA8E,80,80,10,8E,06,00,AF,A1,10,8C,36,00,26,F8,
39,END
1030 M=32600
1040 READA$:IFA$="END" THEN1060 ELSEPOKEM,VAL("&H"+A$)
1050 M=M+1:GOTO1040

1060 RESTORE
1070 RETURN
1080 EXEC32630
1090 RETURN
1100 PRINT@352,"PRESS:-      T SAVE TITLE EAGE
     A SAVE ANIMATIONS              L LOAD PICTURES
          R RETURN"
1110 E$=INKEY$
1120 IFE$="T" THEN1130 ELSEIFE$="A" THEN1190 ELSEIFE$=
"L" THEN CLOADM:RETURN: ELSEIFE$="R' THENRETURN ELSE11
10
1130 PRINT@448,"SELECT RECORD & PRESS ENTER"
1140 IFINKEY$<>CHR$(13) THEN1140
1150 POKE32614,&H06:POKE32625,&H08:POKE32618,&H04
1160 EXEC32613
1170 CSAVEM"INTRO",&H400,&H5FF,&H400
1180 RETURN
1190 PRINT@448,"PRESS LAST PAGE LETTER"
1200 TW$=INKEY$:IFTW$="" THEN1200 ELSETW=ASC(TW$)-64
1210 IFTW<1 ORTW>24 THEN1200
1220 PRINT@448,"SELECT RECORD & PRESS ENTER"
1230 IFINKEY$<>CHR$(13) THEN1220
1240 CSAVEM"ANIMATE ",&H600,TW*&H200+&H600,&H600
1250 RETURN
1260 A$=INKEY$:IFA$="" THEN1260
1270 PRINT@0,ASC(A$)
1280 GOTO:260
```

(listing 1 continued on next page)

Monitor listing

```
10 CLS
20 DATA&H8000,65491,&H4000,65489,&H2000,
65487,&H1000,6
5485,&H800,65483,&H200,65479
30 GOSUB110
40 FORT=1 TO 6:READA(T),B(T):NEXT
50 A$=INKEY$
60 IFA$="+" THENOP=OP+&H200:GOSUB90
70 IFA$="-" THENOP=OP-&H200:GOSUB90
80 GOTO50
90 IFOP<0 THENOP=&HFE00
100 IFOP>&HFE00 THENOP=0
110 PRINT@0,"NEXT PAGE STARTS AT &H"HEX$(OP)
120 FORD=1 TO 500:NEXT
130 NP=OP:FORT=1 TO 5:IFNP<A(T)
THEN NEXT ELSENP=NP-A(
T):POKEB(T),0:NEXT
140 IFNP=&H600 THENPOKE65479,0
150 IFNP=&H200 THENPOKE65479,0:POKE65480,0
160 IFNP=0 THENPOKE65480,0
170 RETURN
180 '
190 '
200 'arrangement of pokes for
                selected screen addresses
210 '
220 '
230 'S
240 'C P   6   6   6   6   6   6
250 'R A   5   5   5   5   5   5
260 'E G   4   4   4   4   4   4
270 'E E   7   8   8   8   8   8
```

(Monitor listing continued on next page)

(Monitor listing continued from previous page)

```
280 'N      9     0     3     5     7     9
290 '-------------------------------------
300 '0000         X
310 '0200   X     X
320 '0400
330 '0600   X
340 '0800         X     X
350 '0A00   X     X     X
360 '0C00               X
370 '0E00   X           X
380 '1000         X           X
390 '1200   X     X           X
400 '1400                     X
410 '1600   X                 X
420 '1800         X     X     X
430 '1A00   X     X     X     X
440 '1C00               X     X
450 '1E00   X           X     X
460 '2000         X                 X
470 '2200   X     X                 X
480 '2400                           X
490 '2600   X                       X
500 '2800         X     X           X
510 '2A00   X     X     X           X
520 '2C00               X           X
530 '2E00   X           X           X
540 '3000         X           X     X
550 '3200   X     X           X     X
560 '3400                     X     X
570 '3600   X                 X     X
580 '3800         X     X     X     X
590 '3A00   X     X     X     X     X
600 '3C00               X     X     X
610 '3E00   X           X     X     X
620 '4000         X                       X
630 '4200   X     X                       X
640 '4400                               X
650 '4600   X                           X
660 '4800         X     X               X
670 '4A00   X     X     X               X
680 '4C00               X               X
690 '4E00   X           X               X
700 '5000         X           X         X
710 '5200   X     X           X         X
720 '5400                     X         X
730 '5600   X                 X         X
740 '5800         X     X     X         X
750 '5A00   X     X     X     X         X
760 '5C00               X     X         X
770 '5E00   X           X     X         X
780 '6000         X                 X   X
790 '6200   X     X                 X   X
800 '6400                           X   X
810 '6600   X                       X   X
820 '6800         X     X           X   X
830 '6A00   X     X     X           X   X
840 '6C00               X           X   X
850 '6E00   X           X           X   X
860 '7000         X           X     X   X
870 '7200   X     X           X     X   X
880 '7400                     X     X   X
890 '7600   X                 X     X   X
900 '7800         X     X     X     X   X
910 '7A00   X     X     X     X     X   X
920 '7C00               X     X     X   X
```

(listing 1 continued from previous page)

```
1290 PRINT@448,;:INPUT"FROM PAGE ";ST$
1300 ST=ASC(ST$)-64
1310 IFST<1 ORST>24 THEN1290
1320 PRINT@448,;:INPUT"  TO PAGE ";TW$
1330 TW=ASC(TW$)-64
1340 IFTW<1 ORTW>24 THEN1320
1350 ST$=HEX$((ST*&H200)+&H400)
1360 TW$=HEX$((TW*&H200)+&H400)
1370 IFLEN(ST$)<4 THENST$="0"+ST$
1380 IFLEN(TW$)<4 THENTW$="0"+TW$
1390 ST=VAL("&H"+LEFT$(ST$,2))
1400 TW=VAL("&H"+LEFT$(TW$,2))
1410 POKE32614,ST:POKE32625,ST+2:POKE32618,TW
1420 EXEC32613
1430 GOSUB1080
1440 RETURN
1450 CLS0
1460 PRINT@0,"'s' = SHIFT";
1470 PRINT@14
1480 PRINT@64,"    ARROWS----------MOVE CURSOR
1490 PRINT@128,"'s'+ARROWS--------EXTRA MOVEMENT"
1500 PRINT@192,"'CLEAR'-------------CLEAR SCREEN"
1510 PRINT@256,"'K'----------------TO COPY PAGES"
1520 PRINT@320,"'?'----------------ENTER WRITTING
1530 PRINT@384,"'SPACE'----LOAD OR SAVE SCREENS"
1540 PRINT@448,"'s'+ NO.-------CHANGE COLOUR SET
1550 GOSUB1720
1560 CLS0
1570 PRINT@14
1580 PRINT@64,"'I'--------------FOR INSTRUCTIONS";
1590 PRINT@128,"'P'----------------DISPLAY FILM
1600 PRINT@192,"'+'OR'-'-------TO TURN THE PAGES
1610 PRINT@256,"'*'----------TO PRINT LINE DATA
     FROM FIRST PAGE ONLY";
1620 PRINT@352,"M-------------TO MOVE BLOCKS OF GRAPHI
CS,POSITION THE CURSOR AT THE TOP LEFT & THEN BOTTOM R
IGHTOF THE BLOCK & PRESS 'm' IN EACHPOSITION.";
1630 GOSUB1720
1640 CLS0:PRINT@14
1650 PRINT@64,"TO ENTER GRAPHICS USE THE BLOCK OF 16 K
EYS:-'1' TO '4' ACROSS  '1' TO 'Z' DOWN IN THE ORDER
AS SHOWN IN THE GRAPHIC CHARACTER SECTION OF THE DRAGO
N MANUAL."
1660 PRINT@260,"1";CHR$(128)CHR$(128);:PRINT@267,"2"CH
R$(128);CHR$(177);:PRINT@274,"3"CHR$(128)CHR$(178);:PR
INT@281,"4"CHR$(128)CHR$(179);
1670 PRINT@324,"Q"CHR$(128)CHR$(180);:PRINT@331,"W"CHR
$(128)CHR$(181);:PRINT@338,"E"CHR$(128)CHR$(182);:PRIN
T@345,"R"CHR$(128)CHR$(183);
1680 PRINT@388,"A"CHR$(128)CHR$(184);:PRINT@395,"S"CHR
$(128)CHR$(185);:PRINT@402,"D"CHR$(128)CHR$(186);:PRIN
T@409,"F"CHR$(128)CHR$(187);
1690 PRINT@452,"Z"CHR$(128)CHR$(188);:PRINT@459,"X"CHR
$(128)CHR$(189);:PRINT@466,"C"CHR$(128)CHR$(190);:PRIN
T@473,"V"CHR$(128)CHR$(191);
1700 GOSUB1720
1710 RETURN
1720 PRINT@14,;:INPUT"PRESS 'ENTER'";E$:IFE$="" THEN R
ETURN ELSE1720
1730 GOSUB1080
1740 CLS0
1750 RETURN
1760 MO=MO+1
1770 IFMO=1 THENBL=BA:PL=PO:POKEPO,35:RETURN
1780 BR=BA:PR=PO:MO=0:POKEPO,35
1790 POKEPL,BL:POKEPR,BR
1800 IFPR<PL THEN MO=0:RETURN
1810 PRINT@448," r -RETURN OR ARROWS TO MOVE"
1820 E$=INKEY$:IFE$="" THEN1820 ELSEEXEC32630
1830 Y=FIX((PR-PL)/32)
1840 X=PR-(PL+(Y*32))
1850 IFE$="R" THENRETURN
1860 IFE$=CHR$(9) GOSUB1880 ELSEIFE$=CHR$(8) GOSUB1940
 ELSE IFE$=CHR$(94) GOSUB2000 ELSEIFE$=CHR$(10) GOSUB2
060 ELSE1820
1870 GOTO1820
1880 FORHO=X TO 0 STEP-1
1890 FORVE=Y*32 TO 0 STEP-32
1900 POKEPL+HO+1+VE,PEEK(PL+HO+VE)
1910 NEXTVE,HO
1920 PL=PL+1:PR=PR+1
1930 RETURN
1940 FORHO=0 TO X
1950 FORVE=Y*32 TO 0 STEP-32
1960 POKEPL+HO-1+VE,PEEK(PL+HO+VE)
1970 NEXTVE,HO
1980 PL=PL-1:PR=PR-1
1990 RETURN
2000 FORVE=0 TO Y*32 STEP32
2010 FORHO=0 TO X
2020 POKEPL-32+VE+HO,PEEK(PL+VE+HO)
2030 NEXTHO,VE
2040 PL=PL-32:PR=PR-32
2050 RETURN
2060 FORVE=Y*32 TO 0 STEP-32
2070 FORHO=0 TO X
2080 POKEPL+32+VE+HO,PEEK(PL+VE+HO)
2090 NEXTHO,VE
2100 PL=PL+32:PR=PR+32
2110 RETURN
```

THE NAME IN VIDEO GAMES

Visions

DEMOLATOR

Following the Thousand year war with the Alien Demolators the last remnants of the human race are being transported across the galaxy in cryogenic suspension aboard the B.S. Quinn (Battle Star).

The Demolators however have invaded the cargo bay and it is your job to destroy the Demolators and to protect the human cargo. All you have to defend Humanity with is Xeno (popularly named "the Phobe") the ultimate Robot. You can control his movements on two planes and fire an ultrasonic Cannon to defend humanity with.



Includes Infinite Lives Version On B side

AVAILABLE FROM ALL LEADING SOFTWARE STORES

DEMOLATOR — BBC — MODEL 'B' 0S1-2, £6.95

VISIONS (SOFTWARE) FACTORY LIMITED 1 FELGATE MEWS STUDLAND STREET LONDON W6

The SV·328 just goes on growing...



With sophisticated 3-channel ADSR sound, high resolution sprite graphics and a rapidly expanding library of software, the Spectravideo SV 328 is all you'd expect in a great games machine.

A slick word processor-style keyboard, CP/M* compatibility and massive RAM (expandable to full 144K) puts it in the business league.

And for keen programmers, the easy-to-use and space saving extended BASIC gives total control of all standard functions.

There's room to grow too – with a complete range of peripherals already available, including some of the best joysticks in the business.

At £262 the SV328 is great value for money!

Spectravideo SV 328: Memory – 32K ROM expandable to 96K, 80K on board RAM expandable to 144K: **Keyboard** – full word processor type, 87 keys, 10 function keys, built in cursor control: **Graphics** – 16 colours, 256 × 192 high resolution graphics, 32 sprites: **Sound** – 3 channels, 8 octaves per channel: **CP/M* compatibility** – to over 3000 existing software packages: **Storage** – cassette drive, 256K disk drive capacity. **Suggested retail price** – £262.

Spectravideo SV 318: Suggested retail price – £186.

Spectravideo Peripherals: Cassette Drive: Disk Drive – single: Disk Drive – double: Disk Drive – full Business Pack: Mini Expander: Super Expander: Monitor: Printer with Interface Card: Centronics Interface: RS 232 Interface: 16K RAM Pack: 64K RAM Pack: 80 Column Card: Coleco Adaptor: Quick Shot Joysticks.

SPECTRAVIDEO™

Tomorrows Computers – Today

Spectravideo Ltd, 165 Garth Road, Morden, Surrey SM4 4LH
Telephone: 01-330 0101. Telex: 28704 MMH VANG

Fill in the coupon today and we'll mail you a full technical brochure and latest test reports of the amazing Spectravideo range, or see it for yourself at DG Leisure Centres and most leading computer stockists.

*CP/M is a registered trade mark of Digital Research Inc.

To: **Spectravideo Ltd**, 165 Garth Road, Morden, Surrey SM4 4LH

I am interested in Spectravideo computers and peripherals. Please send me the latest reports together with a full technical specification brochure.

Name: _____

Address: _____

_____

Tel. No.: _____ STD Code: _____

YC 684

Torsten Martinsen helps you to become a micro artist with this versatile drawing program.



SPECTRUM DRAW

Program 1.

```
  10 POKE 23693,7: POKE 23694,0:
 POKE 23697,0: BORDER 0: CLEAR 2
9999: LOAD ""CODE : CLS
  20 POKE 32583,1: POKE 32582,1:
 POKE 23681,0: POKE 32578,128: P
OKE 32579,88
  30 RANDOMIZE USR 30017
  40 GO SUB USR 31967: GO TO 40
1000 INPUT "Name ? "; LINE a$: I
F NOT LEN a$ OR LEN a$>10 THEN G
O TO 1000
1010 SAVE a$ SCREEN$ : RANDOMIZE
 USR 30017: RETURN
1100 INPUT "Name ? "; LINE a$: L
OAD a$ SCREEN$ : RANDOMIZE USR 3
0017: RETURN
1200 RANDOMIZE USR 30017: INPUT
AT 0,0; PAPER 6; INK 0;"Text (ma
x. ";INT ((256-PEEK 32578)/8/PEE
K 23728);")",, LINE a$: PRINT ;:
 RANDOMIZE USR 31176: REM a$
1210 RANDOMIZE USR 30017: RETURN

3000 LET f=0: GO TO 3020
3010 LET f=1
3020 LET cx=PEEK 32578: LET cy=P
EEK 32579: LET lx=PEEK 32580: LE
T ly=PEEK 32581: LET r=SQR ((cx-
lx)*(cx-lx)+(cy-ly)*(cy-ly))
3030 IF f THEN LET cx=lx: LET cy
=ly
3050 LET lx=cx+r: LET ly=cy: POK
E 32584,lx-256*INT (lx/255): POK
E 32585,128+INT (lx/255): POKE 3
2586,ly: POKE 32587,128
3060 LET s=2*INT (INT (PI*SQR r+
.5)/2)+2: IF s>252 THEN LET s=25
2
3070 FOR n=0 TO 2*PI STEP PI/s
3080 LET x=INT (.5+cx+r*COS n)
3090 LET y=INT (.5+cy+r*SIN n)
3100 RANDOMIZE USR 31526: REM x-
lx,y-ly
3110 LET ly=y: LET lx=x: NEXT n
3120 RANDOMIZE USR 31526: REM cx
+r-lx,cy-ly
3130 RANDOMIZE USR 30017: RETURN
```

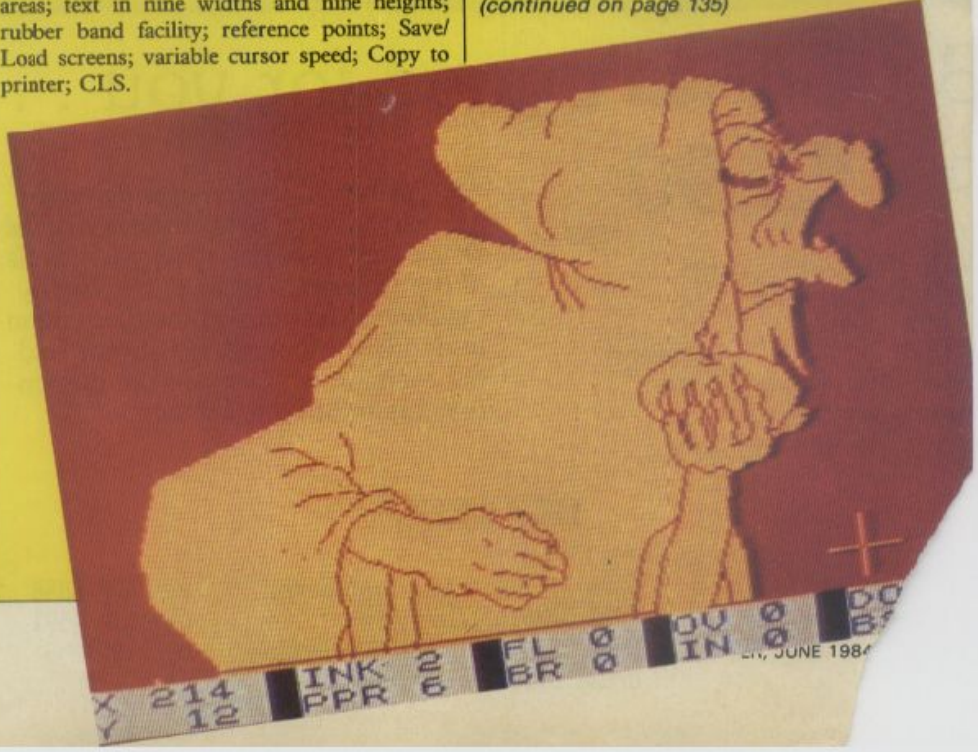
THIS GRAPHICS program for any ZX Spectrum contains the following facilities: Full control of colours, Flash, Bright, Over and Inverse; Draw lines, boxes and circles using normal or dotted lines and with a choice of nine different line widths. Circles may be partly off screen; fill areas; text in nine widths and nine heights; rubber band facility; reference points; Save/Load screens; variable cursor speed; Copy to printer; CLS.

The two bottom lines of the screen give you information on the cursor co-ordinates and the current Ink, Paper, Flash, Bright, Over, Inverse and Dot parameters.

Table 1 lists the keys used and explains how to use them. The program consists of 2050

(continued on page 135)

(x ix)
(y iy)





Binless isn't good for you . . .

Only **£5.90** inc. VAT

For the 48K ZX Spectrum
Joystick Compatible.

Available from selected branches of John Menzies and many good software stockists, or direct from us by mail-order.

Alf, our heroic Dustman is fighting a constant battle against the homicidal refuse that is seeking revenge. Friends of the binless try to help, but merely take him away from one hairy situation to another. Meet Alf, his friends and his enemies, who range from pop-up toasters to broken TV sets.

TIMESCAPE
SOFTWARE

1 VIRGINIA GARDENS,
FAIRWAYS,
MILNGAVIE,
GLASGOW G62 6LG

Telephone: 041-956 5058

DEALERS!!

Timescape Products are available from:

Computer Games	0226 710414	Tiger Distribution	051 420 8888
Dealer UK	0727 34351	Centresoft	021 520 7591
	0924 264412	Drake Distribution	0752 671606
	07535 57181		

Please send me _____
Name _____
Address _____
_____
_____
I enclose a Chq./P.O. for £ _____

YC6

Table 1.

5,6,7,8	Cursor keys. Press Caps Shift for greater steps.
0	Plots a dot at the cursor position.
k,l	Make the cursor move faster/slower.
x	Sets Ink colour.
c	Sets Paper colour.
v	Sets Flash parameter.
b	Sets Bright parameter.
n	Changes Over state.
m	Changes Inverse state.
d	Changes Dot state.
z	Copy.
V	CLS. The program will ask "CLS?". Press Y to clear the screen.
s	Save screen to tape.
j	Load screen from tape.
f	Fill.
r	Controls the rubber bands. To switch band no. 2, for example, on/off, press r and then 2.
y	Reference 1. To set the reference point, move the cursor to the desired location and press y. Now, if you press y, the cursor will jump to this point.
u	Reference 2.
p	Sets the brush size (= line width).
t	Print text string at current cursor position. The program will ask for horizontal and vertical size. Note that different brush sizes produce different fonts.
q	This key is used to set the first point when drawing lines, circles and boxes. The second point is set using the corresponding key. To draw a line, for instance, you move the cursor to one end point, press q, then to the other end point and press w.
w	Lines.
i	Boxes. Two diagonally opposite points are needed.
g,h	Both these keys are used to draw circles, and the points needed are the centre and one on the circumference. With g, you set the point on the circumference first, with h, you set the centre first.
o	Sets Border colour.
a	Colour change. This makes the colours the screen colours.

(continued from page 133)

bytes of machine code and a small Basic program which contains routines for loading, saving and circle drawing.

First, type in program 1. Do not run it yet. Save it on tape and type New.

Now enter program 2 and run it. When it has run successfully, type New and enter program 3, which generates the tables used by the program. When it has run, it will save the code.

Rewind the tape, type LOAD "" and try it all out. To turn off the beep, type

POKE 30725,201

To stop the program, press j and then Caps Shift and 6. To make it a click, type

POKE 30727,0

You can extend the range of commands available by amending the Data statements in program 3. If, for instance, you write a Basic routine at line 5000, and want to allocate it to key e, simply insert e5000 at line 3000, and change the 4 at line 3010 to a 5.



Table 2.

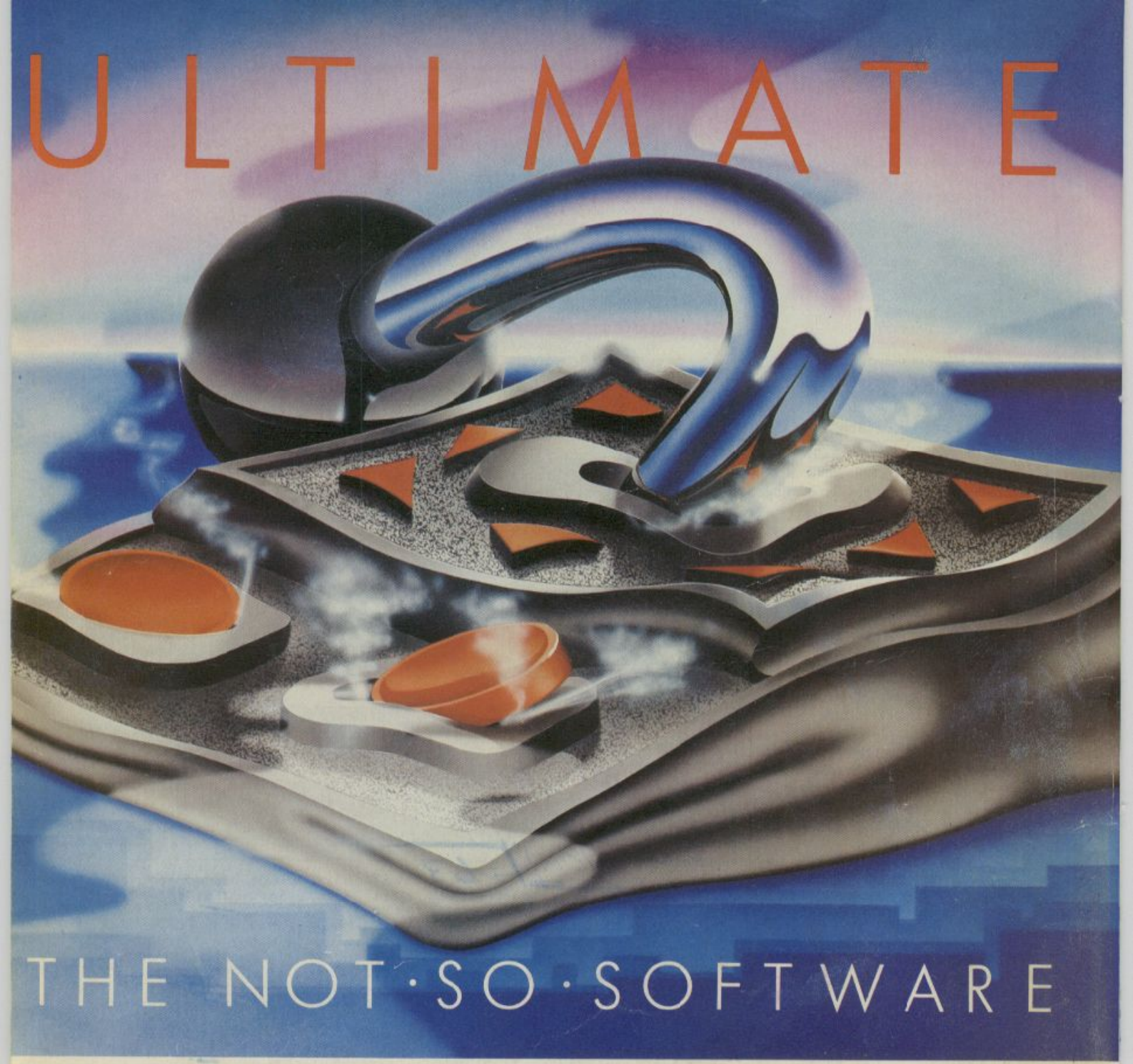
Address	
32578	Co-ordinates of cursor.
32580	Co-ordinates of last point — set with q.
32582	Brush size.
32583	Cursor speed.
32584	Store of co-ordinates. Used by
32586	off-screen line-drawing routine.
32588	Co-ordinates of first and
32590	second reference point.
32592	Co-ordinates of rubber bands.
23681	Bit 0: Dot on. Bit 1: Dot flag. Bits 2-5: Rubber band flags.

Program 2.

```
  10 CLEAR 29999: LET p=30000: F
OR i=1000 TO 1310 STEP 10
  20 READ d,a$
  30 LET c=0: FOR n=1 TO LEN a$
STEP 2
  40 LET a=CODE a$(n)-48: LET b=
CODE a$(n+1)-48
  50 LET a=a-39*(a>9): LET b=b-3
9*(b>9): POKE p,16*a+b
  60 LET c=c+PEEK p: LET p=p+1
  70 NEXT n: PRINT i;" ";: IF c<
>d THEN PRINT "error": STOP
  80 PRINT "OK": NEXT i
1000 DATA 6929,"ed437d5ccdaa2247
043e010f10fdae77c9ed4b427f79d60a
3801afc6145f79c60a4f30057b915f0e
ffc5cd3075c10d1d20f7ed4b427f78d6
0a3801afc6145f78"
1010 DATA 6672,"c60a473eaf903004
835f06afcdaa2247043e010f10fd434f
7ea977cd687610f806043a815c1f1f21
507fc5e51ff5dca975f1e1c1232310f2
c95e23562a427f22"
1020 DATA 6352,"7d5c7a940e013004
7c920eff47517b950e0130047d930eff
594fb8300669d5af5f1807b1c86841d5
160060781f853803bc3807944fd9c1c5
18044fd5d9c12a7d"
1030 DATA 7199,"5c78844779854fcd
3075d97910dfd1215827d9c9ed437d5c
3a467ffe02301121815c7ecb472806ee
0277e602c8c3e5225f6fcb3f57799230
03835faf4f789230"
1040 DATA 6776,"03856faf47556369
fdcb5786e5c5d5cd0f76d1c10c28031d
20f3e14d5c0478feb030031520e62191
5ccb4ec8cbc6c900000000000000000
247ce607c07dc620"
1050 DATA 9208,"6fd87cd60867c9cb
422804a7c83dc9d608d0afc9cb422804
3cc03dc9c608d03effc9ed4b427f3efe
dbfe573ef7dbfecb6779cc77764f3eef
dbfe5fcb6378cc77"
1060 DATA 8329,"7647cb5b78cc8476
feb038023eaf47cb5379cc84764f2a42
7f3ebfdbfe5f3a477fcb4bcc8476cb53
cc777632477fa72809c547c510fec110
fac1ed42c809c5cd"
1070 DATA 7557,"41753eefdbfe1fed
4b427fd40476e122427fcd4175188bc5
cdaa2247043e010f10fda6c1c9c5d501
0500cd051fd1c1c9ed4b427fcd0777c0
c521467f7ef53601"
1080 DATA 7315,"21815c7ef5cb8621
915c7ee6fa7701ffffc5ed4b427fcd07
7720070ced43427f20f01100000ded43
427fc5d5cd0476d1c178feaf28207ba7
200c04cd07772006"
1090 DATA 5289,"cd1577c51e01ed4b
427f7b3d200804cd077728021e00ed4b
427f78a728207aa7200c05cd07772006
cd1577c516017a3d200ced4b427f05cd
07772802160ded4b"
1100 DATA 7417,"427f79a7280a0ded
43427fcd0777289ae122427f24c24277
2cc24277f132815cf132467fe122427f
c9d5012117cdd90dd1affd365530fd77
56c3227dfdcb016e"
1110 DATA 8519,"28fa3a085cfdcb01
aec9cdec77d6238f9fe0a30f5f51132
00210001cdb503f1c9cdec77d63138f9
3cfe0a30f418e6cdec77d63038f9fe02
38dbfe0820f118d5"
1120 DATA 6210,"42414e44204e4f2e
2028312d3429203fa0112f78cdd977cd
ec77d63138f9fe0430f5cd0578114e7f
3c473e020713131 0fb21815c4fae77a1
c82a427feb732372"
1130 DATA 7136,"c9cd4d0dfdcb57d6
012118cdd90d3e58d73a427fcd627911
4d79cd3f793a8d5ce607ee30fdcb5446
28023e38fdcb576e28023e39d7114e79
cd3f793a8d5c07e6"
1140 DATA 6884,"01ee30fdcb547e28
023e38d7115179cd3f793a915ce6020f
ee30d7115379cd3f793a815ce601ee30
d73e20d73e59d73a437fcd6279115579
cd3f793a8d5c0f0f"
1150 DATA 6554,"0fe607ee30fdcb54
5e28023e38fdcb577e28023e39d71158
79cd3f793a8d5c0707e601ee30fdcb54
7628023e38d7115b79cd3f793a915c0f
0f0fe601ee30d711"
1160 DATA 7767,"5d79cd3f793a467f
ee30d73e20d7c93e20d73e8fd7afcd0a
0c3e20d7c980494ecb46cc4fd6444fd4
5050d242d249ce4253a05f1600d5c32c
1afd5e76fd567761"
1170 DATA 7736,"6be5c5d5cd0476d1
c10c1d20f5e14c5d0578 3cc81520eac9
1608cb13d5c5dc6979c1d1fd7e7681d8
4f1520eec92a365cfe8038052a7b5cd6
90eb6f2600292929"
1180 DATA 8176,"1516085ee5d5c5cd
8879c1d1e178fd9677d847231520ecc9
dfe5e7e7cdb228ed4b427f235e231c1d
281723d5e5c57ecd9d79c1e1d1fd7e76
070707813803 4f18"
1190 DATA 4526,"e6e1c3780080494e
4b2028302d392920bf50415045522028
302d392920bf464c4153482028302c31
2c382920bf42524947485420283 02c31
```

(Program 2 continued on page 137)

ULTIMATE



THE NOT·SO·SOFTWARE

CAN YOU HANDLE THE **ULTIMATE?**
THE MOST AMAZING PROGRAMMES, THE SMOOTHEST ACTION, THE HIGHEST RESOLUTION GRAPHICS?
ALL **ULTIMATE** GAMES ARE ARCADE STANDARD,
FEATURE PACKED, 100% MACHINE CODE.
AND PURE ADDICTION.
SO WHICH WILL BLOW FIRST – YOUR COMPUTER OR YOUR MIND?



Cookie 16/48K ZX Spectrum



Tranz Am 16/48K ZX Spectrum



Atic Atac 48K ZX Spectrum



Pssst 16/48K Spectrum



Lunar Jetman 48K ZX Spectrum



Jet Pac 16/48K ZX Spectrum or 8K Expanded VIC 20

ONLY £5·50 EACH
(All games joystick or keyboard control)

Available from: W.H. Smith, Boots, John Menzies, Spectrum Centres, large department stores and all good software retailers. Or send the coupon direct. We'll pack and post your order to you absolutely free in the U.K.

Okay, I dare take my computer to the edge of meltdown. Send me the following:

☐ Cookie ☐ Lunar Jetman ☐ Pssst ☐ Tranz Am
☐ Jet Pac ☐ Jet Pac – Expanded VIC 20 ☐ Atic Atac

I enclose cheque/PO for £_____ Name_____

Address_____

_____

Code_____

Send to:
Ultimate Play The Game,
The Green,
Ashby de la Zouch,
Leicestershire.

ULTIMATE PLAY THE GAME

Ultimate Play The Game is a trade name of Ashby Computers and Graphics Ltd., The Green, Ashby de la Zouch, Leicestershire, Tel (0530) 411485. Dealer enquiries welcome.

(Program 2 continued from page 135)

```
2c382920bf120143"
1200 DATA 5213,"4c533fbf424f5244
4552202830 2d372920bf425255534820
53495a452028312d39293fa011f579cd
d977cdfa7757377a060738050707070 6
384f7a218d5cfe08"
1210 DATA 6761,"79380a7e2807b02f
e62428017 8cd6c223e07ba9fcd6c2223
23070707e6a0c3672211f679cdd977cd
fa7757a718c111017acdd977cd1f780f
5f0680218d5ccd6c"
1220 DATA 6673,"227b0f0f0fc36c22
110e7acdd977cd1f780f0f5f0640218d
5ccd6c227b0f0f0fc36c2221915c7eee
0277c921915c7eee0877c9111d7acdd9
77cdec77cd0578fe"
1230 DATA 8282,"59ca6b0dc921815c
3e01ae77c9112d7acdd977cdec77d630
38f9fe0830f5cd0578c39b2211347acd
d977cd117832467fc9ed43447fc9dfe5
e7e7cd7a1ccd0723"
1240 DATA 6288,"e1225d5c79b83006
69d5af5f1807b1c86841d51600607 81f
853803bc3807944fd9c1c518044fd5d9
c12a487f79a72806233d28022b2b2248
7fe52a4a7f78a728"
1250 DATA 5960,"06233d28022b2b22
4a7fd13e80bc200dba200a7dfeb03005
454bcd0476d97910b7f1215827d9c92a
447fed43447f3e8032497f324b7f7d32
487f7c324a7f1601"
1260 DATA 8182,"5a789430047c9016
ff47799530047d911eff4fc3347b2a44
7fe5c544cd977bc1c5cd977bc1e1e5c5
4dcd977bc1c1c3977b21c05011c1503e
10011f0070e5d5ed"
1270 DATA 8222,"b0d1e108cd6876eb
cd6876eb0B3d20e921c05a11c15a3630
013f00edb0c97e23bbc807d823231 8f6
cd7178fdcb309e2a8d5cbfcd5b0da7fd
cb016efdcb01aec8"
1280 DATA 5833,"fd5ece21f47ecd0e
7c283721327dcd0e7c3fd0e5cd0578cd
4175e14e234637c9484f522e2053495a
452028312d392920bf5645522e205349
5a452028312d3929"
1290 DATA 8546,"20bf7bfe742020cd
e17b114f7ccdd977cd117832b05c1150
7ccdd977cd117832b15c01b00437c9fe
30f5e5c40578cd4175e15e2356cb7acb
bad5c4e17be1ed4b"
1300 DATA 6600,"427fcd2c16cd4175
f128063a045c3c20faa7c92a4c7f2242
7fc92a427f224c7fc92a4e7f224274c9
2a427f224e7fc93e01cd0116cd9276cd
4d0dcd187c30f5c9"
1310 DATA 7619,"210058ed5b8d5c01
c0027eaba2abfdcb577e2808e6c7cb57
2002ee38fdcb576e2808e6f8cb6f2002
ee0777230b78b120d9c921915ccb86cb
96cd0a0cafc35e0d"
```

Program 3.

```
3000 DATA "g3000","h3010","j1100
","s1000"
3010 LET p=32050: FOR n=1 TO 4:
READ a$: POKE p,CODE a$: LET a=V
AL a$(2 TO )
3020 POKE p+1,a-256*INT (a/256):
 POKE p+2,INT (a/256): LET p=p+3
: NEXT n: POKE p,128
4000 DATA 4178,"07604 f7720 rf84
1 xfa54 cfa91 vfa9e bfab8 n7ad3
m7adb Vfae3 d7af5 ofafd"
4010 DATA 2890,"z0eac t0000 pfb1
4 q7b21 w7b97 i7bc6 y7cc3 Y7cca
u7cd1 U7cd8 a7cf0 "+CHR$ 128+"00
00"
4050 LET p=32500
4060 FOR n=1 TO 2
5000 READ t,a$: LET c=0
5010 POKE p,CODE a$
5020 POKE p+1,16*(CODE a$(4)-48-
39*(a$(4)>"9"))+CODE a$(5)-48-39
*(a$(5)>"9")
5030 POKE p+2,16*(CODE a$(2)-48-
39*(a$(2)>"9"))+CODE a$(3)-48-39
*(a$(3)>"9")
5040 LET c=c+PEEK (p+1)+PEEK (p+
2): LET p=p+3: LET a$=a$(7 TO ):
 IF LEN a$ THEN GO TO 5010
5050 PRINT 3990+n*10;: IF c<>t T
HEN PRINT " error": STOP
5060 PRINT " OK": NEXT n
6000 SAVE "mc"CODE 30000,2600
```


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 £40+VAT it is superb value.

Order it using the coupon adding £2.30p&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 £40+VAT De-luxe System inc. Disc £80+VAT
Cheques to Skywave Software Readers' A/C (or enter Visa No.)

Please send me more information:
☐ Multi-Forth 83
☐ ZX81-Forth ROM
☐ Spectrum Forth-I/O Cartridge

Name

Address

Post code

SUBJECT TO AVAILABILITY. FOR 1.0.0.S ONWARDS.
Send to Skywave Software, 73 Curzon Road, Bournemouth, BH1 4PW, Dorset, England. Tel: (0202) 302385

Skywave SOFTWARE

The No.1 Football Game*

Now available for the BBC model 'B'

BBC Model 'B', ZX81 16K, ZX Spectrum 48K

ddictive BBC

FOOTBALL MANAGER



Football Manager

Designed by Kevin Toms

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



Kevin Toms

Some of the features of the game:–

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

Addictive

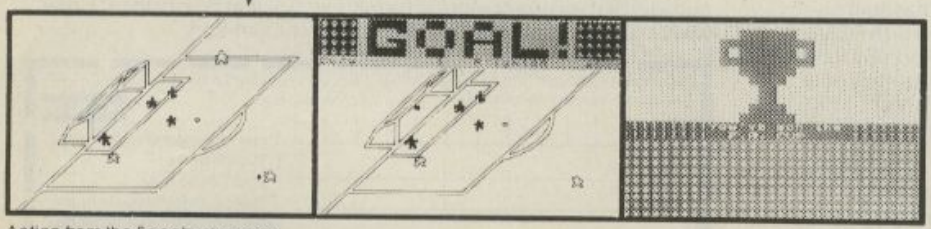
* ZX81 Chart
Home Computing Weekly 21-2-84

Comments about the game from press and our customers

"FOOTBALL MANAGER is the best game I have yet seen on the Spectrum and my personal favourite of all the games on any micro ... To the ordinary person it is an excellent view of what can be done in the field of computer games ... The crowning glory of this game is the short set pieces of match highlights which show little stick men running around a pitch, shooting, defending and scoring ... It is a compulsive game but people who cannot take game sessions of 9 hours or so, which happened on one happy Sunday, will be grateful to know that there is a 'save to tape' option. FOOTBALL MANAGER has everything it could ... The originator, Addictive Games, certainly deserve the name." Rating: 19/20 (Practical Computing – August 1983).

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

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



Action from the Spectrum version

Versions coming soon for

Commodore 64

Dragon, Oric

and Atmos.

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

Available from computer software stockists nationwide, including Boots & 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

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

THINGS TO DO WITH YOUR VIC

Andrew Bacon cobbles together a number of useful facilities for you to try out on your Vic-20.

WE ALL KNOW that Commodore produces some of the best computers by far, but also that the documentation which accompanies them falls to a much lower standard. So here are a few bits and pieces gathered together from many different sources which may help you on your way to making the perfect program.

It is split up into four sections as follows:

- Special effects with the Super Expander.
- Some interesting Peek locations.
- Hi-res with a joystick on the unexpanded Vic.
- Bits and pieces.

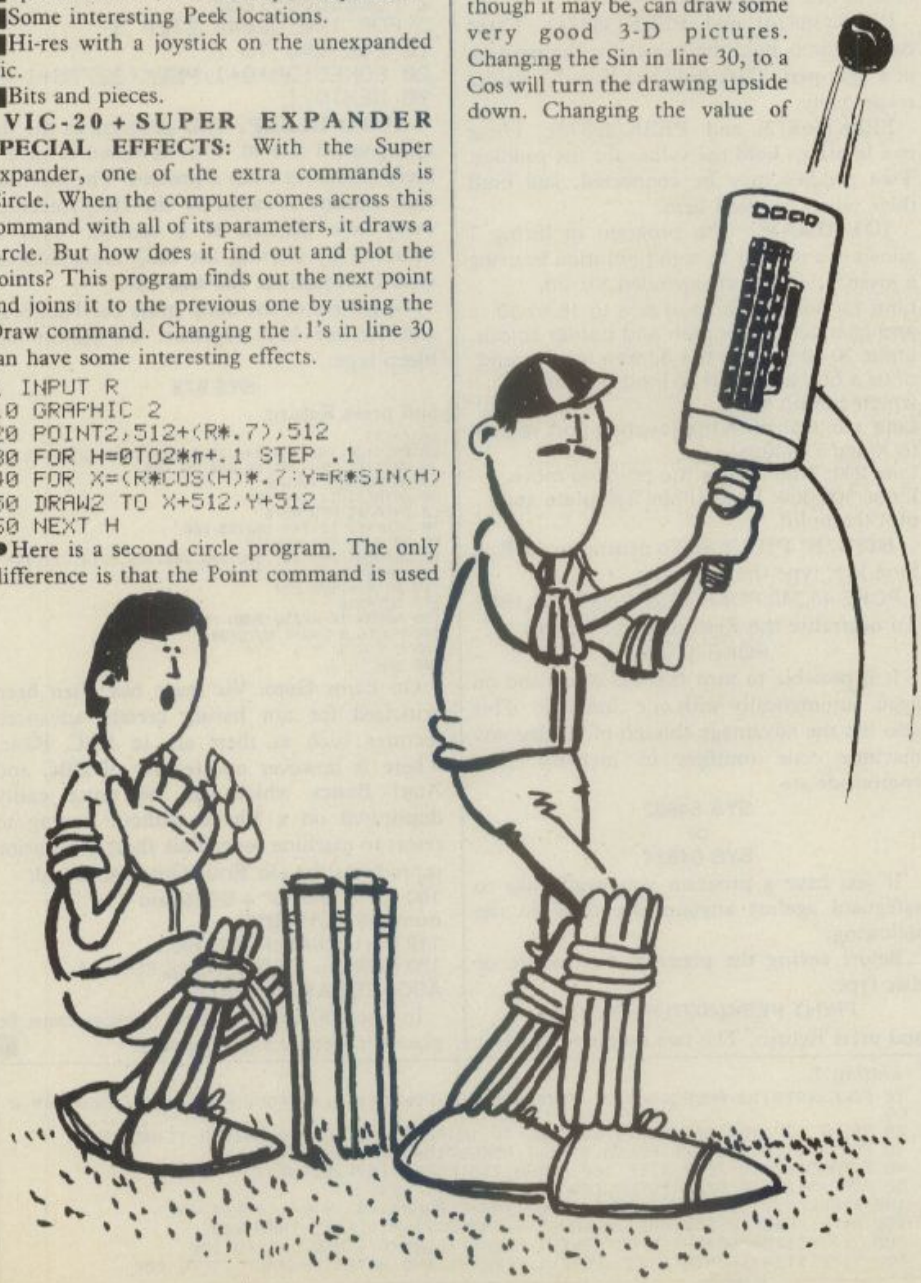
VIC-20 + SUPER EXPANDER SPECIAL EFFECTS: With the Super Expander, one of the extra commands is Circle. When the computer comes across this command with all of its parameters, it draws a circle. But how does it find out and plot the points? This program finds out the next point and joins it to the previous one by using the Draw command. Changing the .1's in line 30 can have some interesting effects.

```
1 INPUT R
10 GRAPHIC 2
20 POINT2,512+(R*.7),512
30 FOR H=0TO2*π+.1 STEP .1
40 FOR X=(R*COS(H)*.7:Y=R*SIN(H)
50 DRAW2 TO X+512,Y+512
60 NEXT H
```

●Here is a second circle program. The only difference is that the Point command is used instead of Draw, and line 30 is slightly changed.

```
1 INPUT R
10 GRAPHIC 2
30 FOR H=0TO2*π+.1 STEP .03
40 FOR X=(R*COS(H)*.7:Y=R*SIN(H)
50 POINT2,X+512,Y+512
60 NEXT H
70 END
```

●The program right, short though it may be, can draw some very good 3-D pictures. Changing the Sin in line 30, to a Cos will turn the drawing upside down. Changing the value of 100 in line 30 will change the steepness of the hills.



```
10 GRAPHIC2:COLOR2,2,1,5
20 FOR A=0 TO 470 STEP 15
30 B=SIN((A)/50)*100
40 CIRCLE2,512,B+500,A,A
50 NEXT
60 END
```

●Do you know about Graphic 4? You don't? Well then I'll tell you about it. After turning the Vic-20 on, you are told that you have 6519 bytes free. But once you've typed a Super Expander command you only have 3069 bytes free left. Where have they all gone to?

This is one of the failings of the Super Expander, but to solve it, type

GRAPHIC 4

and press Return. Then type

PRINT FRE(O)

and press Return. You should now have all your memory back.

Never type Graphic 4 before Graphic 1, 2 or 3 have been used. If you do, the computer will crash and any program in memory will be lost.

●Anyone with a Super Expander will of course know how to plot pixels by using the extra commands. Not everyone though knows how to unplot them. I have therefore written a short program to show this, which is under the explanation of how to unplot pixels.

To draw a circle you may type:

CIRCLE 2,512,512,320,460

Then to unplot it you would type:

CIRCLEOVER 2,512,512,320,460

It is not really important what the word or character is after the command Circle, as long as it it not another system command, ie:

CIRCLETAB 2,512,512,320,460

is incorrect.

CIRCLE X2,512,512,320,460

is correct.

You can also unplot with Draw and Point.

DRAW 2,0,0 to 1023,1023

draws a diagonal line.

DRAW Z2,0,0 to 1023,1023

will unplot it.

POINT 2,512,512

plots a point in the middle of the screen.

POINT F2,512,512

will unplot that point.

(continued on next page)

(continued from previous page)

```
10 COLOR2,6,5,6
20 GRAPHIC2
30 CIRCLE2,565,465,345,460
40 DRAW 2,360,100 TO 765,100 TO 765,610 TO 360,
   610 TO 360,100
50 REGION5:PAINT2,430,210
60 FOR Q=200 TO 0 STEP -6
70 CIRCLEX2,560,360,Q*.7,Q:NEXT Q
80 CIRCLE2,560,360,50,60
90 REGION7:PAINT2,560,360
100 REGION3:PAINT2,565,800:PAINT2,5e5,70:REGION6
110 DRAW2,200,0 TO 200,930 TO 930,930 TO 930,0
120 PAINT2,0,0
130 COLOR2,6,2,2:FOR T=0 TO 200:NEXT:COLOR1,6,
    1,1:FOR T=0 TO 200:NEXT:GOTO 130
```

PEEK LOCATIONS: The following Peek locations may be of some help towards solving your problems. It is not possible to change the contents of these locations because they are checked by the computer every few tenths of a second. The contents of the locations can be read by using the command Print Peek (location). Next to each location number there will be an explanation of the number returned by the above command.

PEEK(17): This location returns a number which corresponds to the last Input, Read, or Get statement. It tells you which one it last came across in the program.
Input = 0. Read = 152. Get = 64.

PEEK(57) and PEEK(58): These two locations work together to produce a total number which is where the program in memory was either stopped or ended. Both locations must be read to get the correct number. Take the value of location (58) and times it by 256, then add to this the value of location (57) ie:

If PEEK(57) = 124 and PEEK(58) = 21 then you are on line 5500. Because (21*256) + 124 = 5500.

PEEK(63) and PEEK(64): These locations return the line number of the current Data statement being read. They work in the same way as (57) and (58).

PEEK(69) and PEEK(70): The values held in these locations correspond to the last variable name used. If the last variable used was A then the value of location (69) will be 65. The second location is used only if the variable was a two lettered variable, ie:

If the last variable used was BZ then PEEK(69) = 66. PEEK(70) = 90.

Refer to the CHR$ table on pages 146-147 of the Vic-20 User Manual for all the correct codes.

PEEK(152): This returns a number which refers to how many files are open at that present time. A value of one is added every time a file is opened, and a value of one is taken away every time a file is closed.

PEEK(214): This returns a number which tells you what row the cursor is on at that present moment. This location can be changed to move the cursor around.

PEEK(215): This location contains the ASCII value of the last key pressed.

PEEK(642): This location returns a number which when multiplied by 256 will give the start of memory location.

PEEK(644): This location returns a number which when multiplied by 256 will give the end of memory location.

PEEK(650): This is the key repeat control area. It can be changed to either 0 or 255.
0 = cursor keys repeat only.
255 = all keys repeat.

PEEK(646): This location contains the cursor colour value. When Poked with a number between 0 and 7 inclusive the cursor just changes colour. If the number is higher than 7 then the cursor goes into multicolour mode.

PEEK(657): This location can be changed to either 0 or 128. It controls the Shift/Commodore keys, and therefore the ability to change from upper to lower case and vice versa.
0 = enabled change.
128 = dissabled.

PEEK(36864): Changing the value held in this location enables you to move the screen from left to right and right to left. The normal value here is 12.

PEEK(36865): This holds the value of the vertical position of the screen. Normal value is 37.

PEEK(37159) and PEEK(36967): Both these locations do the same. They change the speed of the cursor. The higher the value Poked in, the slower the cursor will flash, but the programs will run faster.

PEEK(36867): The screen will either lengthen or shorten depending on the value held in this memory location.

PEEK(36870) and PEEK(36871): These two locations hold the values for the position of a light-pen. They hold the X and Y values respectively.

PEEK(36872) and PEEK(36873): These two locations hold the values for the paddles. Two paddles may be connected, and both their values are read here.

JOY DRAW: The program in listing 1 allows you to draw in high resolution by using a joystick, on the unexpanded Vic-20.
Line 10: Sets the screen size to 16 by 10, and changes the screen and border colour.
Lines 20-50: Set up the screen for use and draw a box around it to limit the area which can be used.
Line 100: Converts the joystick port values to X and Y values.
Line 200: This allows the point to move.
Lines 500-600: These lines calculate and plot the point.

BITS 'N' PIECES: To neutralise the Run Stop key, type the following

POKE 45,240:POKE 46,26:POKE 788,194

To neutralise the Restore key, type this

POKE 37150,3

It is possible to turn the Vic-20 off and on again automatically with one command. This also has the advantage though of leaving any machine code routines in memory. The commands are

SYS 64802
or
SYS 64824

If you have a program you would like to safeguard against anyone else then do the following:

Before saving the program on cassette or disc type:

PRINT PEEK(4097),PEEK(4098)

and press Return. The two numbers which it gives you must be noted down or memorised as they will be needed on loading the program.

Now type:

POKE 4097,0:POKE4098,0

and press Return. The program will now not list or run, although it is still in memory. Now save the program as usual and don't forget those numbers. When you want to load the program, do so as usual and then type the following using X and Y as the numbers you memorised.

POKE 4097, X:POKE 4098,Y

and press Return. The program will now run and list etc...

If you are bored of playing space invaders the normal way round try putting something like this in the program. It automatically gives you a totally new game. You're playing upside down. Type in the program on its own and see what you think.

Once it's been run it can be Newed and to go back to upside down mode again just type

POKE 36869,253

and press Return.

```
2 POKE36869,253
5 FOR I=0TO2048 STEP 8
10 FOR Q=0 TO 7
20 POKE5120+Q+I,PEEK(32775+I-Q)
30 NEXTQ,I
```

AUTO BLEEP: This program is for the unexpanded Vic-20. It is designed to give a bleep whenever a key is pressed. The machine code routine is called by the IRQ interrupt every one sixtieth of a second. This is achieved by altering the IRQ jump address stored at locations 788 and 789.

To get rid of the bleep press the Run-Stop and Restore keys together. To restore the bleep type:

SYS 673

and press Return.

```
10 X=673
20 DATA120,169,174,141,20,3,169,2,141,21,3,88,96
30 DATA165,203,201,64,240,25,169
40 DATA5:REM VOLUME
50 DATA141,14,144,169
60 DATA246:REM NOTE
70 DATA141,11,144,162,55,160
80 DATA255:REM LENGTH
90 DATA136,208,253,202,208,248,169,0,141,11,144
100 DATA169,1,141,139,2
110 DATA76,191,234
120 DATA256
130 READA:IF A=256 THEN 150
140 POKEX,A:X=X+1:GOTO130
150 SYS 673
160 NEW
```

On Error Goto: Vic Basic has often been criticised for not having certain advanced features such as there are in BBC Basic. There is however one feature of BBC and Atari Basics which can be quite easily duplicated on a Vic-20 without having to resort to machine code. This short subroutine reproduces the On Error Goto command:

```
100 A$ = "GOTO" + STR$(line
number) + CHR$(13)
110 L = LEN(A$):POKE 198,L
120 FOR A = 1 TO L: POKE 630 + A,
ASC(MID$(A$,A)):NEXTA
```

In line 100 an actual line number must be placed in between the brackets. ■

Listing 1.

```
10 POKE36879,13:POKE36867,21:POKE36864,17:POKE36865,45:POKE36866,144:POKE36869,2
53
20 PRINT "J":FOR A=1 TO 16:FOR N=1 TO 10:POKE7663+16*N+A,N+10*A-11:NEXTN,A
30 FOR A=5120 TO 7679:POKEA,0:NEXT:POKE37154,127:X=64:Y=80
40 FORA=5120 TO 7679 STEP 160:POKEA,255:POKEA+159,255:NEXT
50 FORA=5121 TO 5278:POKEA,128:POKEA+2400,1:NEXT
100 A=PEEK(37151):X=X+((AANDI6)=0):Y=Y+((AANDI)=0):Y=Y-((AANDI)=0)
200 X=X-((PEEK(37152)ANDI28)=0):F=-((AANDI32)=0):IFF=1 THEN 600
500 Y1=Y+5120+160*INT(X/8):POKEY1,PEEK(Y1)OR2↑(7-XANDI):GOTO 100
600 Y1=Y+5120+160*INT(X/8):POKEY1,PEEK(Y1)AND NOT2↑(7-XANDI):GOTO 100
```

Not for the faint of heart

TOWER OF EVIL

There are more than 40 rooms in the maze-like Tower of Evil. Throughout the Tower is scattered the stolen treasure of King Salimos, which Andros must retrieve and place in the sacred chest at the top of the Tower.

To collect the treasure, Andros must travel from room to room, duelling with the Demi-Clones, wrestling with the Baphonets. To defend himself, Andros can throw fireballs from his fingertips, but even this skill cannot help him negotiate the dreaded Fire Pits, which must be leaped in a single bound.

Tower of Evil is for experts only. We guarantee you hours of enthralling, fast action play.

You should find Tower of Evil, with a free poster offer, at any major software retailer.



£6·95

FOR SPECTRUM 48K

(Vic-20 version also available).

CREATIVE SPARKS

DRAGON K

John Nash raises the chequered flag on a fast machine-code racing game.



Listing 1.

```
1 REM KART for Dragon 32 or 64
2 REM (C) J R G Nash, 1984.
3 REM
4 REM
5 REM
10 GOTO180
20 FORN=1 TO 295:READR:J=J+R
30 JO=INT((JOYSTK(0)-32)/10):JO=JO*30/SP
40 J=J-JO:IFJ<0 THENJ=0
50 POKE28794,J:EXEC28796
60 IFJ<1 ORJ>38 THENGOTO360
70 DE=DE+.05:IFDE>99 THEN340
80 TH=INT(JOYSTK(3)-32)/10:SP=SP-TH:FORD=0 TO 4*(100-SP):NEXT:I
SP<1 THEN SP=1:IFSP=1 THENGOTO350
90 IFSP>100 THENSP=100
100 FU=FU-SP/1000:PRINT@474,FIX(FU);:PRINT@453,FIX(SP);:PRINT@46
5,FIX(DE);:IFFU<1 THENSP=SP-6:FU=0
110 NEXTM:RESTORE:SOUND150,1:GOTO20
120 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0
130 DATA-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
140 DATA2,2,2,2,2,2,3,3,3,3,2,2,2,1,1,1,1,1,1,0,0,0,0,0,0,0,-1,-
1,-1,-1,-2,-2,-2,-2,-2,-3,-3,-3,-3,-2,-2,-2,-2,-1,-1,-1,-1,0,0,0
,0,0
150 DATA0,0,0,2,2,2,3,3,3,3,3,3,3,3,2,2,2,1,1,0,0,-1,-1,-1,-1,-2
,-1,-2,-2,-2,-1,-1,-1,-1,0,0,0,0,0,0,0,0
160 DATA0,0,0,0,0,0,0,0,0,0,0,0,-2,-2,-2,-2,-3,-3,-3,-3,-3,-3,-3,-3,-
3,-2,-2,-2,-2,-1,-1,-1,0,0,0,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3,3,3,3
,2,2,2,2,1,1,1,1,1,0,0,0,0,0,0
170 DATA0,0,0,0,1,1,1,1,1,1,1,1,1,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,0,0,0,0,0,0,0,0,0,
0,0,0,0
180 CLS:CLEAR200,&H6FFF:POKE&HFFD7,0:B$=CHR$(128):PRINT@69,B$;:P
RINT@72,B$:PRINT@76,B$;:PRINT@77,B$;:FORN=81 TO 83:PRINTN,B$;:N
EXT:FORN=87 TO 90:PRINT@N,B$;:NEXT
190 PRINT@101,B$;:PRINT@103,B$;:PRINT@107,B$;:PRINT@110,B$;:PRIN
T@113,B$;:PRINT@116,B$;:L$=CHR$(138):R$=CHR$(133):PRINT@120,L$;:
PRINT@121,R$;
200 PRINT@133,B$;:PRINT@134,B$;:FORN=139 TO 142:PRINT@N,B$;:NEXT
:FORN=145 TO 147:PRINT@N,B$;:NEXT:PRINT@152,L$;:PRINT@153,R$;
210 PRINT@165,B$;:PRINT@167,B$;:PRINT@171,B$;:PRINT@174,B$;:PRIN
T@177,B$;:PRINT@179,B$;:PRINT@184,L$;:PRINT@185,R$;
220 PRINT@197,B$;:PRINT@200,B$;:PRINT@203,B$;:PRINT@206,B$;:PRIN
T@209,B$;:PRINT@212,B$;:PRINT@216,L$;:PRINT@217,R$;
230 PRINT@358,"(C) J R G NASH  1984":PRINT@489,"PRESS ANY KEY";
240 A$=INKEY$:IFA$=""THEN240
250 CLS:PRINT@0,"L H JOYSTICK (FORE & AFT)",,,"TO CONTROL THROTT
LE & BRAKES":PRINT@192,"R H JOYSTICK (SIDE TO SIDE)",,,"TO STEER
":PRINT@384,"GET READY!":PRINT@480,"PRESS ANY KEY";
260 A$=INKEY$:IFA$="" THEN260
270 FORM=1 TO 5:FORN=1 TO 30 STEP 3:SOUNDN,1:NEXTN,M
280 FORN=1024 TO 1535:POKEN,RND(128)+127:NEXT:EXEC29024
290 FORN=1024 TO 1535 STEP 64:FORM=0 TO 31 STEP 2:POKEN+M,128:PO
KEN+M+1,207:NEXTM:FORM=0 TO 31 STEP 2:POKEN+M+32,207:POKEN+M+33,
128:NEXTM,N
300 PRINT@267,"WELL DONE!";:EXEC29058
310 TIMER=0:CLS:PRINT@448,"SPEED";:PRINT@460,"DIST.";:PRINT@470,
"FUEL";:RESTORE
320 FORN=1440 TO 1471:POKEN,239:NEXT:FORN=1024 TO 1191:POKEN,175
:NEXT:FU=99:J=21:SP=8:DE=0:POKE28795,130:DE=0
330 GOTO20
340 EXEC29075:PLAY"L12GGGL4D":GOTO370
350 PRINT@448,"STALLED ENGINE":FORN=10 TO 1 STEP-1:SOUNDN,1:NEXT
N:GOTO370
360 CLS0:EXEC29041:FORN=200 TO 1 STEP -20:SOUNDN,1:NEXT
370 TI=FIX(TIMER/50):FORN=1 TO 5000:NEXT:CLS:PRINT@32,"DISTANCE
";FIX(DE);" MILES";:PRINT@96,"TIME ";TI;" SECONDS":PRINT@448,"PR
ESS ANY KEY OR BREAK";
380 A$=INKEY$:IFA$=""THEN380ELSE310
390 N=0
400 READR:N=N+1:GOTO400
```

I HAVE BEEN SURPRISED at the apparent lack of car simulators for the Dragon. True, there are a number of race-circuit programs, but I have yet to see one which gives you the driver's view through the windscreen. I adopted the principle: "If the program you want does not exist, write it yourself!", and set to work.

The assembler routine to move the display was the first and most important task, and after experimenting with a high resolution routine — listing 2 — I decided this was too slow, although it did produce a very nice display. The hex dump and Basic driver are included in case any readers want to experiment with it.

I then wrote a text screen display routine — listing 1 — which is very much faster, and able to take a variable delay loop without becoming absurd! To load this version of the program, first type in the Basic listing 1 and then Save this to tape or disc *without* trying to Run it. If you Run it, it will crash due to calling non-existent code routines. Next, type New, and then load the hexadecimal bytes from the hex dump. A suitable loader is:

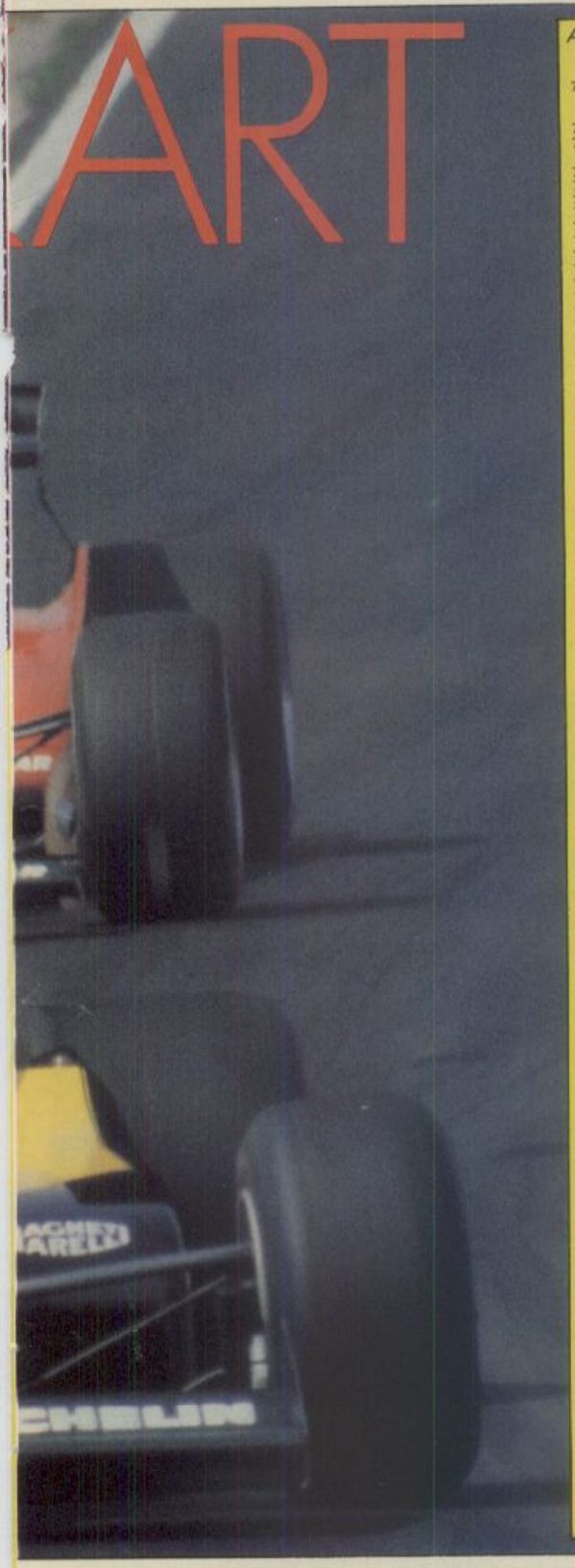
```
10 FOR N = &H7000 TO &H71A3:READA$:
POKEN,VAL("&H" + A$):NEXT
20 DATA C5,45,8E,5,60 etc
```

for as many data statements as you need. It is often convenient to put 10 bytes in a line as in the hex dump. Next do a:

```
CSAVEM"CODE",&H7000,&H71A3,1
```

to store the code on tape. Now you can reload the Basic program and Run to start it. Future loading can be done by loading the code and Basic programs in either order from the tape,

(continued on page 145)



Assembler dump of listing 1.

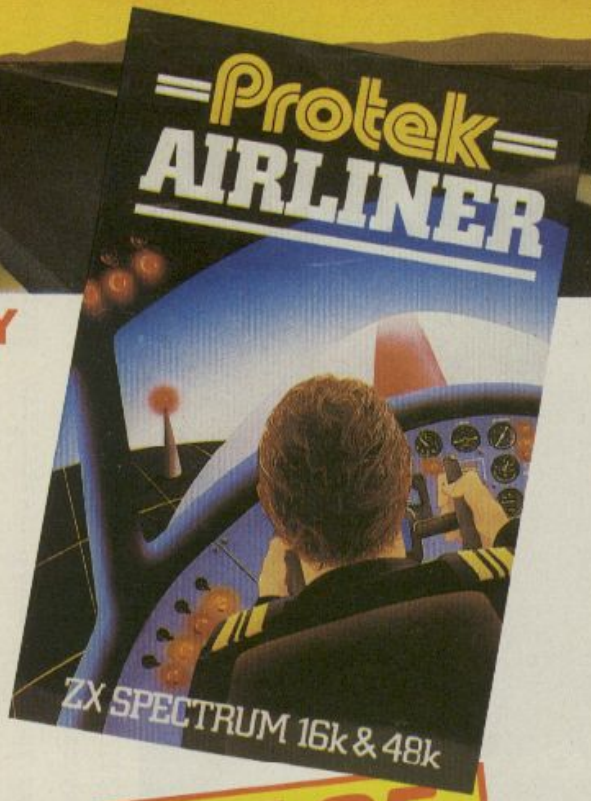
```
                    00090 *TEXT SCREEN ROAD DISPLAY
7000                00100         ORG     $7000
            0088    00110 CL      EQU     136
            0084    00120 CR      EQU     132
7000                00130 FLAG1   RMB     1
7001                00140 FLAG2   RMB     1
              70    00150         SETDP   $70
7002 8E     0560    00160 START   LDX     #1376
7005 108E   0580    00170         LDY     #1408
7009 5F             00180 LOOP1   CLRB
700A 0F     00      00190         CLR     FLAG1
700C 0F     01      00200         CLR     FLAG2
700E A6     85      00210 LOOP0   LDA     B,X
7010 0D     00      00220         TST     FLAG1
7012 26     0E      00230         BNE     ROAD
7014 81     88      00240         CMPA    #CL
7016 27     14      00250         BEQ     LEDGE
7018 0D     01      00260         TST     FLAG2
701A 26     43      00270         BNE     RCOPY
701C 81     80      00280         CMPA    #128
701E 27     02      00290         BEQ     ROAD
7020 20     31      00300         BRA     LCOPY
7022 0C     00      00310 ROAD    INC     FLAG1
7024 81     84      00320         CMPA    #CR
7026 27     16      00330         BEQ     REDGE
7028 A7     A5      00340         STA     B,Y
702A 20     38      00350         BRA     NEXT
702C 5D             00360 LEDGE   TSTB
702D 34     04      00370         PSHS    B
702F 27     01      00380         BEQ     SKIP
7031 5A             00390         DECB
7032 A7     A5      00400 SKIP    STA     B,Y
7034 35     04      00410         PULS    B
7036 86     80      00420         LDA     #128
7038 A7     A5      00430         STA     B,Y
703A 0C     00      00440         INC     FLAG1
703C 20     29      00450         BRA     NEXT
703E C1     1F      00460 REDGE   CMPB    #31
7040 34     04      00470         PSHS    B
7042 24     01      00480         BHS     SKIP2
7044 5C             00490         INCB
7045 A7     A5      00500 SKIP2   STA     B,Y
7047 35     04      00510         PULS    B
7049 86     80      00520         LDA     #128
704B A7     A5      00530         STA     B,Y
704D 0F     00      00540         CLR     FLAG1
704F 0C     01      00550         INC     FLAG2
7051 20     14      00560         BRA     NEXT
7053 5D             00570 LCOPY   TSTB
7054 34     04      00580         PSHS    B
7056 27     01      00590         BEQ     SKIP3
7058 5A             00600         DECB
7059 A7     A5      00610 SKIP3   STA     B,Y
705B 35     04      00620         PULS    B
705D 20     08      00630         BRA     NEXT
705F C1     1F      00640 RCOPY   CMPB    #31
7061 24     04      00650         BHS     NEXT
7063 5C             00660         INCB
7064 A7     A5      00670         STA     B,Y
7066 5A             00680         DECB
7067 5C             00690 NEXT    INCB
7068 C1     1F      00700         CMPB    #31
706A 23     A2      00710         BLS     LOOP0
706C 30     88 E0   00720         LEAX    -32,X
706F 31     A8 E0   00730         LEAY    -32,Y
7072 8C     04A0    00740         CMPX    #1184
7075 24     92      00750         BHS     LOOP1
7077 16     00D2    00760         LBRA    WHITEL
707A                00770 JSTORE  RMB     1
707B                00780 WLINE   RMB     1
707C C6     70      00790 CHOOSE  LDB     #$70
707E 1F     9B      00800         TFR     B,DP
7080 D6     7A      00810         LDB     JSTORE
7082 8E     04A0    00820         LDX     #1184
7085 C1     03      00830         CMPB    #3
7087 25     0F      00840         BLO     OLHS
7089 C1     0A      00850         CMPB    #10
708B 25     1F      00860         BLO     LHS
708D C1     1F      00870         CMPB    #31
708F 25     41      00880         BLO     MID
7091 C1     27      00890         CMPB    #39
7093 25     74      00900         BLO     RHS
7095 16     009C    00910         LBRA    ORHS
7098 86     80      00920 OLHS    LDA     #128
709A A7     80      00930         STA     ,X+
709C 86     84      00940         LDA     #132
709E A7     80      00950         STA     ,X+
70A0 86     8F      00960         LDA     #143
70A2 A7     80      00970 LOOP10  STA     ,X+
70A4 8C     04C0    00980         CMPX    #1216
70A7 25     F9      00990         BLO     LOOP10
70A9 16     FF56    01000         LBRA    START
70AC 34     14      01010 LHS     PSHS    B,X
70AE 5A             01020         DECB
70AF 86     80      01030         LDA     #128
70B1 A7     80      01040 LOOP11  STA     ,X+
70B3 5A             01050         DECB
70B4 26     FB      01060         BNE     LOOP11
70B6 86     84      01070         LDA     #132
70B8 A7     80      01080         STA     ,X+
70BA 86     8F      01090         LDA     #143
70BC A7     80      01100 LOOP2   STA     ,X+
70BE 8C     04C0    01110         CMPX    #1216
70C1 25     F9      01120         BLO     LOOP2
70C3 35     14      01130         PULS    B,X
70C5 C1     05      01140         CMPB    #5
70C7 25     06      01150         BLO     LOUT
70C9 C0     05      01160         SUBB    #5
70CB 96     7B      01170         LDA     WLINE
70CD A7     85      01180         STA     B,X
70CF 16     FF30    01190 LOUT    LBRA    START
70D2 34     14      01200 MID     PSHS    B,X
70D4 34     04      01210         PSHS    B
70D6 C0     0A      01220         SUBB    #10
70D8 86     8F      01230         LDA     #143
70DA 5D             01240         TSTB
70DB 27     05      01250         BEQ     MIDON
70DD A7     80      01260 LOOP3   STA     ,X+
70DF 5A             01270         DECB
70E0 26     FB      01280         BNE     LOOP3
70E2 86     88      01290 MIDON   LDA     #136
70E4 A7     80      01300         STA     ,X+
70E6 86     80      01310         LDA     #128
70E8 C6     08      01320         LDB     #8
70EA A7     80      01330 LOOP4   STA     ,X+
70EC 5A             01340         DECB
70ED 26     FB      01350         BNE     LOOP4
70EF 86     84      01360         LDA     #132
70F1 A7     80      01370         STA     ,X+
70F3 35     04      01380         PULS    B
70F5 86     8F      01390         LDA     #143
70F7 A7     80      01400 LOOP5   STA     ,X+
70F9 5C             01410         INCB
70FA C1     20      01420         CMPB    #32
70FC 25     F9      01430         BLO     LOOP5
70FE 35     14      01440         PULS    B,X
7100 C0     05      01450         SUBB    #5
7102 96     7B      01460         LDA     WLINE
7104 A7     85      01470         STA     B,X
7106 16     FEF9    01480         LBRA    START
7109 34     14      01490 RHS     PSHS    B,X
710B 34     04      01500         PSHS    B
710D C0     0A      01510         SUBB    #10
710F 86     8F      01520         LDA     #143
7111 A7     80      01530 LOOP6   STA     ,X+
7113 5A             01540         DECB
7114 26     FB      01550         BNE     LOOP6
7116 86     88      01560         LDA     #136
7118 A7     80      01570         STA     ,X+
711A 86     80      01580         LDA     #128
711C 35     04      01590         PULS    B
711E A7     80      01600 LOOP7   STA     ,X+
7120 5C             01610         INCB
7121 C1     28      01620         CMPB    #40
7123 23     F9      01630         BLS     LOOP7
7125 35     14      01640         PULS    B,X
7127 C1     24      01650         CMPB    #36
7129 22     06      01660         BHI     ROUT
712B C0     05      01670         SUBB    #5
712D 96     7B      01680         LDA     WLINE
712F A7     85      01690         STA     B,X
7131 16     FECE    01700 ROUT    LBRA    START
7134 C6     27      01710 ORHS    LDB     #39
7136 D7     7A      01720         STB     JSTORE
7138 86     8F      01730         LDA     #143
713A A7     80      01740 LOOP8   STA     ,X+
713C 8C     04BD    01750         CMPX    #1213
713F 23     F9      01760         BLS     LOOP8
7141 86     88      01770         LDA     #136
7143 A7     80      01780         STA     ,X+
7145 86     80      01790         LDA     #128
7147 A7     80      01800         STA     ,X+
7149 16     FEB6    01810         LBRA    START
714C D6     7B      01820 WHITEL  LDB     WLINE
714E C1     82      01830         CMPB    #130
7150 27     06      01840         BEQ     BLACK
7152 C6     82      01850         LDB     #130
7154 D7     7B      01860         STB     WLINE
7156 20     04      01870         BRA     WOUT
7158 C6     80      01880 BLACK   LDB     #128
715A D7     7B      01890         STB     WLINE
715C 5F             01900 WOUT    CLRB
715D 1F     9B      01910         TFR     B,DP
715F 39             01920         RTS
7160 8E     0400    01930 SSTORE  LDX     #1024
7163 108E 7400      01940         LDY     #$7400
7167 A6     80      01950 SSLOOP  LDA     ,X+
7169 A7     A0      01960         STA     ,Y+
716B 8C     0600    01970         CMPX    #1536
716E 25     F7      01980         BLO     SSLOOP
7170 39             01990         RTS
7171 8E     0400    02000 SCREEN  LDX     #1024
7174 108E 7400      02010         LDY     #$7400
7178 A6     A0      02020 SCLOOP  LDA     ,Y+
717A A7     80      02030         STA     ,X+
717C 8C     0600    02040         CMPX    #1536
717F 25     F7      02050         BLO     SCLOOP
7181 39             02060         RTS
7182 8E     0400    02070 CSTORE  LDX     #1024
7185 108E 7600      02080         LDY     #$7600
7189 A6     80      02090 CSLOOP  LDA     ,X+
718B A7     A0      02100         STA     ,Y+
718D 8C     0600    02110         CMPX    #1536
7190 25     F7      02120         BLO     CSLOOP
7192 39             02130         RTS
7193 8E     0400    02140 CWRITE  LDX     #1024
7196 108E 7600      02150         LDY     #$7600
719A A6     A0      02160 CWLOOP  LDA     ,Y+
719C A7     80      02170         STA     ,X+
719E 8C     0600    02180         CMPX    #1536
71A1 25     F7      02190         BLO     CWLOOP
71A3 39             02200 CODEND  RTS
                    0000  02210         END
```

Hex dump for listing 1.

```
28672 C5 45 8E 5 60 10 8E 5 80 5F
28682 F 0 F 1 A6 85 D 0 26 E
28692 81 88 27 14 D 1 26 43 81 80
28702 27 2 20 31 C 0 81 84 27 16
28712 A7 A5 20 38 5D 34 4 27 1 5A
28722 A7 A5 35 4 86 80 A7 A5 F 0 C
28732 20 29 C1 1F 34 4 24 1 5C A7
28742 A5 35 4 86 80 A7 A5 F 0 C
28752 1 20 14 5D 34 4 27 1 5A A7
28762 A5 35 4 20 8 C1 1F 24 4 5C
28772 A7 A5 5A 5C C1 1F 23 A2 30 88
28782 E0 31 A8 E0 8C 4 A0 24 92 16
28792 0 D2 FF FF C6 70 1F 9B D6 7A
28802 8E 4 A0 C1 3 25 F C1 A 25
28812 1F C1 1F 25 41 C1 27 25 74 16
28822 0 9C 86 80 A7 80 86 84 A7 80
28832 86 8F A7 80 8C 4 C0 25 F9 16
28842 FF 56 34 14 5A 86 80 A7 80 5A
28852 26 FB 86 84 A7 80 86 8F A7 80
28862 8C 4 C0 25 F9 35 14 C1 5 25
28872 6 C0 5 96 7B A7 85 16 FF 30
28882 34 14 34 4 C0 A 86 8F 5D 27
28892 5 A7 80 5A 26 FB 86 88 A7 80
28902 86 80 C6 8 A7 80 5A 26 FB 86
28912 84 A7 80 35 4 86 8F A7 80 5C
28922 C1 20 25 F9 35 14 C0 5 96 7B
28932 A7 85 16 FE F9 34 14 34 4 C0
28942 A 86 8F A7 80 5A 26 FB 86 88
28952 A7 80 86 80 35 4 A7 80 5C C1
28962 28 23 F9 35 14 C1 24 22 6 C0
28972 5 96 7B A7 85 16 FE CE C6 27
28982 D7 7A 86 8F A7 80 8C 4 8D 23
28992 F9 86 88 A7 80 86 80 A7 80 16
29002 FE B6 D6 7B C1 82 27 6 C6 82
29012 D7 7B 20 4 C6 80 D7 7B 5F 1F
29022 9B 39 8E 4 0 10 8E 74 0 A6
29032 80 A7 A0 8C 6 0 25 F7 39 8E
29042 4 0 10 8E 74 0 A6 A0 A7 80
29052 8C 6 0 25 F7 39 8E 4 0 10
29062 8E 76 0 A6 80 A7 A0 8C 6 0
29072 25 F7 39 8E 4 0 10 8E 76 0
29082 A6 A0 A7 80 8C 6 0 25 F7 39
```

HIGH FLYING EXCITEMENT FROM PROTEK.





HAVE YOU THE SKILL TO FLY AND LAND AN AIRLINER?

From take off to touch down you're in control. Flight control is totally in your hands. Keeping your aircraft in full flight will be as complex as controlling the real thing.
You'll be able to take off, manoeuvre, navigate, and land the aircraft using realistic aircraft controls. You'll chart your present position on a map or view the runway as you land without losing sight of vital instruments.
In fact, you'll hardly be able to tell the difference thanks to 'Airliners' range of features.
Have you got what it takes to be a high flyer?



£5.95
Available for the BBC and Commodore 64 soon.

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

Protek

VISA

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

(continued from page 142)

and then typing Run.

The right-hand joystick gives steering control, moving the road in the correct sense, i.e., opposite to the stick. If you have a 100K ohm potentiometer with a knob that twists, this would give a more realistic control movement.

Your accelerator and brakes are controlled by the left-hand joystick, forwards to go faster, backwards to slow down. In the exact central position, you will coast. Don't worry if you don't have joysticks, as you can control the program from the keyboard. The listing below shows which lines to add/alter, and you will then use the arrow keys for turning and speed control. The shift key gives a sharper turn. You will probably also want to alter line 250 — instructions — to read more appropriately.

On both versions of the program, the kart has a very flexible engine, giving you a speed range of 8-100 mph with no gear changes. You will find that the faster you go, the less cornering ability you have, so you may well crash off the side of the road, to the accompaniment of a suitable display and sound.

Also, your fuel will only get you to the end if you drive at a moderate speed. Watch the fuel gauge. When you crash, stall or finish, you are given a readout of distance and time. Should you actually finish, you will see a chequered flag and hear a suitable tune.

You can design your own course by altering the data statements in lines 120-170, and adding more if necessary. Value 0 gives straight ahead, +1 to +3 gives various degrees of right turn — 3 is the most — and −1 to −3 various degrees of left turn. Do not exceed 3 either way, as your kart cannot turn more sharply than that. When you have put in the data for your new course, type

```
RESTORE:GOTO390
```

which will stop with an O/D ERROR. If you now type

```
PRINTN
```

you will find out how many data values you have entered, and can then put this in the loop counter in line 20. Once the data is used up, the program squeaks and repeats the course.

You might also like to add a score and high score which could be calculated from the time and distance by a suitable equation such as Score = Distance * 10 − (Time) − 250) + a bonus of 500 if you finish.

Note that if your machine will not accept the speed Poke, you will have to remove

```
POKE&HFFD7,0
```

from line 180.

The entry is at line 790 (Choose), with the right road edge stored in JStore. Choose selects the appropriate routine from five alternatives according to the position of the road. OLHS is when the road is off the left-hand side of the screen, so only a single black square and road edge character is printed.

LHS is when the road is partly off the left-hand edge, so less than the full width will be printed. The stored value is used in line 1050 to count how many squares should be printed. If the edge is more than four spaces into the screen, we require a white centre line, so this is printed in line 1180.

Mid achieves the printing when the whole road width is within the screen, and again a white line is needed. All these routines use accumulator offset indexed addressing — for example line 1470 — and most use the stack as a temporary store — for example line 1200.

RHS and ORHS do the same tasks for road positions partly and completely off the right edge of the screen. Note that these routines have to avoid generating any wrap-around, which would spoil the display.

Now we have printed the black line in the middle of the screen, we need to copy it down the screen, widening the road as it comes towards us. We cannot just copy each line downwards with one more black square in the centre, as this would destroy any curves and perspective effects. We need to pull the screen downwards by starting at the bottom and copying each line down into the one below, widening the road as we go. We will work our way up the screen one line at a time until we reach the horizon.

This is done by Start in line 160. This seeks the edge of road characters, 136 and 132, and uses two flags to keep track. Flag 1 is set for road, clear for grass, while Flag 2 is set for right hand grass area, and clear for left hand grass area. The routine then uses LCopy and RCopy to copy the grass verges downwards with outward shift by one square. The edge routines, LEdge and REdge copy the edge characters downwards and outwards, and place a black square just inboard of them. Finally, the Road routine merely does a straight downward scroll, keeping its eye open — line 320 — for the right-hand edge.

When all this scrolling has finished, the white line character is placed in the centre of the road by WhiteL — line 1820. This ensures that a 130 character and a 128 — black — character are printed alternately.

The remainder of the routines at the end of the listing store the text screen contents for instant replay in the event of a crash and a win. They are fairly self evident.

The Basic program is fairly straightforward, using a loop between lines 20-110 which I have kept as simple as possible for speed. The throttle setting alters the speed, which in turn affects a delay loop in line 80. The steering control merely alters the value passed to the machine code by line 50: all the hard work is done in assembler, in which, paradoxically, it is easier to write this sort of routine than in Basic. Probably, the options and thus possible errors are fewer in assembler, so you have to break the process down into simpler logical steps.

The remainder of the program is initialisation routines, titles and frills! The crash sequence and chequered flag are drawn on the screen and then stored by small assembler routines when the program is first run. These displays are then copied onto the screen when needed, by two more small assembler routines in lines 340 and 360. ■

Listing 2.

```
1 REM BASIC DRIVER FOR HIRES. ROAD PROGRAM
5 CLEAR200,&H6FFF
10 PMODE3:PCLS:SCREEN1,0
11 LINE(0,0)-(256,79),PSET,B:PAINT(10,10),3,4
20 FORD=1 TO 78:READN:JO=N+64:H2=N+128
25 JS=JOYSTK(0):JP=JS-32:JO=JO-JP:H2=H2-JP
30 LINE(JO,80)-(H2,80),PSET
35 WL=(H2+JO)/2:PSET(WL,80,3)
40 EXEC&H7001
50 LINE(JO,80)-(H2,80),PRESET
60 NEXTD:RESTORE:GOTO20
70 DATA30,30,30,30,30,30,30,30,27,24,21,18,14,10,6,4,4,4,4,4,6,8
,10,12,14,16,18,19,20,21,21,21,21,21,21,23,25,27,29,30,33,33,33,
33,33,33,35,37,40,43,46,49,52,55,58,60,60,60,57,54,51,48,46,44,4
2,40,39,38,37,36,35,34,33,32,31,30,30,30
```

Hex dump for listing 2.

```
28672  C5 8E 17 E0 7F 70 0 A6 82 8C
28682  10 0 23 3D 7D 70 0 26 D 34
28692  2 84 AA 35 2 26 13 A7 88 20
28702  20 E7 4D 27 1B 34 2 43 84 AA
28712  35 2 26 12 20 ED 7C 70 0 A7
28722  88 20 1A 1 66 88 20 66 88 21
28732  20 C9 1A 1 A7 88 20 69 88 20
28742  7F 70 0 20 BC 39 A5 F 0 C
```

Modifications for keyboard use.

```
30 JO=-(PEEK(344)=223)+(PEEK(343)=223)
31 IFPEEK(337)<200THENJO=JO*3
32 JO=JO*30/SP
80 TH=3*(PEEK(341)=223)-3*(PEEK(342)=223):SP=SP-TH:FORD=0 TO 4*(
100-SP):NEXT:IFSP<1 THEN SP=1:IFSP=1 THENGOTO350
375 A$=INKEY$
```

Every computer needs

CHATTERBOX II

"Listen creep, I am the leader....."

For **ZX81**
SPECTRUM
BBC
TRS 80
APPLE
NASCOM
VIC/PET/64
(Please state)





NEW! EXCLUSIVE! **PITCH CONTROL**

£39 COMPLETE OR £33 (DIY KIT)

CHATTERBOX II™ can say anything!

Genuine phoneme synthesis - not just recorded speech - hence unlimited vocabulary. Programmable pitch for more natural intonation (exclusive to Wm Stuart Systems)- solid tone cabinet for quality sound - integral beep/music amplifier. **PLUS** expansion socket for BIG EARS voice recognition system. Full instructions technical notes and software supplied with this outstanding educational unit.

DEALER ENQUIRIES WELCOME

As seen on BBC TV "Computer Programme"

BIG EARS

SPEECH INPUT FOR ANY COMPUTER



Hugely successfu Speech Regnition System. complete with microphone, software and full instructions.

ONLY **£49**

BUILT TESTED & GUARANTEED

PLEASE STATE COMPUTER: UK101, SPECTRUM, ATOM, NASCOM2, Vic 20, Micron, ZX80/81, PET, TFS80, MZ80K, APPLE II, BBC MICRO CBM 64

ZX81/SPECTRUM

NEW! **VIBRATO CONTROL**

MUSIC SYNTHESISER (Stereo)
+16 LINE CONTROL PORT

Play 3-part music, sound effects, drums etc. Full control of attack, decay and frequency. Input/Output lines provide control and monitor facility for Home Security, Robot Control, Model Railway etc. etc. Works with or without 16K RAM.

Full instructions/software included.
Add keyboard to make a live performance polyphonic synthesiser!
Note: up to 3 units can be used simultaneously; giving 9 music channels & 48 I/0 lines

AMAZING VALUE AT ONLY
£19.50 (KIT)
£25.50 (BUILT)

SOFTWARE

THE COMPOSER
Synthesiser Music Programme
Enter & play 3 part harmony. Includes demonstrations.
(Spectrum/ZX81) **recommended £7**

TALKING HANGMAN
For Chatterbox!
The classic game claims its victims with a dry vocal accompaniment (Spectrum) **£6**

ZX ARP/DRUMSEQ
Fascinating synthesiser demonstrations. Generates automatic sequences and plays from keyboard. Some weird effects (Spectrum) **£6**

CHROMACODE??????
Can you defuse the bomb by cracking the secret combination before time runs out? With Chatterbox voice output (Spectrum) **£6**

COLOUR MODULATOR

RGB in. PAL/UHF out (not for ZX)

KIT **£16**
BUILT **£22**

Please add VAT at 15% to prices.
Barclay/Access orders accepted by telephone

All enquiries S.A.E. please

WILLIAM STUART SYSTEMS Ltd

Quarley Down House
Cholderton
Nr. Salisbury
Wiltshire. SP4 ODZ
Tel: 098 064 235

BARCLAYCARD VISA

Educational Software LCL



BBC Micro
ZX Spectrum
unexpanded VIC
Electron
ZX81
Apple
PET
Commodore 64
Dragon NEW
All software for the above computers.

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) £5.95.
"The book is a collection of 29 program listings, each one an interesting and amusing challange . . . You'll like this" ELECTRON USER
PICTURE PUZZLES (BBC & Electron, CBM 64). Early learning fun using educational tests. 3D graphics. £6.50
ANIMATED ARITHMETIC Teaches using moving colour pictures (not words) Ages 3-8. £6.50 (disc £7.50).
MASTER MATHS (Apple, Pet and CBM 64 only). 50 program O-Level course or teacher's aid, amazing graphics.
". . . the programming standard is high".
TIMES EDUCATIONAL SUPPLEMENT

Immediate dispatch Micro Maths, and Master Maths. Phone or send orders or requests for free catalogue (200 programs) to:

World leaders in Maths educational software (distributers in 24 countries).

LCL
26 Avondale Ave.
Staines, Middx.
Tel:0784 58771
24 hrs. Orders

ACCESS VISA

GENEROUS TRADE DISCOUNTS.

THE 2ND SOUTH OF ENGLAND PERSONAL COMPUTER FAIR

WOOD GREEN SCHOOL, WITNEY

just off the A40, 11 miles west of Oxford
R.A.C. signposted

SUNDAY 10 JUNE 11AM-7PM

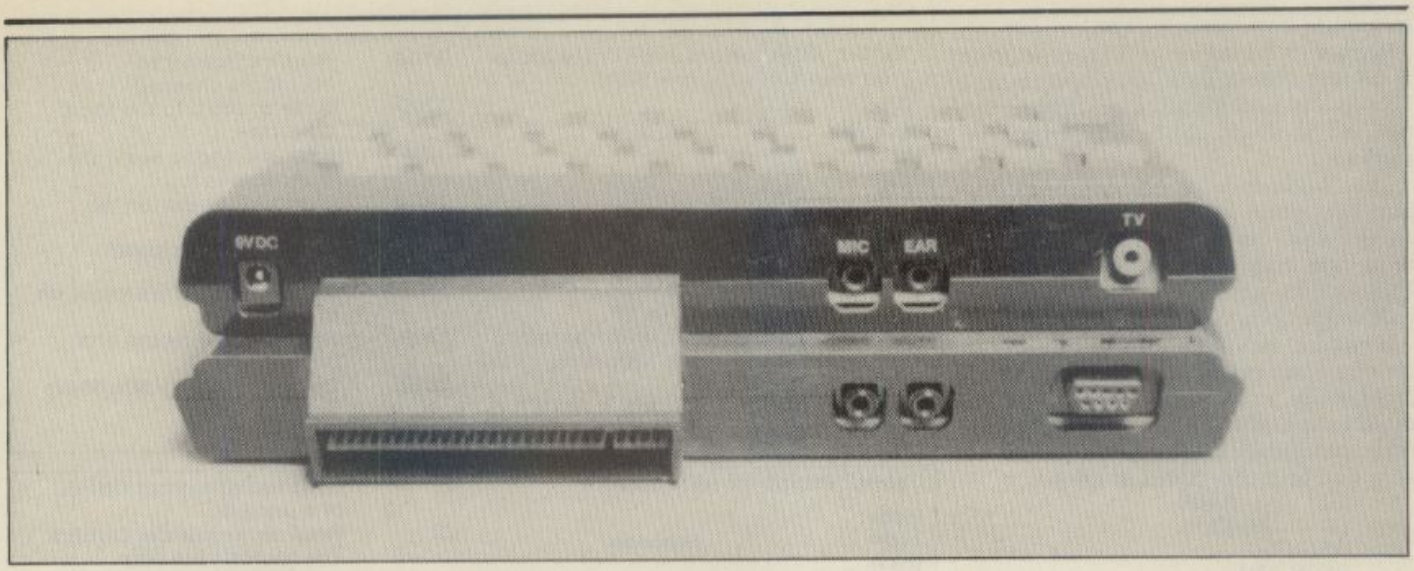
Exhibitors from all over England under one roof!

Microcomputer Equipment and Services on display for all Home, Business and Educational use — beginners and experts alike. Many of the newest and most exciting Micros will be on sale together with a wide selection of computer software and books.

Ample free parking *ADMISSION £1.00*

Lunches available

Further enquiries 0993 2355



THE MICRODRIVE FILE

Robert Newman continues the Microdrive series.

THE ARRIVAL OF the ZX Microdrive greatly increases the power and versatility of the Spectrum computer. Each Microdrive cartridge can hold about 90K of programs or data and this can be accessed at a reasonably fast speed — typically three or four seconds.

This makes it feasible for a program to store large amounts of data which would not all fit into the memory of the computer in a file on the Microdrive which can be read as needed. This permits the Spectrum to tackle applications such as database management and information retrieval, as well as introducing exciting possibilities for adventure gaming.

The extra commands required for handling Microdrive files, as well as those concerned with the network and RS-232 are dealt with by a new 8K ROM inside Interface 1. The new ROM occupies the same addresses as the first half of the existing ROM, and so they cannot both be in the memory map of the computer at the same time.

The new ROM is therefore only paged in when it is needed for syntax checking or execution of the extended Basic commands, after which control returns to the old ROM. This means that you cannot examine the contents of the new ROM by using PEEK. The easiest way to make a copy of the new ROM so that it can be disassembled is to use a program like:

```
10 CLEAR 40959
20 SAVE *"m";1;"newrom" CODE 0,8192
30 LOAD *"m";1;"newrom" CODE 40960
```

The new ROM can then be examined, remembering to subtract 40960 (= A000 hex) from the addresses. The addresses of some of the Microdrive routines which I have found are given in table 1. Some of these are used in the improved catalog routine described here.

If you want to be able to use Microdrive routines in your own machine-code programs, you need to know about how the paging mechanism works, and how files are stored on the Microdrive. The new ROM is paged when a RST 8 instruction is encountered. In the 16K ROM, this restart is used whenever an error occurs during syntax checking or run-time. When the new ROM pages in, it checks to see whether the restart was caused by a "bona-fide" error such as "Out of data", and if so control is passed back to the error routine in the old ROM.

If the restart was due to one of the extended Basic commands — for example Erase — then the error flag is cleared and the appropriate routine in the new ROM called to process the command, after which the new ROM is paged out again. This is not the full story, however, because the authors of the new ROM have also provided a method for machine-code programs to use some of the new routines by following the RST 8 instruction with a data byte called a "hook code".

In your machine code program, RST 8 followed by one of these hook code bytes is equivalent to calling a subroutine in the new ROM. For example:

```
RST 8
DEFB 31H
```

calls a routine which sets up the new system variables used by Interface 1. Twelve of these hook codes are concerned with the Microdrive.

Most of them affect all the main Z-80 registers, and so counters etc. should be pushed to the stack before they are used, as should the alternate pair H'L' otherwise the computer might crash when it returns to Basic.

(continued on next page)

Listing 1. Catalog code dump. 523 bytes, start address = 64000.

207	49	42	101	92	237	91	99	92	167	237	82	1496
125	254	5	56	2	24	8	33	131	6	34	237	915
92	207	50	217	229	217	62	2	205	1	22	205	1509
153	30	237	67	214	92	33	255	255	34	218	92	1680
33	56	250	34	237	92	207	50	225	225	205	109	1723
6	205	232	15	221	126	25	205	247	23	1	255	1561
0	237	67	201	92	205	196	18	205	83	30	32	1366
248	221	126	67	221	182	70	230	2	32	5	205	1609
254	18	24	116	221	126	68	183	32	110	33	11	1196
252	17	12	0	6	0	221	78	13	121	183	40	943
59	229	221	229	193	6	10	35	35	126	221	190	1558
71	32	5	35	221	35	16	245	193	221	225	225	1524
40	70	48	4	25	13	24	221	229	213	197	229	1313
203	33	203	33	96	105	203	33	203	16	9	63	1205
77	225	43	9	235	25	235	237	184	193	209	225	1897
221	229	221	126	67	119	35	221	126	41	119	35	1560
6	10	221	126	71	119	221	35	35	16	247	221	1328
225	221	126	13	60	221	119	13	254	50	40	6	1348
205	18	19	194	77	250	175	205	247	23	221	229	1863
225	17	44	0	25	205	80	29	205	174	251	33	1288
11	252	17	12	0	221	70	13	120	183	202	139	1240
251	221	229	229	213	197	203	86	32	10	205	193	2069
251	62	245	205	102	29	24	110	229	35	126	221	1639
119	13	205	215	251	225	245	175	205	247	23	241	2164
32	95	205	193	251	221	126	82	254	0	40	32	1531
254	3	40	50	62	228	205	102	29	221	126	87	1407
203	119	245	230	31	198	64	205	102	29	241	40	1707
57	62	36	205	102	29	24	50	221	203	90	126	1205
32	44	62	202	205	102	29	221	78	89	221	70	1355
90	205	180	251	24	28	62	175	205	102	29	221	1572
78	85	221	70	86	205	180	251	62	44	205	102	1589
29	221	78	83	221	70	84	205	180	251	205	174	1801
251	193	209	225	221	225	25	5	194	253	250	221	2272
229	205	174	251	205	56	29	123	203	63	215	40	1793
45	215	227	45	205	174	251	221	225	205	196	16	2025
205	0	7	239	160	56	217	225	217	201	62	13	1602
205	102	29	231	221	229	229	215	43	45	215	50	1784
32	225	221	225	201	35	35	6	10	126	183	32	1331
2	62	127	205	102	29	35	16	244	62	32	205	1121
102	29	201	221	126	25	205	247	23	33	240	0	1452
34	201	92	205	196	18	221	126	41	221	190	13	1558
40	7	205	13	19	32	240	60	201	221	229	225	1497
17	67	0	25	205	169	24	205	20	19	192	17	960
15	0	25	205	70	19	201						535

(continued from previous page)

Register IX is used in most of them to point to the start address of the Microdrive channel which is used for reading from or writing to the tape and so should not be altered by your program.

The Microdrive system distinguishes between printfiles and program files. Printfiles are files which can be opened and then written to or read from using Print # and Input #. Program files are Basic programs, arrays or code which can be Saved or Loaded.

If you use the Microdrive hook codes you can only access printfiles. In order to examine program files, you have to keep the new ROM paged in so that routines in it can be called from your machine code program. This can be done with hook code 32 hex as follows:

```
        LD    HL, PAGE
        LD    (23789),HL
        RST   8
        DEFB  32H
PAGE POP  HL
        POP   HL
```

After you have finished with the new ROM, CALL 700H pages it out again.

The machine code dump in listing 1 is an example of what can be done using the routines in the new ROM. It gives you a greatly improved catalog of all files on a Microdrive cartridge — see figure 1 for an example. This catalog contains details of every file on the tape, including "secret" files saved with a CHR$ 0 as the first character of their filename.

For auto-run Basic programs, it tells you which line number it auto-runs from, and for Code files it tells you the start address which they load at and their length. Arrays which were saved using Data a() are shown in the listing by the word Data followed by the array name. Printfiles are shown by the word Print after their name in the catalog.

You should use the loader program in listing 2 to enter the machine code. After you have typed in each line of numbers, the program will give you a checksum which you should compare with that at the right hand side. If you have made a mistake you can retype that line of data. When you have finished, the code is saved to Microdrive 1. Then New the computer and type in this line:

```
10 CLEAR 63999: LOAD *"m";1;"catcode"
   CODE
```

Then save this with

```
SAVE *"m";1;"cat" LINE 10
```

so that whenever you want to use the routine you can load it with

```
LOAD *"m";1;"cat"
```

To try out the routine, put a test cartridge into drive 1. If you have made a mistake in the machine code there is a risk that the routine might go haywire and corrupt your files, so use a cartridge for your first test where this won't matter too much! Run the routine with the command Randomise 1 * USR 64000, and the catalog should appear.

If CHR$ 0 has been used in the name of a secret file, it is printed as a copyright symbol and secret files always appear at the beginning of the listing. If any other non-printable characters have been used in the name — for example, CHR$ 1 — they appear as a question mark. It will take longer to produce this catalog than the normal one, because a lot more information has to be read in from the tape.

If there is more than one screenfull, the routine will stop and give the "Scroll?" query. If you press any key except N or space, the catalog will continue.

To catalog files on a different drive, use a different number after Randomise — for example Randomise 2 * USR 6400 looks at drive 2. If you miss out the drive number, or use an invalid number, you will get an appropriate error message.

The routine is not relocatable, and it also uses 600 bytes from address 64523 as a data area.

To understand how the routine works it is necessary to know something about how files are stored on the Microdrive. This information will also be useful if you want to write your own machine code programs.

The Microdrive tape is divided up into sectors, each given a different number, starting from zero. Although the system caters for 256 sectors, in practice there are only about 180 usable ones on each tape. Each sector is divided into two parts called the header — 27 bytes long — and record — 540 bytes. There is a short gap on the tape between them.

The main information contained in the header is the name of the cartridge — given when you format the tape — and the sector number. The record is best considered as being in two parts, although there is no actual gap between them on the tape.

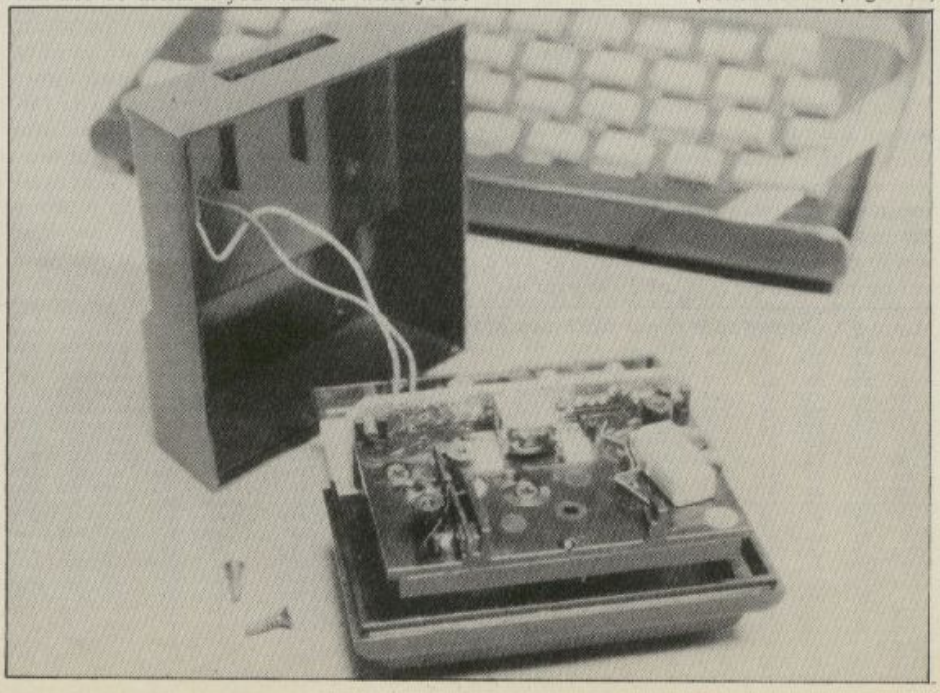
(continued on page 150)

Table 1: Addresses of some of the Microdrive routines in the new ROM.

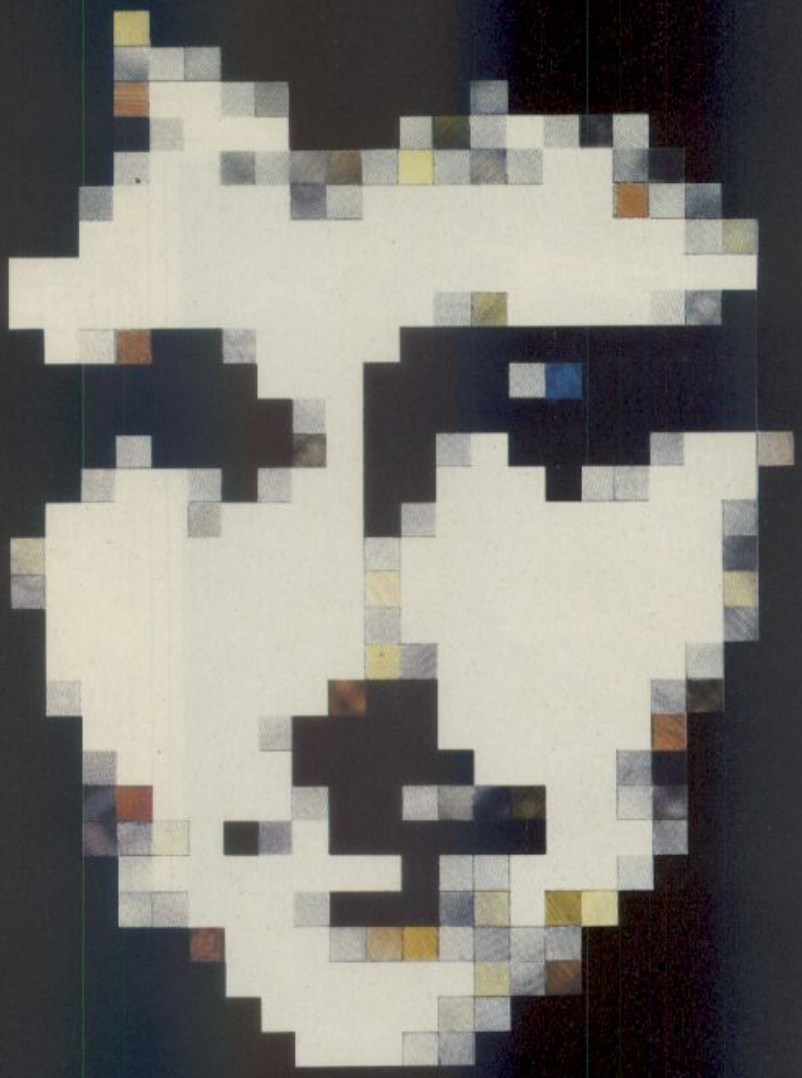
Start Address (HEX)	Action
0700	Page out new ROM, return 16K ROM.
166D	Check for valid drive number in D-STR1.
1FE8	Set up a temporary Microdrive channel.
10C4	Reclaim Microdrive channel.
112C	Inkey$ from a Microdrive channel.
117D	Load record number CHREC of a file into channel.
11D8	Print a character to Microdrive channel.
120D	Write a record to the Microdrive tape.
1264	Examine map to see if the Microdrive is full.
12C4	Read next header on the tape.
1341/1346	Calculate a checksum.
17F7	Switch a Microdrive motor on or off.
1A09	Read the next record of a printfile.
1B29	Open a temporary Microdrive file.
1C58	Catalog the files.

Table 2: Microdrive hook codes.

Hook code (Hex)	Function
21	Switch Microdrive on (A = 1 to 8), or off (A = 0).
22/2B	Open a temporary Microdrive channel (uses system variables D-STR1, N-STR1, T-STR1). Exits with IX = start address of channel.
23	Close a Microdrive channel.
24	Erase file specified by D-STR1, N-STR1, T-STR1.
25	Read next record of printfile.
26	Write a Microdrive record.
27	Read record number CHREC of a printfile.
28	Read sector number CHREC. The contents are only useable if the sector is part of a printfile.
29	Read the next sector which passes the tape head. Contents only useable if sector part of printfile.
2A	Write channel to sector number CHREC.
2C	Reclaim Microdrive channel area.
32	Call new ROM subroutine addressed by system variable HD 11.



MASTER MINDS.



PASS ALL THE QUESTIONS AND DISCOVER THE ANSWER...

■ If you can write original programs, convert from one machine to another and expect your rewards to equal your effort then you may be the person we are looking for.

■ We require programmers proficient in machine code on the Z80 series, 68000 series, 6809, and 6502/6510 processors. We require games, utilities and education programs on the Commodore 64, Spectrum, QL, Electron, BBC, Atari, Memotech, Dragon, Atmos and MSX computers.

■ In return we are offering the right person the opportunity to have their program released throughout Europe by Quicksilva Ltd and throughout the Americas by Quicksilva Inc., plus the financial security that only we can offer and the opportunity to join the greatest team in the Universe!

■ If you want to be associated with the top software house then phone Paul on the hotline today, it may be the start of a great future!

Software Houses

■ Let us take away your problems and give you the opportunity to get back to programming.

■ Quicksilva can provide the financial security, production, promotion, marketing and distribution for all your needs.

■ For a frank discussion, in the strictest confidence, phone Rod Cousens today on (0703) 26515.

QUICKSILVA

We have all the answers.

Quicksilva Limited
Palmerston Park House, 13 Palmerston Road, Southampton Hampshire SO1 1LL
Telephone (0703) 26515 Telex 477889 QSILVA

Listing 2. Loader checksum.

```
 10 CLEAR 63999
 20 LET n=0: LET s=0
 30 LET a=64000
 40 INPUT b: POKE a,b: PRINT b
 50 LET n=n+1: LET s=s+b
 60 LET a=a+1
 70 IF n=12 THEN  GO SUB 1000
 80 IF a<=64522 THEN  GO TO 40
 90 GO SUB 1000: IF a$<>"Y" AND a$<>"y" THEN  GO TO 40
100 SAVE *'m";1;"catcode"CODE 64000,523
110 STOP
120 REM ************************
1000 PRINT 'Checksum for line = ";s
1010 INPUT 'Checksum OK? (Y/N)? "¡a$
1020 LET t=r: LET n=0: LET s=0
1030 IF a$="Y" OR a$="y" THEN  PRINT "Continue": RETURN
1040 LET a=a-t
1050 PRINT "Start again from the beginning  of that line."
1060 RETURN
```



Figure 1. Examples of catalog.

```
Tape 5
@hush-hush
@secret         LINE 10
catcode         CODE 64000,523
chararray       DATA Z$
database        LINE 1
info            PRINT
numbarray       DATA N
testprog

66


Demo
Database        PRINT
Dbase prog      LINE 1
P server
a               LINE 10
editas          CODE 59129,6167
fullcat         CODE 61000,466
headread
a16             LINE 10
monprtcode      CODE 65368,162
musiclabel      LINE 10
net game
run             LINE 10
spritelabs      LINE 10
title ( SCREEN$ ) CODE 16384,691
2

44


Tape 6
@my string      DATA R$
catcode         CODE 64000,523
data            PRINT
epson           LINE 1
pbuff           CODE 23296,256
run             LINE 10

90
```

(continued from page 148)

The first part is the data descriptor section, and holds the name of the file of which this record is a part, the filetype — printfile or program — an end-of-file flag, record number, and the number of bytes of data in the next section, which is the data block. If the record is not the last one in a file, then there will be 512 bytes of data in the data block.

Depending upon the filetype, the data bytes will be either part of a printfile, Basic program, array or machine code. When you save something on the Microdrive, for example a Basic program, it is split up into chunks of 512 bytes and each one written to a different sector on the tape. The first chunk is called record number 0, the next is number 1, and so on, up to the last chunk which is written with a flag to indicate that it is the last record in the file. The system will then be able to load the program in the correct order.

Whenever information is read from or written to the tape, a Microdrive channel is set up as shown in Appendix 3 of the Microdrive and Interface 1 manual. If a file is open for reading, whenever a sector is read from the tape the header information is copied into HDFLG to HDCHK, and the record into RECFLG to DCHK.

If the file is open for writing, these parts of the channel are copied to an unused sector of the tape when the data area is full or when the file is closed. The rest of the channel — ie CHBYTE to CHMAP — is used for more permanent information. During a load, for example, by comparing the filename in CHNAME with the one in a sector just read from the tape — RECNAME — the system knows whether or not that sector is part of the file that is is loading. If so, CHREC and RECNUM can be compared to find out whether or not the record is the next one in the program.

With program files, the first nine bytes in the data area of the first record — number 0 — contain information telling the computer whether the file is a Basic program, an array or a block of code, how long it is, and where to load it into the memory. This is the same sort of information as that which is stored in the header of a cassette tape file when you save it, but is arranged in a different order.

In the Microdrive system, the first byte is a code byte having a value of 0 for a Basic program, 1 for a number array, 2 for a character array and 3 for machine code. The next two bytes give the length of the block. The next two are the start address.

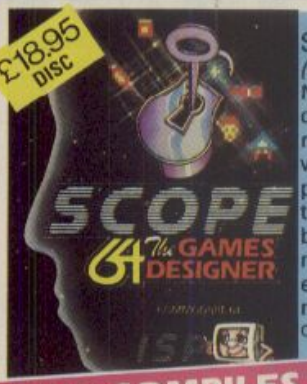
The next two bytes are interpreted differently depending upon whether it is a Basic program or an array, and are not used for machine code. If Basic, they give the length of the program alone — ie. excluding the variables which are also saved — and for arrays only the first byte is used and gives the name of the array — first five bits — and whether it is an array of numbers — bit 6 reset — or characters — bit 6 set. The last two bytes are only used for a Basic program and give the line number if it is auto-run — if not they equal FFFF hex.

Interface 1 and the Microdrives have opened up a new and exciting area of computing for Spectrum owners. As well as being able to access a vast amount of data which can be stored off-line on the Microdrives, with all the possibilities that this opens up for games as well as serious applications, you can also link several Spectrums together on the network, or communicate with other computers via the RS-232.

The new ROM also allows you to add your own commands, and this greatly enhances the versatility of the computer. With a knowledge of machine code the capabilities of the system can be stretched even further, and some of the techniques associated with disc-based systems could be attempted. For example it should be possible to create pseudo-random access files on the Microdrive rather than being limited to the sequential data files which are provided by Basic.

This would result in much faster access for database type programs. A machine code program should also be able to update records or write information to the end of an existing file without needing to create another file to copy the unchanged records to. ■

Unlock Your Imagination



£18.95 DISC

£17.95 TAPE

SCOPE 64
(tape or disc)
Not just a games designer-this remarkable product will revolutionise programming. Easy to use, supplied with bumper instruction manual – tells you everything you need to know.
COMMODORE 64



SCOPE II 48K SPECTRUM

A complete update of the original award winning product – with many Fantastic extras. Sprite routines – Machine code Peek & Poke. Will run your original program totally independently.
Original SCOPE owners – send in your old tape & £6.00 for a complete update and new bumper size manual.

NOMINATED PROGRAM OF THE YEAR

SCOPE COMPILES TRUE MACHINE CODE TO RUN TOTALLY INDEPENDENTLY
– not just a games designer – with SCOPE you can write truly original machine code & publish your own games!

ALL THIS PLUS Free Membership to the SCOPE User's Club PLUS the unique Programmer's "hot-line".



48K SPECTRUM
SPECTRUM SPRITES
Today's games need sprites. Here's everything you need to know about designing and handling sprites. All in a single pack with full instructions. Handle 8 sprites simultaneously – collision detection.
It's all here!
£7.95



48K SPECTRUM
The CHARACTER GENERATOR
Another product essential for that unique and professional finish so important in today's programs. Design your own UDG's and complete character sets. 8 x 8 Pixel grid for easy design. Includes 6 specially designed character sets. Compatible with virtually all other machine code software. Big manual tells you all you need to know. Too many extras to list here.
£8.95



48K SPECTRUM
The SCREEN MACHINE
The definitive screen editor for building and assembling graphic layouts & title pages. Includes many facilities essential to produce really professional screen layouts. Supplied with big manual with full instructions.
£8.95



48K SPECTRUM
The MULTIFILE
The ultimate user friendly database. You design as many tailor made filing systems for whatever purpose. Each protected by your own secret security codes. Full instructions manual includes *FREE TAPE* for your first file.
£9.95



MONSTERS & MAGIC
A classic adventure game requiring hard thinking & quick reflexes. Puzzles to solve and monsters to defend all in real time. Being modular – treasure and experience can be carried forward. The first two modules are *Tregilith, Stronghold of The Giants* and *Temple of Citishtor King of the Undead.*
Enter at your peril
BBC B
£6.95



BATTLE PLANET
Your mission is to fly into the trench & launch a plasma bolt into the Battle Planets' heart. You must avoid Robot Fighters. Other Robot Fighters will bombard you, then the Robot commander joins the fight. *He is invincible!* Save Mankind!
Superb 3-dimensional graphics – only for the most competent player – This game is one of the best.
£6.95 BBC B

CLIP THE COUPON NOW AND UNLOCK YOUR IMAGINATION

Post to: ISP Marketing Ltd., 15a Castons Yard, off New Road, Basingstoke, Hants.
Tel 0256-79 6559. Please allow 30 days for delivery.
Please rush me ☐ SCOPE 64 tape ☐ SCOPE 64 disc ☐ SCOPE II
☐ SCREEN MACHINE ☐ CHARACTER GENERATOR
☐ SPECTRUM SPRITES ☐ MULTIFILE
☐ MONSTERS & MAGIC ☐ BATTLE PLANET
(Cheques payable to ISP Marketing Ltd.)

Name _____ Block capitals please

Address _____

F

Little Brothers should be seen but not heard.



REGULAR, CONDENSED, OR EXTENDED FACES.

CUT SHEET A4 OR ROLLER PAPER.

BATTERY OR MAINS OPERATED.

A maxim which eloquently describes the Brother HR-5.

Less than a foot across, it's nonetheless loaded with features.

But there's one thing the HR-5 won't give you.

Earache.

For the annoying 'clickety clack' many printers produce is mercifully absent from the HR-5.

Quietly efficient, it delivers high definition dot matrix text over 80 columns at 30 c.p.s.

The HR-5 also has something of an artistic bent.

Being capable of producing uni-directional graph and chart images together with bi-directional text.

It will also hone down characters into a condensed face, or extend them for added emphasis.

Incorporating either a Centronics parallel or RS-232C interface, the HR-5 is compatible with most home computers and popular software.

Perfectly portable, the battery or mains operated HR-5 weighs less than 4lbs, and has a starting price of only £179.95 (inc VAT).

Which is really something to shout about.

PLEASE SEND ME MORE DETAILS OF THE REMARKABLE BROTHER HR-5 PRINTER.

NAME_____

ADDRESS_____

_____

_____

_____ TEL NO._____

brother®

DEPT P, BROTHER OFFICE EQUIPMENT DIVISION, JONES + BROTHER, SHEPLEY STREET, GUIDE BRIDGE, AUDENSHAW, MANCHESTER M34 5JD
TEL: 061 330 6531 (10 LINES) 061 330 0111 (6 LINES) 061 330 3036 (4 LINES). TELEX: 669092 BROTHER INDUSTRIES LTD., NAGOYA, JAPAN.



ORIC TREK

Dennis Salisbury explores strange new worlds with the Oric.

THIS PROGRAM IS similar to the popular computer game Star Trek written for the 48K Oric-1. I see no reason why it should not work on the Atmos, but unfortunately it will not fit on the 16K Oric-1. To save the program type: CSAVE "TREK", AUTO
This will run the program automatically when it is loaded.

The galaxy is made up of 8 by 8 sectors of which a maximum of nine can be seen on the LRS — long range scanner — at a time. The starship is always shown in the middle of the sectors displayed. The edge of the galaxy is represented by rows of columns of Xs and if you cross this you will be destroyed.

To move sectors press 1 followed by the appropriate cursor key and the display will be redrawn to show your new position.

To change to the short-range scanner press #2 and the present display is replaced by a view of the entire sector in which you are positioned with anything else which is in that sector. A list of six possible orders are displayed on the right-hand side of the screen. These are as follows:

■ Move — pressing 1 will cause the prompt Direction? to appear. You should now press the cursor key corresponding to the direction you wish to move and then enter the warp — followed by Return — which will move the enterprise that many places in the appropriate direction.

■ Phasers — when you press 2 you then have to enter the energy — followed by Return — that you wish to use. Every time you fire your phasers at a Romulan or Klingon, the enemy ships will lose energy until it is zero and they are destroyed. The amount of energy needed to destroy a Romulan or Klingon depends how close you are. It should range from about 50-200 units.

■ Torpedos — when you press 3 you can fire a single torpedo in one of eight possible directions. These are:



■ Dock — if you find a starship you can dock with it by moving to the position immediately above or below it, and pressing 4. This will replenish shields, phasers, torpedos, fuel and crew.

■ Land — if you move into a position immediately next to a planet you can beam down to the planet by pressing 5. Awaiting on the planet's surface is one of six different surprises ranging from hostile attackers to rooms of treasure which can only be obtained by working out the combination of the lock on the door.

■ LRS — pressing 6 will return the display to long range scanner and status report.

Moving one whole sector uses up 50 units of fuel and moving one place within a sector uses up two units of fuel. Commands such as Beam Back to Ship and Strike Quickly can be carried out by pressing any key.

The starship can be destroyed in the following ways: running out of fuel; losing too many crew; being attacked while crew are on planets surface; being attacked by enemy ships when shields have insufficient energy; trying to cross the galaxy border.

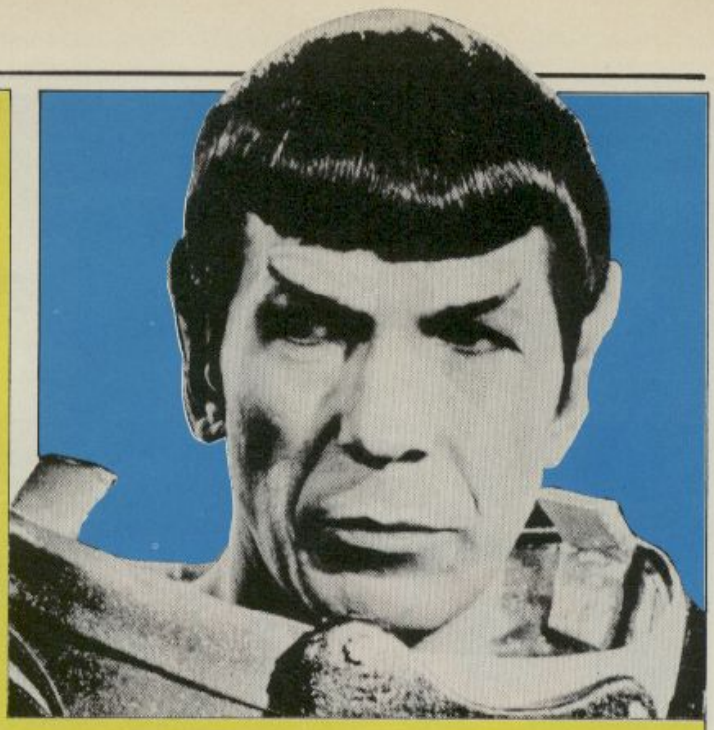
The object of the game is simply to destroy all the Romulans and Klingons and at the same time collect as much treasure as possible.

```
1 FOR I=0 TO PEEK(#276):A=RND(1):NEXT
2 INK7:PAPER0:PRINTCHR$(6)
5 PRINT CHR$(17)
7 DIM KE(20),BE(20)
8 FOR I=1 TO 4:POKE#BBA3+I,32:NEXT I
10 GOSUB 500
20 GOSUB 700
30 GOSUB 1000
40 GOSUB 1100
50 GOSUB 1500
60 GOSUB 2000
70 IF F=0 THEN 95
80 GOSUB 2300
90 GOTO 50
95 GOSUB 2500
96 CLS
97 IF CO=0 THEN 101
98 CO=0
99 PLOT 30,2,'RED ALERT"
100 PLOT 29,2,1:PLOT 28,2,12:GOTO 110
101 PLOT 30,2,"CONDITION"
102 PLOT 32,3,"GREEN"
103 PLOT 31,3,2
110 GOSUB 3000
114 GOSUB 3500
115 IF AN%=1 THEN GOSUB 3600
120 IF AN%=2 THEN GOSUB 4000
130 IF AN%=3 THEN GOSUB 4500
140 IF AN%=4 THEN GOSUB 5000
150 IF AN%=5 THEN GOSUB 5200
151 IF AN%=6 THEN 155
153 GOSUB 6000
154 IF AN%<>6 AND CO=1 THEN EXPLODE
155 IF AN%=6 THEN CO=0:GOTO 50
160 IF H=1 THEN H=0:GOTO 95 ELSE 96
490 PRINT CHR$(17)
495 END
500 FOR CH=1 TO 7
510 READ AS
520 E=46080+8*AS
530 FOR DF=E TO E+7
540 READ BI
550 POKE DF,BI
555 NEXT DF
560 NEXT CH
600 DATA 38,45,45,63,45,30,63,63,30
610 DATA 96,17,31,31,31,21,4,4,14
620 DATA 95,33,33,51,63,63,63,45,12
630 DATA 64,8,42,28,54,34,54,28,42
640 DATA 35,12,22,57,47,51,30,12,0
650 DATA 42,0,0,12,30,30,12,0,0
660 DATA 45,0,0,0,127,0,0,0,0
670 RETURN
700 CLS
720 PRINT
730 PRINT CHR$(4);
740 PRINT CHR$(27);"J          *  STAR  &  TREK  *"
```

(listing continued on next page)

(listing continued from previous page)

```
  745 PRINT
  750 PRINT CHR$(27);"J          ----------------"
  760 PRINT CHR$(4)
  770 PRINT
  780 PRINT"   You are now the Captain of the "
  790 PRINT"USS Enterprise and your crew awaits"
  800 PRINT"your orders.You will see your ship on"
  810 PRINT"the Long Range Scanner which divides"
  820 PRINT"the galaxy up into 64 sectors,but you"
  830 PRINT"can only see up to 9 sectors at any"
  840 PRINT"one time,so you are not always sure"
  850 PRINT"exactly where you are.You must not go"
  860 PRINT"off the edge of the galaxy(xxxxxxx)"
  870 PRINT"but you may move sectors by pressing "
  875 PRINT"1 and then the relevant cursor key."
  880 PRINT"   To display the Short Range"
  890 PRINT"Scanner press 2 .This will display"
  900 PRINT"one whole sector and whatever else is"
  910 PRINT"in that sector."
  915 PRINT
  920 PRINT"     Press any key to continue."
  930 B$=KEY$
  940 IF B$="" THEN 930
  945 CLS
  947 PRINT"  Your mission is to rid the galaxy"
  949 PRINT"of the Klingons and Romulans and get"
  950 PRINT"as much treasure as possible from the"
  951 PRINT"many planets.However,you will lose if"
  953 PRINT"you run out of fuel or you are attac-"
  954 PRINT"ked with insufficient shield strength"
  955 PRINT".Maximum power can be regained only "
  956 PRINT"by docking with a Starbase,several of"
  957 PRINT"which are scattered over the galaxy."
  958 PRINT"Your status report will be on the "
  959 PRINT"screen at all times and the various"
  960 PRINT"orders you may give will also be on"
  961 PRINT"the screen."
  962 PRINT"        Good luck"
  965 PRINT
  970 PRINT"  Press any key to start"
  975 C$=KEY$
  980 IF C$="" THEN 975
  990 RETURN
 1000 CLS
 1010 PRINT
 1020 PRINT CHR$(4);CHR$(27);"J  ** CHARACTER DEFINITI
ONS **"
 1025 PRINT CHR$(4)
 1030 PLOT 5,8,"& - USS Enterprise"
 1035 PLOT 5,10,"@ - Starbase"
 1040 PLOT 5,12,"_ - Romulan ship"
 1045 PLOT 5,14,96
 1050 PLOT 6,14," - Klingon ship"
 1055 PLOT 5,16,"# - Planet"
 1060 PLOT 5,20,"Press any key to continue"
 1065 D$=KEY$
 1070 IF D$="" THEN 1065
 1080 RETURN
 1100 UX=INT(RND(1)*8+1)
 1115 UY=INT(RND(1)*8+1)
 1120 SX=INT(RND(1)*28+1)
 1125 SY=INT(RND(1)*20+1)
 1140 FOR K=1 TO 20
 1145 KX=INT(RND(1)*8+1)
 1150 KY=INT(RND(1)*8+1)
 1155 IF KP(KX,KY)=2 THEN 1145
 1160 KP(KX,KY)=KP(KX,KY)+1
 1170 RX=INT(RND(1)*8+1)
 1180 RY=INT(RND(1)*8+1)
 1185 IF RP(RX,RY)=2 THEN 1170
 1190 RP(RX,RY)=RP(RX,RY)+1
 1195 NEXT K
 1200 FOR S=1 TO 5
 1210 BX=INT(RND(1)*8+1)
 1220 BY=INT(RND(1)*8+1)
 1230 BP(BX,BY)=BP(BX,BY)+1
 1240 NEXT S
 1250 FOR P=1 TO 40
 1260 PX=INT(RND(1)*8+1)
 1270 PY=INT(RND(1)*8+1)
 1275 IF PL(PX,PY)=1 THEN 1260
 1280 PL(PX,PY)=PL(PX,PY)+1
 1285 DP(PX,PY)=INT(RND(1)*6+1)
 1290 NEXT P
 1295 DD=DD+1000
 1300 SH=1000
 1305 PH=500
 1310 TP=20
 1315 TR=0
 1317 CO=0
 1320 FU=1000
 1325 CR=283
 1330 NK=20:NR=20
 1340 FOR I=1 TO 20
 1345 KE(I)=10+KE(I)
 1350 RE(I)=10+RE(I)
 1360 NEXT I
 1400 RETURN
 1500 CLS
 1530 IF UX<2 THEN P=8 ELSE P=4
```



```
 1540 IF UX>7 THEN Q=12 ELSE Q=16
 1550 IF UY<2 THEN R=8 ELSE R=4
 1560 IF UY>7 THEN S=12 ELSE S=16
 1570 FOR I=P TO Q STEP 4
 1580 FOR J=R TO S
 1590 PLOT I,J,"+"
 1600 NEXT J
 1605 NEXT I
 1610 FOR I=R TO S STEP 4
 1615 FOR J=P TO Q
 1620 PLOT J,I,"+"
 1630 NEXT J
 1635 NEXT I
 1640 IF UX>2 THEN 1700
 1660 FOR B=R TO S
 1670 PLOT P,B,"x"
 1680 NEXT B
 1690 GOTO 1750
 1700 IF UX<7 THEN 1750
 1710 FOR B=R TO S
 1720 PLOTQ,B,"x"
 1730 NEXT B
 1750 IF UY>2 THEN 1800
 1760 FOR B=P TO Q
 1770 PLOT B,R,"x"
 1780 NEXT B
 1790 GOTO 1850
 1800 IF UY<7 THEN 1850
 1810 FOR B=P TO Q
 1820 PLOT B,S,"x"
 1830 NEXT B
 1850 PLOT 10,10,"&"
 1860 RETURN
 2000 PLOT 7,1,"Long Range"
 2006 PLOT 9,2,"Scanner"
 2010 PLOT 24,4,"Satus Report"
 2015 PLOT 24,5,"-------------"
 2020 PLOT 23,7,"Shields  -"
 2025 PLOT 33,7,STR$(SH)
 2030 PLOT 23,9,"Phasers  -"
 2035 PLOT 33,9,STR$(PH)
 2040 PLOT 23,11,"Torpedos -"
 2045 PLOT 33,11,STR$(TP)
 2050 PLOT 23,13,"Treasure -"
 2055 PLOT 33,13,STR$(TR)
 2060 PLOT 23,15,"Fuel     -"
 2065 PLOT 33,15,STR$(FU)
 2070 PLOT 23,17,"Crew     -"
 2080 PLOT 33,17,STR$(CR)
 2090 PLOT 23,19,"Klingons -"
 2095 PLOT 33,19,STR$(NK)
 2097 PLOT 23,21,"Romulans -"
 2098 PLOT 33,21,STR$(NR)
 2100 PLOT 4,20,"You can-"
 2110 PLOT 3,21,"1. MOVE SECTORS"
 2120 PLOT 3,22,"2. CHANGE SCANNER"
 2130 AN$=KEY$
 2140 IF AN$<>"1" AND AN$<>"2" THEN 2130
 2145 D=VAL(AN$):GOSUB 8000
 2150 IF AN$="1" THEN F=1 ELSE F=0
 2180 RETURN
 2300 PLOT 3,25,"Direction?"
 2320 D$=KEY$
 2330 IF D$="" THEN 2320
 2340 IF ASC(D$)<8 OR ASC(D$)>11 THEN 2320
 2350 M=ASC(D$)
 2355 D=M-5:GOSUB 8000
```

(listing continued on page 156)

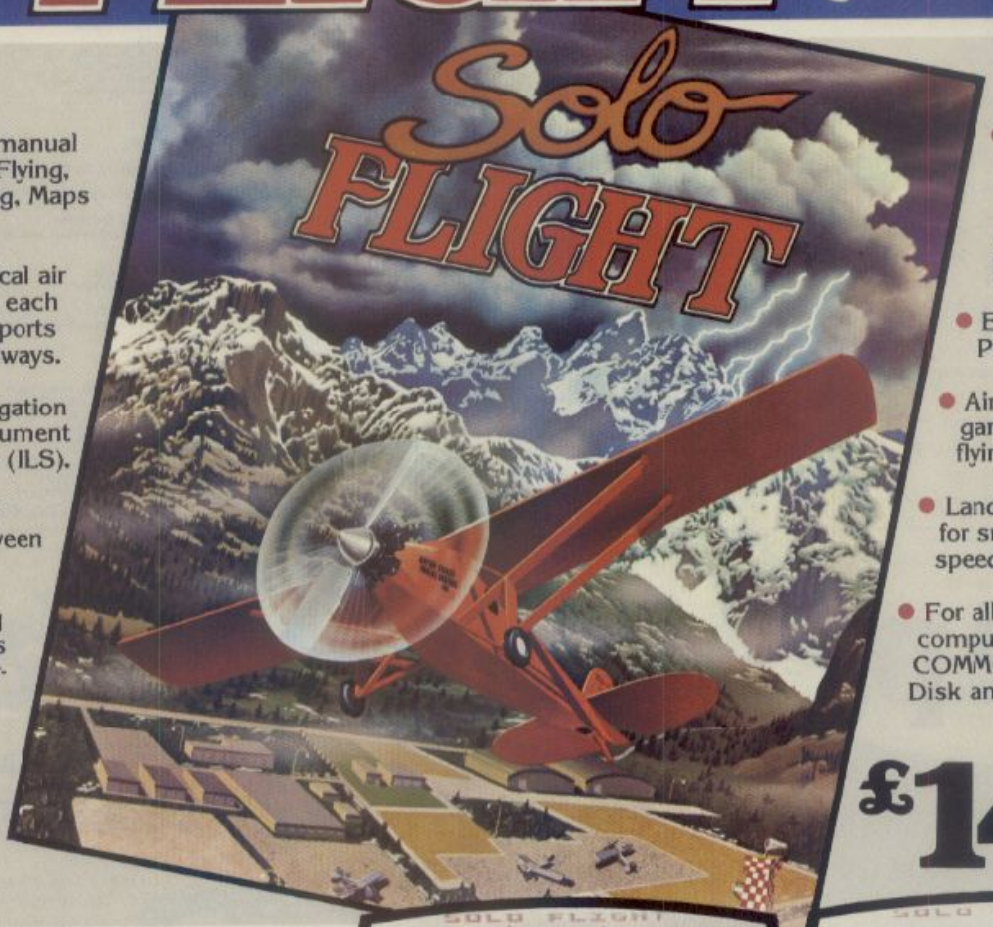
At last... A REAL FLIGHT SIMULATOR!

Solo FLIGHT

ATARI

commodore 64

- Extensive flight manual including Basic Flying, Instrument Flying, Maps and Charts.
- Three geographical air navigation areas each with multiple airports and multiple runways.
- Dual Radio Navigation (VOR) and Instrument Landing System (ILS).
- On screen flight path review between flights.
- Multiple Landing Approach Charts and Design-your-own approach feature.
- Take-offs and Landings under all weather conditions.



- Cross-Country Navigation via Landmarks, VOR Stations and Dead Reckoning.
- Emergency Procedure Practice.
- Air Mail delivery game to test your flying skills.
- Landing ratings for smoothness and speed.
- For all ATARI computers, COMMODORE 64 Disk and Cassette.

£14.95





SOLO FLIGHT is an advanced simulation that uses realistic three dimensional terrain graphics, actual configuration instrument panel, multiple air navigation maps, and accurate aircraft performance characteristics to provide the challenge, thrill, excitement, and joy of the flight experience.

SOLO FLIGHT is a quality product from MicroProse Software

★ ★

THE ULTIMATE IN AMERICAN SOFTWARE FOR YOU ON U.S. GOLD

U.S. Gold is stocked by all leading computer stores including: Boots WHSMITH

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

(listing continued from page 154)

```
2360 IF M=8 THEN UX=UX-1
2370 IF M=9 THEN UX=UX+1
2380 IF M=10 THEN UY=UY+1
2390 IF M=11 THEN UY=UY-1
2400 FU=FU-50
2410 GOSUB 10000
2420 RETURN
2500 IF KP(UX,UY)=0 THEN 2560
2522 CO=1
2525 FOR K=1 TO KP(UX,UY)
2530 RK(K)=INT(RND(1)*28+1)
2540 SK(K)=INT(RND(1)*20+1)
2555 NEXT K
2560 IF RP(UX,UY)=0 THEN 2620
2565 CO=1
2570 FOR R=1 TO RP(UX,UY)
2580 RR(R)=INT(RND(1)*28+1)
2590 SR(R)=INT(RND(1)*20+1)
2610 NEXT R
2620 IF BP(UX,UY)=0 THEN 2700
2630 FOR S=1 TO BP(UX,UY)
2640 RB(S)=INT(RND(1)*28+1)
2650 ST(S)=INT(RND(1)*20+1)
2670 NEXT S
2700 IF PL(UX,UY)=0 THEN 2750
2710 FOR P=1 TO PL(UX,UY)
2720 QP(P)=INT(RND(1)*28+1)
2730 SP(P)=INT(RND(1)*20+1)
2745 NEXT P
2750 RETURN
3000 PLOT 32,5,"Orders"
3020 PLOT 32,6,"--------"
3025 PLOT 29,8,"1. MOVE"
3030 PLOT 29,10,"2. PHASERS"
3035 PLOT 29,12,"3. TORPEDO"
3040 PLOT 29,14,"4. DOCK"
3050 PLOT 29,16,"5. LAND"
3060 PLOT 29,18,"A. IRR"
3100 PLOT SX,SY,"&"
3120 IF KP(UX,UY)=0 THEN 3160
3122 CO=1
3125 FOR K=1 TO KP(UX,UY)
3150 PLOT RK(K),SK(K),96
3155 NEXT K
3160 IF RP(UX,UY)=0 THEN 3220
3165 CO=1
3170 FOR R=1 TO RP(UX,UY)
3200 PLOT RR(R),SR(R),"_"
3210 NEXT R
3220 IF BP(UX,UY)=0 THEN 3300
3230 FOR B=1 TO BP(UX,UY)
3260 PLOT RB(S),ST(S),"#"
3270 NEXT S
3300 IF PL(UX,UY)=0 THEN 3350
3310 FOR P=1 TO PL(UX,UY)
3340 PLOT QP(P),SP(P),"#"
3345 NEXT P
3350 GET AN$
3355 IF ASC(AN$)<48 OR ASC(AN$)>54 THEN 3350
3360 AN%=VAL(AN$)
3370 D=AN%:GOSUB 8000
3400 RETURN
3500 IF KP(UX,UY)=0 THEN 3550
3520 FOR I=1 TO KP(UX,UY)
3530 DK(I)=((RK(I)-SX)^2+(SK(I)-SY)^2)^0.5
3540 NEXT I
3550 IF RP(UX,UY)=0 THEN 3590
3560 FOR I=1 TO RP(UX,UY)
3570 DR(I)=((RR(I)-SX)^2+(SR(I)-SY)^2)^0.5
3580 NEXT I
3590 RETURN
3600 PLOT 29,20,"Direction?"
3620 GET D$
3630 IF ASC(D$)<48 OR ASC(D$)>11 THEN 3620
3640 M=ASC(D$)
3645 D=M-5:GOSUB 8000
3646 INPUT"Warp(1 to 19)";WP
3647 IF WP<1 OR WP>19 THEN 3646
3648 WP=INT(WP)
3650 IF M=8 THEN SX=SX-WP
3660 IF M=9 THEN SX=SX+WP
3670 IF M=10 THEN SY=SY+WP
3680 IF M=11 THEN SY=SY-WP
3690 FU=FU-2*WP
3695 M=0
3700 IF SX>0 AND SX<29 AND SY>0 AND SY<21 THEN 370
3710 IF SX<1 THEN SX=SX+28:UX=UX-1
3720 IF SX>28 THEN SX=SX-28:UX=UX+1
3730 IF SY<1 THEN SY=SY+20:UY=UY-1
3740 IF SY>20 THEN SY=SY-20:UY=UY+1
3742 IF KP(UX,UY)=0 AND RP(UX,UY)=0 THEN CO=0 ELSE CO
=1
3745 M=1
3750 GOSUB 10000
3800 RETURN
4000 PLOT 29,20,"Energy?"
4020 INPUT EN
4030 IF PH-EN>0 THEN 4100
4040 IF SH+PH-EN>0 THEN 4070
4050 A$="Run out of energy"
4060 GOTO 11000
4070 SH=SH+PH-EN
4080 PH=0
4090 GOTO 4150
4100 PH=PH-EN
4110 JAP
4150 IF KP(UX,UY)=0 THEN 4250
4160 FOR I=1 TO KP(UX,UY)
4165 DK(I)=((RK(I)-SX)^2+(SK(I)-SY)^2)^0.5
4170 DA(I)=EN/DK(I)
4180 RE(I)=RE(I)-DA(I)
4185 IF RE(I)>0 THEN 4220
4190 PLOT RK(I),SK(I)," ":EXPLODE
4195 KP(UX,UY)=KP(UX,UY)-1:NK=NK-1
4197 IF NK=0 AND NR=0 THEN 12000
4200 IF RE(I)<=0 THEN RE(I)=RE(2):RK(I)=RK(2):SK(I)=S
K(2)
4220 NEXT I
4250 IF RP(UX,UY)=0 THEN 4350
4260 FOR I=1 TO RP(UX,UY)
4265 DR(I)=((RR(I)-SX)^2+(SR(I)-SY)^2)^0.5
4270 DA=EN/DR(I)
4280 RE(I)=RE(I)-DA
4285 IF RE(I)>0 THEN 4320
4290 PLOT RR(I),SR(I)," ":EXPLODE
4295 RP(UX,UY)=RP(UX,UY)-1:NR=NR-1
4297 IF NK=0 AND NR=0 THEN 12000
4300 IF RE(I)<=0 THEN RE(I)=RE(2):RR(I)=RR(2):SR(I)=S
R(2)
4320 NEXT I
4350 IF KP(UX,UY)=0 AND RP(UX,UY)=0 THEN CO=0
4400 RETURN
4500 IF TP>0 THEN 4510
4505 PRINT"Out of torpedoes"
4507 GOTO 4800
4510 PLOT 29,20,"Direction?"
4520 PLOT 32,21,"(0-7)"
4530 GET D$
4535 D=VAL(D$):GOSUB 8000
4540 IF D>7 THEN 4530
4550 IF D=0 OR D=4 THEN TX=0:GOTO4580
4560 IF D>0 AND D<4 THEN TX=1:GOTO 4580
4570 TX=-1
4580 IF D=2 OR D=6 THEN TY=0:GOTO4610
4590 IF D>2 AND D<6 THEN TY=1:GOTO 4610
4600 TY=-1
4610 ZAP
4615 REPEAT
4620 Z=Z+1
4622 K=Z
4625 J=SCRN(SX+Z*TX,SY+Z*TY)
4630 PLOT SX+Z*TX,SY+Z*TY,"*"
4660 IF J=95 OR J=96 THEN Z=0:EXPLODE
4670 IF SX+Z*TX<1 OR SX+Z*TX>28 THEN Z=0
4680 IF SY+Z*TY<1 OR SY+Z*TY>20 THEN Z=0
4690 PLOT SX+Z*TX,SY+Z*TY," "
4700 UNTIL Z=0
4710 IF J<>95 AND J<>96 THEN 4790
4715 IF J=96 THEN 4755
4720 RP(UX,UY)=RP(UX,UY)-1:NR=NR-1
4730 IF SX+K*TX=RR(1) AND SY+K*TY=SR(1) THEN RR(1)=RR
(2):SR(1)=SR(2)
4750 GOTO 4790
4755 KP(UX,UY)=KP(UX,UY)-1:NK=NK-1
4760 IF SX+K*TX=RK(1) AND SY+K*TY=SK(1) THEN RK(1)=RK
(2):SK(1)=SK(2)
4790 TP=TP-1
4795 IF KP(UX,UY)=0 AND RP(UX,UY)=0 THEN CO=0
4797 IF NK=0 AND NR=0 THEN 12000
4800 RETURN
5000 IF SCRN(SX,SY+1)=64 OR SCRN(SX,SY-1)=64 THEN 505
0
5020 PLOT 3,23,"Docking Negative!"
5030 WAIT 100:GOTO 5150
5050 PLOT 3,23,"Docking Affirmative"
5060 MUSIC 2,3,6,10
5070 PLAY 3,0,7,2000
5080 WAIT 15
5085 MUSIC 2,5,10,10
5090 PLAY 3,0,7,2000
5100 WAIT 10:PLAY 0,0,0,0
5110 FU=1000:SH=1000
5120 PH=500
5130 CR=283
5140 TP=20
5145 WAIT 100
5150 RETURN
5200 IF SCRN(SX+1,SY)=35 OR SCRN(SX-1,SY)=35 THEN PN=
1 ELSE PN=0
5220 IF SCRN(SX,SY+1)=35 OR SCRN(SX,SY-1)=35 THEN PN=
1
5230 IF PN=1 THEN 5260
5240 PLOT 3,25,"Beaming not possible"
5245 WAIT 200
5250 GOTO 5400
5260 MUSIC 1,5,8,0
5270 PLAY 3,0,7,2000
5280 WAIT 300
5290 PLAY 0,0,0,0
5300 PLOT 3,25,"You have beamed down safely"
5305 WAIT 300
5307 PLOT 3,25,"                          "
5310 GOSUB 9000
5400 RETURN
6000 IF KP(UX,UY)=0 THEN 6100
6015 FOR I=1 TO KP(UX,UY)
6017 IF DK(I)=0 THEN DK(I)=1
6020 SH=SH-INT(DD/DK(I))
6030 IF SH>0 THEN 6100
6040 GOTO 10000
6100 IF RP(UX,UY)=0 THEN 6200
6110 FOR I=1 TO RP(UX,UY)
6115 IF DR(I)=0 THEN DR(I)=1
```

(listing continued on page 158)

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 A

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 COMPUTER PRODUCTS LIMITED
UNIT 18, CENTRAL TRADING ESTATE,
STAINES, MIDDLESEX TW18 4UX.
Telephone Staines (STD 0784) 62781

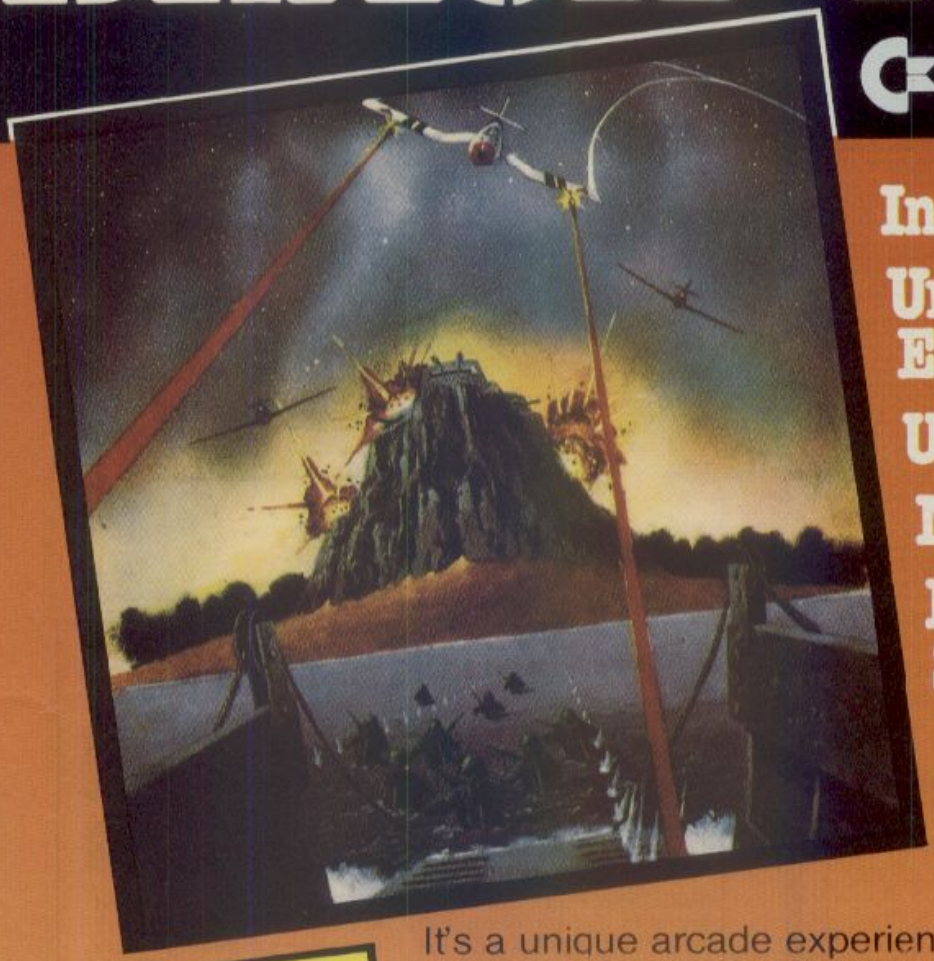
CASE HC/1 Takes Micro's – ZX81, ZX Spectrum, Oric 1, COL.M5. CASE HC/2 Takes Micro's – VIC20, BBC 'B', Commodore 64, Texas TI/99, Oric 1, Dragon 32, Colour Genie, Sharp MZ700, Acorn Electron, Lynx, Tandy Colour, Atari 600XL, Acorn Atom. CASE HC/A Can be adapted to take any of the above computers and various accessories such as Tape Recorder, printer etc.

One of America's most popular games

THE ULTIMATE IN BATTLE ACTION...

BEACH-HEAD™

commodore 64



- Incredible 3-D Graphics
- Unbelievable Sound Effects
- Unique Games Concept
- Multiple Screens
- High Resolution Scenario
- 100% Machine Language

Voted by U.S. Billboard magazine as the best game for sound and graphics on the Commodore 64

It's a unique arcade experience in sound and vision and a stunning display of Commodore 64 capabilities.

Another quality product from ***ACCESS*** Software.



Available on CASSETTE £9·95 DISK £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

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

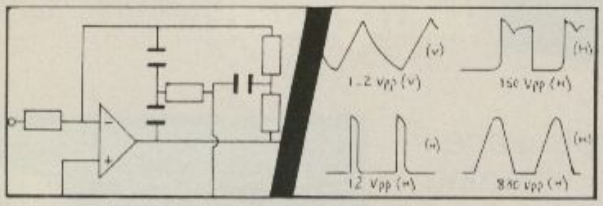
All American Software

(listing continued from page 156)

```
6120 BH=BH-INT(500/DR(I))
6140 IF SH>0 THEN 6150
6145 GOTO 10000
6150 CK=INT(RND(1)*16)
6160 CR=CR-CK
6200 RETURN
8000 MUSIC 2,0,0+1,10
8010 PLAY 3,0,7,2000
8020 WAIT 10
8030 PLAY 0,0,0,0
8050 RETURN
9000 IF OP(UX,UY)=0 THEN 9050
9030 IF OP(UX,UY)=2 THEN 9700
9040 IF OP(UX,UY)=3 THEN 9600
9050 IF OP(UX,UY)=4 THEN 9400
9055 IF OP(UX,UY)=5 THEN 9500
9060 IF OP(UX,UY)=6 THEN 9300
9065 PLOT 3,25,"Footsteps approach...":WAIT 200
9070 PLOT 3,25,"Quick!You are being attacked...":WAIT
200
9075 PLOT 3,25,"Beam up to the Enterprise before you
are all killed!"
9077 CK=0
9080 REPEAT
9085 CK=CK+1
9090 BE$=KEY$
9095 IF CK>65 THEN BE$="S"
9100 UNTIL BE$<>""
9105 IF CK<65 AND CK>4 THEN 9110
9106 A$="You have failed your mission,having been kil
led by the attackers"
9107 GOTO 11000
9110 CR=CR-CK
9115 PLOT 3,25,"That was close...!
                    "
9120 WAIT 300
9125 PLOT 3,25,"...but you lost  "
9130 PLOT 19,25,STR$(CK)
9135 PLOT 23,25,"crew.":WAIT200
9180 GOTO 9900
9200 PLOT 3,25,"The planet contains crystals...":WAIT
300
9205 PLOT 3,25,"capable of regenerating your phasers'
:WAIT 300
9210 PLOT 3,25,"Beam back up to the ship and install
them"
9220 BET BE$
9230 FH=500
9240 PLOT 3,25,"Crystals installed
     ":WAIT 200
9250 GOTO 9900
9300 PLOT 3,25,"Scanners show planet is rich in fuel"
:WAIT 300
9310 PLOT 3,25,"Beam up to ship with fuel          "
9320 BET BE$
9330 PLOT 3,25,"Fuel now full.                  ":WAIT
200
9340 FU=1000
9360 GOTO 9900
9400 PLOT 3,25,"Footsteps approach...":WAIT 200
9410 PLOT 3,25,"Lucky!Friendly inhabitants...":WAIT 2
50
9420 PLOT 3,25,"...but nothing to offer except food."
:WAIT 300
9430 PLOT 3,25,"Beam back to ship.             "
9440 BET BE$
9450 GOTO 9900
9500 PLOT 3,25,"Footsteps approach...":WAIT 200
9510 PLOT 3,25,"Quick!Its the dreaded beast of Trog..
":WAIT 200
9520 CK=0
9530 PLOT 3,25,"Strike quickly..!
                    "
9532 TI=0
9533 A$="You have been killed by the beast of trog"
9535 REPEAT
9540 TI=TI+1
9555 B$=KEY$
9557 IF TI>100 THEN B$="S"
9560 UNTIL B$<>""
9562 IF TI>100 THEN 11000
9565 IF TI<15 AND TI>5 THEN 9580
9570 PLOT 3,25,"Missed..!          ":WAIT 200
9575 CK=CK+1:IF CK>5 THEN 11000 ELSE 9530
9580 CR=CR-CK
9590 PLOT 3,25,"You have killed the beast and...":WAI
T 300
9591 PLOT 3,25,"collected 10 units of treasure..":WAI
T 300
9592 PLOT 3,25,"Beam back to ship with the treasure."
9593 BET BE$
9594 TR=TR+10
9595 GOTO 9900
9600 REM
9605 COMB$=""
9610 OP(UX,UY)=0
9620 CLS
9625 PRINT
9630 PRINT" You have found a room which contains"
9635 PRINT"an unknown amount of treasure.But the"
9640 PRINT"door is firmly sealed and can only be"
9645 PRINT"opened by typing in the correct four"
9650 PRINT"number combination of the lock."
9655 PRINT" No two nusbers in the combination"
9660 PRINT"are the same,but time is limited and"
9665 PRINT"you only have 6 attempts to guess the"
9670 PRINT"combination."
9675 BASE=INT(RND(1)*4+4)
9680 PRINT" Since the inhabitants use base ";BASE
9685 PRINT"only the numbers 0 to ";BA-1;" will be"
9690 PRINT"included in the combination."
9695 PRINT"(Remember-once you type in a number  you
cannot change it)"
9700 PRINT" Having typed in the combination two"
9702 PRINT"numbers will appear.The first number"
9703 PRINT"represents how many of your numbers "
9704 PRINT"are in the correct position,and the"
9705 PRINT"second represents how many of your"
9706 PRINT"numbers are correct but in the wrong"
9707 PRINT"position."
9709 PRINT:PRINT
9710 PRINT"Press any key to continue"
9712 GET D$
9714 CLS:PRINT
9720 FOR I=1 TO 4
9725 RN(I)=INT(RND(1)*BASE)
9730 IF I=1 THEN 9750
9735 FOR J=1 TO I-1
9740 IF RN(J)=RN(I) THEN 9725
9745 NEXT J
9750 COMB$=COMB$+STR$(RN(I))
9752 NEXT I
9767 FOR GUESS=1 TO 6
9768 CB$=""
9770 PRINT:PRINT"Combination >";
9772 FOR I=1 TO 4
9774 GET D$
9776 IF ASC(D$)<ASC("0") OR ASC(D$)>ASC("9")+BA-1 THE
N 9774
9777 D=VAL(D$):GOSUB 8000
9778 PRINT D$;
9780 CB$=CB$+D$
9782 NEXT I
9784 B=0:W=0
9786 FOR CHECK=1 TO 4
9788 IF VAL(MID$(CB$,CH,1))=RN(CH) THEN B=B+1
9790 FOR WHITE=1 TO 4
9792 IF VAL(MID$(CB$,CH,1))=RN(WH) THEN W=W+1
9794 NEXT WH
9796 NEXT CH
9798 IF B=4 THEN 9820
9800 W=W-B
9802 PRINT SPC(6);B;SPC(B);W
9804 PRINT
9806 NEXT GU
9808 WAIT 200:CLS:PRINT
9810 PRINT"  Hard luck-but it's time to leave."
9812 PRINT" The treasure is gone for good now so"
9814 PRINT" don't come back!"
9816 PRINT" Beam back to ship."
9818 GOTO 9860
9820 CLS:PRINT
9822 PLOT 10,1,"WELL  DONE!"
9824 PLOT 10,2,"WELL  DONE!"
9826 PLOT 9,2,14
9828 PLOT 9,1,14
9830 PRINT:PRINT
9832 TU=INT(RND(1)*21+10)
9833 PRINT:PRINT
9834 PRINT"You have collected ";TU;" units of
 treasure."
9836 PRINT"Beam back to ship with treasure."
9838 TR=TR+TU
9840 GOTO 9860
9850 PLOT 3,25,"No treasure left...          ":W
AIT 200
9855 PLOT 3,25,"Beam back to ship  "
9860 BET BE$
9900 RETURN
10000 IF FU<=0 THEN A$="You have run out of fuel.Game
 over":GOTO 11000
10010 IF SH<0 THEN A$="You have been blown to bits.
Game over":GOTO 11000
10020 IF CR>150 THEN A$="You have lost too many crew.
Game over":GOTO 11000
10030 RETURN
11000 CLS:PLOT 10,10,A$
11010 PLOT 10,15,"Another game(Y/N)?"
11020 GET AN$
11030 IF AN$="N" THEN 495
11040 IF AN$="Y" THEN 11060
11050 GOTO 11020
11060 PLOT 5,17,"Do you need instructions(Y/N)?"
11070 GET AN$
11080 IF AN$="Y" THEN RUN 7
11090 IF AN$="N" THEN CLEAR:DIM KE(20),RE(20):GOTO 40
11100 GOTO 11070
12000 CLS:PRINT
12010 PRINT CHR$(4);CHR$(27);"J            WELL  DONE!
"
12020 PRINT CHR$(4)
12030 PRINT:PRINT
12040 PRINT"  You have defeated the Klingons and"
12045 PRINT"Romulans and collected ";TR;"units of"
12047 PRINT"treasure."
12050 PRINT" Now try again-but this time you will"
12060 PRINT"not find it so easy.They will not be"
12070 PRINT"so easy to destroy and will damage"
12080 PRINT"your ship more."
12085 PRINT
12090 PRINT"     Good luck!"
12100 PRINT
12110 PRINT"  Press any key to start again."
12120 GET D$
12125 FOR X=1 TO 8
12130 FOR Y=1 TO 8
12140 KP(X,Y)=0:RP(X,Y)=0
12150 BP(X,Y)=0:PL(X,Y)=0
12160 OP(X,Y)=0
12170 NEXT Y
12180 NEXT X
12190 GOTO 40
```


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, fuses, triacs, diodes, etc, 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 a 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)

LINNET £ 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. Happily deals with highly complex networks - the instruction book provides numerous examples using transistors, I.C.s, bandpass filters, op amps, etc, etc... An invaluable tool for both professional and amateur designers.

48K SPECTRUM

HEARING IS BELIEVING

Tele Sound

SPECTRUM BEEP BOOSTER

TELESOUND is ready built and tested so that you can get the full sound of your Spectrum through any unmodified television set, black and white or colour. The unit is easy to fit in minutes without any previous experience as full fitting instructions are provided.

TELESOUND has been designed using the very latest ultra miniature components so it's size is an **incredible 2x1.3x1cm. and fits neatly inside** the Spectrum. Three easy push-on connections are made to the Spectrum. The connections are clearly shown in a diagram that comes with full fitting instructions.

TELESOUND FEATURES

- SOUND AND VISION TOGETHER FOR ADDED REALISM.
- BEEP VOLUME CONTROLLABLE FROM A WHISPER TO A ROAR.
- KEYBOARD CLICK CLEARLY HEARD TO ASSIST PROGRAM ENTRY.
- PROGRAMS CAN BE HEARD WHEN BEING LOADED • NO SOLDERING OR CASE CUTTING REQUIRED.
- ADDITIONAL AMPLIFIER NOT NECESSARY • SEPARATE POWER SUPPLY NOT REQUIRED.
- USES NO MEMORY SO WORKS WITH ALL PROGRAMS • COMPATIBLE WITH ALL OTHER ADD-ONS INCLUDING MICRODRIVE

TELESOUND comes complete with easy to follow fitting instructions and costs £9.95 inclusive of post, packing etc. Please state your computer when ordering.

COMPUSOUND

BARCLAYCARD VISA

Overseas and Trade Enquiries Welcome

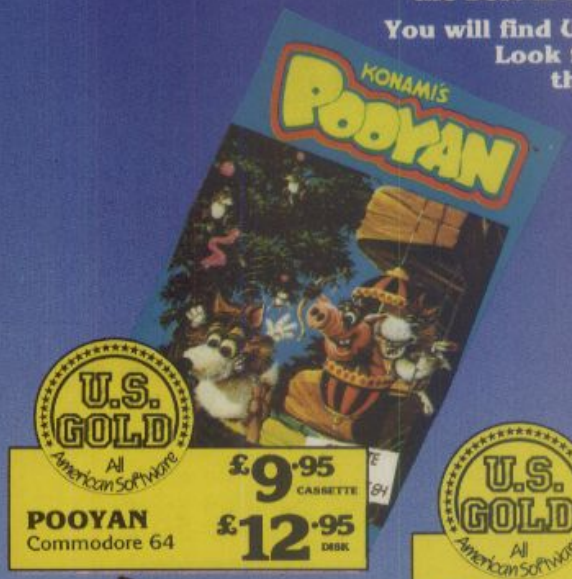
ACCESS

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

Introducing U.S. GOLD

U.S. Gold is a new concept in software marketing. We are dedicated to bringing to you the best in American software at a sensible price.

You will find U.S. Gold in all leading computer stores. Look for the U.S. Gold emblem — it's the mark of quality software.



U.S. GOLD All American Software

POOYAN Commodore 64 — £9.95 CASSETTE / £12.95 DISK



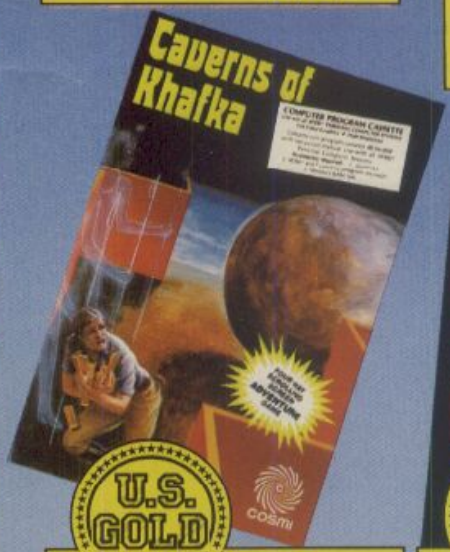
U.S. GOLD All American Software

ZAXXON Atari Systems — £14.95 CASSETTE ONLY



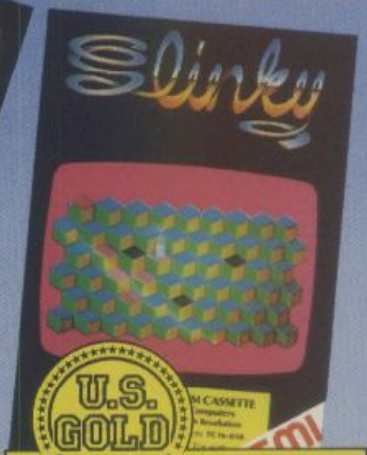
U.S. GOLD All American Software

O'RILEY'S MINE Atari/Commodore 64 — £9.95 CASSETTE / £12.95 DISK



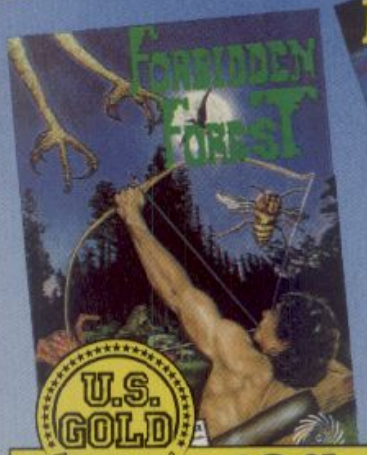
U.S. GOLD All American Software

CAVERNS OF KHAFKA Atari/Commodore 64 — £8.95 CASSETTE / £12.95 DISK



U.S. GOLD All American Software

SLINKY Atari/Commodore 64 — £8.95 CASSETTE / £12.95 DISK



U.S. GOLD All American Software

FORBIDDEN FOREST Atari/Commodore 64 — £8.95 CASSETTE / £12.95 DISK



U.S. GOLD All American Software

AZTEC CHALLENGE Atari/Commodore 64 — £8.95 CASSETTE / £12.95 DISK

★ ★

THE ULTIMATE IN AMERICAN SOFTWARE FOR YOU ON U.S. GOLD

U.S. Gold is stocked by all leading computer stores including: Boots WHSMITH

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

QL Competition RESULTS



APRIL'S BEFORE AND AFTER COMPETITION proves that *Your Computer* readers will do anything to get their hands on a QL — mind you, so would most of the people who sent off their £400 cheques to Sinclair four months ago and are still waiting.

To win a new Sinclair you had to send in a sketch or photograph of your existing computer system — the Before — which would convince us that you needed a tidy QL — the After — to replace it. This seemed to spark all your creative instincts. We were deluged with pictures of very strange looking systems indeed — which could explain why some of you have such difficulty typing in listings.

One of the weirdest entries was neither a sketch nor a photograph but a lump of crushed metal with wires sticking out the end which PJ Thys of Leiden in Holland claims actually is his old computer. Tests by the *Your Computer* forensic laboratory reveal that PJ Thys's lump of metal is a car hub cap so it's no wonder he wants a QL.

Other odd entries included an anonymous nude picture — of a three year old boy, and from Zunic Davor of Zagreb Yugoslavia a photograph of a snowman with an uncanny resemblance to Sir Clive. Maybe he's been snowed in since the Winter Olympics and that's why we've had to wait for our QLs.

While some sent in accurate detailed drawings of their systems others sent in caricatures — at least that's what we hope they are otherwise there are a lot more of you running Cray Is off ZX keyboards than we had ever imagined. If Andrew Heggie's sepia drawing is to be believed his home in Glenrothes — Scotland's silicon glen — is dominated by a 1 RAM system, the type that comes complete with horns being pursued by a sheepdog, which includes blackboard, 1920's gramophone and abacus amongst its peripherals.

Malcolm Banthorpe of Northolt, Middlesex, needs a QL because the Galactic Union of Invasion Operatives and Allied Nasties has mounted an official picket of his old American Atari. They are demanding a 16 bit QL — 8 is not enough. Well Malcolm if you will go for an old American trouble shooter you cannot expect us to interfere in your bit strike.

The most popular "Before" was an abacus — we had several hundred of them — and running that close was spaghetti. Fortunately, nobody sent in any half-eaten pasta but Ernest Babbington of Highgate, London, sent in a section of a Heinz wrapper.

Dogs crashing through your systems and cats sitting on over-warm power packs were another obsession of the competitors. Richard Trollis of Oxford was moved to paint a full colour masterpiece of his cat knocking a joystick into the inevitable cup of coffee.

Collages were also popular. Adrian Oates of Guildford included a picture of Sir Clive being swallowed by a Pacman on his — the ultimate video nasty.

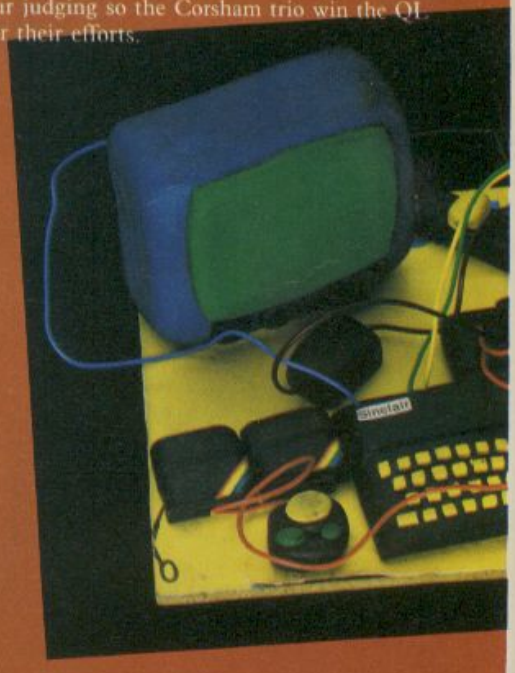
Quiche Lorraine "because preparation is lengthy but its worth the wait" was a team entry from Sime, Andy and Deb from Corsham in Wiltshire. It wasn't the best slogan but that's only meant to be a tie-breaker. Instead of a sketch or a photo of their current system they sent in a colourful scale model — not strictly within the rules but in a competition brimming with original entries we felt obliged to show some imagination in our judging so the Corsham trio win the QL for their efforts.



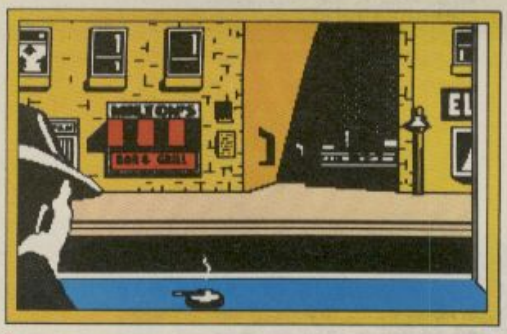









COMPETITION
If you want to win the new Sinclair QL in addition to putting in your sketch or photo you must complete this sentence in 12 words or fewer and send this coupon to Your Computer, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. "I think the QL in Sinclair QL stands for
Quiche Lorraine !
because preparation is lengthy, but it's worth the wait.
Name Sinc, Andy and Deb
Address 42 High Street,
Corsham,
Wiltshire.





Announcing Mugsy, the first interactive computer comic strip for your 48K Spectrum.

You are Mugsy, the Godfather to a gang of hoodlums and your aim is to be the toughest and most powerful gang leader in the city.

Your tasks involve managing the gang, making lots of money, organizing the protection rackets, buying weapons and ammunition but beware, your reign as the Big Boss is rather delicate. If you are too successful a contract will be put out by other gangs to get rid of you!!

You are the decision maker and one wrong move could mean the end!

Mugsy gives a totally new direction for thrill-seekers — comic animation, stunning graphics and a full arcade game.

Remember — you are da boss!



Melbourne House Publishers

☐ Please send me your free catalogue

Please send me:

SPECTRUM

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

COMMODORE 64

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

BBC

- ☐ BBC Model B The Hobbit £14.95

ORIC-1

- ☐ Oric-1/48K The Hobbit £14.95

Orders to: YC6

Melbourne House, 131 Trafalgar Road, Greenwich London SE10.

Correspondence to:

Melbourne House, Church Yard Tring, Hertfordshire.

Trade enquiries welcome

All Melbourne House cassette software is unconditionally guaranteed against malfunction. Access orders can be telephoned through on our 24 hour ansafone (01) 858 7397.

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

I enclose my cheque/money orcer for £	£
Please debit my Access Card No. Expiry date	£ + p/p .80
Signature	Total
Name	£
Address	
Postcode	

All prices include VAT where applicable. Please add 80p for post and pack.

IUGSY



Muscle in on da action!

M

Melbourne House

NEW from Melbourne House



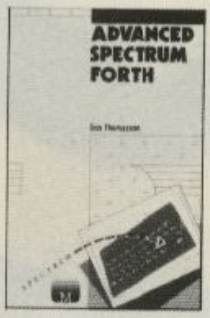
A Guide to Playing The Hobbit
Finally! A Guide to Playing the most exciting and challenging adventure today, The Hobbit. This book, whilst providing solutions to the problems which were encountered, aims to preserve as far as possible the qualities of challenge and discovery which are so much a part of The Hobbit program.
No two games are alike and this Guide will help you discover more about The Hobbit each time you play.
£3.95



Advanced Spectrum Machine Language
This book is a collection of ready-made Machine Language routines which show how to achieve spectacular effects on the Spectrum. Most of the routines are aimed at creating visual displays that are at the frontier of Spectrum capabilities. Routines include features that have never been published before. This book gives a unique insight into the Spectrum and into a professional's Machine Language programs.
£6.95



Computer and Video Games Book of Adventure
Adventure games are the most exciting applications of computers to games. The book talks about adventure games: what they are and how to write your own with practical examples for BBC, Spectrum and Commodore 64. **£5.95**



Advanced Spectrum FORTH
With the growing popularity of language, other then BASIC and FORTH in particular, there is real need for information on how to use these languages.
This book does not attempt to teach FORTH, but provides the advanced programmer with an in-depth look at this exciting language. **£8.95**



Commodore 64 Sound and Graphics Concise, easy to follow instructions on programming the superb graphics and sound capabilities of the COMMODORE.
Sample programs demonstrate everything the user needs to know to create programs with sprite and character design, music synthesis and many more.
£5.95



Commodore 64 Machine Language for the Absolute Beginner If you are frustrated by the limitations of BASIC and want to write faster, more powerful, space-saving programs or subroutines, then this is the book for you.
Each chapter includes specific examples of machine language applications which can be demonstrated and used on your Commodore as well as a self-test questionnaire. At the end of the book, all this is brought together into an entire machine language program — from design right through to the complete listing of an exciting, original arcade game. **£6.95**

Melbourne House Publishers

☐ Please send me your free catalogue

Orders to: Melbourne House, 131 Trafalgar Road, Greenwich, London SE10.
Correspondence to: Melbourne House, Church Yard, Tring, Hertfordshire HP23 5LU.

Please send me: CVG6

Spectrum Books
- ☐ Understanding Your Spectrum £6.95
- ☐ Spectrum Machine Language for the Absolute Beginner £5.95
- ☐ Over The Spectrum £4.95
- ☐ The Complete Spectrum ROM Disassembly £9.95
- ☐ Spectrum Hardware Manual £5.95
- ☐ Spectrum Microdrive £5.95
- ☐ Super Charge Your Spectrum £5.95
- ☐ Advanced Spectrum Machine Language £6.95
- ☐ Advanced Spectrum Forth £8.95

BBC/Electron Books
- ☐ BBC BASIC for Beginners £7.95
- ☐ BBC Hardware Projects £8.95
- ☐ Energise Your Electron £5.95

General Books
- ☐ C&VG Book of Adventure £5.95
- ☐ A Guide To Playing The Hobbit £3.95

Commodore 64 Books
- ☐ Commodore 64 Exposed £6.95
- ☐ Commodore 64 Games Book £5.95
- ☐ Commodore 64 Sound & Graphics £5.95

Dragon Books
- ☐ Enter The Dragon £4.95
- ☐ Dragon 32 Programmer's Reference Guide £6.95
- ☐ Dragon 32 Machine Language for the Absolute Beginner £6.95

I enclose my cheque/money order for £

Please debit my Access Card No. Expiry Date

Signature

Name

Address

Postcode

£

£ +p/p .80

Total £

Trade enquiries welcome

All prices include VAT where applicable. Please add 80p for post and pack.

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

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

TEXT EDITOR

An "electronic notepad", which is easily updated with 12 "pages" — Julian Ossowski explains.



Listing 1.

```
10 LET L=0
20 LET A$="XXXXXX 32 X5 XXXXX"
30 LET L=USR 20495
40 IF L=1 THEN COPY
50 IF L=2 THEN LOAD A$
60 IF L=3 THEN SAVE A$
70 RUN
```

Listing 2.

```
 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
```

BEING BORED with zapping space invaders, I decided to sit down and write a really useful ZX-81 program, and 'Textpro' was what I came up with. The program is essentially an electronic notepad, allowing access to an infinite number of screens which can easily be updated at any time. The program has the following features:

- Instant access to 12 "pages" stored in memory;
- Saving of pages on tape;
- Editor to write and update pages;
- Help page;
- Two display formats;
- Print function allowing pages to be dumped onto a printer;
- Scroll function for advertising displays etc.

Now onto the program itself, it is largely in Z-80 machine code, and has two parts, the first sets up the machine code, and then loads the second, which is the "slave" program used for storing pages on tape.

Type

POKE 16389,80

and then New, now type in listing 2 and Run it and so load in the machine code.

Now type New and create Rem lines 1-16 each 96 characters long — excluding the Rem — then type

POKE 16511,92 POKE 16512,6

to make one long line, then type

POKE 16510,0

to prevent it from being edited and

POKE 16514,118

and

POKE 16515,118

to prevent it from being listed. Now type

RAND USR 21658

to down load the machine code and save the Rem statement just in case something happens. Now type in the rest of listing 4, start the tape recorder on record and type run.

Type New and type in listing 3, save it just in case, and then Run it.

Command and Edit modes

Now load listing 4 from tape, add line 10 Rand USR 16962 and Run it after setting your tape recorder to record. This is now the complete master program. Now Break out of it.

Type New, type in listing 1, Run it, if all is well a message should appear, press "S", type

SLAVE

between the quotes, and then follow the instructions after pressing newline. This is the complete slave program.

There are two modes, Command and Edit. If you are ever stuck, and you are in Command mode, then if you press H you will get the help page. So after following the procedures above you will have just saved a blank page and you will be back in Command mode so if you press H you will get the help page, which will tell you how to use the system. If you want to type something, you have to go into Edit mode. To do this press shifted one, and a cursor and a message will appear. This editor is very much

(continued on page 167)

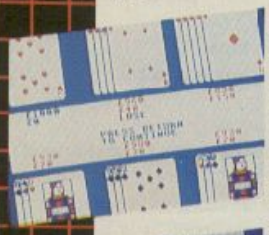
ELECTRON/ BBC MODEL 'B'

OASIS

THE BEST DEAL YET

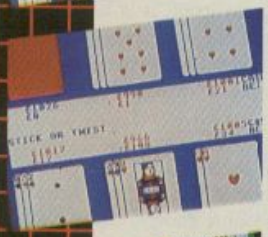
ACES HIGH

Brings four of the most popular casino-type games to the screen of your computer in amazing high resolution colour graphics.

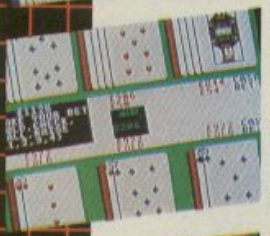


● One to five players, several levels of play. ● At no time can the computer "see" other players' hands. ● Reserves, Stakes and "pots" clearly displayed at all times.

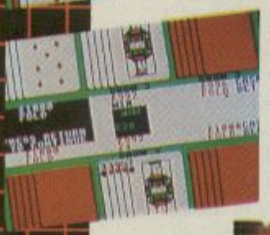
BLACK JACK.
Bets are placed on the first card dealt and from then on strong nerve is a necessity as you go for the "natural".
Includes such features as doubling of stakes and splitting the hand.



PONTOON.
To "stick", to "twist" or to "buy". That is the question in the search for that elusive Pontoon or Five Card Trick.



DRAW-POKER.
All the features you'd expect; "calling", "checking", "raising", "folding", discarding of cards and two rounds of betting.



STUD POKER.
Cards are dealt one at a time with a round of betting in between. All the usual features and as in Draw Poker, the program recognises all the standard poker hands.

£14.95



INCLUDES: VAT, P & P. FULL INSTRUCTIONS AND LIFETIME GUARANTEE.

Please send me ___ Aces High Compendium(s).
I enclose cheque/PO for £ _____

Name: _____
Address: _____

OASIS SOFTWARE, 9A ALEXANDRA PARADE, WESTON-SUPER-MARE. TEL: 0934 · 419921.

ACCESS ORDERS TAKEN BY PHONE 24 HOURS A DAY. 0934 · 419921.

ZX – SPECTRUM 48K

OASIS

GREAT GAMES FOR GREAT BRAINS

MIND GAMES

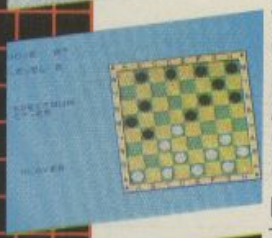
"Oasis seem to specialise in these "mind" games, and they do it rather well." (Crash Magazine).



CHESS.
Compiled to the same high- spec as our best-selling Dragon Chess. ● Six levels of play. ● All legal Chess moves. ● High resolution graphics. ● Set-up from any position. ● Opening move library, best move hint, move cancellation, move storage to tape. ● One of the most flexible and enjoyable Chess programs available.
(sold separately: £5.95).



BACKGAMMON.
All the features of today's popular board game complete with full instructions and demo.
(sold separately: £4.95).



DRAUGHTS.
A real test of your ingenuity whatever your standard of play.
(sold separately: £4.95).



INVADER CUBE.
The thinking man's Invaders game. Some of the best Spectrum graphics around, demanding the highest levels of skill.
(sold separately: £4.95).

IT TAKES GREAT BRAINS TO BEAT THE MIND GAMES PACKAGE. EXERCISE YOURS TODAY.

£14.95



INCLUDES: VAT, P & P. FULL INSTRUCTIONS AND LIFETIME GUARANTEE.

Please send me ___ Mind Games Compendium(s).
I enclose cheque/PO for £ _____

Name: _____
Address: _____

OASIS SOFTWARE, 9A ALEXANDRA PARADE, WESTON-SUPER-MARE. TEL: 0934 · 419921.

ACCESS ORDERS TAKEN BY PHONE 24 HOURS A DAY. 0934 · 419921.

Listing 3.

```
  5 POKE 16418,0
 10 PRINT
 20 PRINT "EDITING"
 30 PRINT "        PRESS SHIFTED
""I"" FOR"
 40 PRINT "        EDIT MODE"
 50 PRINT "        USE THE CURSO
R CONTROL"
 60 PRINT "        KEYS AND RUBO
UT"
 70 PRINT "        PRESS SHIFTED
""A"" WHEN"
 80 PRINT "        YOU HAVE SHIF
TED"
 90 PRINT
100 PRINT "STORING PAGES"
110 PRINT "        ON TAPE; PRES
S ""S"""
120 PRINT "        IN MEMORY; PR
ESS ""M"""
130 PRINT
140 PRINT "RETRIEVING PAGES"
150 PRINT "        FROM TAPE; PR
ESS""J"""
160 PRINT "        FROM MEMORY;
PRESS ""R"""
170 PRINT
180 PRINT "PRESS ""B"" TO SCROL
L PAGES"
190 PRINT "PRESS ""H"" FOR THIS
PAGE"
200 PRINT "PRESS ""I"" TO INVER
T A PAGE"
210 PRINT "PRESS ""V"" TO CLEAR
THE SCREEN"
220 PRINT "PRESS ""Z"" TO PRINT
OUT A PAGE"
240 PRINT "HELP PAGE:- INFORMAT
ION"
250 RAND USR 21670
260 REM THIS INVERTS THE PAGE A
ND STORES IT"
```

Listing 4.

```
 1 REM ************************
       *  J.OSBOWSKI 1984     *
       *  VERSION 4           *
       ************************
10 RAND USR 16962
20 SAVE "TEXTPR"
30 RAND USR 17648
40 POKE 16389,80
50 CLS
60 PRINT AT 12,6;"TEXTPRO MAST
ER"
70 PRINT AT 16,7;"STOP THE TAP
E"
80 PRINT AT 10,7;"PRESS ANY KE
Y"
90 IF INKEY$="" THEN GOTO 90
100 CLS
110 PRINT AT 10,3;"PRESS ""J""
TO LOAD A PAGE"
120 IF INKEY$<>"J" THEN GOTO 12
0
130 LOAD ""
```

(continued from page 165)

like the 81's editor in that you can move the cursor around with shifted 5, 6, 7 and 8 and you can also use rubout.

You can store a page in memory by pressing M and then location 0 to 9 — there are two other pages which you can use for temporarily storing pages in: A and B. Retrieving pages is done by pressing R and then the page you want — 0 to B. If you select a page other than 0 to B you will return to Command mode.

To save a page press S and then enter the filename, and follow the instructions. It is a good idea to save the page in memory first in case you cause an input error e.g. rubbing out a quote gives an error.

To load a page, press J and then type the filename — if you do not know this, then just press newline.

If you press B you will scroll through all 12 pages at a moderate rate. If, however, you press any key then they will whizz past your face and you will return to Command mode.

There are a few bytes of system variables in front of the main machine code, one of them being SYSP — the current page number — which is mentioned in the listings. ■

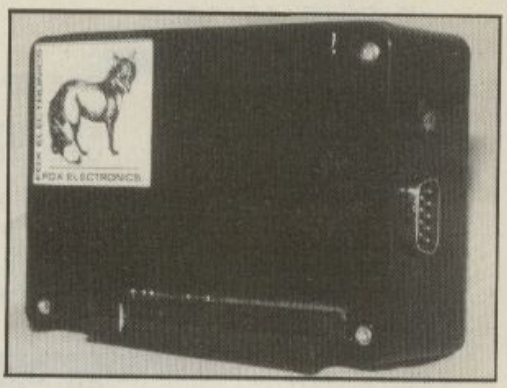
Listing 5.

```
20495 E1220050C38850CD = 955
20503 0451FE2E2006CDEB = 883
20511 51C38850FE3B200B = 848
20519 CD2A0A3E80320450 = 581
20527 C38850FE322006CD = 956
20535 6D51C38850FE3720 = 842
20543 06CD1A51C38850FE = 983
20551 752006CD0553C388 = 779
20559 50FE2D200CCDC051 = 901
20567 CD0451CDC051C388 = 1099
20575 50FE382009CDFE51 = 971
20583 3CFE01C23754FE2F = 949
20591 2006CDFE51C33D54 = 918
20599 FE3F20080101002A = 401
20607 0050E5C9FE27CCE2 = 1203
20615 53CDD951A3B482B2 = 1290
20623 A6B3A9805284A9AA = 1339
20631 9980B2A680AA80A6 = 1265
20639 80A8AD84AEA8AA80 = 1289
20647 8080808076B5A6AC = 1149
20655 AA8080808080B0AF = 1113
20663 98B4B888B4BCB8B0 = 1431
20671 AE80809DA5A4A080 = 1204
20679 8080808030FF3A04 = 957
20687 502A0C4001FE0209 = 484
20695 77C3165000000000 = 416
20703 0000000000000000 = 0
20711 0000000000000000 = 0
20719 0000000000000000 = 0
20727 0000000000000000 = 0
20735 000000000CDB8B02 = 394
20743 444D511428F7CDBD = 927
20751 077EF8CD88022C20 = 848
20759 FAF1C93E80320450 = 1018
20767 CDD95187AA8987AE = 1398
20775 AA88AA80608CADAE = 1318
20783 A8AD80B184A8A689 = 1345
20791 AEB4B38F80909C96 = 1254
20799 A59180FFCD0451D6 = 1197
20807 1C47E6F0200678FE = 981
20815 0CFA5451C90411D6 = 883
20823 022142581910FD01 = 484
20831 D602ED5B0C40EDB0 = 1033
20839 C69C320450C93E80 = 879
20847 320450CDD9518889 = 1006
20855 B4B7AA8080BCADAE = 1324
20863 A8AD80B184A8A689 = 1345
20871 AEB4B38F80909C96 = 1254
20879 A59180808080FFCD = 1282
20887 0451D61C47E6F020 = 900
20895 0678FE0CFAA751C9 = 1091
20903 0411D602214258I9 = 449
20911 10FD01D602ED5B0C = 828
20919 40EBED8000000000 = 712
20927 C92A0C4011005806 = 430
20935 197EFE7620094F1A = 677
20943 77791213231BF210 = 594
20951 FAC92A0C4001D702 = 787
20959 09D11A13D5FEFFC8 = 1185
20967 772318F506182A0C = 507
20975 40237EFE76280SC6 = 840
20983 807718F510F3C9CD = 1181
20991 D951AEB385BAB980 = 1331
20999 ABAEB1AAB3A6B2AA = 1385
21007 80848780AFBAB8B9 = 1349
21015 80B3AABCB1AEB3AA = 1365
21023 8080760000000000 = 374
21031 0000000000000000 = 0
21039 0000000000000000 = 0
21047 0000000000000000 = 0
21055 000000FF06002A10 = 319
21063 407EFE4628052310 = 610
21071 F8CF1E2A0C4011F8 = 868
21079 0219360B23360BE5 = 421
21087 CD0451E1CB7200A = 879
21095 77237EFE7620EE2B = 966
21103 18EBFE7200B3600 = 729
21111 2B7EFE7620DF2318 = 855
21119 DCFE7620D82A0C40 = 988
21127 11F802197EFE0B28 = 723
21135 47CDD9512A373734 = 778
21143 370E1600322E3838 = 299
21151 2E332C00363A3439 = 362
21159 2A1A00393E352A00 = 282
21167 373A330076000000 = 282
21175 0000000000000000 = 0
21183 0000000000000000 = 0
21191 0000000000000000 = 0
21199 000000000FFCF19 = 467
21207 23E506017EFE0B28 = 702
21215 0704CB6820AB2318 = 580
21223 F32A1040237EFE46 = 850
21231 20FA237E3D280B77 = 668
21239 2323D11A77231310 = 494
21247 FAC93600D1C9CDD9 = 1337
21255 51AAA9AEB980B2B4 = 1265
21263 A9AA8080B587AAB8 = 1313
21271 B880B8B984B580B9 = 1355
21279 8480AAB8A8A6B5AA = 1347
21287 80FFE1220250160I = 747
21295 1E01D5CD8A53E17E = 1069
21303 D94FD93692CDBB02 = 1107
21311 444D511428F7CDBD = 927
21319 077ECB7720280947 = 815
21327 D9CDBA53E1D978D9 = 1470
21335 77D11CD5CDBA53E1 = 1268
21343 7ED94FD9CDBB022C = 1077
21351 20FA0619C506FF10 = 787
21359 FEC110F818BDD947 = 1212
21367 D9CDBA53E1D979D9 = 1471
21375 77D978D9D1FE7320 = 1283
21383 011CFE7220067BFE = 812
21391 0128011DFE702006 = 475
21399 7AFE01280115FE71 = 806
21407 200114FEE320052A = 613
21415 0250E5C9FE772008 = 925
21423 360078FE0128011D = 502
21431 D519A9C1D1C57BFE = 1382
21439 2020091E0147AFE = 500
21447 16200115D5422A0C = 409
21455 402311210019I0FD = 443
21463 D1D5160019D1C1D5 = 1084
21471 E5C5C9CDD951B8A8 = 1482
21479 B7B481B18080B587 = 1337
21487 AAB8B880A6B3BE80 = 1329
21495 80AABE80B9B480AA = 1327
21503 B8A8A685AA80FF21 = 1285
21511 185B01F300C5E5ED = 1022
21519 5B0C4001D602ED80 = 797
21527 CDBB022C20080119 = 504
21535 190878B120FBE101 = 842
21543 210009C10B78B120 = 575
21551 DCCDB8022C28D0C9 = 1107
21559 010300C518040102 = 232
21567 00C5CDD951B8B9A6 = 1235
21575 B7B980B9A6B5AA9A = 1352
21583 80B9ADAAB3808587 = 1327
21591 AAB6B680A6B3BE80 = 1329
21599 80AABE8080FFCD04 = 1256
21607 51C12A005055C921 = 859
21615 824011005031FF04 = 551
21623 ED802A0C40110058 = 636
21631 011903EDB0CD2A0A = 699
21639 060C11185BC501D6 = 562
21647 022A0C40EDB000C1 = 726
21655 10F3C92100501182 = 720
21663 40010006EDB0C9CD = 890
21671 EB511100582A0C40 = 539
21679 011903EDB0C9 = 643
```

PRODUCTS FOR THE VIC-20 + SPECTRUM

SPECTRUM OWNERS! NOW AVAILABLE

THE ULTIMATE IN JOYSTICK INTERFACES



THE FOX PROGRAMMABLE INTERFACE — AN INTERFACE WITH:

- ★ Complete compatibility with all programs.
- ★ In-built memory to store up to 16 different games keysets at one time.
- ★ Battery back-up so no loss of memory after power off. (Battery recharged during use so no replacements are required).
- ★ One switch only for simplicity of use.
- ★ Full casing.
- ★ Through port for further expansion.
- ★ Proven compatibility with the microdrive
- ★ Built-in pseudo Rom facility with room for personnel tool kit.
- ★ Compatible with all Atari-type joysticks.

The superior interface without awkward trailing leads, just plug in and start your game.

LAUNCH PRICE ONLY **£34.95** INCL



SPECTRUM UPGRADES

ONLY **£21.00**

INCLUSIVE (Issue 2 machines only)



FOX ELECTRONICS LTD. **FOX ELECTRONICS LTD.**

A high quality kit at a new low, low price which simply plugs into existing socket within your Spectrum, no soldering is required and step by step instructions are supplied. Takes your 16K to 48K in simple steps.

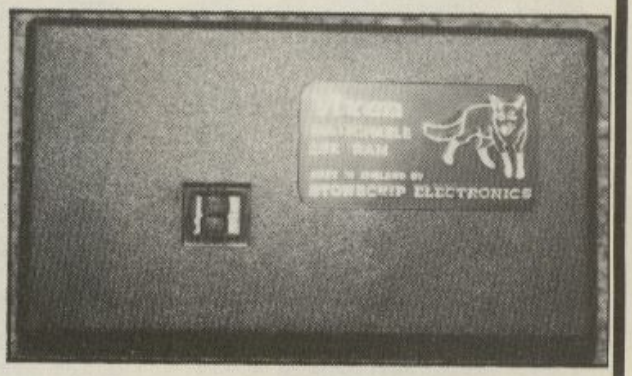
PROBABLY THE BEST KIT AVAILABLE AT DEFINITELY THE LOWEST PRICE

AND FOR THE VIC-20

Vixen RAM Cartridge
Switchable between 16K or 8K + 3K.

Gives you the option of full 16K RAM or 8K and 3K RAM in one package. When added to a standard VIC-20 gives 16384 bytes of extra memory in memory blocks 1 and 2 or 3092 bytes of extra memory into the 3K memory block AND 8192 bytes of extra memory switchable between memory blocks 1 and 3

- Fully compatible with available motherboards/modules.
- Simply plugs into the rear expansion port of computer.
- No re-addressing of existing BASIC programs needed.



Only £34.95



SEND NOW TO **FOX ELECTRONICS** CALLERS WELCOME

141 ABBEY ROAD, BASINGSTOKE, HANTS. TEL: 0256 20671

Please send me:—

Joystick interface ☐
Spectrum upgrade ☐
Vixen Ram ☐
Catalogue ☐

Name. . . . . .

Address. . . . . .

. . . . . .

I enclose £. . . . . .

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".

VIC MEMORY

I have a Vic with 32K RAM fitted. I wish to leave the 32K in place all the time. Is this possible? Can the Vic be re-directed to accept programs which require no extension; for those programs which need 3K extra; for those which demand 8K; and for those which need 16K? I am a complete newcomer to computers and hope you can help.

C B Wood,
Cheadle Hulme,
Cheshire.

THIS IS RELATIVELY easy to do. You need only enter the following directly, or make it the first line of a program, and you can fool your Vic into thinking it has whatever memory you want.

Standard memory — POKE 642,16: POKE 644,30:POKE 648,30:SYS 64824
Plus 3K — POKE 642,4:POKE 644, 30:POKE 648,30:SYS 64824
Plus 8K — POKE 642,18:POKE 644, 64:POKE 648,16:SYS 64824
Plus 16K — POKE 642,18:POKE 644,96:POKE 648,16:SYS 64824
Plus 24K — POKE 642,18:POKE 644,128:POKE 648,16:SYS 64824

QL MICRODRIVE

I have bought a Microdrive for my Spectrum and am gradually transferring my programs from cassette to Microdrive. Will I be able to run these on a QL if I buy one?

Geoffrey Fraser,
Dartford, Kent.

NO. THE MICRODRIVES on the QL are improved versions of the Spectrum ones, holding 100K compared with the Spectrum 85K. As well, QL SuperBasic is incompatible with Spectrum Basic.

RUN/STOP STOP

Is there any way of turning off the Run/Stop key on my Commodore 64 while a program is running? I would like you to tell me how this can be done.

G Dartin,
Arbouthorne.

THERE IS A way of doing it using a Poke and a Peek, but it has the disadvantage of turning off the internal clock as well.

POKE 788,PEEK(788)+3

will disable the Run/Stop key and

POKE 788,PEEK(788)–3

will turn it on again.

GRAPHIC PROBLEM

I am a very interested reader of *Your Computer* magazines but I have a problem. I bought a 48K Spectrum last year and decided to type in some programs from back issues of the magazine. The ones I tried were Balloon Hopper and Star Wars. However, I don't know how I must type and what I must do to get the user graphics needed in the Basic program. Could you help me? I found these programs very attractive.

Daniel Janssens,
Belgium.

THE GRAPHICS referred to, in these and similar programs, are produced by redefining a set of up to 21 letters from the Spectrum's character set. You get into graphics mode by holding down Caps Shift and pressing the Graphics key — the 9 key. Then, if the A has been re-defined, you get the relevant graphic each time you pressed the A key, while in graphics mode. You can tell you are in graphics mode because the cursor becomes a G. You will find a full explanation of how to create these in your Spectrum manual, chapter 14, pages 67 to 73.

VARIABLE PEEK

I bought a Spectrum recently and would like to find out what is actually happening in its variables area. I have tried the following statements which unfortunately failed to dump all variables to the screen:

```
10 FOR X = 0 TO nn
20 PRINT CHR$(PEEK(PEEK 23627
   + 256*PEEK 23628 + X))
30 NEXT X
```

Would you please explain some way to let the program variables be revealed?

P Lee,
Seven Sisters Road,
London N4.

YOU HAVE ALMOST got it right. The variables begin at 23627 — so you are right about that — but the second line of your program is incorrect. To find out what is happening, where X is the address, you need to get the value

PEEK X + 256*(PEEK(N + 1))

Therefore, the state of an address, in terms of your program, can be found by changing line 20 of the program to:

```
20 PRINT PEEK (23627 + X) + 256*
   PEEK(23628 + X)
```

You also need to add Step 2 to the end of line 10.

SPECTRUM VERIFY

I own a 48K Spectrum and I have encountered a major problem when trying to include a Verify routine within a program. The routine usually prints up:"Do you wish to Verify 'name'?". If I answer Yes, the computer prints up "Rewind tape recorder and press any key", followed by a line Verify "name". I always get an R Tape loading error with the line number of the line Verify "name"! I have tried many different ways of programming such a routine and have yet to find success. Can you help?

U Schoke,
Aachen-lau.

AS FAR AS I CAN determine, you are not able to use Verify within a program. It is designed to be used in the direct mode only. I cannot see why it should not work within a program, as the other tape storage commands, Load, Save and Merge, can all be accessed by calls within a program. However, I cannot make it work; you cannot make it work; the manual gives no indication that it should work; so I suppose it is not going to happen. I would be pleased to hear from anyone who has a way of doing it, so I can pass the information on.

CABLE TROUBLE?

I am considering moving house and, of course, taking my Spectrum with me. However, the new house has some overhead power cables very close to it. Would these power cables and their magnetic field have any effect on my computer? They are not national grid lines, but they do carry most of Swindon's power and are about 500 yd. from the house. I would be grateful if you could publish the answer to this rather worrying question.

P K Brown,
Blunsdon,
Swindon.

I HAVE NEVER heard of problems being encountered in a situation such as you describe. The only vaguely similar situation I have come across is the owner of a ZX-81 who lived next door to a CB enthusiast, who found his ability to load and save was severely restricted when the neighbour's rig was in action. Fluctuating massive power surges could pose a problem, but you are most unlikely to suffer from them in your situation. If you have any problems, which I consider extremely unlikely, you could minimise them by keeping all leads as short as possible, and perhaps using battery power on your cassette recorder.

ORIC LOADING

I have had an Oric now for three months, and have tried it with three different cassette recorders. The loading has not been reliable on any of them. Should I buy the computer-compatible cassette machine I have seen advertised?

David Hunt,
Finsbury Park, N4.

FROM WHAT I have read about one such cassette recorder they do not seem significantly better than other recorders which cost about the same. Clive Gifford, author of a book on the Oric, suggests you set your volume on about 30 percent of maximum and tone around 80/90 percent. The Oric is sensitive to volume and tone changes, so this should give you a starting point. Check your cassette leads. Undo the casing of your plugs carefully, and check for a loose or poor connection. Keep the recorder heads clean, using a fluid cleaner rather than a head-cleaner tape — these tend to treat your heads harshly. Use C-15 or C-12 computer tapes, rather than ordinary audio ones, or if you must use audio ones, stick to C-60 or shorter and buy the highest quality you can afford. It is best to erase the tape before you record another program over it. Try to keep, in a safe place, a tape which always loads perfectly. If, at some time in the future, you experience a series of loading problems, you can check using your perfect tape to try and work out if it is the computer which is causing the problem. Incidentally, these suggestions apply to loading programs on most computers which use cassettes, although some are not as volume-sensitive as the Oric.

A GOOD BUY?

Having closely inspected the review of the Electron in *Your Computer* — September 1983 — I am seriously reconsidering buying the BBC Micro Model B. I am not particularly interested in interfacing the computer to anything apart from another processor sometime in the future. Is the extra £200 really worth paying?

Robert Lyle,
Alva,
Clacks.

MANY PEOPLE HAVE decided that buying an Electron and then upgrading it gradually so that it is, in effect, a BBC Micro is a sensible way to proceed. It will never be quite the same as a BBC Micro — no Mode 7, only a single sound channel — but for almost everything else you will probably be able to buy whatever you need to modify it.

SOUND OF MUSIC

I have recently bought myself an Oric and although I have no trouble with the built-in sound commands like Ping and Zap, I am confused about the use of Sound and Music.

Andrew Peterson,
Guildford, Surrey.

THE MUSIC COMMAND is good for music, and while you can still make music with Sound, you will find this is best for sound effects. The Oric, flexible beast that it is, also has a Play command which is good for sound effects. Music is followed by four numbers, which can also be previously-assigned variables, which control channel 1, 2 or 3 — octave — 0 to 6 — note — 1 to 12 — and volume — 0 to 15. Sound is followed by three numbers which are channel — 1 to 3 as in Music for music, 4 to 6 for noise — period — the length of the note 0 to 32767 — and volume, as in Music. Play is much more complicated, with four numbers following the command: tone enable — 0 to 7 — noise enable — 0 to 7 — envelope — 1 to 7 — and period. ■

VISION STORE South London's Largest Specialist Micro Computer Centres Offer

INTEREST FREE CREDIT on Micro Computers and Peripherals

In addition to offering computers and peripherals at low, low prices, Vision Store now offer Interest Free Credit i.e. paying over 6 or 9 months with no interest charge. To take advantage of our Interest Free Credit Scheme come to one of our stores where our friendly staff will help you complete the form. Then subject to status, after paying the deposit, you can take the goods away with you. It's as simple as that!

COMPUTERS

COMMODORE

CBM 64 Business Package including 1541 disk drive, 801 dot matrix printer and £205 worth of FREE software
£629.95
Interest Free
Deposit £77.95 + 6 monthly payments of £92.00



	Price	Deposit	Payments
CBM 64	£204.95	£24.95	6x£30.00
CBM 64 with C2N Cassette	£249.95	£33.95	6x£36.00
CBM 1541 Disk Drive	£219.95	£27.95	6x£32.00
CBM 801 Dot Matrix Printer	£225.95	£30.95	6x£32.50
CBM 1526 Letter quality dot printer	£339.95	£39.95	6x£50.00
CBM 1701 Colour Monitor	£229.95	£31.95	6x£33.00

SX64 Portable Computer including Disk Drive and Colour Monitor plus £210 of FREE Software
£895.90
Interest Free
Deposit £89.59 + 9 monthly payments of £89.59



VIC 20 PACKAGE inc VIC 20 C2N Cassette Joystick 5 Game Cassette Game Cartridge Usual Price £169.95	£149.95	£17.95	6x£22.00

ATARI

Atari 800XL 64K computer with FREE Software
£249.99
Interest Free
Deposit £33.99 + 6 monthly payments of £36.00



600XL with 1010 Cassette Deck	£209.90	£23.90	6x£31.00
800XL with 1010 Cassette Deck	£299.90	£35.90	6x£44.00
800XL with 1050 disk drive	£549.90	£57.90	6x£82.00
1050 disk drive	£299.90	£35.90	6x£44.00
1020 Colour printer/ plotter	£199.90	£19.90	6x£30.00
1027 Letter quality printer	£299.90	£35.90	6x£44.00

DRAGON

	Price	Deposit	Payments

Dragon 32 32K Computer with FREE Software
£169.95
Interest Free
Deposit £19.95 + 6 monthly payments of £25.00



Dragon 64	£224.95	£29.95	6x£32.50
Dragon Disk Drive inc Controller	£279.95	£39.95	6x£40.00

BBC

BBC Model B + computer cassette deck and cables
£439.95
Interest Free
Deposit £49.95 + 6 monthly payments of £65.00



BBC B with Disk I/F plus 100K Cumana Disk Drive	£689.95	£95.95	6x£99.00

Cumana CSX100 Disk Drive
£185.95
Interest Free
Deposit £29.95 + 6 monthly payments of £26.00



CUMANA 1x200K Disk Drive CSX200	£229.95	£37.95	6x£32.00
CUMANA 2x100K Disk Drive CD200	£359.95	£47.95	6x£52.00
CUMANA 40/80TR 2x200K CD400	£539.95	£71.95	6x£78.00
CUMANA 40/80TR 2x400K CD800	£579.95	£99.95	6x£80.00

Microvitec Cub RGB Colour Monitor
£249.95
Interest Free
Deposit £33.95 + 6 monthly payments of £36.00

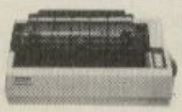


SANYO 14" RGB Monitor Std	£249.95	£33.95	6x£36.00
TORCH Z80 Disk Pack inc C/PM Programs Perfect Speller Perfect Writer Perfect Filer	£859.95	£259.95	6x£100.00

PRINTERS

DOT MATRIX

Epson RX80 Dot Matrix Printer
£259.95
Interest Free
Deposit £37.95 + 6 monthly payments of £37.00



EPSON RX80 F/T	£299.95	£59.95	6x£40.00
EPSON FX80	£439.95	£49.95	6x£65.00
EPSON MX100 F/T	£489.95	£57.95	6x£72.00
EPSON FX100 F/T	£579.95	£63.95	6x£86.00
SEIKOSHA GP100A	£199.95	£19.95	6x£30.00
SEIKOSHA GP100VC	£209.95	£23.95	6x£31.00
SEIKOSHA GP250VC	£259.95	£37.95	6x£37.00
SEIKOSHA GP700A	£419.95	£47.95	6x£62.00
SHINWA CP80	£279.95	£39.95	6x£40.00
STAR DP515	£319.95	£43.95	6x£46.00
STAR GEMINI 10X	£299.95	£35.95	6x£44.00
Brother EP44	£239.95	£35.95	6x£34.00

DAISY WHEEL LETTER QUALITY

	Price	Deposit	Payments

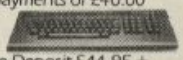
Smith-Corona TPI Daisy Wheel Printer
£259.95
Interest Free
Deposit £37.95 + 6 monthly payments of £37.00



JUKI 6100	£439.95	£49.95	6x£65.00
BROTHER HR15	£455.95	£53.95	6x£67.00

Memotech MTX500 32K
£274.45 Interest Free Deposit £34.95 + 6 monthly payments of £40.00

Memotech MTX512 64K
£314.95 Interest Free Deposit £44.95 + 6 monthly payments of £45.00



New Additions – Just In

Lynx Laureat 128K CP/M System inc. perfect speller, perfect writer, perfect filer, perfect calc.
£999.00 Interest Free Deposit £99.99 + 9 monthly payments of £99.99

Coleco Adam Word Processor inc. Printer
£669.95 Interest Free Deposit £75.95 + 6 monthly payments of £99.00

Seikosha GP500A Dot Matrix Printer
£239.95 Interest Free Deposit £29.95 + 6 monthly payments of £35.00

Seikosha GP550A Correspondance quality Dot Matrix Printer
£289.95 Interest Free Deposit £43.95 + 6 monthly payments of £41.00

Silver Reed EXP500 Daisy Wheel Printer
£349.95 Interest Free Deposit £49.95 + 6 monthly payments of £50.00

Cash Sales Only

Sinclair Spectrum 48K inc. 2 Free Games Programs	**£129.95**
BBC Model B inc. 2 Free Games Programs	**£399.95**
Acorn Electron	**£199.95**
Commodore Vic-20 inc. 4 Games Cartridges (worth £39.96)	**£99.95**
Oric Atmos 48K In Stock Now	**£159.95**
Brother HR5 Printer	**£159.95**

Also we are main Apple agents

SOFTWARE

Dont forget—
We are London's largest stockist of Micro Computer Software. Over 1,000 programmes in stock for games, educational and business. Continuous demonstrations.

EXPORT

All our hardware and software is available Tax-Free to overseas customers, please send for our comprehensive list. Please contact our Croydon office.

MAIL ORDER

We send our whole range anywhere in the UK by FREE Insured Securicor Delivery. Please contact our Croydon office.

All Prices Include VAT

Interest Free Credit available to Mail Order Customers. Phone or write for details.

VISION STORE

VISIONSTORE KINGSTON
3 Eden Walk Precinct, Kingston,
Surrey. Tel: 01-546 8974

VISIONSTORE CROYDON
96-98 North End, Croydon,
Surrey. Tel: 01-681 7539

SOFTWARE FILE

Software File gives you the opportunity to have your programs, ideas and discoveries published. We will accept contributions for any home computer provided they are submitted to *Your Computer* exclusively. Please double-check your programs and specify the memory they require before sending them, preferably on cassette. We pay between £6 and £36 for contributions published.

Docking

Clyde W Bish,
Exeter,
Devon.

SPECTRUM

THIS PROGRAM MAKES use of the excellent 3D Graphics Rotation program by Mark Jones — YC July. It simulates bringing a spacecraft into visual range of a satellite using a radar screen system, then using a visual/instrument display docking with the object. The satellite is displayed as a simple cube with a cross on the front face. This could be elaborated with extra data statements — there is room purposely left above RAMtop for this — but it would slow down the graphic draw routine. In the program information which follows I have included the machine code listing in decimal as the original listing contained some errors which were corrected in subsequent issues of your magazine. The game is for the 48K machine although the 16K version of the machine code is used as space is needed to hold the screen bytes.

Type in program 1 and Run. Enter the numbers in table A. This is the machine code routine. If you already have the 16K version of the original program on tape

CLEAR 30999, LOAD "name" CODE 31000

and Run 4. You have two checks for accuracy available. Each entry is displayed on screen after it is Entered, and a check number appears at the end of the Inputs. This should be 84840. Any other number means you have made a mistake.

If all is well, press Cont and Enter. The program will now construct the sine table, and data table above RAMtop, then draw the cockpit display. When this is complete the D File bytes are loaded above RAMtop. Whilst all this is going on make yourself a cup of coffee and recover from entering umpteen machine bytes without making a mistake!

The option to Save the code then follows. Use this if you do not intend to type in the main program now. Otherwise Break and New the machine. Don't worry — your precious code is safe above RAMtop — and type in program 2. Before you try your skill as a shuttle pilot Save the whole program using

SAVE "dock" LINE 6110:SAVE "d" CODE 31000, 10144

and verify using

VERIFY "" : VERIFY "" CODE

If you have previously Saved the code Load it into the machine using.

CLEAR 30999 : LOAD "" CODE

before Saving as above.

When you Load in the program it will autostart and Load in the code before starting the display. If you want to play having just typed it in use Run 6115.

The first display is of your craft and the satellite in orbit. You must guide your craft to superimpose the two images using the 6 key to bring it into a tighter, faster orbit, and 7 to move into a wider, slower orbit. Each move uses up 10 fuel units. The read-out of the fuel remaining and difference in the two orbits is given at bottom left of screen.

When you have superimposed the images the second part of the task begins. You are given a view of the satellite — at random attitude and position — through the viewport plus a readout of the current docking status and thruster control in operation at top left of screen, and a read-out of the control attitudes status, thrust level, and remaining fuel at bottom right.

The control keys are:

P & O = pitch to front or back
Y & T = yaw to right or left
R & E = roll to right or left
U & D = move up or down
F & B = move forward or back
M & N = move right and left

Use these to select your thruster, then press a number 1-9 to select the power of the thrust. High values are less wasteful of fuel, but you are more likely to overshoot! Cancel the thrust using the opposing thruster e.g., B cancels F. You have to get all the read-outs of control attitude status, except F-B, to 0 before moving in to dock. Your final thrust speed must be between 4 and 6 inclusive and F-B must end at 0. If all attitudes do not end 0, or you come in too fast you will crash. If you come in too slowly you will not close the docking latches, but will see the satellite bounce off. You may try again, but be careful not to run out of fuel! Pressing 0 will play again.

The capital letters in program 1, lines 6019, 6020, 6022, 6027, and program 2, lines 6020, 6040 and 6050 are user-defined graphics and should be entered in the Graphics mode.

Program 1.

```
  2 POKE 23609,50: CLEAR 30999:
 LET t=0: FOR n=31000 TO 31684:
INPUT i: LET t=t+i: POKE n,i: PR
INT n,PEEK n: NEXT n: PRINT "che
ck=";t: STOP
  4 POKE 31724,0: POKE 31725,12
8: POKE 31723,3
  10 FOR f=0 TO 180: LET c=INT (
256*SIN (2*PI*f/360))
  15 IF c=256 THEN LET c=255
  20 POKE f+31730,c: NEXT f
 100 DATA 20,-20,20,0,20,-20,-20
,1,-20,-20,-20,1,-20,-20,20,1,20
,-20,20,1,20,20,20,1,20,20,-20,1
,-20,20,-20,1,-20,20,20,1,20,20,
20,1,20,-20,-20,0,20,20,-20,1,-2
0,-20,-20,0,-20,20,-20,1,-20,-20
,20,0,-20,20,20,1
 110 DATA 0,-10,20,0,0,10,20,1,1
0,0,20,0,-10,0,20,1
1000 RESTORE 100: LET v=20
5000 FOR f=1 TO v: READ x,y,z,p
5001 IF x<0 THEN LET x=x+256
5002 IF y<0 THEN LET y=y+255
5003 IF z<0 THEN LET z=z+255
5010 POKE 31998+f*4,x: POKE 3199
7+4*f,y: POKE 31996+4*f,z: POKE
31999+4*f,p: NEXT f
5015 POKE 31699,v
6000 PAPER 0: CLS : INK 7: PLOT
0,0: DRAW 175,175,-(PI/2): FOR n
=0 TO 175: LET c=0
6005 IF POINT (c,n)=1 THEN GO TO
 6010
6010 PLOT c,n: LET c=c+1: GO TO
6005
6010 NEXT n
6019 INVERSE 1: RESTORE 6032: LE
T w=32: LET x=4: FOR n=1 TO 11:
READ a$: FOR j=0 TO 7: READ a: P
OKE USR a$+j,a: NEXT j: NEXT n
6020 FOR n=13 TO 20: PRINT AT n,
21;"D          E": NEXT n: PRINT
AT 12,21;"ABBBBBBBBBC";AT 21,21;
"FGGGGGGGGH"
6022 INVERSE 0: PRINT AT 21,0;"I
";AT 0,31;"J";AT 11,31;"K";AT 21
,0;"M
6025 PLOT 160,96: DRAW 0,-17: DR
AW -17,0
6027 PRINT AT 0,0; INVERSE 1;"AB
BBBBBBC";AT 1,0;"D          E";AT 2
,0;"FGGGGGGGH";AT 4,1;"ABC";AT 5
,1;"D E";AT 6,1;"FGH"
6032 DATA "a",0,0,63,w,w,w,w,w,"
b",0,0,255,0,0,0,0,0,"c",0,0,252
,4,4,4,4,4,4,"d",w,w,w,w,w,w,"e"
,4,4,4,4,4,4,"f",w,w,w,w,w,w,"g"
,63,0,0,0,0,0,0,0,255,0,0,"h
",4,4,4,4,4,4,252,0,0,"i",128,128,
128,128,128,128,192,224,240,"j",31,7
,3,1,0,0,0
6033 DATA "k",0,0,0,1,1,3,7,31
6050 FOR n=16384 TO 22528: POKE
16616+n,PEEK n: NEXT n: POKE 317
22,184: POKE 31723,135
9999 SAVE "D"CODE 31000,10144: V
ERIFY ""CODE
```

Program 2.

```
  1 IF v<0 THEN LET v=v+65536
  2 LET a=INT (v/256): LET b=IN
T (256*(v/256-a)): POKE d,b: POK
E d+1,a: LET d=d+2: RETURN
  3 POKE 31725,125: POKE 23658,
8
  4 BORDER 7: FOR f=1 TO 2: PAP
ER 0: CLS : INK 7: NEXT f: LET t
h=0: LET c$="DOCKING": LET b$="
": LET t=0
  5 LET px=INT (RND*10+10): LET
py=INT (RND*40+40): LET pz=INT
(RND*50+50)
  7 LET phi=INT (RND*360): LET
psi=INT (RND*360): LET theta=INT
(RND*360)
2000 LET a$=INKEY$: IF a$="" THE
N LET a$=b$
2001 IF t>0 THEN LET th=INT (th+
9*1/t): LET fu=INT (fu-9*1/t)
2002 IF a$>="0" AND a$<="9" THEN
 LET t=VAL a$: LET fu=fu-t: LET
a$=b$
2005 IF a$="U" AND b$="D" OR a$=
"D" AND b$="U" OR a$="M" AND b$=
"N" OR a$="N" AND b$="M" OR a$="
F" AND b$="B" OR a$="B" AND b$="
F" OR a$="P" AND b$="O" OR a$="O
" AND b$="P" OR a$="Y" AND b$="T
" OR a$="T" AND b$="Y" OR a$="R"
 AND b$="E" OR a$="E" AND b$="R"
 THEN LET fu=fu-th: LET th=0: LE
T t=0
2010 LET b$=a$: LET px=px+ta(a$=
"N")-t*(a$="M")
2020 LET py=py+t*(a$="U")-t*(a$=
"D")
2030 LET pz=pz+t*(a$="B")-t*(a$=
"F")
2040 LET theta=theta+t*(a$="T")-
t*(a$="Y")
2050 LET psi=psi+t*(a$="R")-t*(a
$="E")
2060 LET phi=phi+t*(a$="O")-t*(a
$="P")
2080 IF theta>=360 THEN LET thet
a=theta-360
2090 IF psi>=360 THEN LET psi=ps
i-360
3000 IF phi>=360 THEN LET phi=ph
i-360
3010 IF theta<0 THEN LET theta=t
heta+360
3020 IF phi<0 THEN LET phi=phi+3
60
3030 IF psi<0 THEN LET psi=psi+3
60
3040 IF pz>256 THEN LET pz=256
3050 LET v=px: LET d=31706: GO S
UB 1: LET v=py: GO SUB 1: LET v=
pz: GO SUB 1
3052 LET d=31712: LET v=phi: GO
SUB 1: LET v=theta: GO SUB 1: LE
T v=psi: GO SUB 1
3054 RANDOMIZE USR 31535
3056 PRINT AT 1,1;c$;AT 5,2; INV
ERSE 1;a$;AT 13,22;"L-R ";px+19
;AT 14,22;"U-D ";py-83;AT 15,22
;"F-B ";pz+109;AT 16,22;"Pitch"
;phi-180;AT 17,22;"Yaw ";theta;
AT 18,22;"Roll ";psi;AT 19,22;"T
hrus";t;AT 20,22;"Fuel ";fu;
IF c$="NO DOCK" THEN RETURN
3060 IF fu<1 THEN LET c$="NO FUE
L": GO TO 5000
3065 LET P=0: IF phi=180 AND psi
=0 AND theta=0 AND px=-19 AND py
=83 THEN LET p=1
3070 IF pz<-109 OR pz=-109 AND p
<>1 OR pz=-109 AND p=1 AND t>6 T
HEN LET c$="CRASHED": GO TO 5000
3080 IF pz=-109 AND p=1 AND T<7
AND T>3 THEN LET c$="DOCKED": G
O TO 5000
3090 IF pz=-109 AND p=1 AND T<4
THEN LET C$="NO DOCK": LET R=INT
 (RND*10+1): FOR N=1 TO RND*5+5:
 LET pz=pz+r*2: LET theta=theta-
r: LET psi=psi-r*2: LET phi=phi+
r: GO SUB 2000: NEXT n: GO TO 50
00
3099 GO TO 2000
5010 PRINT AT 1,1; FLASH 1;c$; I
F C$="NO DOCK" THEN LET C$="DOCK
ING": LET B$=" ": GO TO 2000
5020 GO TO 9000
6000 BORDER 1: PAPER 7: CLS : IN
K 0: LET fu=999: LET r1=INT (RND
*5)+3: LET r2=INT (RND*6)+3: LET
 a1=0: LET a2=PI: LET h=0
6010 PRINT AT 19,0; INK 1;"▀▀▀▀
▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀
▀
```

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 £9.90 (10 ISSUES)

NAME .....

ADDRESS .....

..... AMOUNT ENCLOSED .....

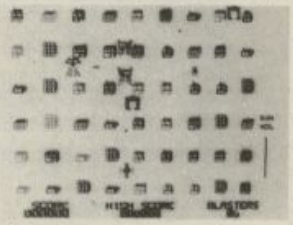
BEEBUG HAS BEEN ESTABLISHED FOR TWO YEARS AND NOW HAS OVER 25,000 MEMBERS. IT OFFERS TOTAL USER SUPPORT TO ALL BBC MICRO USERS.

PLEASE MAKE CHEQUES MADE PAYABLE TO BEEBUG PUBLICATIONS LTD.
AND SEND TO:- DEPT 4 PO BOX 109, HIGH WYCOMBE, BUCKS.
(DISTRIBUTION AGENTS FOR BEEBUG)

CITYFIGHTER

*** FOR ANY ZX SPECTRUM OR CBM-64 ***

In CITYFIGHTER you have been chosen as Earth's last hope to stop the evil Zygorian hordes from destroying the remaining human stronghold. Earth Defence Control have given you a squadron of four phase mobile mega-blasters.
Your mission is to rescue the refugee human facilities from each city block and obliterate the invading Zygorians.
Can you succeed where others have failed?





Features:
- 100% solid machine code;
- Lots of different aliens;
- User programmable controls;
- Total player mobility.



WHY IMAGINE THE ULTIMATE GAME WHEN THERE IS AN OBVIOUS CHOICE?

*** COMING SOON – BBC AND LYNX VERSIONS ***

You can obtain CITYFIGHTER from your local computer shop or direct by P.O. or cheque for £5.50 (Spectrum)/£6.95 (CBM-64) made payable CHOICE SOFTWARE to:

CHOICE SOFTWARE,
Choice Buildings, Carrickfergus Industrial Centre,
CARRICKFERGUS, Co. Antrim, BT38 8PR.

DEALERS: CONTACT PCS DISTRIBUTION LTD. OR CHOICE SOFTWARE @ 09603 69129

ORIC AND SINCLAIR COMPUTERS



Oric Atmos computer 48K £171 (£158) £168. Oric colour printer £134 (£123) £140. New Sinclair QL Computer £495 (£455) £475. Sinclair Spectrum 48K £131 (£131) £143. Spectrum 16K £101 (£105) £117. Interface 2 £20-45 (£20) £24. Microdrive £70 (£65) £75. RS232 interface £70 (£65) £75. Blank microdrive cartridges £8 (£8) £9. 32K memory upgrade kit for 16K Spectrum (issue 2 and 3 only) £31 (£28) £30. Fuller Mastger urit for the Spectrum including speech synthesizer, sound synthesizer, amplifier and joystick port £56 (£56) £52. 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. 5 rolls printer paper £13 (£16) £21. ZX81 computer £45 (£44) £54. ZX81 16K ram packs £28 (£25) £30.

COMMODORE COMPUTERS

Commodore 64 £204 (£184) £204. Vic 20 £104 (£97) £117. Convertor to allow most ordinary mono cassette recorders to be used with the Vic 20 and the Commodore 64 £10-95 (£11) £13. Bargain package:– cassette convertor + compatible cassette recorder £37 (£38) £44. Commodore cassette recorder £43 (£44) £50. Centronics printer interfaces for Vic 20 and the Commodore 64 £45 (£41) £46. RS232 printer interface for Commodore 64 £45 (£41) £46. Disc drive £233 (£209) £234. 1520 Printer/Plotter £165 (£149£ £159. 1525 Printer $235 (£220) £245. 1526 Printer £350 (£330) £360.

ACORN COMPUTERS

0Electron £203 (£209) £229. BBC Model B £404 (£357) £387. 14" Colour Moritor £228 (£299) £319. Kenda double density disk interface system £139 (£125) £135. 3" Floppy disc drive £'78 (£160) £190. 80 track double sided 5.25" drives:– Single 400/800K £245 (£230) £250, Dual 800/1600K £455 (£420) £450.

PRINTERS



Brother HR5 £185 (£171) £190. Oki Microline 80 £203 (£187) £228. Shinwa CTI CP80 £225 (£218) £248. Cannon PW-080A £332 (£299) £329. Epson RX80 £306 (£271) £302. Epson RX80F/T £346 (£316) £346. Epson FX80 £440 (£408) £438. Combined matrix printers and electric typewriters:– Brother EP22 £173 (£166) £186, Brother EP44 £258 (£235) £260. Smith Coronoa 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.

UK101, SUPERBOARD AND VIDEOGENIE COMPUTERS

We still support these gorgeous machines. Please write for our free price list.

SWANLEY ELECTRONICS,
The Computer Export Specialists,
Dept YC, 32 Goldsel Rd., Swanley, Kent BR8 8EZ, England.
Tel: SWANLEY (0322) 64851.

Nothing extra to pay. All prices are inclusive. 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.

(continued from page 171)

```
T y1,x1:a$: IF x1=x2 AND y1=y2 T
HEN GO TO 6100
6050 PRINT AT y2,x2;"I": IF INKE
Y$="6" THEN LET r1=r1-1: LET fu=
fu-10
6060 IF INKEY$="7" THEN LET r1=r
1+1: LET fu=fu-10
6070 PRINT AT 21,9;ABS (r1-r2);A
T 22,6+(fu<100);" ";fu: LET y8=y
1: LET x8=x1: LET y9=y2: LET x9=
x2: IF r1>10 THEN LET r1=10
6075 IF fu=0 THEN PRINT AT 10,12
; BRIGHT 1; FLASH 1;"NO FUEL": G
O TO 9000
6080 IF r1<1 THEN LET r1=1
6090 LET h=h+1: GO TO 6020
6100 PRINT AT y1,x1;a$;AT y1,x1;
 OVER 1;"I": PRINT AT 0,3; FLASH
 1; BRIGHT 1;"SATELLITE IN VISUA
L RANGE": FOR N=1 TO 500: NEXT N
: GO TO 3
6110 CLEAR 30999: LOAD ""CODE
6115 RESTORE 6115: FOR n=USA ""
 TO USA "y"+7: READ a: POKE n,a:
 NEXT n: GO TO 6000: DATA 0,252,
254,103,103,254,252,0,24,28,252,
230,103,63,31,14,102,126,126,102
,102,126,60,24,12,28,63,103,230,
252,248,112,0,63,127,230,230,127
,63,0,112,248,252,230,103,63,28,
12,24,60,126,102,102,126,126,102
,14,31,63,103,230,252,56,48,0,0,
0,24,24,0,0,0,0,60,126,126,126,1
26,60,0
9000>PRINT #0;"PRESS 0 TO PLAY A
GAIN": PAUSE 0: IF INKEY$<>"0" T
HEN GO TO 9000
9010 GO TO 6000
```

Table A.

```
62 128 50 232 123 17 0 1
42 216 123 205 85 121 34 216
123 34 230 123 175 50 232 123
17 0 0 42 212 123 235 205
85 121 17 128 0 205 178 121
34 212 123 17 87 0 42 214
123 213 205 85 121 209 205 178
121 34 214 123 201 175 235 237
82 203 124 196 194 121 68 77
58 232 123 143 56 4 237 75
230 123 229 197 235 33 0 0
205 156 121 48 22 175 225 209
188 32 1 235 205 147 121 68
77 33 0 0 205 156 121 205
147 121 201 6 8 205 149 121
209 209 201 6 4 203 60 203
29 16 250 201 203 56 203 25
48 2 25 216 40 6 235 41
216 235 24 240 120 254 0 200
24 244 235 58 232 123 203 63
48 5 25 50 232 123 201 237
82 201 213 235 175 103 111 237
82 58 232 123 60 50 232 123
209 201 31 48 15 1 90 0
9 229 1 104 1 237 66 56
2 193 229 225 229 175 1 180
0 237 66 56 4 62 1 193
229 225 50 232 123 1 242 123
9 78 6 0 237 67 230 123
235 205 89 121 201 197 229 245
205 210 121 58 232 123 31 220
194 121 241 60 209 193 245 229
235 80 89 205 210 121 58 232
123 31 220 194 121 209 241 31
48 2 25 201 235 237 82 201
42 226 123 237 91 212 123 237
75 216 123 229 213 197 62 1
205 5 122 34 212 123 193 209
225 175 205 5 122 229 193 42
224 123 237 91 214 123 229 213
197 175 205 5 122 34 216 123
193 209 225 62 1 205 5 122
229 193 42 228 123 237 91 212
123 229 213 197 62 1 205 5
122 34 212 123 193 209 225 175
205 5 122 34 214 123 201 42
212 123 237 91 238 123 14 1
175 237 82 203 124 40 6 38
0 149 111 13 13 69 197 42
214 123 237 91 240 123 6 1
175 237 82 203 124 40 4 149
111 5 5 209 74 80 69 217
229 217 121 184 48 6 105 213
175 95 24 8 177 40 59 104
65 213 22 0 96 120 31 133
56 3 188 56 7 148 79 217
193 197 24 4 79 213 217 193
42 240 123 121 72 5 40 1
4 9 34 240 123 42 238 123
79 71 5 40 1 4 9 34
238 123 205 6 123 217 121 16
206 209 217 225 217 201 175 42
238 123 188 192 77 42 240 123
188 192 62 175 149 216 71 205
177 34 71 4 62 1 15 16
253 70 253 203 87 94 40 4
47 160 119 201 176 119 201 58
233 123 31 48 25 31 1 0
24 17 0 64 48 7 42 234
123 237 176 24 9 33 203 36
43 237 160 234 72 123 237 75
210 123 42 236 123 197 175 87
94 203 123 40 1 21 237 83
212 123 87 35 94 203 123 40
1 21 237 83 214 123 87 35
94 203 123 40 1 21 237 83
216 123 35 229 205 48 122 237
91 218 123 42 212 123 41 25
34 212 123 237 91 220 123 42
214 123 41 25 34 214 123 237
91 222 123 42 216 123 25 34
216 123 205 24 121 225 126 35
229 31 56 17 42 212 123 34
238 123 42 214 123 34 240 123
205 6 123 24 3 205 135 122
225 193 16 145 201 0 0 0

CHECK = 84840
```

Guitar Player

Richard Adams,
Milton Keynes,
Buckinghamshire.

CBM-64

WHEN THE PROGRAM is run the computer reads data in for the chord shapes on a guitar. Then you will be shown the frets of a guitar on the screen. By pressing the letter C on the keyboard the computer will play the chord of C using the same notes as a guitar and will also print the chord shape on to the screen.

This program will work with seventh and minor chords and also sharps. Instructions appear on the screen also. Here is a description of the program.

```
10 GOSUB150
20 P1=PEEK(197)-10:P2=PEEK(653)
30 IFP1>18THEN20
40 IFP2>3THENP2=P2-8
50 N$=V$(P2,P1)
60 PRINT"■■■":FORI=Z TO7:PRINT"■■■■■■■■■■■■■■■":NEXT
70 POKES+4,SO
80 FORI=8TOLEN(N$):N=VAL(MID$(N$,I,8))
90 POKES+8,CH(I-8,N):POKES,CL(I-8,N)
100 IFN=ZTHEN120
110 X=L■N■B+I■B-8:POKEC0+X,BC:POKESC+X,BR
120 NEXT
130 POKES+4,SZ :POKES,Z:POKES1,Z
140 GOTO20
150 I=0:J=0:Z=0:8=1:SC=1064:CO=55336:B=2:L=40:BR=81:BC=5:SZ=32:SO=33:P1=0:P2=0
160 S=54272:FORI=STOS+24:POKEI,0:NEXT
170 POKES+24,15:POKES+5,SZ-1
180 DIMN(6),V$(6,18),CH(5,8),CL(5,8)
190 POKE53280,0:POKE53281,0
200 POKE646,15
210 PRINT"■"
220 FORI=ZTO6:READN(I)
230 FORJ=ZTO5:READV$(J,N(I)):NEXT:NEXT
240 FORI=ZTO5:FORJ=ZTO8:READCH(I,J),CL(I,J):NEXTJ,I
250 PRINTTAB(13)"■■■■■■■■■■■■■■■
```

(continued from previous page)

```
1076 DATA688766,686766,688666
1077 DATA18,224442,224242,224432
1078 DATA335553,335353,335543
1080 DATA5,71,5,152,5,237,6,71,6,167,7,12,7,119,7,233,8,97
1090 DATA7,12,7,119,7,233,8,97,8,225,9,104,9,247,10,143,11,48
1100 DATA9,104,9,247,10,143,11,48,11,218,12,143,13,78,14,24,14,239
1110 DATA12,143,13,78,14,24,14,239,15,210,16,195,17,195,18,209,19,239
1120 DATA15,210,16,195,17,195,18,209,19,239,21,31,22,96,23,181,25,30
1130 DATA21,31,22,96,23,181,25,30,26,156,28,49,29,223,31,165,33,135
```

3D Oxo

A J Heathcote,
Canterbury,
Kent.

ZX-81

3D Oxo is a three-dimensional adaptation of noughts and crosses. This program is written in machine code for a 16K ZX-81.

The board displayed on the screen is a representation of a 4 by 4 cube. The aim of the game is to complete a line of four crosses — in any direction — before the computer gets a line of four noughts. The player may select one of three levels of skill; level 1 is the easiest. The machine code is stored in a Rem statement in Line 1. To create this line, type:

1 Rem, followed by 133 characters.

If the line has been correctly entered, then Peek 16647 = 118. By editing the line number, enter a total of 12 Rem statements — lines 1-12 — of the same length. Check that Peek 18176 = 118, then:

```
POKE 16511, 128
POKE 16512, 6
```

Line 1 is now one long Rem statement containing 1,662 characters. The machine code occupies 1,528 of these addresses; the remaining addresses are used by the computer as a workspace.

Type in the hex loader program — figure 1. Run the program, and enter the machine code, line by line, as shown in figure 2. Save the program on a cassette, then overwrite lines 10-40 as follows:

```
10 RAND USR 17831
20 STOP
30 SAVE "3D OXO"
40 RUN
```

Delete lines 50-250, and then run the program. If the code has been entered correctly, you will be asked first to choose your level of play and then to decide who starts. At the beginning of each move, a cursor appears at the top left-hand corner of the board. The keys 5 to 8 are used to move the cursor. Shift 6 and Shift 7 will move the cursor to a different level — down and up respectively.

Move the cursor to the square of your choice, then press Newline to enter an X. The computer makes its move in the same way, entering a 0 in one of the squares. To stop the game, enter S instead of making your move.

A complete line of noughts or crosses is indicated by a row of flashing squares. If no result is possible, the computer declares a draw.

When you are satisfied that the program is running smoothly, save it again, using the command Run 30.

A copy of this program is available on a cassette, price £3, from A J Heathcote, 11 Norman Road, Canterbury, Kent CT1 3LX.

Figure 1.

```
  10 REM HEX LOADER
  20 PRINT "START ADDRESS"
  30 INPUT A
  40 LET A$=""
  50 FOR N=A TO 18034 STEP 8
  60 SCROLL
  70 LET S=0
  80 PRINT AT 18,0;N;"   ";
  90 INPUT A$
 100 IF A$="S" THEN STOP
 110 IF LEN A$<>16 THEN GOTO 220
 120 PRINT A$;" = ";
 130 INPUT T
 140 PRINT T
 150 FOR K=0 TO 7
 160 LET C=16*CODE A$+CODE A$(2)
-476
 170 LET S=S+C
 180 POKE N+K,C
 190 LET A$=A$(3 TO )
 200 NEXT K
 210 IF S=T THEN GOTO 240
 220 PRINT AT 18,7;"PLEASE ENTER
 AGAIN      "
 230 GOTO 70
 240 NEXT N
 250 STOP
```

Figure 2.

```
16514   3E343A370032343B  =  388
16522   2A00323E00323438  =  315
16530   2A00173E343A003C  =  297
16538   2E331717002E003C  =  249
16546   2E3300170026333A  =  261
16554   392D2A370000002C  =  243
16562   28322A0F0000BCAD  =  506
16570   B480B8B9A6B7B9B8  =  1395
16578   0F00103E18321117  =  207
16586   2600293726 3C1700  =  255
16594   011504130D0D100B  =  98
16602   0105110521053105  =  120
16610   0403140324033403  =  124
16618   0111051109110D11  =  96
16626   040F080F0C0F100F  =  100
16634   0114021403140414  =  90
16642   0D0C0E0C0F0C100C  =  106
16650   0101050109010D01  =  32
16658   1101150119011D01  =  96
16666   2101250129012D01  =  160
16674   3101350139013D01  =  224
16682   0104020403040404  =  26
16690   1104120413041404  =  90
16698   2104220423042404  =  154
16706   3104320433043404  =  218
16714   0110021003100410  =  74
16722   0510061007100810  =  90
16730   09100A100B100C10  =  106
16738   0D100E100F101010  =  122
16746   FFC5CDF5A8A6093E  =  987
16754   16D710FDC1040DC9  =  917
16762   CD7D41CD8041C5CD  =  1195
16770   F5083E18D706043E  =  626
16778   18D73E18D710F8C1  =  1000
16786   040DC9FD3622001E  =  589
16794   0406000E09D5CD6B  =  558
16802   41CD7A41CD6B41D1  =  1043
16810   1D20F0C9CD8B022C  =  940
16818   20FACDBB02444D2C  =  865
16826   28F6CDBD077EC901  =  1017
16834   00400BCB7828FBC9  =  890
16842   01140BD5CDF508D1  =  912
16850   010900C36B0B21C0  =  545
16858   46AF327F46064077  =  681
16866   2310FCC9ED4B3C40  =  940
16874   FD563EC9CDE64179  =  1223
16882   8790C6094F7A8782  =  952
16890   87803C47C3F508CD  =  1047
16898   EE41CBFEE5CDAE41  =  1433
16906   E1CB8EFE76283FFE  =  1347
16914   382833E5213E40FE  =  789
16922   702007AF8E282135  =  642
16930   1821FE7120083E03  =  529
16938   8E2815341815 2BFE  =  645
16946   2328E8FE2228EF28  =  917
16954   FE2128DFFE2428E6  =  1110
16962   E118BFE118B9CDBB  =  1266
16970   022C20FACF08CB6E  =  856
16978   20803634CDE64121  =  847
16986   80467A8787808787  =  988
16994   8116005F193634C9  =  578
17002   116046A7ED527D16  =  848
17010   FF14D61030FBC510  =  1018
17018   06FF04D60430FBC6  =  960
17026   044FC97BA7C834C5  =  1023
17034   E5D5CDEE41CBFECD  =  1612
17042   C141CBBED1E1C17B  =  1401
17050   8EC83418EACD6A42  =  1077
17058   CDB84259CD894258  =  1040
17066   23CD85425A23CD85  =  902
17074   422A0E40363D213E  =  396
17082   40AF772B772B77C9  =  883
17090   4E235EAF4757217F  =  700
17098   46094F06043A2140  =  323
17106   8E2004CBC11816AF  =  843
17114   8E2010CB512808CB  =  773
```

(continued on page 177)

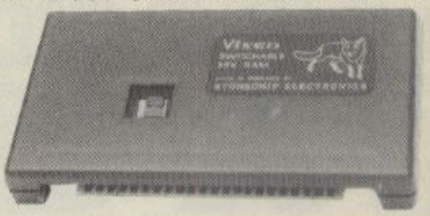


The famous Panda Expandable RAM pack for the ZX81. Massive 16K add-on memory which can easily be expanded to a GIANT 32K with an optional plug-in MODULE. Rugged no-wobble design injection moulded case with integral LED power on indicator. No additional power supply needed, just plug on and go. British designed and built. Thousands in use. Prices: PANDA 16K **£19.95**. MODULE **£14.50**. GIANT 32K **£34.00**.

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 obsoleted. 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.



Spectravideo QUICK SHOT 2. JOYSTICK

The Most Popular Joystick, 8 position, 2 fire buttons PLUS Rapid-Fire switch. Left or Right handed index finger (Trigger Finger) and top-mounted Thumb operated Fire Button. Comfortable contoured ultra ergonomic Design. Built-in Stabilizing suction caps for impressive one-handed operation. Suitable for most computers with Nine way socket. VIC 20, Commodore 64, Atari, Spectrum (with interface) etc. **£12.50 incl.**



Programmable Joystick Interface. For the Spectrum

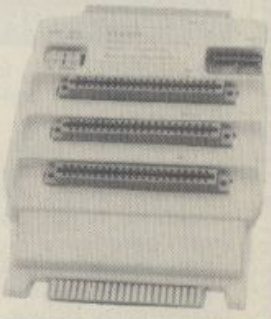
Use any game suitable for the Spectrum and simply program the Joystick to take control of the cursor and FIRE functions. Useable with any Joystick having the standard nine pin plug. Fits snuggly onto the user port of the Spectrum. Can handle 8 directions and even complex functions such as diagonal with fire etc. No additional software needed, simply plug in, program and play. **£24.95 inc.**

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 nd 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.

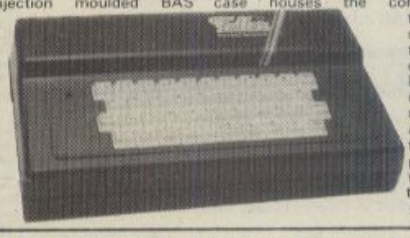
A sound investment for the serious user and serious games player which will not become obsolete.



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 BAS case houses the computer and converts it into a professiona 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** oplus £2.00 postage and handling.





LIGHT PEN. For the VIC 20. This allows the user to draw and paint in colour on the screen. It is ideal for screen layouts, graphic designs or as a games aid. Screen layouts can be altered and erased as desired and the finished work can be saved on tape and reloaded for future use or editing. Excellent Horizontal and Vertical resolution with superb stability. The Pen works perfectly in the High Resolution Graphics mode, even though the resolution determined by your VIC 20 is only 1/4 Pixel. Supplied complete with software cassette and full instructions. **£19.95**

The STONECHIP SPECTRUM Keyboard. £59.95

The ultimate replacement keyboard for the popular ZX Spectrum. Featuring a standard full size QWERTY keyboard format format using high quality, long-life keyswitches as used in modern computers. It has a full size Space Bar, a single entry double shift key, a double entry reset function and an integral sound amplifier with volume and tone control and Load/Save switch with internal Speaker and voice-on-tape cue facility. The Spectrum fits snuggly INSIDE the keyboard and is not removed from its case hence protecting your guarantee. Supplied in a strong attractive black plastic moulded case with all the legends and graphics clearly printed (no stick-on labels). No soldering, cutting or special skills required.



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. **£23.00**

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**

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

MICROPOWER MICROPOWER MICROPOWER

(continued from page 174)

```
17122  592802CBE1CBD9CB  =  1182
17130  D11802CBC91910DD  =  901
17138  C90604AFED52BE28  =  935
17146  0210F8363DC39F42  =  801
17154  CDD84121D2407EFE  =  1173
17162  FF281FE5CDC2423E  =  1052
17170  05B92006CDF342E1  =  967
17178  18233CB9200722C0  =  569
17186  46ED53C246E12323  =  949
17194  16DC3AC146A7C82A  =  974
17202  C046ED5BC246CDF3  =  1302
17210  42C1C3304621D240  =  879
17218  7EFEFFC8E5CDC242  =  1529
17226  3E02893005E12323  =  597
17234  18EEC1A7ED52E5ED  =  1407
17242  52CD6A42CDF141E5  =  1205
17250  E1D5CD6A42CDF141  =  1326
17258  D1E5A7ED52EBE14E  =  1462
17266  060679CBFF180BA7  =  793
17274  77ED5277ED5277ED  =  1232
17282  5277C50100200CDC4  =  832
17290  41C1CB7E28E97119  =  998
17298  711971197110EB11  =  657
17306  94403E34BE28021E  =  588
17314  9DC1CDCA4111A640  =  1069
17322  01140DCDCD4111AF  =  701
17330  4001140ECDCD41CD  =  779
17338  AE41FE33CA4842FE  =  1138
17346  3E20F4C3A445CDD8  =  1187
17354  4121D2407EFEFFC8  =  1207
17362  E5CDC2423E0DB920  =  986
17370  290604A7ED52E57E  =  892
17378  A7201CD5117F46D5  =  867
17386  ED52EB7EA721C046  =  1142
17394  2809577EBB2B1023  =  540
17402  1520F873E134D1E1  =  1127
17410  10D9E1232318C5D1  =  958
17418  D1E1D1363DCD9F42  =  1188
17426  E1C33046CDC8433A  =  1068
17434  7F46A7C821D2407E  =  997
17442  FEFFC8E5CDC2423E  =  1465
17450  1DB9202906040E02  =  313
17458  A7ED52E57EA7201A  =  1065
17466  D5117F46ED52EB56  =  1067
17474  21C0467EBB200600  =  659
17482  2810327B40231520  =  381
17490  F2D1E110DBE12323  =  1206
17498  18C5D1E1E1217B40  =  1100
17506  5E2D2600C3E044CD  =  885
17514  D84121D2407EFEFF  =  1223
17522  2838E5CDC2423E03  =  855
17530  A1FE032828A72802  =  707
17538  3E013C00CB612002  =  457
17546  C6044F0604AFED52  =  785
17554  BE2010E5D5118046  =  895
17562  ED5211C046197E81  =  878
17570  77D1E110E8E12323  =  1096
17578  18C30640AF0E0021  =  511
17586  C046BE20010C3003  =  548
17594  7E0E012310F4A728  =  643
17602  2457413A34409030  =  554
17610  FD803C4F06407A2B  =  755
17618  BE20030D280210F7  =  543
17626  A711C046ED521180  =  910
17634  4619C30D4411C940  =  653
17642  C3A343000000080B  =  441
17650  0000080808000000  =  24
17658  0000080800000800  =  24
17666  0000080000080800  =  24
17674  0000000000000000  =  0
17682  0800080000080000  =  24
17690  0008000008000008  =  24
17698  0008000008000008  =  24
17706  0000000000000008  =  8
17714  0800080000080000  =  24
17722  0008000008000000  =  16
17730  0800000008000008  =  24
17738  0000000028343538  =  207
17746  372E2C2D390E0025  =  299
17754  002F002D2A263920  =  274
17762  2834392A1A001D25  =  283
17770  2420000120000D6B  =  413
17778  08C90620D710FDC9  =  935
17786  FD362200010000CD  =  547
17794  F50806180E20AFD7  =  719
17802  0D20FC3E76D710F4  =  952
17810  C9BCADA6B980B1AA  =  1388
17818  8BAAB10F00101D16  =  516
17826  1F11CD7A45010000  =  445
17834  CDF5083E09CD7445  =  919
17842  3E17CD74453E76D7  =  870
17850  D711ED44016000CD  =  639
17858  6B08110D45CD6D45  =  600
17866  11ED44CD6D453E76  =  885
17874  D7D73E17CD74453E  =  967
17882  09CD74453E76D7D7  =  1009
17890  114D45CD6D450101  =  548
17898  12C5CDF508011100  =  691
17906  119345CD6B0BCDAE  =  935
17914  41FE1D38F9FE2030  =  987
17922  F5327C40C1CDF508  =  1134
17930  0111001186840CD6B  =  595
17938  0BCDAE41FE322805  =  804
17946  FE3E20F5AFF5CD7A  =  1340
17954  45218046CDDB41CD  =  994
17962  9541F1A7280CCDB8  =  1063
17970  42118240CDCA41CD  =  954
17978  0142118B40CDCA41  =  759
17986  FD36213DCD3F43CD  =  941
17994  02433A7C40FE1D28  =  638
18002  1FCDC843FD362134  =  895
18010  CDC8433A7C40FE1E  =  1002
18018  280EFD36213DCD15  =  582
18026  44FD362134CD1644  =  755
18034  FD36213DCD6944C9  =  980
```

Race Chase

Martin Blackburn,
Brighouse,
West Yorkshire.

BBC

RACE CHASE makes full use of the BBC's colour and sound facilities. It is by no means easy, and needs skill and quick reactions.

The game starts by displaying a title screen complete with instructions. After a key is pressed the nine high scores are displayed. The introduction tune, taken from the television series Grand Prix, is played. Next, upon pressing another key the maze is drawn. It then changes colour, and when a colour scheme that you want appears, press a key to retain it.

Both cars will appear; the car that you control is the one on the left. A further key is now pressed, upon which the high score appears in the middle of the maze, complete with the person's name.

Your score and bonus appear at the top of the screen and the game starts. When a dot has been run over the computer emits a short note, and the score increases by 10 points. Your car can be moved in or out one lane only by pressing key I or D respectively at the appropriate moment.

The object of the game is to clear the maze

(continued on page 179)

```
  140 *FX14,6
  150A1$=CHR$(129):A2$=CHR$(130):A3$=CHR$(131):A4$=CHR
$(132):A5$=CHR$(133):A6$=CHR$(134)
  160*KEY 10 O.!M!NL.!M
  170DATA121,20,121,5,129,5,133,10,129,5,121,5,113,5,1
21,5,129,10,101,20
  180DIMA$(4),P(4),Q(4),R(4),S(4)
  190SC=0:T=5000
  200MODE7:FORA=1TO2:PRINTA4$;CHR$(157);CHR$(141);A1$"
          RACE-CHASE":NEXT
  210FORA=23TO24:PRINTTAB(0,A);A4$;CHR$(157);A1$;CHR$(
141);"COPYRIGHT M.Blackburn MARCH 1984";:NEXT
  220PRINTTAB(0,5);A2$;"The object of the game is to d
rive     ";A2$;"around the maze, collecting the dots
 ";A2$;"& avoiding the drongo driver in the    ";A2$;"
other car"
  230PRINTA6$;"There are 2 phases in the game, the
";A6$;"second of which is twice as fast as the";A6$;"f
irst."
  240PRINT;A5$;"Press 'I' to move in a lane, & 'O' to
 ";A5$;"move out a lane"
  250*FX21,0
  260PRINT:PRINT:FORA=1TO2:PRINT;A2$;CHR$(141);"HIT A
KEY":NEXT
  270A=GET
  280CLS
  290DIMS$(10),Z(10)
  300FORB=1TO9:S$(B)="Barnaby soft":Z(B)=(300*(10-B)):
NEXT
  310FORA=1TO2:PRINT;A4$;CHR$(157);CHR$(141);A1$;"
```

(listing continued on page 179)

NEW

For home or business the IBM compatible Advance 86a

16 Bit Micro-Computer

Under £350*



For the home user start with Model A with its massive 144K RAM, 64K ROM and outstanding typewriter style keyboard that fits within the base unit for portability and storage.
Note the large return key and position of the numeric keyboard. Fast retrieval from storage and fast action on games is achieved by the use of the Intel 8086 16 bit micro-processor running at 4.77 MHz.
The Advance 86A runs IBM PC software.

Specification

CPU Type	16-bit 8086 running at 4.77 MHz.
RAM	128K or 256K with parity plus 16K video
ROM	64K.
ROM Contents	Diagnostics, Basic, Cassette O/S
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 User-upgradeable to Model B Provision for 8087 Arithmetic Processor



The business user can upgrade to Model B by adding the Advance Expansion box containing 2 × 5.25" disc drives providing 720K storage at £956.52.
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, Filer software (MS/DOS) for only £1304.34 plus VAT & Delivery.

Advance 86 Models A & B are designed and marketed by Advance Technology UK Ltd.
128K expansion £125 + VAT

Delivery within 30 days from receipt of payment.

*Ex VAT.

Advance Technology UK Ltd.
8A Hornsey Street, London N7 8HB

01-609 0061

To Advance Technology UK Ltd., 8A Hornsey Street, London N7 8HB YC1

☐ Please send Model 86A, Micro-Computer & Keyboard I enclose £405.99 including VAT & Delivery.
☐ Please send Model 86B which includes Model 86A plus Expansion Box & Software. I enclose £1304.34 plus £195.64 VAT plus £10 Delivery
☐ 128K expansion £125 + VAT

Cheque/Barclaycard/Access No. _____

Name _____ Company _____

Address _____ Address _____

(continued from page 177)

of all the dots in the fastest possible time, and at the same time avoiding the Drongo Driver in the other car. The longer you take the lower your score will be as the bonus is constantly decreasing.

If the first maze is completed successfully the screen will be cleared, and the maze will be drawn again. A key will then have to be pressed quickly if the same colour scheme is required. Upon pressing another key the second phase will start, but watch out, it is twice as fast as the first.

When the first maze has been completed your score will consist of the points scored for running over the dots, plus the remainder of your bonus. On starting the second phase the bonus is reset to 5,000 points.

If a sheet is not completed then no bonus is added to your score. When you are killed, if you achieve a high score then you will be asked for your name — characters only. If your score was not high enough then you will be informed; either way hitting a key restarts the game.

The Escape key has been disabled so that the high scores cannot be lost if this key is pressed. The only way to stop the game is by pressing the Break key.

Finally, if you have not got the time to copy in the program, or you are not very good at typing, then send a blank cassette along with a stamped addressed envelope, and £1.50 to the following address: Martin Blackburn, 15 Long Ridge, Rastrick, Brighouse, West Yorkshire HD6 3RZ.

(listing continued from page 177)

```
  RACE-CHASE HI-SCORES":NEXT
  320FORB=1TO9:PRINT'"    ";A3$;B;" ";A1$;S$(B);STRING$
((25-LENS$(B)),".");A5$;Z(B):NEXTB
  330*FX21,0
  340RESTORE:PRINT:FORA=1TO2:PRINT;A4$+CHR$(157);CHR$(
141);A1$;"              HIT A KEY":NEXT:FORA=1TO10:READC
,D:SOUND1,-15,C-46,D-1:SOUND1,0,0,0:NEXT:A=GET
  350ENVELOPE1,1,0,0,0,0,0,0,126,-1,-1,-100,126,125
  360 MODE1
  370S=2
  380VDU24,0;0;1240;983;
  390GCOL0,129:GCOL0,3:CLG
  400COLOUR129
  410 VDU23,255,0,0,0,0,48,48,0,0
  420VDU23,251,14,238,69,255,255,69,238,14
  430VDU23,252,90,126,90,24,219,255,219,60
  440VDU23,253,112,119,162,255,255,162,119,112
  450VDU23,254,60,219,255,219,24,90,126,90
  460 FORA=12TO440STEP64
  470 MOVEA,A-4
  480 DRAWA,983-A
  490 DRAW1243-A,983-A
  500 DRAW1243-A,A-4
  510 DRAWA,A-4
  520 NEXTA
  530COLOUR2
  540 FORA=1TO37STEP2
  550 FORB=2TO31STEP2
  560 PRINTTAB(A,B);CHR$(255);
  570 NEXTB,A
  580 FORA=2TO12
  590 PRINTTAB(18,A);"    "
  600 PRINTTAB(18,A+18);"    "
  610 NEXT
  620 FORA=15TO17
  630 PRINTTAB(1,A);"              "
  640 PRINTTAB(27,A);"              "
  650 NEXT
  660FORA=14TO18:PRINTTAB(13,A);"                ":NEXT
  670PRINTTAB(15,16)"HIT A KEY"
  680*FX21,0
  690D=INKEY(100):IFD>0THEN760
  700A=RND(5)-1:B=RND(8)-1:C=RND(8)-1
  710IFA=B OR A=C THEN700
  720VDU19,1,A,0,0,0
  730VDU19,3,B,0,0,0
  740VDU19,2,C,0,0,0
  750GOTO690
  760DATA-16,-16,0,-12,0,12,16,16,16,48,0,-12,0,12,-16
,-48
  770RESTORE760:FORA=1TO4
  780READP(A),R(A),Q(A),S(A):A$(A)=CHR$(250+A):NEXT
  790X=540:Y=56:E=1:L=1:D=0:G=668:H=120:M=2:F=3:Z=0
  800VDU5
  810VDU18,3,2,25,4,G-P(F)*S;H-Q(F)*S;250+F
  820VDU18,3,2,25,4,X-P(E)*S;Y-Q(E)*S;250+E
  830VDU4
  840A=GET
  850PRINTTAB(0,0);"  SCORE                    BONUS
    "
  860PRINTTAB(13,15);"HI SCORE ";Z(1):PRINTTAB(15,16);
"   BY    ";TAB(17);S$(1);STRING$(13-LENS$(1),"."):
VDU5
  870*FX11,9
  880*FX12,2
  890VDU18,3,2,25,4,X-P(E)*S;Y-Q(E)*S;250+E:B=INKEY(1)
:*FX21,0
  900IFPOINT(X+R(E),Y+S(E))=3THENE=E+1:IFE=5THENE=1
  910IFPOINT(X+16,Y-16)=2THEND=D+1:SC=SC+10:SOUND1,-15
,(D MOD 2)*4,1
  920IFD=240THEN1100
  930VDU4:PRINTTAB(8,0);SC;TAB(32,0);T:VDU5
  940IFB<>73THEN960ELSEIFX>584ANDX<624ANDL<6THENY=Y-P(
E)*4:L=L+1
  950IFY>472ANDY<512ANDL<6THENX=X+Q(E)*4:L=L+1
  960IFB<>79THEN980ELSEIFY>472ANDY<512ANDL>1THENX=X-Q(
E)*4:L=L-1
  970IFX>584ANDX<624ANDL>1THENY=Y+P(E)*4:L=L-1
  980VDU18,0,3,25,4,X;Y;250+E
  990X=X+P(E)*S:Y=Y+Q(E)*S
 1000VDU18,3,2,25,4,G-P(F)*S;H-Q(F)*S;250+F
 1010 IFPOINT(G+R(F),H+S(F))=3THENF=F-1:IFF=0THENF=4
 1020IFL<=M THEN1040ELSEIFG>584ANDG<624THENH=H+P(F)*4:
M=M+1
 1030IFH>464ANDH<520THENG=G-Q(F)*4:M=M+1
 1040IFL>=M THEN1060ELSEIFH>464ANDH<520THENG=G+Q(F)*4:
M=M-1
 1050IFG>584ANDG<624THENH=H-P(F)*4:M=M-1
 1060VDU18,3,2,25,4,G;H;250+F
 1070IFABS(G-X)<40ANDABS(H-Y)<40THEN1220
 1080G=G+P(F)*S:H=H+Q(F)*S:T=T-(3*S)
 1090GOTO890
 1100VDU4:S=S*2:D=0
 1110IFS=8THEN1120ELSESC=SC+T:T=5000:GOTO380
 1120SC=SC+T
 1130MODE7
 1140*FX12,0
 1150IFSC<=Z(9)THEN1270
 1160B=9:*FX21,0
 1170IFSC>Z(B)THENZ(B+1)=Z(B):S$(B+1)=S$(B)
 1180IFSC<=Z(B-1)ORB=1THENZ(B)=SC:PRINT;A6$;"Well done
.....you're in the top 9":PRINT;A2$;"Please enter you
r name":INPUT" ";S$(B)ELSE1200
 1190IFLENS$(B)>12THENSOUND1,-15,100,5:CLS:GOTO1180ELS
EGOTO1210
 1200B=B-1:IFB>0THEN1170
 1210PRINT;A4$;"Press any key to play again":B=GET:RES
TORE760:SC=0:T=5000:CLS:GOTO310
 1220*FX12,0
 1230*FX21,0
 1240MODE7
 1250SOUND0,1,6,100:MODE7
 1260GOTO1150
 1270FORA=1TO2:PRINTCHR$(141);A6$;"NO HI-SCORE!":NEXT
 1280*FX21,0
 1290GOTO1210
```

Listing 2. Casino hex dump.

```
7530: 8E,D,89,10,8E,1E,4C,EC,A1,ED,
753A: 84,30,88,20,10,8C,1E,BE,25,F3,
7544: 8E,D,8C,10,8E,21,6C,EC,A1,ED,
754E: 84,30,88,20,10,8C,21,DE,25,F3,
7558: 8E,D,8F,10,8E,24,8C,EC,A1,ED,
7562: 84,30,88,20,10,8C,24,FE,25,F3,
756C: 8E,D,92,10,8E,27,AC,EC,A1,ED,
7576: 84,30,88,20,10,8C,28,1E,25,F3,
7580: 39,FC,7D,66,10,83,0,0,27,23,
758A: BE,1F,2E,BF,7D,64,8E,1F,2E,EC,
7594: 84,ED,2,30,1E,8C,1D,FE,26,F5,
759E: BE,7D,64,BF,1E,0,FC,7D,66,83,
75A8: 0,1,FD,7D,66,FC,7D,68,10,83,
75B2: 0,0,27,23,BE,22,4E,BF,7D,64,
75BC: 8E,22,4E,EC,84,ED,2,30,1E,8C,
75C6: 21,1E,26,F5,BE,7D,64,BF,21,20,
75D0: FC,7D,68,83,0,1,FD,7D,68,FC,
75DA: 7D,6A,10,83,0,0,27,23,BE,25,
75E4: 6E,BF,7D,64,8E,25,6E,EC,84,ED,
75EE: 2,30,1E,8C,24,3E,26,F5,BE,7D,
75F8: 64,BF,24,40,FC,7D,6A,83,0,1,
7602: FD,7D,6A,FC,7D,6C,10,83,0,0,
760C: 10,27,45,16,BE,28,8E,BF,7D,64,
7616: 8E,28,8E,EC,84,ED,2,30,1E,8C,
7620: 27,5E,26,F5,BE,7D,64,BF,27,60,
762A: FC,7D,6C,83,0,1,FD,7D,6C,BD,
7634: 75,30,7E,75,81,0,0,0,0,0,
763E: 0,0,A7,A0,5C,C1,10,26,F3,FC,
```

Casino

Smog,
Radcliffe-on-Trent,
Nottingham.

DRAGON

THIS IS A game that I devised while playing around with my assembler. I didn't realise how easy writing such a game was. The only thing involved is moving different memory locations around and testing others.

The hardest part was defining the graphics

(continued on next page)

(continued from previous page)

for the different reels. I did this using a short binary converter.

The game is a computerised version of the old one-arm bandit which is getting scarcer and scarcer in the local arcades..

The game can be played by up to four players and each player takes it in turns to try his luck with the reels of fortune. You win 90 pounds for two in a row, 500 for three in a row and 1,000 for a jackpot which is all four reels matched up — which I have never done! The program does not incorporate nudges or holds as the machine code will return to Basic after the last reel has stopped.

This can be changed with a little imagination from you and a fair knowledge of machine language. The line that would need changing is line 1690. You would then also need to add some Basic coding.

Type in listing 1 and save it, then enter listing 2 using a hex loader and save it as a machine-code file. Now enter the main program. When run listing 1 will load in the other two programs.

The game is fairly long and if you cannot be bothered to type it in I will send you a copy for £2.50 and a large SAE or jiffy bag: 12 Yonge Close, Radcliffe-on-Trent, Nottingham NG12 2EE.

Listing 1.

```
10 'c
20 ' a
30 '  s       TO RUN ON
40 '   i      A DRAGON 32.
50 '    n     THE MACHINE CODE
60 '     o    LIES ABOVE &7530.
70 '
80 'WRITTEN AND CREATED BY..
90 'DREW MARSHALL (C)1984
100 ' *SMOG* SOFTWARE LTD.
110 PCLEAR8:CLEAR2767,29999:ENTRY=30000:BYTE=0
120 GOSUB320 'INTRO
130 GOSUB230 'GRAPHICS  E.T.C.
140 GOSUB160
150 GOTO540
160 ENTRY=32700
170 FOR REEL =1 TO 4
180 FOR PICT =1 TO 8
190 READ OBJ:POKE ENTRY,OBJ
200 ENTRY = ENTRY+1
210 NEXT PICT,REEL
220 RETURN
230 IFENTRY<&H7530 THEN530
240 FOR PICTURE=1 TO 7
250 FOR BYTE =1 TO 16
260 READA$,B$:POKE ENTRY,VAL("&H"+A$):POKE ENTRY+1,VAL
("&H"+B$)
270 ENTRY=ENTRY+2
280 NEXT BYTE
290 NEXT PICTURE
300 PRINT@480," IMAGES HAVE BEEN POKED.....  ";:POKE1
535,96
310 RETURN
320 CLS0:PRINT@0,STRING$(32,179);CHR$(128);CHR$(128);S
TRING$(28,204);
330 FORI=1224 TO 1235:READA:PLAY"T25O1BFB-";POKEI,A:NE
XT:DATA3,128,1,128,19,128,9,128,14,128,15,46
340 A$=CHR$(128):PRINT@32+8+3,"written"A$"by"A$"drew"A
$"marshall";:PRINT@32+9,"    (C) SMOG SOFTWARE
  ";
350 PRINT@490,"please"A$"wait";
360 PLAY"T2002CP8CCDEP8EFD-P8D-EAAEP16AP16038-"
370 SCREEN0,1
380 RETURN
390 DATA0,0,7,E0,F,F0,1C,70,1C,70,38,30,30,30,30,0,FE,
0,FE,0,30,0,30,0,38,0,3F,F8,3F,F8,0,0    'pound sign
400 DATAC,10,14,28,2,40,1,80,7,E0,F,F8,1F,D8,3F,D8,3F,
EC,3F,CC,3F,D8,1F,F8,1F,F0,F,E0,7,80,0,0 'apple
410 DATAFF,FF,E1,87,F1,8F,B9,9D,9D,B9,8F,F1,87,E1,FF,F
F,FF,FF,87,E1,8F,F1,9D,B9,B9,9D,F1,8F,FF,FF,FF,FF
                'union jack
420 DATA0,0,0,0,3F,FC,3F,FC,0,1C,0,38,0,70,0,E0,
1,C0,3,80,7,0,E,0,1C,0,38,0,38,0    'number seven
430 DATA0,0,0,0,38,E,3C,E,3E,E,3F,E,38,BE,39,CE,38,EE,
38,7E,38,3E,38,1E,38,E,38,E,38,E,0,0    'nudge symbol
440 DATA70,7C,40,4,70,4,10,4,77,C4,5,44,5,40,0,0,0,F0,
0,90,20,F0,20,0,20,F,3F,8,0,A,0,E        smog symbol
450 DATAFF,FF,E0,7,C3,E3,8F,F1,9E,31,98,1,98,1,98,1,98
,1,98,1,9E,31,8F,F1,83,E1,C0,3,E0,7,FF,FF 'copytight s
ymbol
460 DATA5,3,6,2,7,1,4,6
470 DATA5,6,3,1,4,7,7,2
480 DATA5,1,4,4,7,3,2,4
490 DATA5,1,3,4,7,3,6,2
500 P=30192:FORI=1544TO1544+32*15STEP32:POKEI,PEEK(P):
POKEI+1,PEEK(P+1):P=P+2:NEXT
510 SCREEN1,0:SCREEN1,1:GOTO510
520 STOP
530 PRINT"error IN NUMERICS;":PRINT"COULD RESULT IN A
CRASH.":STOP
540 ENTRY =&H1E00:PRINT@480,"NOW FILLING DATA FOR EACH
 REEL ";:POKE1535,96:SCREEN0,1
550 RR=1
560 FOR P=32700 TO 32731
570 A=PEEK(P):IFA>0THENPRINT"\ERROR IN DATA/"
580 A=A-1
590 A=32*A:A=A+30000
600 FOR I=A TO A+31
610 POKE ENTRY ,PEEK(I)
620 ENTRY=ENTRY+1
630 NEXTI
640 FORI=1 TO&:POKEEN,0:EN=EN+1:NEXT
650 IF RR/8<>INT(RR/8) THEN670
660 IFRR<>32THENREAD ENTRY:IFEN<7680 OR EN >13000 GOTO
 530 ELSE SOUND1,1
670 RR=RR+1:NEXTP
680 DATA8490,9280,10080
690 PRINT@480,"FINISHED FILLING DATA.          ";:POKE1
535,96
700 FORI=1TO1000:NEXT
710 SOUND200,2
720 PRINT@480,"NOW LOADING MACHINE CODE.       ";:POKE1
536,96
730 SCREEN0,1
740 CLOADM
750 PRINT@480,"    LOADING MAIN PROG.          ";:POKE1
536,96:SCREEN0,1
760 CLOAD
```

Casino main program.

```
10 'MAIN PROGRAM FOR CASINO
20 GOSUB1240:GOSUB1070
30 RE=C:E=0:RD=0:DEFFNZ(Z)=256*PEEK(A)+PEEK(A+1)
40 E=5
50 RD =4079
60 RO=1
70 CLS0
80 FORO=1TO5:FORP=1TO12
90 PLAY"V20T85O"+STR$(O)+";"+STR$(P):NEXTP,O
100 PRINT@42,"casino";
110 PRINT@480,"BY DREW MARSHALL              ";:POKE1
535,96
120 FORX=0TO63STEP2:FORY=10 TO 20 STEP 2
130 SET(X,Y,E):IFE=5 THENE=4ELSEE=5
140 NEXTY,X
150 IF RE=1 THEN RETURN
160 FOR1=200 TO 1 STEP-5
170 SOUND1,1:NEXT
180 E=4:RE=1:GOSUB120
190 FORP=1TO1000
200 NEXTP:CLS:SOUND200,2
210 PRINT"          :-CASINO-:"
220 PRINT
230 PRINT:PRINT
240 INPUT"HOW MANY PLAYERS (1-4) ";PL:IFPL<1 OR PL>4 T
HENCLS:GOTO210
250 FORI=1TOPL
260 PRINT"WHAT IS THE NAME OF PLAYER"I
270 LINEINPUTPL$(I)
280 IFLEN(PL$(I))>10 THEN260
290 NEXT
300 FORI=1TOPL:PM(I)=200:NEXT
310 'PRINTOUT
320 II=PL
330 CP=1
340 CLS0
350 IFPL$(CP)="**X**"THEN570ELSEPRINT"PLAYER"CP,PL$(CP
)
360 PRINT
370 PRINT"YOU HAVE"PM(CP)"POUNDS"
380 PRINT"DO YOU WISH TO PLAY THIS ROUND"
390 PRINT"(Y/N)"
400 IN$=INKEY$:IFIN$=""THEN400ELSEIFIN$="N"THEN570 ELS
E IFIN$<>"Y"THEN400
410 IFPM(CP)<=0 THEN 1370 ELSE PM(CP)=PM(CP)-40
411 IFSGN(PM(CP))=-1 THEN PM(CP)=0
420 PRINT"PRESS ENTER"
430 LINEINPUT#
440 SCREEN1,1:PLAY"T1000SGDBAGDBEGCEEDDGCBE0DCCDE":EX
EC30000
450 IN#=INKEY$:IFIN#=""THENPLAY"V5T255O1E":GOTO450
460 POKE&H7D66,0:POKE&H7D67,19+RND(13)
470 POKE&H7D6B,1:POKE&H7D69,10+(19*RND(12))
480 POKE&H7D6A,2:POKE&H7D6B,1+(19*RND(13))
490 POKE&H7D6C,3:POKE&H7D6D,11+(19*RND(12))
500 EXEC30081
510 A=4297:A(1)=FNZ(Z):A=4300:A(2)=FNZ(Z):A=4303:A(3)=
FNZ(Z):A=4306:A(4)=FNZ(Z)
520 GOSUB 760 'check for win
530 PM(CP)=PM(CP)+DW
540 FORP=1TO1000:NEXT
550 CLS0:PRINT@128;IFDW=90 THEN PRINT"TWO IN A ROW..CO
ULD HAVE DONE   BETTER" ELSE IF DW=500 THEN PRINT"THRE
E IN A ROW....NOT BAD!!!"ELSEIFDW=1000THENPRINT"WHAT M
ORE CAN I SAY??"ELSEPRINT"PATHETIC "PL$(CP)
560 FORP=1TO1500:NEXT
570 'NEXT PLAYER
580 CP=CP+1
590 IFCP>PL THEN 610
600 GOTO340
610 CLS
620 PRINT"WELL THAT IS THE END OF "
630 PRINT"ROUND "RO" THE MONEY."
640 PRINT"SITUATION IS LIKE SO..."
650 PRINT
660 FORI=1TOPL
670 PRINTPL$(I)" HAS "PM(I)" POUNDS"
680 PRINT:NEXT
690 PRINT"THERE ARE "7-RO"ROUNDS LEFT"
700 PRINT@480,"PRESS A KEY";:IFINKEY$=""THEN700
710 PRINT
720 RO=RO+1:IFRO<>7 THEN 310
730 PRINT"WELL I'M AFRAID THAT'S ALL I'VE GOT TIME FOR
...THE CASINO IS NOWCLOSED UNTIL YOU PRESS enter"
740 IFINKEY$<>CHR$(13)THEN740ELSEGOTO30
750 STOP
760 DW=0
770 IFA(1)=A(2) THEN DW=90 ELSE RETURN
780 IF A(2)=A(3)THENDW=500 ELSE RETURN
790 IF A(3)=A(4)THENDW=1000 ELSE RETURN
800 'JACKPOT!!!!!
810 FORO=1 TO 5
820 PLAY"O"+STR$(O)+"T30;V31;1;2;3;4;5;6;7;8;9;10;11;1
2;11;10;9;8;7;6"
830 NEXTO
840 FORI=1TO15:SCREEN1,1:SOUNDI*10,1:SCREEN1,0:SOUND25
5-I*10,1:NEXT
850 CLS:PRINT"Y",," O",," J",,,," G",," O",,"
    T",,,," T",," H",," E"
860 PRINT@420,"j a c k p o t";
870 PLAY"T40O1C"
880 FORP=1TO100:NEXTP
890 PRINT@420,STRING$(32,143);
900 FORP=1TO100:NEXTP
910 PLAY"T4005B"
920 R=R+1:IFR<=6 THEN 860
930 FORI=1TO16:PRINT:SOUNDI*1.5,1:NEXT
940 CLS
950 PRINT"THAT WAS FANTASTIC!!"
960 PRINT"YOU RECIEVE 1000 POUNDS FOR THAT"
970 PRINT@480,"PRESS A KEY";
980 PRINT@492,CHR$(128);
990 FORP=1TO130:IFINKEY$=""THENNEXT ELSE 1030
1000 PRINT@492," ";
1010 FORP=1TO130:IFINKEY$=""THENNEXT ELSE 1030
1020 GOTO980
1030 PRINT@492,"...THANK YOU!!"
1040 FORI=1TO100:NEXT:RETURN
1050 GOTO1050
1060 GOTO1060
1070 PMODE4,1:PCLS5:COLOR0
1080 FORY=0 TO 170 STEP 20
1090 LINE(3,Y)-(13,Y+10),PSET:LINE-(3,Y+20),PSET:LINE(
252,Y)-(242,Y+10),PSET:LINE-(252,Y+20),PSET
1100 NEXT
1110 LINE-(255,191),PSET:LINE(3,170)-(0,191),PSET
1120 PAINT(3,10)
1130 PAINT(252,10)
1140 PMODE3:COLOR2
1150 LINE(30,30)-(225,160),PSET,BF
1160 PMODE4:COLOR0
1170 LINE(60,50)-(175,130),PSET,BF
1180 FORX=30TO225 STEP10:CIRCLE(X,5),5:CIRCLE(X,185),5
:PAINT(X,185):NEXT
1190 COLOR5:LINE(190,50)-(210,140),PSET,BF:COLOR0:LINE
(190,50)-(210,140),PSET,B
1200 DR$="NR5D5R5BM-5,5R5D6L5U3R5L5D3BM+0,+5NR5D3R5D3L
5BM+3,+5U18D2U3BM-3,+5ND5R5D5BM-5,+5D5R5U5L5"
1210 DRAW"BM196,60C0;XDR$;"
1220 PMODE3:DRAW"BM197,61C2;XDR$;":PMODE4
1230 RETURN
1240 CLS8:PRINT@33,"CASINO";
1250 PRINT@69,"INITIALISING";
1260 PRINT@102,"PLEASE";
1270 PRINT@133,"WAIT";
1280 PLAY"T50O1AABEDDE"
1290 SCREEN0,1:RETURN
1370 CLS
1380 PRINT"BECAUSE "PL$(CP)' IS OUT OF"
1390 PRINT"MONEY.WE MUST CLOSE THE CASINO  TO YOUR PAR
TY."
1395 PRINT"(IF I WERE YOU I WOULD NOT LET  HIM PLAY FO
R GETTING YOU CHUCKEDOUT OF THIS ACE PLACE.)"
1400 PRINT
1410 PRINT"TOTAL ROUND UP."
1420 PRINT"NAME","MONEY"
1430 FORI=1TOPL
1440 PRINTPL$(I),PM(I)
1450 NEXT
1460 PRINT@416,"TYPE clear TO RUN"
1470 IFINKEY$<>CHR$(12)THEN1470
1480 RUN
```

Light Cycles

Paul Burke,
County Galway,
Eire.

VIC-20

LIGHT CYCLES is a program for the Vic-20 based on the arcade game Tron. You must trap the three enemy cycles which are controlled by the computer. You move your cycle with the following keys; T− up , V− down , F− left , H− right.

To trap a cycle you must completely enclose it. No cycle may cross either its own or another's trail. You start off with three lives and every time you clear 10 screens you gain an extra one. You score 1,000 points every time you destroy three cycles plus a bonus depending on how quickly you clear the sheet. The Vic-20 will wait for you to press a key before beginning each screen. When the game ends press shift to restart.

Because there is only 3.5K program space on the unexpanded Vic-20 I have split the program into two parts. Type in and Save program 1 now New the micro and type in and Save program 2. When loading just load program 1 and program 2 will automatically load and Run.

Program 1.

```
0 POKE36869,240
1 POKE52,27:POKE56,27:CLR:GOSUB300:POKE650,128
10 FORT=830TO860:READA:POKET,A:NEXT
11 K=RND(-W)
20 FORT=900TO940:READA:POKET,A:NEXT:REM UP
30 FORT=941TO981:READA:POKET,A:NEXT:REM RIGHT
40 FORT=982TO1022:READA:POKET,A:NEXT:REM DOWN
45 FORT=7680TO7640:READA:POKET,A:NEXT:REM DOWN
50 FORT=7424TO7538:READA:POKET,A:NEXT
60 FORT=7568TO7589:READA:POKET,A:NEXT
65 FORT=830TO1023:POKE6082+T,PEEK(T):NEXT
70 PRINT"■";:GOSUB600:PRINT"■■LOADING PART TWO":LOAD
300 FORT=7168TO7255:READA:POKET,A:NEXT
310 FORT=7296TO7327:READA:POKET,A:NEXT
320 POKE36879,8:PRINT"□":POKE646,11:GOSUB600:PRINT"■■    PLEASE WAIT"
330 FORT=1TO5:FORY=1TO6:POKE36878,16*Y:FORU=1TO100:NEXT:NEXT:NEXT:POKE36879,160
399 RETURN
400 DATA255,255,255,255,255,255,255,255
410 DATA28,62,119,99,65,119,54,28,28,54,119,65,99,119,62,28
420 DATA60,118,231,195,231,118,60,0,60,110,231,131,231,110,60,0
430 DATA0,84,42,84,42,84,42,0
```

(continued on page 183)

GET TO GRIPS WITH ARCADE ACTION!

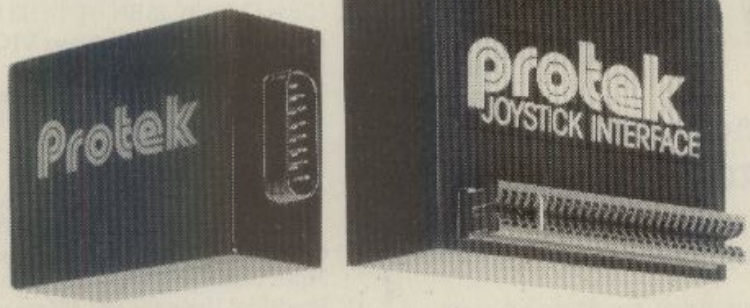




QUICKSHOT II £11.95
New improved design • Trigger + Top Fire Button • Auto Fire • Built in Stabilizing Suction Cups • For use with any computer with a '5 pin D' type connector. (Atari Compatible).

QUICKSHOT I £9.95
New improved styling • 3 Fast action fire buttons • 4' foot long cord • Arcade Control • For use with any computer with a '9 Pin D' Type connector. (Atari Compatible).

BBC JOYSTICK INTERFACE £11.95
Simply plugs in • Compatible with any Atari type Joystick, e.g. Quickshot and Games Master • Suitable for use with all standard BBC Software.



ZX SPECTRUM SWITCHABLE INTERFACE £19.95
No programming required • Simply plugs in • No additional software • Compatible at the flick of a switch with Protek (Cursor Keys) Kempston and Sinclair Joystick Software. Compatible with any Atari Type Joystick, e.g. Quickshot or Games Master.



BBC JOYSTICK SET £19.95
Contents: Quickshot I Joystick • Protek BBC Joystick Interface • In an attractive Gift Box.

ZX SPECTRUM JOYSTICK SET £24.95
Contents: Quickshot I Joystick • Protek Joystick Interface • Airliner —A Full Flight. Simulation Program (16K) • In an attractive Gift Box.



Protek

VISA

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

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 £_____

- ☐ **Exploring the Sinclair QL — An Introduction to SuperBASIC** — Andrew Nelson, ISBN 0 907563 84 8 — £4.95
- ☐ **49 Explosive Games for your ZX Spectrum** — Tim Hartnell, ISBN 0 907563 53 8 — £4.95
- ☐ **Delving Deeper into your VIC 20** — Philip Campbell, ISBN 0 907563 62 7 — £4.95
- ☐ **Creating Adventure Games on your Dragon 32** — Clive Gifford, ISBN 0 907563 57 0 — £4.95
- ☐ **Dynamic Games for your VIC 20** — Mathew Boek, ISBN 0 907563 34 1 — £4.95
- ☐ **Creating Adventure Programs on your Computer** — Andrew Nelson, ISBN 0 907563 36 8 — £4.95
- ☐ **Putting your VIC 20 to Work** — Tom Lau, ISBN 0 907563 46 5 — £4.95
- ☐ **The Easy Way to Program your New Computer** — Tim Hartnell, ISBN 0 907563 60 0 — £3.95
- ☐ **Creating Adventures on your ZX Spectrum** — Peter Shaw & James Mortleman, ISBN 0 907563 58 9 — £4.95
- ☐ **Practical Uses for the Microcomputer in the Home** — David Hole, ISBN 0 907563 59 7 — £4.95
- ☐ **Mastering Machine Code on your Commodore 64** — Mark Greenshields, ISBN 0 907563 69 4 — £7.95
- ☐ **Making the Most of your TI 99/4A** — Scott Vincent, ISBN 0 907563 66 X — £4.95
- ☐ **Dynamic Games for your Electron** — Neal Cavalier-Smith, ISBN 0 907563 67 8 — £4.95
- ☐ **The 3-D Animated Apple** — Phil Cohen, ISBN 0 907563 78 3 — £4.95
- ☐ **The Art of Structured Programming** — Peter Juliff, ISBN 0 907563 79 1 — £5.95
- ☐ **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!

(continued from page 180)

```
440 DATA129,227,102,94,56,120,233,195,8,20,99,99,20,99,99,28
450 DATA28,99,99,20,99,99,28,8,108,108,146,129,146,108,108,0
460 DATA54,54,73,129,73,54,54,0
500 DATA255,128,128,128,128,128,128,128,255,1,1,1,1,1,1,1,1,1,1,1,1,255
510 DATA128,128,128,128,128,128,128,255
600 PRINT"[illegible]"; PRINT"[illegible]":PRINT"[illegible]
"
610 PRINT"[illegible]":PRINT"[illegible]":PRINT"[illegible]
[illegible]";
620 PRINT"[illegible]"
640 RETURN
1000 DATA169,0,133,0,165,0,201,5,208,3,76,1,0
1010 DATA165,254,201,1,208,3,76,132,3
1020 DATA201,2,208,3,76,173,3
1030 DATA201,3,208,3,76,214,3
1040 DATA76,176,29
2000 REM....UP.......
2010 DATA160,0,177,252,201,15,:6,9,169,2,133,254,230,0,76,66,3
2020 DATA169,7,145,252,160,22,169,5,145,252,165,252,24,233,21,133,252,165,253,23
3,0
2030 DATA133,253,96
3000 REM..RIGHT.....
3010 DATA160,23,177,252,201,15:16,9,169,3,133,254,230,0,76,66,3
3020 DATA169,9,145,252,160,22,169,5,145,252,165,252,24,105,1,133,252,165,253,105
,0
3030 DATA133,253,96
4000 REM...DOWN......
4010 DATA160,44,177,252,201,15:16,9,169,4,133,254,230,0,76,66,3
4020 DATA169,8,145,252,160,22,169,5,145,252,165,252,24,105,22,133,252,165,253,10
5,0
4030 DATA133,253,96
5000 REM...LEFT......
5010 DATA160,21,177,252,201,15:16,9,169,1,133,254,230,0,76,66,3
5020 DATA169,10,145,252,160,22,169,5,145,252,165,252,24,233,0,133,252,165,253,23
3,0
5030 DATA133,253,96
9000 DATA173,52,3,133,252,173,53,3,133,253,173,54,3,133,254,32,62,3,165,252,141,
52,3
9010 DATA165,253,141,53,3,165,254,141,54,3,165,0,141,58,3
9020 DATA173,55,3,133,252,173,56,3,133,253,173,57,3,133,254,32,62,3,165,252,141,
55,3
9030 DATA165,253,141,56,3,165,254,141,57,3,165,0,141,59,3
9040 DATA173,250,29,133,252,173,251,29,133,253,173,252,29,133,254
9041 DATA32,62,3,165,252,141,250,29
9050 DATA165,253,141,251,29,165,254,141,252,29,165,0,141,255,29,96
10000 DATA160,0,185,0,30,201,5,208,5,169,1,153,0,150,185,0,31,201,5,208,5
10010 DATA169,1,153,0,151,136,208,229,96
```

Program 2.

```
0 FORT=830TO1020:POKET,PEEK(60802+T):NEXT
5 POKE52,28:POKE56,28:CLR
10 POKE36869,255:PRINT"[illegible]":W=100:SC=0:LL=0:Q=0:POKE36878,10:X=7
15 K=RND(-W*50+9)
20 POKE1,96:POKE820,46:POKE821,30:POKE822,1
25 POKE823,1:POKE824,31:POKE825,3
30 POKE826,0:POKE827,0
35 POKE36879,56:P=7910:OR=22
40 POKE7674,255:POKE7675,30:POKE7676,1:POKE7679,0
45 I=0:II=0:I2=0:CD=0:POKE36876,0:POKE36875,0:S=128
50 POKE252,0:POKE253,30:POKE254,4:PRINT"[illegible]";:R=0:FORT=1TO
10
55 PRINT"[illegible]";
60 PRINT"[illegible]":NEXT:PRINT"[illegible]";
65 PRINT"[illegible]";:POKE8185,0:POKE30720+8185,4
70 IFW=110THENW=100:Q=Q+10:LL=LL-1:X=X-1:IFX<1THENX=1
75 PRINT"[illegible]LEVEL"W-99"[illegible]SCORE"SC
80 POKE198,0:WAIT198,1:POKE198,0
85 PRINT"[illegible]";:POKE198,0:WAIT198,1:TI$="
000000"
90 SYS7424:SYS7560:IFRND(1)>.8THENPOKE822,INT(RND(1)*4)+1
95 IFRND(1)>.9THENPOKE825,INT(RND(1)*4)+1
100 IFPEEK(7679)=5RND12=0THENGOSUB500:I2=1:CD=CD+1
105 IFPEEK(826)=5RND1=0THENGOSUB500:I=1:CD=CD+1
110 IFPEEK(827)=5RND1I=0THENGOSUB500:II=1:CD=CD+1
112 Z1=Z1+1:IFZ1=XTHENSYS7424:SYS7560:Z1=0
115 IFCD=3THENCD=0:W=W+1:SC=SC+1000+1000-TI:GOTO15
120 F=PEEK(197):A=0:A=A+22*(F=50)-22*(F=27)-(F=43)+(F=42):IFA=0ORA=-ORTHENA=OR
125 S=S+1.5:POKE36876,S:POKE36875,S:IFAC>ORTHENS=128
127 POKEP,0:POKE30720+P,7:P=P+A:IFPEEK(P)<15THEN800
130 POKEP,1:POKEP+30720,2:OR=A:A=0
140 GOTO90
500 POKE36878,15:POKE36877,253:FORT=1TO150:NEXT:POKE36877,150:FORT=16TO0STEP-2
510 POKE36877,150:FORT=16TO0STEP-2:FORU=1TO40:NEXT:POKE36878,T:NEXT:POKE36877,0
520 POKE36878,10:RETURN
800 POKE36876,0:POKE36875,0:POKEP-A,6:LL=LL+1
805 POKE36878,170:FORT=0TO15:POKE30720+P-A,T:FORY=1TO40:NEXT
810 POKE36877,200-3*T:NEXT:POKE36877,0:IFLL=3THEN900
815 POKE198,0:WAIT198,1:GOTO15
900 POKEP-A,6:PRINT"[illegible]";:FORT=1TO9:PRINTMID$("GAME OVER",T,1);:FORH=
1TO199
910 NEXT:NEXT:PRINT"[illegible]":IFSC>HSTHENHS=SC
920 PRINT"[illegible]SC"SC,"HI"HS:WAIT653,1:GOTO10
```

Back-up Minefield

Anthony Timson,
Harrow-Weald,
Middlesex.

ORIC

BOTH OF THE following programs were written on the 48K Oric-1 microcomputer but both will run on a 16K machine with some modification. Here is a brief description of each program.

Back-up: This short program will make a back-up of any piece of software — for personal use only. It consists of 39 bytes of machine code, and it is used by typing in !"Name" or !" ".

Once the program has loaded, the Oric will Ping and wait for you to press a key. During this time you should swap the leads etc. and set the tape recorder in record mode, then press any key and an exact copy of that program will be made.

An added bonus is that if the program is written in Basic then you can list it afterwards. Please note that this program copies only one stage of a program at a time, so for multi-stage programs — i.e., programs that load in more than one part, you must repeat the process several times, typing new before going on to the next stage.

The program is very small with no on-screen messages except for loading and saving, so that it allows nearly all of RAM to be available for programs. Because there are no absolute addresses, it can be relocated in memory.

Minefield: All the instructions are in the game.

Back-up.

```
 20 FOR X=#9000 TO #9027
 30 READ Y$:Y= VAL("#"+Y$)
 40 POKE X,Y
 50 NEXTX
 60 DATA A5,9C,A4,9D,85,00,84,01,08,20,25,E7,20,CA,E6,
20,A8,E4
 70 DATA 20,04,E8,20,85,FA,20,F8,C5,20,CA,E6,20,7B,E5,
20,04,E8,20,6B,C9,60
 80 DOKE #2F5,#9000
 90 HIMEM #9000
 100 CLS
 110 NEW
```

Minefield.

```
 1 REM FOR "_" READ POUND SIGN
 10 REM *************************
 20 REM * Minefield for the 48k *
 30 REM * Oric-1 Microcomputer. *
 40 REM *=======================*
 50 REM * <c>TIMMOSOFT 23/02/84 *
 60 REM *************************
 70 TEXT:GRAB:HIMEM #B399:DIMM1%(1000),M2%(1000)
 80 CLS:PAPER0:INK7:POKE#26A,10:PRINTCHR$(20)
 90 GOSUB 9000 'Define characters
 100 REM Main Loop
 110 REPEAT
 120 MINE%=10:SC%=0:LIVE%=3:FLAG%=0:CHEAT%=FALSE
 130 GOSUB 1000 'Title page
 140 GOSUB 2000 'Play the game
 150 UNTIL FALSE
 160 END
 1000 REM Title page
 1010 CLS:PAPER 0:INK7
 1020 PLOT 0,1,CHR$(20)+CHR$(7)+CHR$(10):PLOT0,2,CHR$(
20)+CHR$(7)+CHR$(10)
 1030 PLOT 14,1,"Minefield":PLOT 14,2,"Minefield"
 1040 FOR X=1 TO 5:PRINT:NEXTX
 1050 PRINT" In this game, invisible mines are "
 1060 PRINT"put around the screen. You (*) have to";
 1070 PRINT"get from the bottom of the screen to"
 1080 PRINT"the top of the screen, but if you hit"
 1090 PRINT"a mine, you lose a life. After every"
 1100 PRINT"full screen that you complete, the"
 1200 PRINT"number of mines is increased. To help"
 1210 PRINT"you on your travels, an indicator"
 1220 PRINT"shows you how many mines there are "
 1230 PRINT"in your vicinity."
 1240 PRINT" If you see a flag (_), you can coll-"
 1250 PRINT"ect it and get an extra 100 points. If";
 1260 PRINT"you hit the surrounding wall (#) you "
 1270 PRINT"die because it is also mined. After "
 1280 PRINT"time that you lose a life you will see";
 1290 PRINT"an action replay."
 1300 PRINT:PRINTCHR$(129)CHR$(140)"USE THE CURSOR KEY
S FOR MOVEMENT."
 1400 PLOT 0,25,CHR$(21)+CHR$(12)+"PRESS THE SPACE BAR
 TO PLAY ....."
 1410 REPEAT:GETA$:UNTIL A$=" "
 1420 CLS
 1430 PLOT6,12,CHR$(1)+"Do you wish to"+CHR$(12)+"Chea
t"+CHR$(8)+"?"
 1440 REPEAT:GET CH$:UNTIL CH$="y"OR CH$="n"
 1450 IF CH$="y"THEN CHEAT%=TRUE:GOSUB5000
 1460 RETURN
 2000 REM Play the game!
 2010 GOSUB 3000 'Set up screen
 2020 FOR X=1 TO 12:MUSIC1,5,X,10
 2030 PLAY 1,0,1,100:WAIT 7:NEXTX
 2040 PING:CNT%=1
 2050 REPEAT
 2060 K$=KEY$
 2070 IF K$<>""THEN PLOT X%,Y%," "
 2080 IF K$=CHR$(8) THEN X%=X%-1:SC%=SC%+5
 2090 IF K$=CHR$(9) THEN X%=X%+1:SC%=SC%+5
 2100 IF K$=CHR$(10) AND Y%<25 THEN Y%=Y%+1
 2110 IF K$=CHR$(11) THEN Y%=Y%-1:SC%=SC%+10
 2120 IF SCRN(X%,Y%)=35 OR SCRN(X%,Y%)=64 THEN EXPLODE
:DIE%=TRUE
 2125 IF SCRN(X%,Y%)=95 THEN SC%=SC%+100:ZAP
 2130 PLOT X%,Y%,"*"
 2140 IF K$<> "" THEN M1%(CNT%)=Y%:M2%(CNT%)=X%:CNT%=C
NT%+1
 2150 IF SCRN(X%-1,Y%)=64 THEN MN%=MN%+1
```

(continued on page 186)

NOTICE

Your Computer has been asked by Kensington CID to announce that they are currently investigating **Spirit Software.**

Readers who have responded to their advertisements will be contacted by the CID in the next 8 weeks.

COMMODORE 64 TAPE COPIER

COPYCAT — THE ULTIMATE BACK-UP COPIER

★ COPIES ALMOST ALL PROTECTED SOFTWARE
★ INCORPORATES SPECTACULAR MULTICOLOURED LOAD AND SAVE
★ 100% MACHINE CODE COPIER
★ COPIES MACHINE CODE, BASIC, OR MIXTURE
★ WIZARD AUDIO WARNINGS AT THE END OF EACH SECTION
★ WRITTEN BY A COMPUTER PROFESSIONAL
★ FULL INSTRUCTIONS WITH THIS EASY TO USE COPIER
★ NO RISK TO ORIGINAL TAPE

Dispatch of orders within 24 hours!

★★★★★

CHEQUES/P.O.S. TO:

£5.95 incl. VAT & P&P

WIZARD SOFTWARE
59, THE MARLES
EXMOUTH
DEVON
EX8 4NE

N.B. This software is sold on the understanding that it is used only to copy user owned tapes for personal use.



COURSEWINNER

The Punters Computer Program

COURSEWINNER allows you to use the power of your computer to get the edge on the bookmaker.

- COURSEWINNER contains a database full of detailed information on all English and Scottish flat courses. The ten leading jockeys and trainers, and effect of the draw is detailed for each course. This information can be displayed on the screen at any time.
- The program analyses these factors combined with the results of the last three outings, starting price and weight carried.
- COURSEWINNER is simple and quick to use, yet very powerful.
- Boxed with detailed instruction booklet.

Price £12.50 all inclusive IMMEDIATE DISPATCH (RETURN OF POST)

Available for:
SPECTRUM (48K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K).

POOLSWINNER

The Ultimate Pools Prediction Program



- POOLSWINNER is the most sophisticated pools prediction aid ever produced. It comes complete with its own massive database.
- Can be used for Scoredraws, Draws, Aways and Homes.
- The database contains over 20000 matches (10 years league football). It updates automatically as results come in.
- The precise prediction formula can be set by the user. This allows development of your own unique method.
- Package is complete with program, database and detailed instruction booklet.

Price £15.00 all inclusive IMMEDIATE DISPATCH (RETURN OF POST)

Available for: SPECTRUM (48K), ZX81 (16K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K).

Available from dealers or direct (return of post) from:

VISA PHONE

selec SOFTWARE

ACCESS PHONE

37 Councillor Lane, Cheadle, Cheshire. Phone: 061-428 7425

MAKE MONEY WITH YOUR MICROCOMPUTER

Most people buy a micro *either* to play games, like 'Invaders', on it ... *or* to learn more about computers ... *or* as an educational aid for their children. But now, there is another — **potentially far more exciting** — way to use your microcomputer.

The fact is, *your micro can do the same amount of work it took several people many hours to do only a few years ago* ... in a matter of minutes. What's more, most of your expenses are already covered — electricity, rent, rates and even the computer itself ... they're all paid for. So **any money you bring in with your micro should be almost pure profit.** All you need now is the 'inside track' on who needs which services where, how to get them to sign on with you and what to charge.

New Guide Tells All

"Make Money With Your Micro" is a new, working manual that answers all these questions ... and a lot more besides. Like **how to set up a small computer business** ... what books to keep ... when to call in professional help ... how to arrange your workspace to maximum advantage ... why *the right micro based business can be unusually profitable*, and what you need to climb on the bandwagon ... before it really gets rolling. Here is a brief sampling of what else you can expect to learn from this special report:

What You Will Learn

* **Where to find customers** ... and what to offer them.
* **Why word processing is different** ... and some rather surprising, little-known, ways to make it pay big.
* **How to save businesses money** ... and make yourself a small fortune in the process.
* **Which number services pay best** ... and how to perform them efficiently.
* **Where to get referrals** ... and why they matter.
* **Managing your time** ... always important, but vital if you plan a part time operation.
* **Preparing mailing lists** ... why this is potentially one of the most profitable services you'll be offering.
* **And much, much more.**

Where Do I Find Customers?

In addition to taking you through the very necessary steps that precede any truly successful microcomputer-based business, **"Make Money With Your Microcomputer"** gives you the low-down on exactly which businesses want what services, and how best to get these firms as big paying customers.

Working from this profession-by-profession section, **you can find several openings available right now to suit your circumstances** — areas where you, with your micro, can really *coin* money ... giving people and businesses in your part of the country what they want and need to become more efficient ... and, therefore, more profitable.

Do I Need Capital?

You don't require any 'capital' as such to get started in this microcomputer business ... remember, what we are talking about here is primarily a service industry. You can work from home, in your own time at your own pace ... starting with just a couple of evenings a week only, if you like. There's no need for 'staff' ... *your micro does the hard work for you* ... and your 'office' is already paid for because this, more than any other business in the world, takes very little space ... almost any quiet corner will do.

Must I Be An Expert?

It really doesn't matter if you don't know a lot about computers, because there are plenty (almost too many!) 'ready-made' programmes already on the market ... most of them with built-in instructions ... covering just about every and any computer job you are likely to encounter in your new business. But, naturally, if you can design your own programmes, and that is what you enjoy, there's nothing to stop you doing so — although, frankly, the chances are there's a better, less expensive programme already in existence.

Which Micro Do I Need?

Almost any modern micro will do, because most programmes these days are — or can be made — compatible with just about any other microcomputer. If you haven't yet bought your own micro, you'll find the cost surprisingly low ... and certainly very small compared to its earning potential. However, either way, you may need a few 'add-ons' ... although, again, these cost very little when you consider how much money they can make for you.

An Alternative Service

If you prefer offering a service direct to the public, you'll also find in this new manual a special section devoted to areas where you can do just that. But, it's only fair to tell you now, you are likely to *make much more money helping companies* and the professions (e.g. Doctors, Architects, etc. etc.) than you ever could selling services direct to the public.

Get There First

As with any other business, to be successful you must find a need and fill it. Right now, there are literally dozens of companies and professions in your area that urgently need micro based help. The *big* money in this field will be made by those men and women, young or old, who are first to sign these businesses on as customers, and then grow with them.

Your Guarantee

"Make Money With Your Microcomputer", the practical, working manual that can guide you into this exciting new field, costs just £10, post paid. There is a 30 day satisfaction-or-your-money-back **guarantee**, so all you are risking to find out more about what could be the fastest growing part of our economy over the next few years is a few postage stamps.

How To Order

To order your copy now, just complete the form below and return it here. And, remember — the sooner you get it, the sooner you too can "make money with YOUR microcomputer!"

© Chartsearch Ltd 1984 • 11 Blomfield Street, London, EC2M 7AY

"MAKE MONEY WITH YOUR MICROCOMPUTER"

To: Chartsearch Ltd., 11 Blomfield Street, London, EC2M 7AY.

Please send me one copy of "Make Money With Your Microcomputer" as soon as possible for which I enclose payment of £10 (includes postage and packaging)

☐ Cheque/Postal Order of £10 enclosed
☐ Please charge my Credit Card as follows:

A/C number_____ (Access/Visa/Diners/Amex)

From:
Name_____ BLOCK

Address_____ CAPITALS

PLEASE

_____

_____ Postcode_____

Signed_____ Date_____

Registered in England No. 1340222

(continued from page 183)

```
 2160 IF SCRN(X%+1,Y%)=64 THEN MN%=MN%+1
 2170 IF SCRN(X%,Y%+1)=64 THEN MN%=MN%+1
 2180 IF SCRN(X%,Y%-1)=64 THEN MN%=MN%+1
 2190 PLOT 7,0,STR$(MN%)
 2200 MN%=0:PLOT 32,0,STR$(SC%)
 2210 UNTIL DIE% OR Y%=2
 2220 IF DIE% THEN 2270
 2230 PING:CLS
 2240 MINE%=MINE%+5:IF MINE%>25 THEN FLAG%=FLAG%+INT(R
ND(1)*5)
 2260 GOTO 2000
 2270 DIE%=FALSE:GOSUB7000
 2280 LIVE%=LIVE%-1
 2290 IF LIVE%=0 THEN GOSUB 8000:RETURN
 2310 GOTO 2000
 3000 REM Set up the screen
 3010 PAPER4:CLS
 3020 PLOT 0,2,"########################################
"
 3030 PLOT0,25,"########################################
"
 3040 FOR X=3 TO 25:PLOT 0,X,"#":PLOT 37,X,"#":NEXTX
 3050 IF NOT CHEAT% THEN GOSUB 4000
 3060 FOR X= 1 TO MINE%
 3070 Y=INT(RND(1)*36)+1
 3080 Z=INT(RND(1)*21)+3
 3090 PLOT Y,Z,"@"
 3100 NEXTX
 3110 PLOT 0,0,CHR$(2)+"Mines:"
 3120 PLOT 13,0,CHR$(3)+"Lives:"+RIGHT$(STR$(LIVE%),1)
 3130 PLOT 25,0,CHR$(5)+"Score:"
 3140 PLOT 18,2,"   "
 3150 PLOT 18,25,"   "
 3160 X%=19:Y%=25
 3170 PLAY0,0,0,0
 3180 IF FLAG%=FALSE THEN RETURN
 3190 FOR X=1 TO FLAG%
 3200 Y=INT(RND(1)*35)+1
 3210 Z=INT(RND(1)*20)+4
 3220 PLOT Y,Z,"_"
 3230 NEXTX
 3240 RETURN
 4000 REM Redefine Mine
 4010 FOR X=#B600 TO #B607
 4020 POKE X,0
 4030 NEXTX
 4040 RETURN
 5000 REM Redefine Mine
 5010 POKE#B600,30
 5020 POKE#B601,45
 5030 POKE#B602,30
 5040 POKE#B603,18
 5050 POKE#B604,30
 5060 POKE#B605,33
 5070 POKE#B606,30
 5080 POKE#B607,33
 5090 RETURN
 7000 REM Action Replay!
 7010 GOSUB 5000 'Redefine Mine
 7020 PLOT X%,Y%,"@"
 7030 WAIT 75
 7040 PLOT0,0,CHR$(17)+CHR$(12)+"ACTION REPLAY -- PLEA
SE WATCH"+CHR$(8)+CHR$(0)
 7050 FOR X=1 TO CNT%-1:CALL#FB03
 7060 PLOT M2%(X),M1%(X),"*"
 7070 WAIT 15
 7080 PLOT M2%(X),M1%(X)," "
 7090 NEXTX:PLOT M2%(CNT%-1),M1%(CNT%-1),"X"
 7100 ZAP
 7110 WAIT 300
 7120 RETURN
 8000 REM Lost all lives
 8010 FOR X=12 TO 1 STEP -1
 8020 MUSIC 1,5,X,7:PLAY 1,0,7,100
 8030 WAIT 20:NEXTX:PLAY0,0,0,0
 8040 WAIT 500
 8050 RETURN
 9000 REM Define characters
 9010 FOR X=#B6F8 TO #B6FF
 9020 READ Y:POKE X,Y
 9030 NEXTX
 9040 DATA 16,28,30,28,16,16,16,56
 9050 FOR X=#B550 TO #B557
 9060 READ Y:POKE X,Y
 9070 NEXTX
 9080 DATA 12,18,12,63,63,51,18,18
 9090 FOR X=#B518 TO #B51F
 9100 READ Y:POKE X,Y
 9110 NEXTX
 9120 DATA 63,33,33,33,33,33,33,63
 9130 RETURN
 10000 REM THIS PROGRAM WAS WRITTEN BY
 10010 REM Anthony Timson (c)1984 A.T.
```

Saturn Patrol

Patrick Edmond,
Driffield,
East Yorkshire.

CBM-64

SATURN PATROL IS a high-speed, arcade-style game for the Commodore 64. Use a joystick to control your ship at the top of the screen and fire down at the many swarming aliens, but watch out for the missiles aimed at your ship, even if you are moving they are fired on the correct trajectory — your skill is required to avoid them. There is no time limit to the game — just dodge the missiles as long as you can.

Saturn Patrol can be keyed in as shown but if you own an assembler or machine-code monitor and do not like waiting for the hex code to be entered from data statements into memory by the Basic routine — which takes about 45 seconds — then save the machine code separately.

Type in the program omitting lines 30, 1000 to 1460, 3000 to 3070 and add the following line

```
1 A=A+1 : IF A=1 THEN LOAD " ",
    1, 1 and save on cassette
```

Now enter the hex code in lines 1000 to 1460 directly with your assembler starting at location $6000 (24576 decimal) and save this on cassette after the previous Basic program (Save $6000 to $62E0).

To load these programs press shift and run stop, the machine code will be loaded by line 1 of the Basic program.

Saturn Patrol uses three sprites — data stored from 16128 to 16384 — one for your ship, one for your bomb and one for the missile. User defined graphics start at 12288, Sys 25280 is a routine copying some of the Commodore 64 ROM characters into RAM for the words High Score and the numbers zero to nine.

The aliens make up characters 65 to 74, 65 being just the feet and consecutive characters are more of the alien up to 74 which is the whole alien.

One routine puts alien feet on the screen at random, another scans the screen and increments any character between 65 and 73 — hence the aliens build up from feet to whole body.

To change the colour of the aliens change line 352, the colour code is Poked into location 253 and the subroutine at 25184 fills colour RAM with this colour.

```
10 POKE52,48:POKE56,48:CLR
20 POKE46,44:POKE48,44:POKE50,44:CLR
30 GOSUB3000:REM ENTER MACHINE CODE
40 SYS25280:REM COPY ROM CHARSET
80 GOSUB2000:REM SET UP U.D.GRAPHICS
90 SP$="■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■"
100 POKE53281,10:POKE53280,10:PRINT"□":POKE53272,21:POKE53269,0
110 PRINTSPC(14)"■SATURN PATROL"
120 PRINT"■■■■DURING ROUTINE PATROL OVER THE SURFACE"
130 PRINT"OF SATURN YOU DISCOVER ALIENS GATHERING,"
140 PRINT"FOR AN INVASION ? ..... THESE ALIENS ARE"
150 PRINT"CERTAINLY HOSTILE , AT LEAST, SINCE THEY"
160 PRINT"IMMEDIATELY AIM  & FIRE MISSILES AT YOUR"
170 PRINT"ATMOS-CRAFT .... YOU DECIDE TO RADIO FOR"
180 PRINT"ASSISTANCE ,& IN THE MEANTIME ATTEMPT TO"
190 PRINT"CONTROL THESE SWARMING ALIENS."
200 PRINTSPC(7)"■■■PRESS ANY KEY TO CONTINUE":POKE198,0
210 GETA$:IFA$=""THEN210
220 PRINT"□":POKE53280,0:POKE53281,0
230 PRINT"■■USE A JOYSTICK (IN CONTROL PORT 2)"
240 PRINT"■■TO CONTROL YOUR ATMOS-CRAFT."
250 PRINT"■■■BEWARE OF THE MISSILES LAUNCHED AT HIGH"
260 PRINT"■SPEED....BONUS POINTS ARE AWARDED FOR "
270 PRINT"■■HITTING THEM IN MID-FLIGHT BUT SINCE "
280 PRINT"■■THEY ARE INDESTRUCTABLE YOU MUST SOON"
290 PRINT"■■DODGE OUT OF THE WAY."
300 PRINTSPC(11)"■■■PRESS A KEY TO START":POKE198,0
```

```
340 GETA$:R%=RND(TI):IFA$=""THEN340
349 FORI=0TO16:POKE53248+I,0:NEXT
350 REM M/C ROUTINE TO COLOUR SCREEN
351 REM 251 STORES THE COLOUR CODE
352 PRINT"■":POKE253,6:SYS25184
353 FORI=0TO39:POKE1984+I,34
354 POKE1904+I,33:POKE56256+I,8
355 POKE56176+I,8:NEXT
356 REM SET SOUND + SPRITES
357 PRINTSP$;"■■HIGH SCORE";HI
358 FORI=0TO32:POKE32512+I,20:NEXT
359 POKE32565,0:POKE32566,0
360 POKE53288,1:POKE53289,1
361 FORI=0TO32:POKE32512+I,20:NEXT
362 POKE255,54:POKE254,0:POKE2040,255
363 POKE53248,54:POKE53249,50
364 POKE2041,254:POKE53264,0
365 POKE53269,1:POKE53287,7:POKE53276,1
366 POKE53285,8:POKE53286,10
367 POKE54272,5:POKE54277,63
368 POKE54278,9:POKE54276,0
369 POKE54296,15:POKE2042,253
370 POKE54274,0:POKE54275,1
371 POKE54286,200:POKE54287,0
372 POKE54291,10:POKE54292,10
373 POKE54290,0
374 POKE54274,0:POKE54275,1
375 POKE54281,10:POKE54280,10
376 POKE54284,15:POKE54285,7
377 POKE53272,28:POKE53278,0
378 POKE53271,0:POKE53277,0
379 PRINTSP$;TAB(24)"■SCORE  000000"
400 SYS25238:REM MAIN GAME ROUTINE
401 R=PEEK(53248):R=R-10
402 IFR>=0THEN404
403 R=R+255:POKE53264,PEEK(53264)AND254
404 POKE53248,R
700 POKE2040,252:POKE53277,1
701 POKE53271,1:POKE54276,0
702 POKE54283,0:POKE54286,5
703 POKE54287,20:POKE54290,0
704 POKE54291,15:POKE54292,14
705 POKE54290,129:SC=0
706 FORJ=0TO50:POKE53249,50+(J*J/12.5)
707 POKE54287,3*J:POKE53287,2+J
708 IFJ=4THENPOKE54290,128
709 POKE53286,J:POKE53285,1+J:NEXTJ
710 FORI=0TO5
711 SC=SC+(PEEK(1980-I)-48)*10^I
712 NEXT:PRINT"■■■■■■■■■YOU SCORED ";SC
713 POKE53269,0:IFSC>HITHENHI=SC
714 PRINT"■■■HIGH SCORE ";HI:POKE198,0
715 PRINT"■■■■■PRESS ANY KEY"
716 GETA$:IFA$=""THEN716
717 GOTO100
900 DATA195,124,124,254,214,124,56,0
910 DATA32,32,0,60,240,0,51,48,0,51
920 DATA48,0,63,240,0,15,192,0,3,0,0
930 DATA1,0,0,-1
1000 DATAAD,00,DC,29,04,C9,04,F0
1005 DATA28,A5,FE,C9,00,D0,11,A5
1010 DATAFF,C9,1A,F0,1C,38,E9,02
1015 DATA85,FF,8D,00,D0,4C,31,60
1020 DATAA5,FF,38,E9,02,85,FF,8D
1025 DATA00,D0,B0,05,C6,FE,CE,10
1030 DATAD0,AD,00,DC,29,08,C9,08
1035 DATAF0,28,A5,FE,C9,00,F0,11
1040 DATAA5,FF,C9,40,F0,1C,18,69
1045 DATA02,85,FF,8D,00,D0,4C,62
1050 DATA60,A5,FF,18,69,02,85,FF
1055 DATA8D,00,D0,90,05,EE,10,D0
1060 DATAE6,FE,20,97,E0,A5,63,4A
1065 DATA4A,4A,AA,DE,00,7F,BD,00
1070 DATA7F,C9,00,D0,05,A9,13,9D
1075 DATA00,7F,A0,00,8C,31,7F,0A
1080 DATA0A,0A,8D,30,7F,0A,2E,31
1085 DATA7F,0A,2E,31,7F,18,6D,30
1090 DATA7F,8D,30,7F,90,03,EE,31
1095 DATA7F,A9,54,85,AA,A9,04,85
1100 DATAAB,AD,30,7F,18,65,AA,85
1105 DATAAA,90,02,E6,AB,18,AD,31
1110 DATA7F,65,AB,85,AB,8A,A8,A9
1115 DATA41,91,AA,8E,27,D0,8A,18
1120 DATA69,0A,8D,01,D4,29,01,18
1125 DATA69,12,8D,04,D4,EA,EA,EA
1130 DATAAD,03,D0,C9,00,D0,2E,A5
1135 DATA63,18,C9,F0,90,42,20,87
1140 DATA62,8D,02,D0,AD,10,D0,29
1145 DATA05,8D,10,D0,29,01,0A,0D
1150 DATA10,D0,8D,10,D0,A9,C8,8D
1155 DATA03,D0,AD,15,D0,09,02,8D
1160 DATA15,D0,4C,20,61,AD,03,D0
1165 DATA38,E9,08,8D,03,D0,18,C9
1170 DATA22,B0,0D,A9,00,8D,03,D0
1175 DATAAD,15,D0,29,05,8D,15,D0
1180 DATAAD,03,D0,38,E9,60,8D,08
1185 DATAD4,29,01,69,20,8D,0B,D4
1190 DATAA9,00,85,FB,AD,05,D0,C9
1195 DATA00,D0,44,AD,00,DC,29,10
1200 DATAC9,10,F0,38,AD,00,D0,8D
1205 DATA04,D0,4A,4A,4A,85,FC,A0
1210 DATA00,AD,10,D0,29,03,8D,10
1215 DATAD0,29,01,0A,0A,0D,10,D0
1220 DATA8D,10,D0,20,76,62,18,65
1225 DATAFC,18,69,26,85,FC,A9,04
1230 DATA85,FD,A9,30,8D,05,D0,B1
1235 DATAFC,8D,37,7F,4C,F6,61,A0
1240 DATA00,AD,37,7F,91,FC,A5,FC
1245 DATA18,69,28,85,FC,90,02,E6
1250 DATAFD,AD,05,D0,18,69,08,8D
1255 DATA05,D0,AD,15,D0,09,04,8D
1260 DATA15,D0,AD,05,D0,18,C9,D8
1265 DATA90,16,AD,15,D0,29,03,8D
1270 DATA15,D0,A9,00,8D,05,D0,8D
1275 DATA0F,D4,8D,12,D4,4C,F6,61
1280 DATAA0,00,B1,FC,8D,37,7F,18
1285 DATAC9,40,90,0A,18,C9,4B,B0
1290 DATA05,38,E9,40,85,FB,A9,20
1295 DATA8D,37,7F,A9,81,8D,12,D4
1300 DATAAD,05,D0,8D,0F,D4,AD,1E
1305 DATAD0,29,06,C9,06,D0,07,A9
1310 DATA64,18,65,FB,85,FB,EA,EA
1315 DATAEA,EA,EA,EA,EA,EA,EA,EA
1320 DATAA9,04,85,AB,F9,00,85,AA
1325 DATAA0,00,B1,AA,18,C9,40,90
1330 DATA0A,18,C9,49,B0,05,18,69
1335 DATA01,91,AA,C8,D0,EC,E6,AB
1340 DATAA5,AB,C9,08,D0,E2,A5,A9
1345 DATAEA,EA,C9,01,D0,14,AD,02
1350 DATAD0,38,E9,02,8D,02,D0,B0
1355 DATA08,AD,10,D0,29,05,8D,10
1360 DATAD0,60,AD,02,D0,18,65,A9
1365 DATA8D,02,D0,90,08,AD,10,D0
1370 DATA09,02,8D,10,D0,60,EA,EA
1375 DATAEA,EA,EA,EA,EA,EA,EA,EA
1380 DATAA2,00,A5,FD,9D,00,D8,9D
1385 DATA00,D9,9D,00,DA,9D,00,DB
1390 DATAE8,D0,F1,60,EA,EA,A0,20
1395 DATAAD,10,D0,29,01,C9,01,F0
1400 DATA02,A0,00,98,A0,00,60,AD
1405 DATA00,DC,4A,4A,49,03,29,03
1410 DATA85,A9,AD,00,D0,60,A5,FB
1415 DATAC9,00,F0,17,A2,06,C6,FB
1420 DATAFE,B6,07,BD,B6,07,C9,3A
1425 DATAD0,EC,A9,30,9D,B6,07,CA
1430 DATA4C,A0,62,20,00,60,AD,1E
1435 DATAD0,29,01,C9,01,D0,D7,60
1440 DATA78,A5,01,29,FB,85,01,A2
1445 DATA00,BD,00,D0,9D,00,30,BD
1450 DATA00,D1,9D,00,31,E8,D0,F1
1455 DATAA5,01,09,04,85,01,58,60
1460 DATA*
2000 FORI=0TO7:POKE12544+I,0
2001 POKE12992+1,24:NEXT
2002 FORI=0TO63:POKE12808+I,0:NEXT
2003 FORI=0TO7:READA:FORJ=0TO7-I)
2004 POKE12879-J*8-I,A:NEXTJ,I
2005 FORI=16128TO16383:POKEI,0:NEXT
2006 FORI=0TO23:READA:POKE16320+I,A
2007 NEXT:FORI=24TO63:POKE16320+I,0
2008 NEXT
2009 FORI=0TO7:POKE16216+I*3,3
2010 POKE16280+I*3,3:NEXT
2011 FORI=1TO14:POKE12552+I,0:NEXT
2012 POKE12552,255:POKE12567,255
2013 FORI=16128TO16191:POKEI,RND(1)*255
2014 NEXT:RETURN
3000 READA:IFA<>-1THEN3000
3010 J=24576:PRINT"■■■■ENTERING DATA"
3020 READA$:IFA$="*"THENRESTORE:RETURN
3030 R$=RIGHT$(A$,1)
3040 L$=LEFT$(A$,1):L=ASC(L$)-48
3050 R=ASC(R$)-48:IFR>9THENR=R-7
3060 IFL>9THENL=L-7
3070 POKEJ,L*16+R:J=J+1:GOTO3020
```

```
   1 REM KEYWORDS     G.KENDALL
   5 IF PEEK 23631+256*PEEK 2363
2<>23734 THEN PRINT "STOP HERE.":
: STOP
  10 CLEAR 30999
  20 LET ADD=31000: REM address
  30 LET H=0: REM   hex to dec
  40 LET NUM=1010: REM line no.
  50 LET ERR=0: REM error count
  60 PRINT "PLEASE WAIT..."
 100 RESTORE : READ A$,A
 110 FOR F=1 TO 301
 120 FOR Z=1 TO 2
 140 LET H=H*16+CODE A$(Z)-48-7*
(A$(Z)>"9")
 150 NEXT Z
 160 LET ERR=ERR+H
 170 POKE ADD,H: LET ADD=ADD+1:
LET H=0
 180 LET A$=A$(3 TO )
 190 IF NOT LEN A$ THEN GO SUB 5
00
 200 NEXT F
 210 PRINT NUM'"O.K."
 220 SAVE "BASIC": GO TO 220
 290 STOP
 500 IF ERR<>A THEN PRINT "ERROR
 IN LINE ";NUM: STOP
 510 PRINT NUM: READ A$,A: LET N
UM=NUM+10
 520 RETURN
1000:
1010 DATA "2A535C2B01EB00CD5A160
111002A4F5C11D05C232373237209EB"
,1939
1015:
1020 DATA "21315B010600EDB021150
022105CFDCB30DEC9F409A8104B80",4
295
1025:
1030 DATA "213B5CCB5E2016CBDE3EF
D32415CCDA81028FBF5CD1D11AFCD011
6F1C9CDA810F5FE0DCC125D",9014
1035:
1040 DATA "CDFB5CF1C93AB85CFE0DC
011085DCD1311C93A0D5C11D05CCD131
1C92A595C2B237EFE0DC8FE222073FE"
,13870
1045:
1050 DATA "0E287AFE4038EFFE5B30E
B22B05C16A30194002AB05C030AFE36C
AA45DCB7F28031418F2BE20EF0B0A03"
,18157
1055:
1060 DATA "1730E91E0103231C0ABE2
8F9CB7F20030B18D614E67FBE20D0237
EFE202812FE0D20C6233E80BE2B20BF"
,22151
1065:
1070 DATA "E5D5CD5216D1E11C06004
BA7ED427EFE202802230D72E523CDE81
9E11884237EFE2228F8FE80C818F523"
,27261
1075:
1080 DATA "2323232318ECE5ED5B615
CA7ED52E1D018E021187911045B01330
0EDB0CD045B214B7911D05C01E000EDB
0C900",32014
```

Keyword

Glyn Kendall,
Streatham,
London SW16.

SPECTRUM

HAVING RECENTLY obtained a proper keyboard for the Spectrum that did not have the legends printed on the keys, and disliking the idea of painting them on, I set about writing a routine to enable the keywords to be typed in letter by letter. This may seem a retrograde step but using the multi-shifted Spectrum I find myself chanting things like Symbol Shift Caps Symbol Shift x to get Ink up on the screen.

The routine is not interrupt driven so will not tie up computing time, in fact it comes into operation between the time you press enter and the ROM's syntax checker gets at it. The working section consits of 223 bytes so you only lose about 230 bytes from Basic..

Enter the program and Run it, the checks will catch most of the errors and print what line they occurred in. When correct the Program will go into a loop and save itself in case of any undetected errors. When you are satisfied that you have saved enough copies break into the program and New it. Then enter.

RAND USR 31274

(continued on page 189)

PRINTER EXTRAVAGANZA

Order Today
Print Tomorrow
24 HOUR DELIVERY

We challenge you to find a better deal!

The only printer firm OPEN 7 DAYS A WEEK

EPSON PRICE CRASH

EPSON RX80 (DOT MATRIX)	£219 + VAT =	£251.85
EPSON RX80FT (DOT MATRIX)	£247 + VAT =	£284.05
EPSON FX80 (DOT MATRIX)	£324 + VAT =	£372.60
EPSON MX100 (DOT MATRIX)	£355 + VAT =	£408.25
EPSON RX100 (DOT MATRIX)	£385 + VAT =	£442.75
EPSON FX100 (DOT MATRIX)	£499 + VAT =	£573.85

As FX 100 now in very short supply, telephone for alternatives



MAKING WAY FOR THE NEW

star

DOT MATRIX PRINTERS

The power behind the printed word.

STAR GEMINI 10X	£198 + VAT =	£227.70
STAR DELTA 10	£325 + VAT =	£373.75
STAR GEMINI 15X	*Ring for stupid prices*	**NOW**
STAR DELTA 15	£499 + VAT =	£573.85

WE WILL MATCH ANY GENUINE PRICE ADVERTISED
SCI(UK) IS NEVER BEATEN ON PRICE

MANY MORE PRINTERS AVAILABLE - 1000's OF SCI(UK) BARGAINS

SEND NOW FOR THE **FAMOUS** SCI(UK) CATALOGUE



for cheapest prices telephone **0730 63741** *or* **0730 61745**

MORE SCI(UK) BARGAINS

SHINWA CP80	£179 + VAT =	£205.85
BROTHER EP44	£179 + VAT =	£205.85
CPP 40 Colour printer/plotter	£109 + VAT =	£125.35
RITEMAN A1	£229 + VAT =	£263.35
FIDELITY 14" Colour monitor/video	£189 + VAT =	£217.35

DAISYWHEEL PRINTERS

JUKI 6100	*phone for stupid price*	
DAISEYSTEP 2000	£279 + VAT =	£320.85
UCHIDA DWX305	£279 + VAT =	£320.85
BROTHER HR 15	*Ring for stupid price*	**NOW**

New from the world famous CANON Company

CANON 1080A NLQ DM best value ever at ..... **£319** + VAT = £366.85

CANON 1156A New wide bodied NLQ DM
Sensational value at ..... **£399** + VAT = £458.85

We have interfaces for all types of computers, including CBM 64, VIC 20, APPLE, TRS 80, IBM, BBC, SPECTRUM, QL, etc.

AMERICAN EXPRESS · MasterCard · Access · EUROCARD

BEAT THAT

24 HOUR SECURICOR DELIVERY £9.50 plus VAT • BANKERS ORDERS, BUILDING SOCIETY CHEQUES, POSTAL ORDERS - SAME DAY
ALL ORDERS COVERED BY THE MAIL ORDER PROTECTION SCHEME • NATIONWIDE MAINTENANCE CONRACTS ARRANGED
EDUCATIONAL DISCOUNTS VERY WELCOME

Its SUNDAY - Do you realise you can order NOW - We are open 7 DAYS A WEEK.

DEALER ENQUIRIES WELCOME
WRITE FOR DETAILS

SCI(UK)

SCI (UK) FREEPOST (No Stamp needed)
PETERSFIELD HANTS GU32 2BR

0730 61745
0730 63741

EXPORT ENQUIRIES
NO TAX
DELIVERY AT COST

Personal callers welcomed. Unit 16. Inmans Lane. Sheet. PETERSFIELD. Hants. TELEX 86625 MYNEWS G

(continued from page 187)

This will put the code in the right place and turn it on. Press Enter and you should have a different cursor. If not or the program crashes then Load Basic again and carefully check it against the listing. If it is OK then Enter the header. This must be entered as listed — except for the colour statements — or the computer will crash.

SAVE "KEYWORD" LINE 1 :SAVE "START" CODE 23300,51 : SAVE "MAIN" CODE 23760,224

This will be the working copy so save it a few times. You can now delete the header.

Start is put in the printer buffer because it is only needed once, so you can wipe it out if you want. Do not call Start more than once as it reserves memory for Main each time it is used. To turn it off

POKE 23736,168: POKE 23737,16

To turn it back on

POKE 23736,208; POKE 23737,92

It is safer if you put these commands on a single line separated by a colon. In fact I insist that you do. Note that the address of a line 1 Rem is no longer 23760.

Using keyword; the editor will search for keywords in capitals followed by a space or in certain circumstances non capitals i.e., numeric. If in doubt put a space. Single words like Run or List can be entered direct — no space. E mode and Graphics mode are recognised as is Symbol Shift Caps etc. The only thing missing is the K mode. Anything in quotes is ignored but a Rem line is not. This should not matter as the computer will jump it anyway. Do not forget that words like Goto and Gosub need spaces in them to be recognised.

Point plot

I S Gibson,
Maidstone, Kent.

BBC

THIS PROGRAM enables points to be plotted and lines to be drawn in Mode 6 and Mode 3. This means that including the program, there is 3K more than Mode 0 in Mode 3 and 1K more in Mode 6 than Mode 4. Points may be plotted using the form:

PROCPLOT (X,Y)

and unplotted using

PROCUNPLOT (X,Y)

Also I've added a line drawing routine

PROCLINE (X1,Y1,X2,Y2;P)

where P is 1 for a plotted line and 0 for unplotted. The variable ST% must be 640 in Mode 3 or 320 in Mode 6.

If the screen is wobbly, change the 38 in line 70. Values between 30 and 45 are best.

```
   10REM MODE 6 & MODE 3 PLOTTER
   20REM by I.Gibson
   30MODE 3
   40ST%=640: REM ST%=320 for MODE 6
   50VDU 23;8202;0;0;0;
   60VDU 23,0,9,7,0;0;0;
   70VDU 23,0,4,38,0;0;0;
   80VDU 23,0,7,30,0;0;0;
   90VDU 23,140,128,128,128,128,128,128,128,1
28
  100PRINTTAB(0,11);"
                     "
  110FOR D%=0 TO 24
  120PRINTTAB(40,D%);CHR$(140);
  130NEXT D%
  140PROCLINE(320,104,328,104,1)
  150FOR X5%=0 TO 639
  160PROCPLOT(X5%,90+SIN(X5%/102)+104)
  170NEXT
  180END
10000DEF PROCLINE(XX1%,YY1%,XX2%,YY2%,SE%)
10010DX%=XX2%-XX1%:WW%=YY2%-YY1%:ZZ%=SGN(DX%)
:VV%=SGN(WW%):RR%=SGN(DX%):SS%=0:NN%=ABS(DX%)
:MM%=ABS(WW%)
10020IF NN%>MM% THEN 10040
10030RR%=0:SS%=SGN(WW%):NN%=ABS(WW%):MM%=ABS(
DX%)
10040JJ%=INT(NN%/2)
10050FOR KK%=0 TO NN%
10060IF SE%=1 THEN PROCPLOT(XX1%,YY1%) ELSE
PROCUNPLOT(XX1%,YY1%)
10070JJ%=JJ%+MM%
10080IF JJ%<NN% THEN 10110
10090JJ%=JJ%-NN%:XX1%=XX1%+ZZ%:YY1%=YY1%+VV%
10100GOTO 10120
10110XX1%=XX1%+RR%:YY1%=YY1%+SS%
10120NEXT KK%
10130ENDPROC
10140DEF PROCPLOT(X%,Y%)
10150Y%=199-Y%
10160P%=((X% DIV 8)*8+(Y% MOD 8)) + (Y% DIV 8
)*ST%
10170A$="00000000"
10180M%=X% MOD 8
10190A$=LEFT$(A$,M%)+"1"+MID$(A$,M%+2)
10200?(HIMEM+P%)=?(HIMEM+P%) OR FNBIT(VAL(A$)
)
10210ENDPROC
10220DEF PROCUNPLOT(X%,Y%)
10230Y%=199-Y%
10240P%=((X% DIV 8)*8+(Y% MOD 8) + (Y% DIV 8)
*ST%)
10250A$=""
10260TI%=?(HIMEM+P%)
10270EN%=256
10280FOR TR%=1 TO 8
10290EN%=EN%/2
10300IF TI%>=EN% THEN TI%=TI%-EN%:A$=A$+"1" E
LSE A$=A$+"0"
10310NEXT TR%
10320M%=X% MOD 8
10330A$=LEFT$(A$,M%)+"0"+MID$(A$,M%+2)
10340?(HIMEM+P%)=FNBIT(VAL(A$))
10350ENDPROC
10360DEF FNBIT(B%)
10370IF B% MOD 10>1 THEN =0
10380IF B%=B% MOD 2 THEN =B% ELSE = FNBIT(B%
DIV 10)*2+B% MOD 2
```

Break-disable

Robert Newman,
Peterborough,
Northamptonshire.

SPECTRUM

I HAVE WRITTEN two machine-code routines for the Spectrum which disables the Break key during the running of a Basic program — i.e., preventing the errors "Break into program" and "Break — Cont repeats" from halting the program.

Routine A also causes the computer to reset when the program finishes, or if any error apart from Break occurs. This would be useful if you want to prevent people from listing or copying your program. However, unless your program is on a Microdrive, it could always be Merged instead of Loaded to overcome this.

Routine B just disables Break, so that if the program stops for any other reason it can be listed, edited, Run etc.

Put the lines of Basic from listing 1 at the beginning of your program, using the Data statements for either routine A or routine B. Both routines can be used with 16K or 48K. You only need to change the Clear statement in line 2, and the value of Start in line 3.

If you only want to disable break during certain parts of your program, then miss out lines 5 and 6, and use the two Pokes later when you want to switch break-disable on. Break can then be re-enabled with these two Pokes:

POKE errsp,3 : POKE errsp + 1,19

Listing 1.

```
 1 REM Break-disable (C) R Newman 1984
 2 CLEAR 65329          : REM or 32559 if 16K
 3 LET start = 65330    : REM or 32560 if 16K
 4 LET errsp = PEEK 23613 + 256 * PEEK 23614
 5 POKE errsp, start - 256 * INT (start/256)
 6 POKE errsp+1, INT (start/256)
 7 READ n
 8 FOR j = start TO start + n - 1
 9 READ a : POKE j,a
10 NEXT j
Use these DATA statements for routine A :-
11 DATA 27,33,start-256*INT(start/256),INT(start/256),229,58,58,
       92,254,20,40,5,254
12 DATA 12,194,0,0,253,54,0,255,253,203,1,174,195,125,27
Use these DATA statements for routine B :-
11 DATA 33,33,3,19,58,58,92,254,20,40,4,254,12,32,15,33
12 DATA start-256*INT(start/256),INT(start/256)
13 DATA 229,253,54,0,255,253,203,1,174,195,125,27,229,195,3,19
```

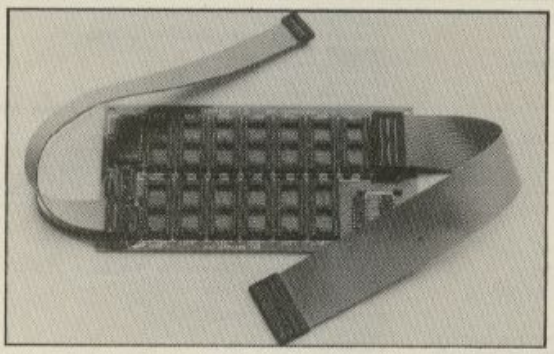
Demo program for routine A.

```
 10 REM Break disable demo
 20 REM Robert Newman 1984
 30 REM Routine A
 40 CLEAR 65329
 50 LET start=65330
 60 LET errsp=PEEK 23613+256*PEEK 23614
 70 POKE errsp,start-256*INT (start/256)
 80 POKE errsp+1,INT (start/256)
 90 READ n
100 FOR j=start TO start+n-1
110 READ a: POKE j,a
120 NEXT j
130 DATA 27,33,start-256*INT (start/256),INT (start/256),229,58,58,92,254,20,40
,5,254
140 DATA 12,194,0,0,253,54,0,255,253,203,1,174,195,125,27
145 REM ************************
146 CLS
150 PRINT "Demonstration of routine A."
160 PRINT "This routine disables BREAK."
170 PRINT "If any other error occurs, or   the program finishes, the       comp
uter will reset itself."
180 PRINT "This prevents the program from  being listed or copied."
190 PRINT '"Try pressing BREAK."
200 FOR j=1 TO 400
210 PRINT AT 10,10;j
220 NEXT j
230 CLS
240 PRINT "Pressing BREAK,N or space does  not prevent scrolling."
250 FOR j=1 TO 50: PRINT j: NEXT j
260 PRINT "To return to start of demo,enterY. Other inputs will cause reset"
270 INPUT a$
280 IF a$="Y" OR a$="y" THEN  GO TO 145
```

Demo program for routine B.

```
 10 REM Break disable demo
 20 REM Robert Newman 1984
 30 REM Routine B
 40 CLEAR 65329
 50 LET start=65330
 60 LET errsp=PEEK 23613+256*PEEK 23614
 70 POKE errsp,start-256*INT (start/256)
 80 POKE errsp+1,INT (start/256)
 90 READ n
100 FOR j=start TO start+n-1
110 READ a: POKE j,a
120 NEXT j
130 DATA 33,33,3,19,58,58,92,254,20,40,4,254,12,32,15,33
135 DATA start-256*INT (start/256),INT (start/256)
140 DATA 229,253,54,0,255,253,203,1,174,195,125,27,229,195,3,19
145 REM ************************
146 CLS
150 PRINT "Demonstration of routine B."
160 PRINT "This routine disables BREAK."
170 PRINT "Successful completion, or any   error except BREAK will stop theprog
ram, which can then be      listed and RUN again."
190 PRINT '"Try pressing BREAK."
200 FOR j=1 TO 500
210 PRINT AT 10,10;j
220 NEXT j
230 CLS
240 PRINT "Pressing BREAK,N or space does  not prevent scrolling."
250 FOR j=1 TO 50: PRINT j: NEXT j
260 PRINT "To return to start of demo,enterY. Other inputs will end program"
270 INPUT a$
280 IF a$="Y" OR a$="y" THEN  GO TO 145
```

ROM extension board for the BBC Micro



This GCC designed add-on enables the user to increase sideways ROM capacity from the basic 4 sockets up to the full 16, which is capable of support by the current operating system.

- Mounts inside the lid of the BBC computer
- Normally, no soldering required
- Does not suffer from over-heating problems

ROMS/EPROMS – accommodates 2764, 27128 and 2732 EPROMS.

Price including VAT £45.94 (+£1.75 p&p).

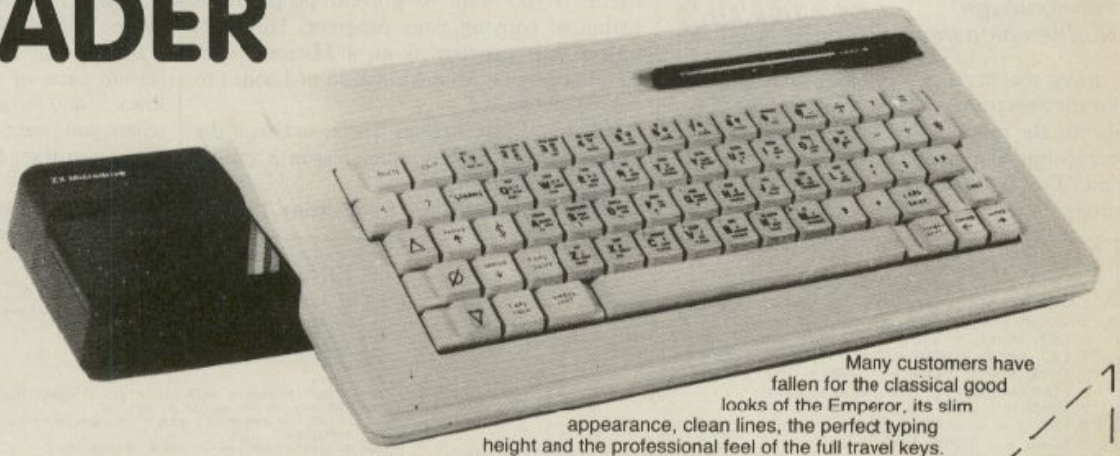
Personal Computer News January '84
"...the Romex 13 is the best I have seen".

STOCK SUBJECT TO PRIOR SALE
Trade & Local authority enquiries welcome.
Prices correct at time of going to press.

Access BARCLAYCARD VISA

GCC (Cambridge) Limited
66 High Street, Sawston,
Cambridge, England CB2 4BG
Telephone: Cambridge (0223) 835330/834641
Telex: 81594 SAWCOM

CRUSADER



NEW SPECTRUM KEYBOARDS...

Interface 1 Compatible
6 Convenience Keys
inc. **Full Size Space Bar**
22 AUTOSHIFTED
Special Function Keys

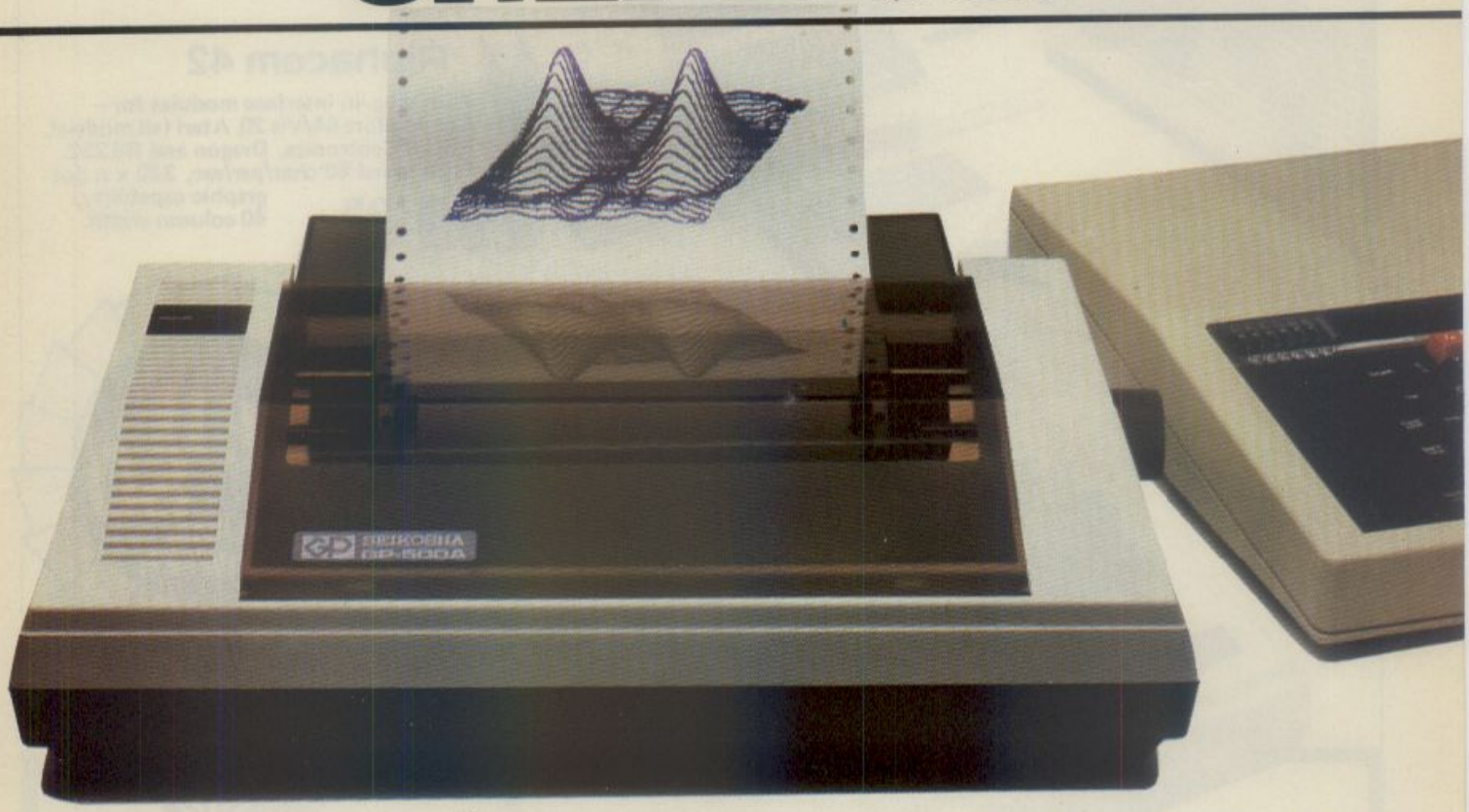
WOKING COMPUTER CENTRE
32 Chertsey Road, Woking, Surrey.
Telephone Woking (048 62) 23845.
Trade enquiries welcome

Many customers have fallen for the classical good looks of the Emperor, its slim appearance, clean lines, the perfect typing height and the professional feel of the full travel keys. Now we have added the CRUSADER to the range, identical in appearance but purpose built for the serious programmer, typist or business user. It is the same size, 14.5"x7.3"x2" fitted, in Ivory, but has a triple matrix featuring 22 AUTOSHIFTED function keys: all the microdrive command/maths keys ÷ × = − + # are together in the top right hand corner, main punctuation , . ; : " where typists expect them, autoshifted cursors, Caps lock, $, Graphics, ‹, ›, Edit and DELETE. We have retained the convenience keys, ⟲(7), ⟳(6), fire (0), double caps shift & symbol shift for easy access to the extended modes, and the full sized space bar.

We have also maintained: the easy fitting, you need 1 screw driver — and 5 minutes AND, for a quality keyboard, incredible low cost of **£59.95.**

Please send me Emperor/Crusader keyboard(s), £49.95/£59.95+£1.50 P&P
I enclose cheque/P.O./Access/Visa No. _____
To Woking Computer Centre, for
Name _____
Address _____
Please fill in this coupon and your address (which is also your address label) in block capitals to ensure prompt delivery

YOUR BBC MICRO MEETS ITS MATCH. SEIKOSHA GP500A. ONLY £199.



Even with such a versatile workhorse as your BBC Micro, you've got problems.

For example, supposing you want a permanent record of important graphics? Or need to eliminate glitches from a lengthy program? Fast.

Without a printer you're stuck.

And up to now, even if you had a printer that could play in the same league as your BBC Micro, you were stuck - with a price tag running into three or four hundred pounds.

The Seikosha GP500A changes all that.

It's got full graphics capability, with a single command enabling you to repeat a column of graphic data as many times as you like.

Its printing speed is 50 characters a second in an 80 column dot matrix format on standard width paper adjustable up to 10 inches.

And under its sleek casing, there's a wealth of sophisticated features. Like automatic printing (no data lost due to overflow), intermixing of all modes on a single line and printing of one copy as well as the original.

All for only £199.00.

No, you didn't misread. The Seikosha GP500A complete with BBC Micro interface cable costs only £199.00.

See the GP500A in action - consult the dealer list that follows this advertisement for your nearest dealer, he'll be delighted to arrange a demonstration.

SEIKOSHA **DRG**

DRG Business Systems, Peripherals Division, 13/14 Lynx Crescent, Winterstoke Road, Weston-super-Mare, Avon BS24 9DN.
Telephone: 0934 419914. Telex: 444761.

Alphacom

range of 32, 40 and 80 column HIGH-SPEED THERMAL PRINTERS



Alphacom 32

Fully interfaced to SPECTRUM and ZX81. Uses standard Sinclair print commands (COPY, LLIST, PRINT). Print speed 80 char/per/sec, 256 x n dot graphic capability, 32 column width.

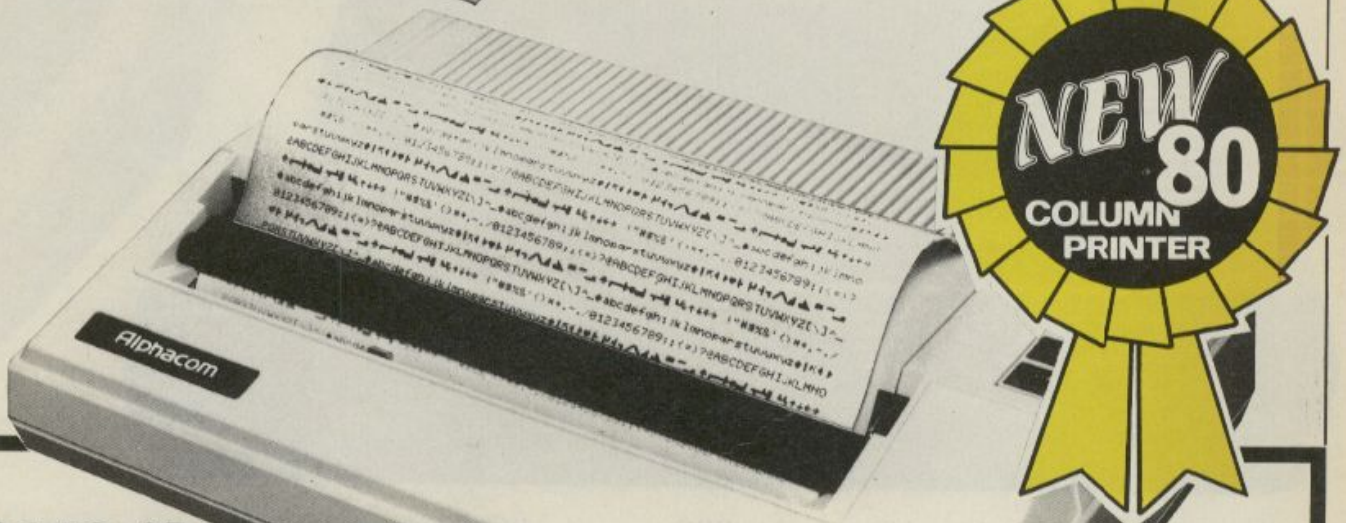
£69·95 Add £2 p.p.



Alphacom 42

With plug-in interface modules for — Commodore 64/Vic 20, Atari (all models), BBC B Centronics, Dragon and RS232. Print speed 80 char/per/sec, 320 x n dot graphic capability, 40 column width.

£99·95 Add £2 p.p.



£149·95 Add £2.50 p.p.

Alphacom 81

An 80 column thermal printer (8¼ ins paper width). Print speed 100 char/per/sec with full graphic capability and line feed advance.

For Commodore 64/Vic 20, BBC B Centronics, Atari (all models), Dragon and RS232. To the printer, simply plug in the interface module applicable to your computer (similar to model 42 above). Each module supplied includes the appropriate self-test programme. Additional interface modules available separately.

DEAN ELECTRONICS LIMITED
Glendale Park Fernbank Road Ascot Berkshire SL5 8JB
Telephone 0344 885661 Telex 849242

Please send ..... ALPHACOM 32 @ £71.95 } and .... boxes of paper @ £12 (10 rolls)
..... ALPHACOM 42 @ £101.95 }
..... ALPHACOM 81 @ £152.45 and .... rolls of paper @ £5.50 (2 rolls)
To be used with computer .....
Total £..... PO/Cheque enclosed or debit Access/Barclay Card Account No. .....
Name/address .....
.....
.....

Or from branches of: W H Smith, John Menzies, Greens, John Lewis Group, Spectrum Group.

WE'VE GOT IT DOWN IN PRICE. YOU GET IT DOWN IN BLACK AND WHITE.



Get more out of your Spectrum with a printer. Not just for the help it can give you with preparing and debugging programs, but also jobs like cataloguing, file listing and word processing.

A printer needn't cost you the earth, either. The new Seikosha GP50S (available soon) with its 5" paper width, graphics capability, intermixing of all modes on a single line and alternative colour ribbons costs only £138. Including built-in interface for your Spectrum.

Or if you're looking for something more sophisticated, there's the Seikosha GP500S. A development of the highly popular 100A, it's got a 50 cps printing speed, full graphics capability, paper width adjustable up to 10". Plus a dedicated Spectrum interface, all for just £229.00.

Get into print NOW - consult the dealer list that follows this advertisement for your nearest dealer, he'll be delighted to arrange a demonstration.

SEIKOSHA **DRG**

DRG Business Systems, Peripherals Division. 13/14 Lynx Crescent, Winterstoke Road, Weston-super-Mare, Avon BS24 9DN.
Telephone: 0934 419914. Telex: 444761.

THE HOTTEST GAMES IN TOWN FROM LLAMASOFT



HELL GATE

HELL GATE on the 64 is certainly no REVENGE or HOVER BOVVER, being the VIC 20 code tweaked to run on this system. However we are offering it at a bargain price to those who like an unusual shoot-'em-up, fans of Gridrunner and Matrix should enjoy themselves and the game is challenging to all.
Available for Commmodore 64 **£5.00** and VIC-20 **£6.**

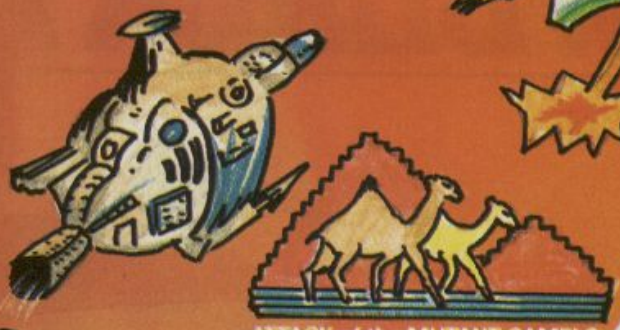
MATRIX

Jeff Minter has taken Gridrunner – the game that topped bestseller charts in USA and UK – and created an awesome sequel.
Graphically superb, it features multiple screens, new aliens and attack waves, mystery bonuses, renegade humanoids, deflexor fields, diagonal tracking countdown/panic phase and much, much more ...
Packed into 20 mind-zapping zones and accompanied by incredible sonics.
8K expansion required.
Available for Commmodore 64 **£7.50** and VIC-20 **£6.**



LASER ZONE

Experience Laser Zone – an utterly NEW totally ORIGINAL masterpiece of Video games design. Learn to control two spaceships at once. Feel the EXHILARATION as, after long hours of practice, you control the two ships so that they function as a smooth, co-operative team! Feel the raw POWER as you lunge for the electro button and BLAST your enemies into expanding clouds of SPACE JUNK!! Feel the humiliation as a carelessly aimed BLAST slams into the side of your last remaining ship!! 8K expansion required.
Available for Commodore 64 **£7.50** and VIC-20 **£6.**



METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

A fast and original game for the unexpanded VIC. Challenging and colourful, with good sonics and a unique game action and design, this promises to be the most exciting new 3.5K VIC game since the introduction of GRIDRUNNER nearly a year ago.
£5.50



ATTACK of the MUTANT CAMELS

Planet earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 90 foot high, neutronium shielded, laser spitting death camels!! Can you fly your tiny, manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the humans stronghold! You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features superb scrolling, scanner 1/2 player actions and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome m/c action! Available for Commodore 64 **£7.50.**



GRIDRUNNER

Finally true arcade quality on the unexpanded VIC! Shoot down the segmented DROIDS invading the grid. Beware of the pods and zappers! The awesome speed, sound, and graphics gives you the best blast available for unexpended VIC. Available for VIC-20 **£5.00** Commodore 64 **£5.00** Atari 400/800 **£7.50**

HOVER BOVVER

A totally original arcade game for C64 featuring outstanding graphics and a sound track created by a professional Piano Wizard. Gordon Bennet has borrowed his neighbour's Air-Mo lawnmower. Mow your way through as many of the 16 lawns as you can before the pursuing neighbour retrieves his mower. Set your dog onto the neighbour to help you out of tight spots and don't annoy the gardener. Try not to plough through the neat flower beds or overheat your mower!
£7.50





REVENGE OF THE MUTANT CAMELS

At last the long awaited sequel to Attack of the Mutant Camels is available. You are controlling a ninety foot high, neutronium shielded lazer spitting death camel; leading a rebellion against your evil Zryaxian overlords. The game features beautiful smooth scrolling graphics and no less than 42 different attack waves, more than any game in video history. The challenge of play will last for months as you battle to see what's on the next wave.
£7.50



llamasoft

Awesome Games Software

All orders add 50p postage and packing

LLAMASOFT GAMES NOW IN LASKYS AND MANY OTHER RETAILERS

49 MOUNT PLEASANT, TADLEY, HANTS. RG26 6BN.
TELEPHONE: TADLEY (07356) 4478

Computers for Export

Sinclair
Oric
Commodore
Atari
Texas
Epson
Coleco



BBC
Vectrex
Linx
Aquarius
New Brain
Acorn

Plus Printers, Disc Drives, Memory Expansion, Software

Quantity discounts available

No tax charge for equipment shipped abroad
Write for our price list or call our 24hr answer phone
01-686 6362

Galaset Ltd, 30 Bayford Road, Littlehampton, West Sussex, England. Telex. 8954018 Acurat G

MICRO-X EXPORT

ORIC, COMMODORE, SINCLAIR, ACORN, MEMOTECH, ETC.

We export Microcomputers and Peripherals to all Countries. Any make. Any Quantities. BIG DISCOUNTS.

Send for comprehensive price list:
MICRO-X LTD (Dept 165)
765-767 HARROW ROAD, LONDON, NW10 5NY
TELEPHONE 01-968 6522 TELEX 915866 MICROX G

SEE THE FULL SEIKOSHA RANGE AT THESE DEALERS.

ENGLAND

AVON
Bristol: Dewco Computer Services. (0272) 23352.

BEDFORDSHIRE
Bedford: Bedford Computers. (0234) 215015.

BUCKINGHAMSHIRE
High Wycombe: Kingsley Computers. (0494) 449749.

CHESHIRE
Frodsham: Northern Computers. (0928) 35110.

CORNWALL
Camborne: Microaid. (0209) 831274.

COUNTY DURHAM
Darlington: Darlington Computer Shop. (0325) 487478.

CUMBRIA
Carlisle: The Computer Shop. (Carlisle) Ltd. (0228) 27710.

DEVON
Exeter: Devon Computers Ltd. (0392) 218401.

DORSET
Poole: Densham Computers Ltd. (0202) 737493.

ESSEX
Harlow: Akhter Instruments. (0279) 443521.

GLOUCESTERSHIRE
Cheltenham: The Screen Scene. (0242) 528979.

HAMPSHIRE
Portsmouth: Advanced Digital Services. (0705) 823825.

HERTFORDSHIRE
Watford: Computer Plus. (0923) 33927.

HUMBERSIDE
Hull: The Computer Centre. (Humberside) Ltd. (0482) 26297.

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

LANCASHIRE
Burnley: IMO Computer Centre. (0282) 57411/54299.
Lancaster: Castle Computers. (0524) 61133.

LEICESTERSHIRE
Leicester: Arcade Computers. Leicester (0533) 532991.

LONDON
Eltham: The Advanced Technology Centre. 01-859 7696.
N1: Microfast. 01-729 1778.

LINCOLNSHIRE
Grantham: Oakleaf Computers. (0476) 76994.

MANCHESTER
Sumlock Electronics Services Ltd. 061-834 4233.

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

NORFOLK
Norwich: Sumlock Bondain. (0603) 617083.

NOTTINGHAMSHIRE
Nottingham: Computer Market. (0602) 586454.

SALOP
Telford: Computer Village. (0952) 506771.

SOUTH YORKSHIRE
Barnsley: Comtec. (0226) 46972.

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

SURREY
Croydon: Visionstore Ltd. 01-681 7539.
Kingston-upon-Thames: Visionstore Ltd. 01-546 8974.

SUSSEX
Worthing: Worthing Computer Centre. (0903) 210861.

TYNE AND WEAR
Gateshead: H.C.C.S. Associates Ltd. (0632) 821924.

WEST MIDLANDS
Birmingham: Specialist Computer Centre Ltd. 021-643 4743.
Coventry: Coventry Micros. (0203) 58942.

WEST YORKSHIRE
Bradford: Eltec Computers. (0274) 722512.
Leeds: Microcell. (0532) 449722.

WILTSHIRE
Westbury: Everyman Computers. (0373) 864644.

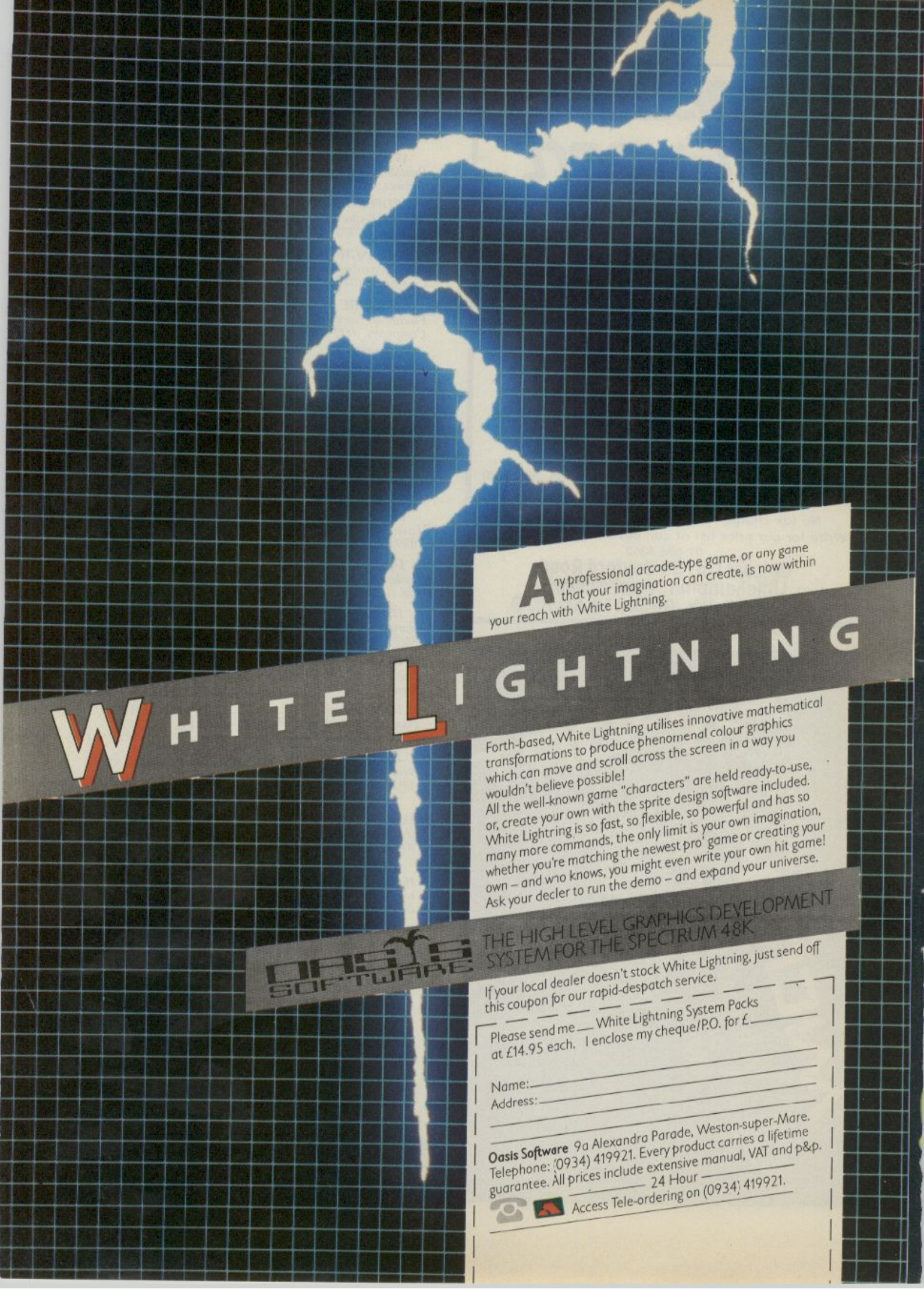
SCOTLAND

GLASGOW
Exchange Computers Ltd. 041-424 4242

WALES

CLWYD
Abergele: Abergele Computer Centre. (0745) 826234.

SEIKOSHA DRG



Any professional arcade-type game, or any game that your imagination can create, is now within your reach with White Lightning.

WHITE LIGHTNING

Forth-based, White Lightning utilises innovative mathematical transformations to produce phenomenal colour graphics which can move and scroll across the screen in a way you wouldn't believe possible!
All the well-known game "characters" are held ready-to-use, or, create your own with the sprite design software included. White Lightning is so fast, so flexible, so powerful and has so many more commands, the only limit is your own imagination, whether you're matching the newest 'pro' game or creating your own – and who knows, you might even write your own hit game!
Ask your decler to run the demo – and expand your universe.

OASIS SOFTWARE

THE HIGH LEVEL GRAPHICS DEVELOPMENT SYSTEM FOR THE SPECTRUM 48K

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. Telephone: (0934) 419921. Every product carries a lifetime guarantee. All prices include extensive manual, VAT and p&p.

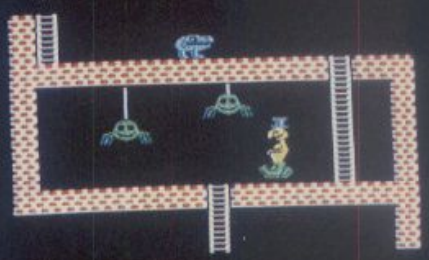
24 Hour Access Tele-ordering on (0934) 419921.

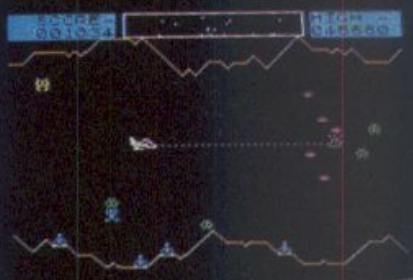
THE GAMES LANGUAGE OF THE 80'S!

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



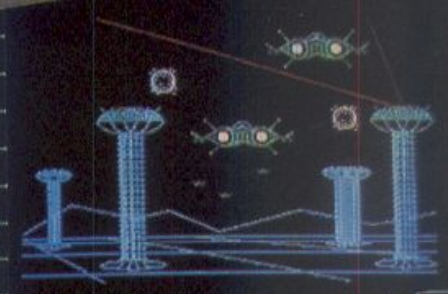


THE KEY TO PROFESSIONAL GAMES DESIGN

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.





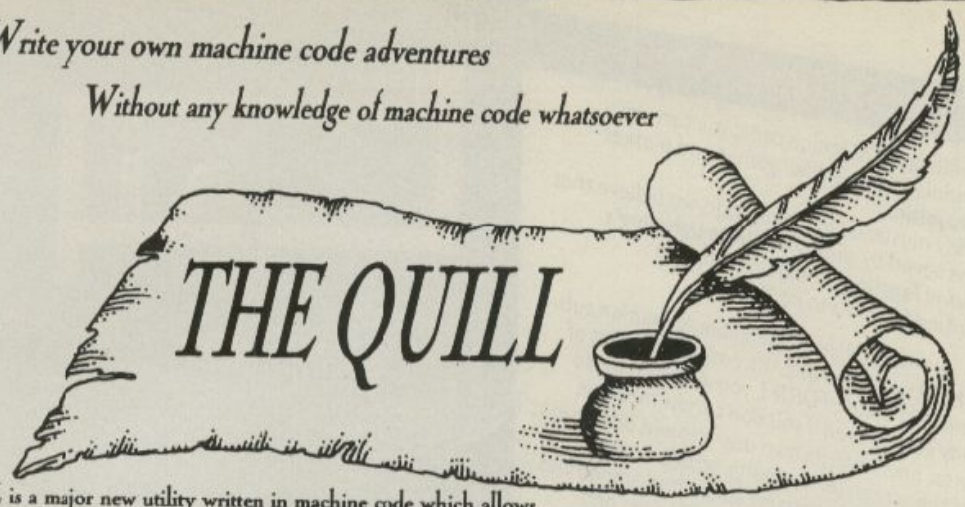
Oasis Products are available from Boots and all good software suppliers. Including:
Websters, Games & Computers, Microdeal, The Dragon Dungeon, PCS Distribution, Pilonmist, Goal Computers (France), Falck Computers (Scandinavia) and Joylab (Germany).
If your local dealer does not stock our products then let us know his address and we will contact him.

COMING SOON
the power of White Lightning on the COMMODORE 64!

Write your own machine code adventures

Without any knowledge of machine code whatsoever

THE QUILL



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

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

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

FOR THE 48K SPECTRUM AT £14.95

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

SAE for full details of our range.

Dealer enquires welcome.

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

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

ACCESS BARCLAYCARD VISA

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 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.

THE MICRO WORKSHOP

MICRO COMPUTER SPECIALISTS

(Spectrum Group Member)

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

DOWN, DOWN AND DOWN AGAIN

The deeper you dive, the deeper the danger. Through cavern after cavern to find the pearls and the treasure. (It's different every game!) Sharks, octopuses and jellyfish are everywhere; and look out for your oxygen level! Staggering graphics, fantastic colou – a true arcade adventure.

Another great quality game from the house which brought you **"Harrier Attack!"** and **"Jungle Trouble."**

DURELL software

available from
W. H. SMITH • LASKYS •
GREENS at DEBENHAMS •
BOOTS • MARTINS •
COMPUTERS FOR ALL •
SPECTRUM CENTRES
and many other
retail outlets

or order direct from
CASTLE LODGE, CASTLE GREEN,
TAUNTON, SOMERSET. TA1 4AB

Spectrum Oric/Atmos commodore

MAIL ORDER

SPECTRUM software £5.95 all other software £6.95
Price includes postage and packing.

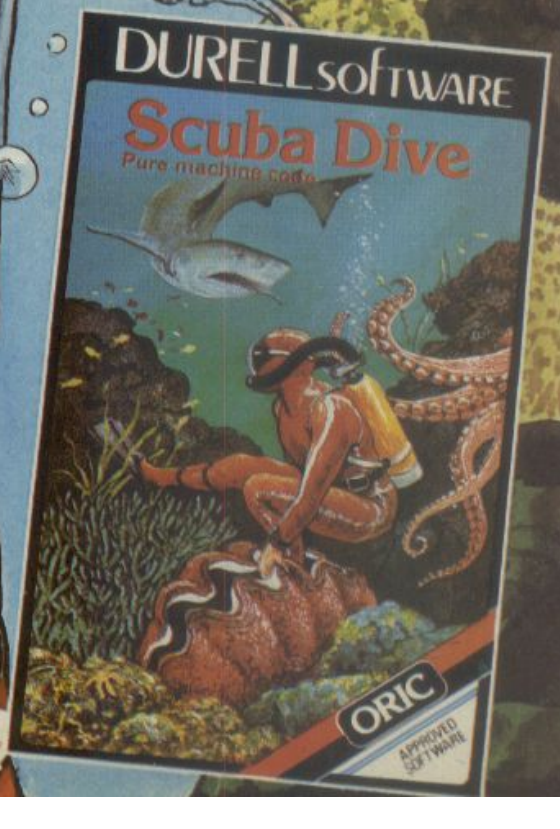
TYPE OF COMPUTER: .....

CASSETTE TITLES:
1) .....
2) .....
3) .....

NAME: .....

ADDRESS: .....

Overseas customers please allow £1.00 extra



Together the biggest marketplace in Britain



Success breeds success and that's certainly true of The Computer Fair series of exhibitions. By including the Computer Fair series in your marketing plan you can reach three large groups of customers from the consumer, business and trade markets with your products throughout the year, and time new launches to coincide with the shows, adding interest and stimulating demand.

The continuing growth of The Computer Fair series is evidence of their success. You can be part of that success if you take a stand at the shows. To find out how simply ring Chris O'Hea on 01-661 3125 or return the coupon below:

THE Computer Fair

Personal computers
Home computing
Small business systems

Please send further information on exhibiting at:
Please tick as applicable

Northern Computer Fair – Manchester ☐ Midland Computer Fair – Birmingham ☐ The Computer Fair – London ☐

Name_____

Position_____

Company_____

Address_____

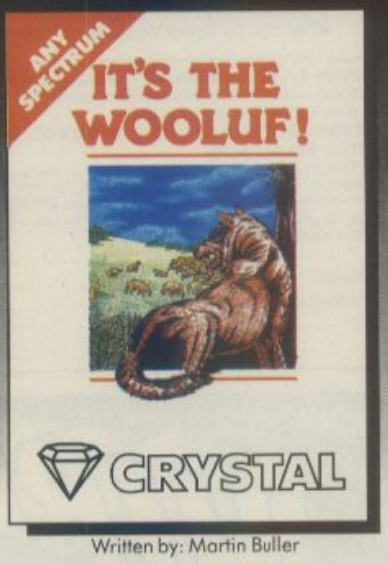
Tel No._____

Return to: The Exhibition Sales Manager,
The Computer Fair, Room L310 Quadrant House, The Quadrant, Sutton, Surrey, SM2 5AS

TWO NEW RELEASES FROM CRYSTAL

IT'S THE WOOLUF!

TUBE WAY ARMY



Written by: Martin Buller



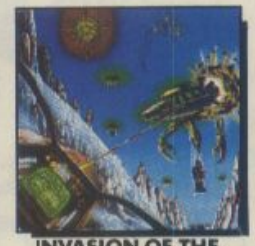
Written by: Rainbow Software

From the creators of 'Halls of the Things,' 'Invasion of the body snatchas,' and many other software classics come these exciting new games.
Games to tax your judgement and puzzle and frustrate you for months on end.
Don't forget our other titles, which have attracted enthusiastic reviews like
"Spectacular, one of the best games I've seen"... POPULAR COMPUTING WEEKLY and
"Excellent, dangerously addictive, could change the Spectrum games scene overnight"... SINCLAIR USER.

COMING SOON RETURN OF THE THINGS



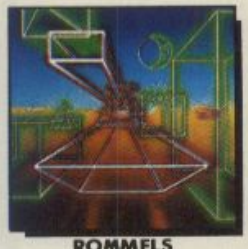
HALLS OF THE THINGS
Written by: Neil Mottershead, Simon Brattel and Martin Horsley



INVASION OF THE BODY SNATCHAS
Written by: Simon Brattel and Neil Mottershead



Written by: Graham Stafford



ROMMELS REVENGE
Written by: Martin Horsley



THE DUNGEON MASTER
Written by: Graham Stafford

All titles for 48K Spectrum unless otherwise stated

PROGRAMMERS! WRITTEN ANY SOFTWARE THAT COMES UP TO OUR STANDARDS? IF SO SEND IT TO US FOR EVALUATION. WE OFFER GENEROUS ROYALTIES.

Selected titles available from:–
Boots spectrum
John Menzies
HMV
WOOLWORTH
other large department stores and all good major software retailers. Alternatively, send the coupon to:–

Please supply:

HALLS OF THE THINGS	£7.50	INVASION OF THE BODY SNATCHAS	£6.50
IT'S THE WOOLUF	£6.50	THE DUNGEON MASTER	£7.50
TUBE WAY ARMY	£7.50	ROMMELS REVENGE	£6.50
CATALOGUE OF LATEST SOFTWARE		ZEUS 64	£9.95

NAME _____

ADDRESS _____

_____

I enclose cheque/p.o. for .....
P & P included. Overseas orders, please add £1.50 per item. YC6

CRYSTAL

CRYSTAL COMPUTING, 2 ASHTON WAY,
EAST HERRINGTON, SUNDERLAND SR3 3RX.
TRADE ENQUIRIES WELCOME:– Tel: 061-205 6603.
CRYSTAL COMPUTING IS THE TRADING NAME OF CHANDREX LTD.

CAMEL PRODUCTS

Firm up your S/ware with an

EPROM PROGRAMMER

AT LAST! for the Spectrum user. Put your programs, utilities, Assemblers into EPROMs for instant load from the unique ROM-SP.



ROM-SP NEW for Spectrum
Ingenious unit for Spectrum, with 2×28 pin sockets and a Reset button allows up to 16K of Basic or M/C program to RUN or LOAD instantly from EPROMS. Cabled connector and full extender card. NOTE: Does not disable Sinclair ROM. **£29.95**

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

PROMER 81.S NEW for Spectrum
The very popular PROMER-81 for the ZX81 has been adapted to the Spectrum, and the price kept low. **£22.95**

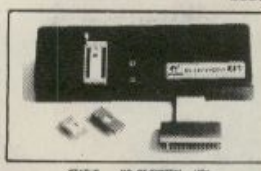
ROM-81 for ZX81
Provides two 24 pin sockets for up to 8K of EPROM memory in the 8-16K area. Can use 2516/32 or 2716/32 **£14.95**

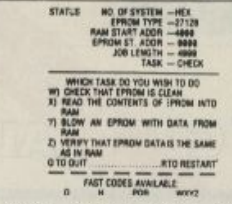
PROMER-81 for ZX81
At last! A low cost reliable programmer for 2516/32, 2716/32 EPROMS. Requires 4×PP3 batteries **£19.95**

DHOBI 1 UV ERASER
Compact. Mains powered. Safe. Fully cased. Up to 3 EPROMS **£18.95**

DHOBI 2 With automatic timer **£22.95**

BLOPROM-81
A uniquely sophisticated EPROM PROGRAMMER
In use at various labs incl. Sinclair





Eprom programmer for the 2516, 27XX single supply families, yes, even the 27128 from Intel. Check, Read, Program + Verify all or part of Eprom.
So immensely user friendly you'll hardly need the manual. Designed for the beginner but includes a single key entry route for the professional. Supplied as firmware, the m/c driver routine alone is worth more than the price of BLOPROM-81. No personality Cards, or other additions, just a ZX81. Several inbuilt safety features. On-board Vpp generation. 28pin ZIF socket. Cabled connector and extender plug. ABS case. **£79.95**

Dream-81
Full 64K Rampack with link options to disable 0-8-16K. Plus a 28 pin EPROM socket for 2716, 2732/2764 and even the latest 27128 from Intel, Fast/slow Eprom option, professionally built and tested. In an ABS case with an LED indicator **£59.95**

MEMIC-81
A 4K CMOS RAM and lithium battery unit. Easy SAVEing, 10yr storage and instant retrieval of programs. Resides in 8-12K or 12-16K of ZX81. **£29.95**

CRAMIC-81
Ingenious hardware/software allows this 16K CMOS RAM with lithium battery to CO-exist in same memory area as ordinary RAM. ZX81 can multitask on two completely independent programs. **£79.95**



PRINTER/MONITOR ACCESSORIES

MSB Monitor Stand for BBC micro. Sits over the Beeb 17"×12"×3.75" P&P £3.50 **£19.95**

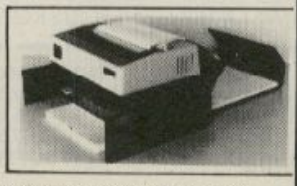
PSS Standard printer stands for OKI. Epson etc. 15"×12"×4.5". P+P £3.50 **£16.95**

PSL Large model 17"×14.5"×3.75" P&P £3.50 **£19.95**

PSC-3 for Epson MX-100 etc. etc. 21"×14"×3.75" P&P £3.50 **£22.95**

CUSTOM PRINTER STANDS for larger printers **P.O.A.**

POT Printer Output Tray for 11" fanfold paper P&P £3.50 **£16.95**



UK. VAT extra. No VAT on exports P + P UK. Free. Europe +5% — overseas +10% TLX 81574 CML

Cambridge Microelectronics Ltd. One Milton Rd. Cambridge CB4 1UY Tel (0223) 314814

ROM-SP • ROM 81 • PROMER-81 • PROMER-SP • PROMER 81-S • PRINTER STANDS

BLOPROM-81 • PIO-81 • PIO-SP • CRAMIC-81 • MEMIC-81 • MONITOR STANDS

VIC TAPE BACK UP



VIC TAPE BACKUP is a new and unique machine-code program which can provide security backup copies of most VIC-20 programs currently available.

- will backup most types of program, in BASIC or machine-code
- Detailed instructions provided
- Very easy to use, with audio-visual promptirg system
- No risks to original tapes
- Works with all memory configurations
- Allowance for load errors
- Expanded VIC may backup Commodore 64 programs
- Written for Raeto West, noted expert in CBM/VIC programming

Price £7.95 (includes VAT, post and packing – no extras)
Send orders with Cheque/PO crossed 'a/c payee' made out to Level Software Ltd to the distributors:
LEVEL SOFTWARE LTD, P.O. BOX 55, SHIRLEY, SOLIHULL B90 4SL.
TEL: 021-643 6728
This program is sold strictly on condition that purchasers use it only to take security backup copies of tapes which they own, for their own use.
I have read and understood the conditions and agree to abide by them.
It is the policy of Level Software Ltd not to accept returns under any circumstances.

.....Signature

NAME:.....

ADDRESS.....

.....

.....YC 6/84

NOW 3RD GREAT YEAR!

HIRE SPECTRUM and ZX81 PROGRAM TAPES

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

JOIN OVER 3,000 DELIGHTED MEMBERS!

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

ADVENTURE GAMES
ARCADE and SIMULATION GAMES
BUSINESS and PRACTICAL PROGRAMS
UTILITIES
M/c COMPILERS
EDUCATIONAL
FROM OVER 50 TOP SUPPLIERS ALL WITH PERMISSION!

YOUR FIRST TAPE FREE IF YOU JOIN NOW!

Formerly Sinclair Owners' S'ware Library

NOW READ THE FACTS

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

WHY SETTLE FOR LESS ?

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

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

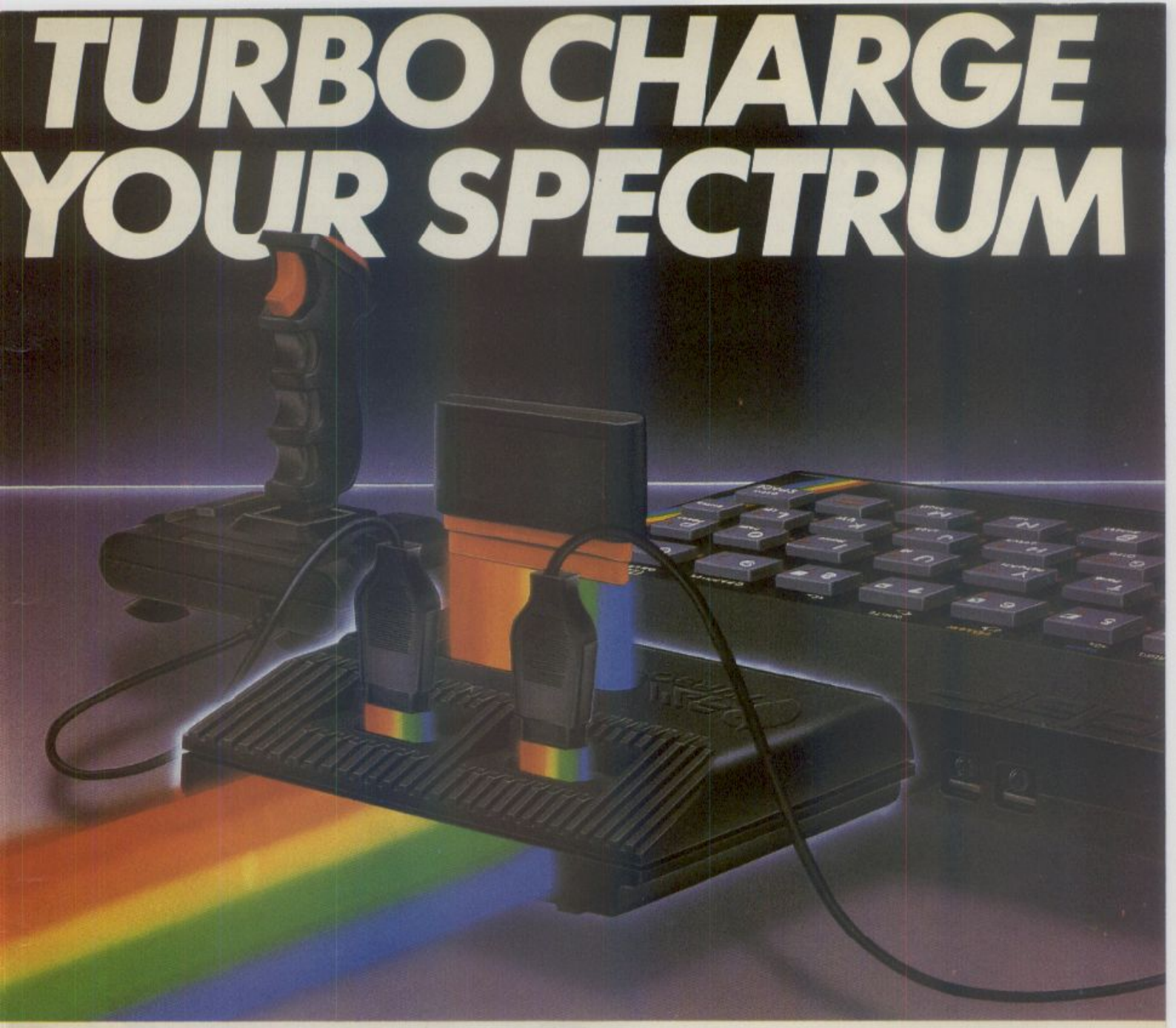
ADDRESS.....

.....

THE ORIGINAL SINCLAIR LIBRARY!

Special offer from this issue: LIFE MEMBERSHIP **£6** (normally £9.50). Overseas (Europe only) £10, or join a local branch: **Scandinavia:** Peder Lykkesvej 33, 2300 Copenhagen S. **Benelux:** Jacobsmitslaan 75, B-2400 MOL, Belgium. **W.Germany:** Postfach 7809, 4800 Bielfeld. **S.Africa:** PO Box 769, Manzini, Swaziland. **Eire:** 122 South Circular Rd., Dublin 8. YC

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.

24 Hr despatch for credit cards and postal orders

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: £_____

VISA

Name _____

Address _____

_____

Tel _____

To: Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA.

RAM TURBO

Trade and export enquiries welcome.

£1 off
Earls Court, London. June 15 – 17 1984
The Computer Fair
This voucher entitles the bearer to a £1 reduction on the purchase of 1 Adult or Child full-price ticket on the door. This cannot be used with any other offer.

Now is the time to set your sights on Britains's biggest ever home computer exhibition – The Computer Fair.

If you're seriously interested in microcomputers this is one show you definitely won't want to miss because there will be over 150 stands packed with the latest microcomputers, add-ons and software.

And The Computer Fair is the ideal place to get expert advice on all types of hardware and software products if you'd like to find out for the first time how useful and what fun microcomputers can be.

Because it's held at Earls Court, The Computer Fair is easy to travel to by car, bus or tube. With refreshment facilities on site you can make it a day out for the whole family.

Ea
Co
Ju
15

'LOCK ON C
THE COMP

THE Computer Fair
Personal computers
Home computing
Small business systems

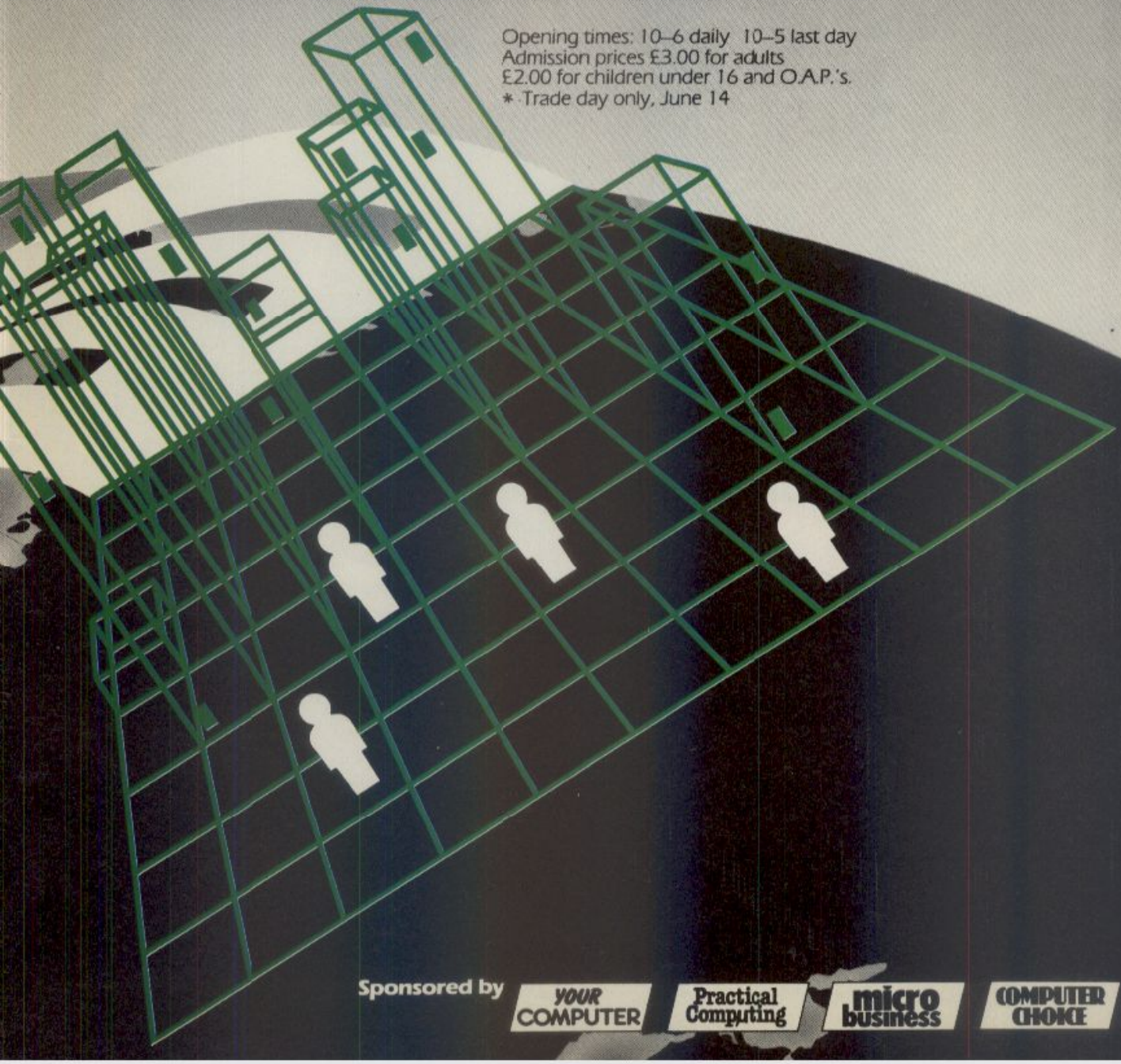


rls
rt
ne
17*

As The Computer Fair is sponsored by 'Practical Computing', 'Your Computer' and Computer Choice', the leading microcomputer magazines, you can be certain a visit is well worthwhile. So program the co-ordinates and make sure you're locked on course for The Computer Fair, June 15 – 17, 1984, Earls Courts, London.

OURSE FOR
UTER FAIR'

Opening times: 10–6 daily 10–5 last day
Admission prices £3.00 for adults
£2.00 for children under 16 and O.A.P.'s.
* Trade day only, June 14



Sponsored by YOUR COMPUTER | Practical Computing | micro business | COMPUTER CHOICE


JEFF WAYNE'S VIDEO GAME VERSION OF
THE WAR OF THE WORLDS
CRL
THE DREAM MAKERS
CRL House, 9 Kings Yard, Carpenters Road, London E15 2HD. Tel: 01-533 2918

Punchy





Punchy Now Runs & Jumps On :-

VIC 20 + 16K

CBM64 (Distributed by Commodore).

SPECTRUM 48K

SPECTRAVIDEO 318/328

AMSTRAD CPC 464 (Distributed by AMSOFT).

M.S.X. version available in June.

PUNCHY (VIC + 16K) . . £6.90

OTHER MR. MICRO TITLES AVAILABLE NOW:—

GOLD RUSH (VIC 20)	£6.90
INVINCIBLE (VIC 20)	£6.90
HUMPHREY (VIC + 16K)	£6.90
MYSTERIOUS ISLAND (VIC + 16K)	£9.90
DIGGER (VIC + 16K)	£6.90
BENGO (VIC 20)	£6.90
AMIGO (VIC + 16K)	£6.90
HUMPHREY (BBC B)	£6.90
PUNCHY (SPECTRUM 48)	£6.90
CRAZY GOLF (SPECTRUM 48)	£6.90
DRACULA (ORIC)	£6.90
RAM DAM (VIC)	£13.90
DRAGON TAMER (DRAGON)	£9.90
SCORE STORE (ALL)	£1.95
HARLEQUIN (SPECTRUM 48)	£6.90
LIGHTNING ASSEMB/DIS (ORIC)	£13.90

SPECIAL TRADE PACKAGE AVAILABLE.

ACCESS & VISA.
TEL: 061-728 2282

AVAILABLE FROM ALL GOOD STOCKISTS OR ORDER DIRECT FROM:—

MR. MICRO LTD., 69 PARTINGTON LANE, SWINTON, MANCHESTER M27 3AL, ENGLAND.

Mr. MICRO

ONLY THE BEST BECOME A....

FIGHTER PILOT

48K SPECTRUM

BY D.K.MARSHALL

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

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

£7.95
inc. VAT & p. & p.
Joystick Compatible
(Kempston, AGF, Sinclair Interface 2, Protek etc.)*

OTHER AMAZING FEATURES

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



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



TAXI
£5.50
Any Spectrum
Become a Taxi Driver and test your skills - but beware the Reckless Drivers! Fun for all the family



FOOTBALL
£7.95
48K Spectrum
League Analysis - Easy to use Pools Prediction.
With 9 methods of team performance analysis - let your Spectrum guide you to your pools selection.



NIGHT GUNNER
£6.95
48K Spectrum
Joystick Compatible ★
The air battle where only aces survive - with enemy fighters attacking from all directions, guns blazing, explosive 3D ground attack sorties - and there's **still** the flight home.



DIGITAL INTEGRATION

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

Selected products available from:
Boots, Woolworths, H.M.V., Menzies, Greens, Lasky's, Currys, Rumbelows, Selfridges, Spectrum Dealers, Video Palace, Zappo, and all good Computer shops

Please send me the following games for the Spectrum

Fighter Pilot 48K	☐ £7.95
Night Gunner 48K	☐ £6.95
Football 48K	☐ £7.95
Taxi (Any Spectrum)	☐ £5.50

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

Trade and Export enquiries welcome.

Lifetime Guarantee Cheques payable to Digital Integration

I enclose a cheque/P.O. for_____Total.

Name_____

Address_____

Or debit my Access/ Account No.

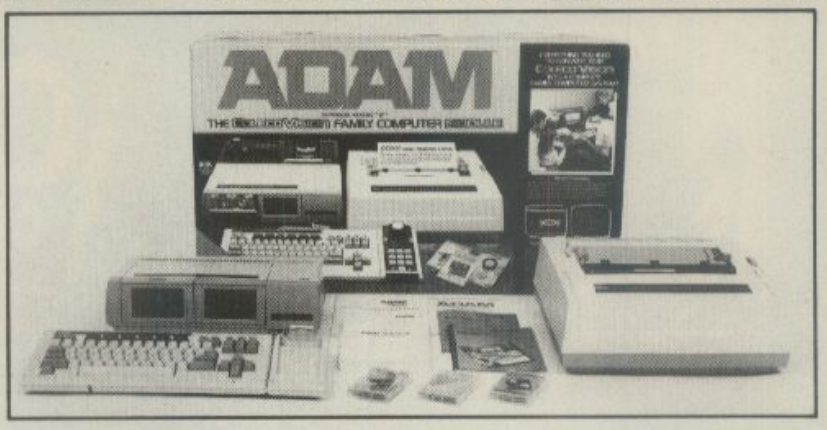
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Access

Tele Sales Camberley (0276) 684959

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

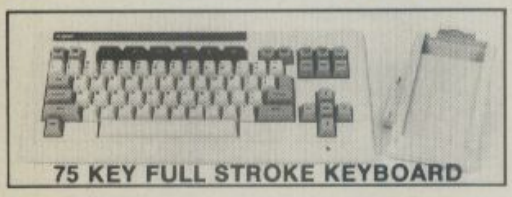
A COMPLETE PACKAGE - ALL THIS FOR £499!

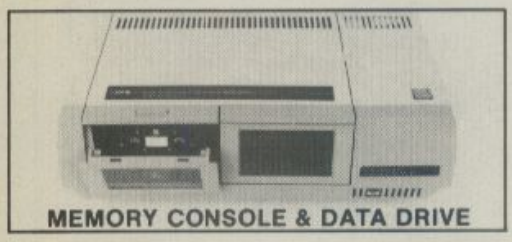
* 80K* RAM (Exp to 144K)
* Full Stroke Keyboard
* 256K Data Storage Unit
* Daisywheel Printer
* Built-in Word Processing
* Buck Rogers Arcade Game
* Colecovision Compatible



ADAM™ - £499

Inc VAT


75 KEY FULL STROKE KEYBOARD


MEMORY CONSOLE & DATA DRIVE


DAISYWHEEL PRINTER


COMPREHENSIVE INSTRUCTIONS


COLECOVISION GAMES CONSOLE

QUITE SIMPLY - VALUE FOR MONEY!

If you're looking for real value in a computer system, one which can handle anything from serious Word Processing to enhanced Colecovision style video games such as Buck Rogers, look no further. The Coleco Adam is here with a package which will make you wonder if you're dreaming when we tell you about it. A price breakthrough in computer systems, Adam is comprised of an 80K RAM memory console with a built-in 256K digital data drive; a professional quality, stepped and sculptured 75 key full-stroke keyboard; a letter quality daisywheel printer and a full word processing program built into the Console. Two additional pieces of software, Smart BASIC and also 'Buck Rogers - Planet of Zoom' (the ultimate in advanced video games), are included as well as a blank digital data pack. Adam can be used with any domestic colour Television set.*

MEMORY CONSOLE/DATA DRIVE: *The heart of the Adam system is the 40K ROM and 64K RAM memory console which combines with the 32K ROM and 16K RAM in Colecovision to give you a total of 72K ROM (including 24K cartridge ROM) and 80K RAM (expandable to 144K). Built into the memory console is a digital data drive which accepts Adam's digital data packs, a fast and reliable mass storage medium that is capable of storing 256K of information, that's about 250 pages of double spaced text! The console is also designed to accomodate a second optional digital data drive.

FULL STROKE KEYBOARD: The Adam keyboard has been designed as a professional quality keyboard that combines ease of use with an impressive array of features. It is stepped and sculptured for maximum efficiency and has 75 full stroke keys which include 6 colour coded Smart Keys which are redefined for each new application; 10 command keys which are dedicated to the word processing function, and 5 cursor control keys for easy positioning of the cursor at any point on the screen. You can attach a Colecovision controller to the keyboard to function as a numeric keypad for easy data entry. It can also be held like a calculator, a feature which makes working with numbers particularly easy. The joystick part of the hand controller can be used in the same way as the cursor control keys, to move the cursor around the screen.

LETTER QUALITY PRINTER: The SmartWriter letter quality daisywheel printer is a bi-directional 80 column printer which prints at a rate of 120 words per minute. It uses standard interchangeable daisywheels, so a variety of typestyles are available. The printer has a 9.5 inch wide carriage for either single sheets or continuous fan fold paper and uses standard carbon ribbons. It is comparable to many printers which cost as much as the total Adam package. The printer can be used either with the Adam's SmartWriter word processing program or as a stand alone electronic typewriter.

BUILT-IN WORD PROCESSOR: Adam comes with SmartWriter word processing built-in. This program is so easy to use that you only have to turn the power on and the word processor is on line and ready to go. Detailed instruction books are not necessary as the Computer guides you step by step, working from a series of Menu commands. It enables you to type in text, then completely edit or revise it with the touch of a few keys. Changes are readily made and a series of queries from the computer confirm your intentions, so that you can continuously double check your work as you type.

COMPATIBILITY WITH COLECOVISION: By using high speed interactive microprocessors in each of the modules, the Coleco Adam is designed to take additional advantage of both the 32K ROM and 16K RAM memory capability in the Colecovision. If you do not already own a Colecovision Console (£99 inc VAT), then you will need to purchase this when you initially purchase your Adam Computer package (£499 inc VAT), making a total purchase price of (£598 inc VAT).

WHAT IS COLECOVISION: Colecovision is one of the worlds most powerful video game systems, capable of displaying arcade quality colour graphics of incredible quality on a standard Colour TV set. The console (see picture bottom left) accepts 24K ROM cartridges such as Turbo and Zaxxon and is supplied with the popular Donkey Kong cartridge and a pair of joystick controllers. Colecovision has a range of licenced arcade hits available such as: Gorf, Carnival, Cosmic Avenger, Mouse Trap, Lacybug, Venture, Smurf, Pepper II, Space Panic, Looping, Space Fury, Mr Do, Time Pilot, Wizard of Wor and many others. So there you have it, Adam plus Colecovision the unbeatable combination. Send the coupon below for your FREE copy of our 12 page Colour brochure giving details on the complete Adam system.

SILICA SHOP LTD., 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Tel: 01-309 1111 or 01-301 1111

ORDER NOW - OR SEND FOR A FREE COLOUR BROCHURE

To: SILICA SHOP LTD, Dept YCO684, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Telephone: 01-309 1111 or 01-301 1111

LITERATURE REQUEST:

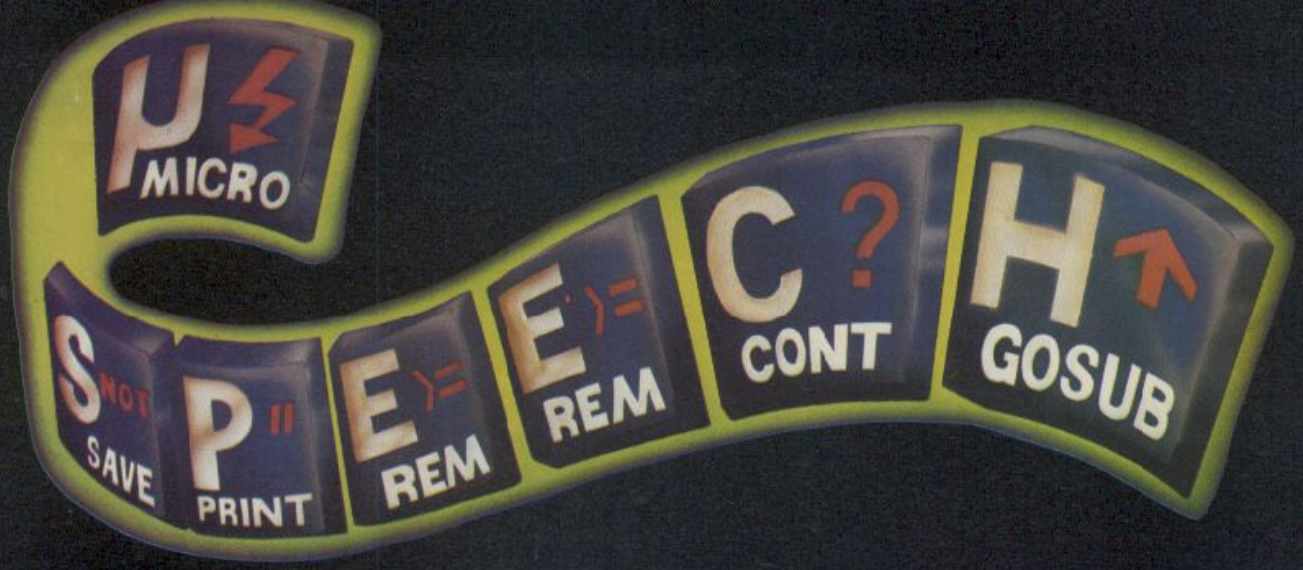
☐ Please send me your FREE 12 page colour brochure on Colecovision/Adam
☐ I own a ..... Videogame ☐ I own a ..... Computer
Mr/Mrs/Ms: ..... Initials: ..... Surname: .....
Address: .....
.....
.....
..... Postcode: .....

ORDER REQUEST:

Please send me: ☐ Adam (add-on package only) ..... £499 inc VAT
☐ Adam & Colecovision (£499+£99) ..... £598 inc VAT

☐ I enclose Cheque/P.O. payable to Silica Shop Limited
☐ CREDIT CARD - Please debit my Access/Barclaycard/Visa/Am Ex/Diners Club
Card Number: .....

Rev 2



EXPERIENCE THE DEVASTATING SOUND OF MICROSPEECH ON YOUR SPECTRUM

- μ EVERYONE FINDS IT FUN BECAUSE IT'S EASY TO USE
  (it says any word you want it to say)
- μ EXCLUSIVE TECHNOLOGY MEANS ALL SOUND IS NOW PUT THROUGH YOUR TV
- μ AND THE GAMES WITH SPEECH..... SPEAK FOR THEMSELVES

.....ULTIMATE..Lunar Jetman.....BUG BYTE..Birds and the Bees.....OCEAN..Mr Wimpy..Hunchback..Moon Alert.....QUICKSILVA..Mined Out .....
.....ROMIK..3D Monster Chase..Shark Attack..Colour Clash.....MARTECH..Blastermind.....MOGUL..Las Vegas Lady.....CRYSTAL..The Island.....
.....DIGITAL FANTASIA..Mysterious Adventures (Parts 1-10).....LYVERSOFT..Lunar Rescue.....BRITANNIA..Grand Prix Driver.....CDS.. Time Bomb.....
.....ARCADIA..Mushroom Mania.....PSS..Blade Alley.....MR MICRO..Crazy Golf..Punchy..Harlequin.....DkTRONICS..Maziacs.....

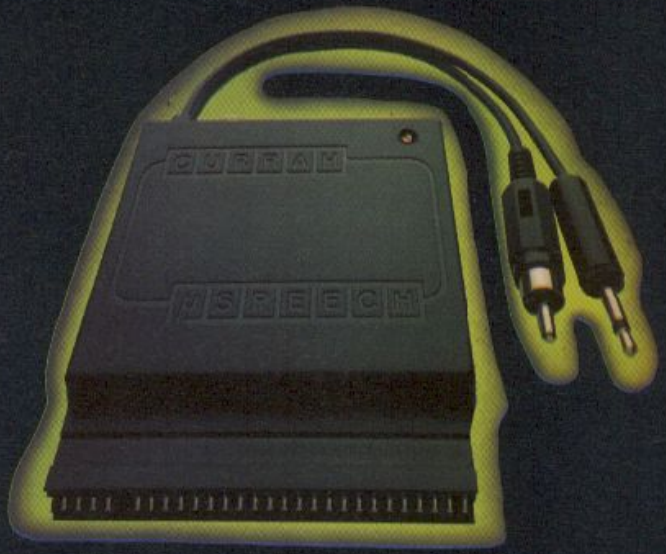
(some of these games are new versions of original programs)

AND THIS ISN'T THE END OF IT!

NEW PROGRAMS FROM

POSTERN
VIRGIN
SALAMANDER
VISIONS
INCENTIVE
MIKROGEN
SOFTEK
ABBEX
ANIROG
AUTOMATA
HEWSON CONSULTANTS
RICHARD SHEPHERD
SOFTWARE PROJECTS
THOR
FANTASY
MICROMANIA
M.C.LOTHLORIEN

WILL BE APPEARING SOON



AVAILABLE FROM COMPUTER DEALERS NATIONWIDE INCLUDING

COMET . W. H. SMITH . JOHN MENZIES . WOOLWORTHS . GREENS . SPECTRUM

You won't wait long when you order from us!
Send to: MICRO SPEECH OFFER, P.O.BOX 1, GATESHEAD NE8 1AJ
or telephone: NEWCASTLE (0632) 824683

Please send me .....MICRO SPEECH units.

Name (Print clearly) .....

Address.....

.....

.....Postcode.....

I enclose Cheque/Postal Order payable to "Micro Speech Offer"
or debit my Barclaycard/Access account No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

I understand that I can have my money back within 10 days of purchase if I am not delighted.
Please allow 21 days for delivery. 12 months parts and labour guarantee.

Signed..... Ref ☐

COMPLETE DETAILS ARE ON OUR LEAFLET

PICK ONE UP FROM ANY STORE

CURRAH μSPEECH ONLY **£29.95** EACH

including μ FREE SPEECH GAME "MYSTIC TOWER"
μ COMPREHENSIVE MANUAL
μ DEMO CASSETTE

Find out why YOUR COMPUTER is Britain's biggest selling computer magazine — subscribe today!



Forget the crowds clamouring at the newstands to buy the latest copy of Your Computer; forget that frustrated feeling when you discover the last copy in your newsagent has been sold. Instead take some positive steps to avoid disappointment. Take out a year's subscription to Your Computer today and enjoy the privilege of receiving your favourite home computer magazine every month in the comfort of your own home. **Simply fill in the form below and return it to the address stated, today.**

YOUR COMPUTER

SUBSCRIPTION ORDER FORM

Please send me YOUR COMPUTER each month for 12 months

A. I enclose cheque/PO to the value of £10.50 (UK), £17.00 (Overseas). Cheques should be made payable to Business Press International Ltd. Air mail rates available on request.

B. Please debit my credit card account:

Enter number: (please tick)

Access ☐ Barclaycard/Visa ☐ Diners Club ☐ American Express ☐

Signed_____ Date_____

NAME:_____

ADDRESS:_____

Job Title (if any)_____

Type of Business (if any)_____

Do you own a computer? Yes ☐ No ☐

Do you have access to a computer? Yes ☐ No ☐

If so please state type_____

Please return to: Your Computer, Subscription Manager, Business Press International Ltd., Oakfield House, Perrymount Road, HAYWARDS HEATH, Sussex, RH16 3DH

YOUR COMPUTER CLASSIFIED

01-661 3036

Contact: Claire Notley

ADVERTISEMENT RATES — Copy Date

Linage: 40p per word
(Min. 15 words)
Box No: £4.00 extra
Linage advertisements are prepayable and the order form published in this section should be completed and returned with remittance. Credit Card facilities are available.

Display — rates per scc (Min. 2scc)

One insertion	:	£8.50
Three insertions	:	£8.20
Six insertions	:	£8.00
Twelve insertions	:	£7.50

Display advertisers should preferably reserve space by phone.

Closing date for Classified advertisements is the 23rd May for the July edition.

Post to
Your Computer, Classified Department, Room H211, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Britain's Biggest Selling Home Computer Magazine

BACK-UP TAPE COPIERS

Unique machine code programs to allow security back-up copies of the majority of protected software.

Available for:

COMMODORE 64	£5.95	ELECTRON	£5.95
VIC 20	£5.95	ATMI	£5.95
BBC	£5.95	SPECTRUM	£5.95

TAPE TO DISK TRANSFER UTILITIES

Speed loading and transfer your games, etc to disk.
Available for:

COMMODORE 64	£9.95
BBC	£9.95
ATARI	£9.95

ALL COMPLETE WITH FULL INSTRUCTIONS

Price includes UK Post & Packing. Cheques or Credit Card Number to:

EVESHAM MICRO CENTRE
Bridge St, Evesham, Worcestershire
Tel: 0386 49641
NEW SHOP NOW OPEN – Micro Centre, 1756 Pershore Rd, Cotteridge, Birmingham Tel: 021-458 4564

POOLSWINNER

THE ULTIMATE POOLS PREDICTION PROGRAM

POOLSWINNER is the most sophisticated pools prediction aid ever produced. It comes complete wth its own massive database.
Fully menu driven. Simple to use, yet very powerful.
Predicts SCOREDRAWS, DRAWS, AWAYS and HOMES.
Selec Software guarantee that POOLSWINNER performs significantly better than chance. Your prospects of dividends, and perhaps a jackpot, are greatly enhanced.
POOLSWINNER automatically calculates the league tabes as the season progresses. The tables for any division can be displayed for reference at any time.
THE DATABASE supplied with the package is the largest available — over 20000 matches (10 years league football). The database automatically updates as results come in, allowing the program to adapt to recent changes in patterns.
POOLSWINNER is for use with English and Scottish league matches, or cup matches between league sides. The program can be used for all future seasons.
This package is complete with program, 20000 match database, and detailed instruction booklet.
AVAILABLE FOR: SPECTRUM (48K), ZX81 (16K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K).

PRICE £15.00 ALL INCLUSIVE

Immediate dispatch (return of post)

SUPERIOR TAPE COPIER

We are convinced that the new 007 SPY is the very best Spectrum tape copier available on cassette. Find a better one & TWICE your money back if you find a better copier offering better value.
a. Can copy complete programs all in one go.
b. Can make copies of programs upto 80K long. (Yes, I did say 80K long).
c. Very simple to use.
d. Has copied all programs we know of.
e. Microdrive Compatible AND includes a program to copy tapes to microdrive.
WARNING: You can buy a cheaper 'Mickey Mouse' copier which copies only one section at a time & has to be reloaded after each. 007 SPY stays in Spectrum till told to go.
007 SPY is just £3.95 150

ZX-GUARANTEED (YC)
29 Chadderton Drive, Unsworth, Bury, Lancs.
Tel: 061-766 5712

SPECTRUM KOPYKAT

IMPROVED PERFORMANCE
Simply the best. Copying **any** program is now as easy as LOADing and SAVEing your own programs. **Any** ZX Spectrum program can be backed-up onto a fresh tape. Even programs that can not be stopped can now be copied. 100 per machine code. Copies headerless files. Prints file name. SPECTRUMKOPYKAT uses no program area so **full size** programs **over** 41.7K are easily duplicated (9K+ for 16K machines). PLUS **FREE** Header Reader program.
Despatched by first class return of post. Send cheque/PO for **£4.95** to:

MEDSOFT
61 Ardeen Road, Intake, Doncaster DN2 5ER
IT CAN EVEN COPY ITSELF 544/10

TEXAS TI99/4A SOFTWARE

ANT INVASION, SPIDERS CAVE, HONEY HOP, SNAKEBITE, TRACKER, GYMKHANA and QUEST.....£3.95 inc.
TANKMAN and MONSTER HUNT .....Double £5.50 inc
MINES OF SATURN and RETURN TO EARTH.....Double £6.50 inc.
T I CASSETTE LEAD.....£6.95 inc.
T I JOYSTICK ADAPTOR (MOST MAKES).....£6.95
SHARP MZ700 SOFTWARE S.A.E. FOR LIST.
Computer repairs by post. Most popular makes. Secondhand computers and software etc. wanted. Phone or write for price.
All in P&P. Cheques/PO's to:

STATION ELECTRICAL
Coastal Road, Hest Bank, LANCS. LA2 6HN.
Tel: 10524 824519.

DISCOUNT SOFTWARE SOUTH WEST

Send for Free Catalogue containing over 800 titles for all the popular Home Micro's.
ALL AT 15% DISCOUNT
No postage to pay at all
Write today to:
Discount Software — South West
Freepost, Plymouth, PL1 1BR.

COPYMATE 64 only £4.74

A utility for COMMODORE 64 will make back-up copies of most cassette based programs. Supplied with full instructions. Send Cheque/PO for £4.75 to:

HORIZON SOFTWARE
15, Bamburg Close, Corby
Northamptonshire NN18 9PA.

DO IT WITH TRANS-EXPRESS

TAPE TO MICRODRIVE — MICRODRIVE TO TAPE

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 go much beyond where similar attempts failed, enabling you to transfer any kind of programs up to the full 48.0K length - provided you do not infringe copyright.
TRANS-EXPRESS is an essential microdrive companion and an invaluable software back-up utility.
We are offering the entire package for **£ 9.95** or a combination of TAPE TO MICRODRIVE & MICRODRIVE TO MICRODRIVE for **£ 7.50**. You can also buy each of the four programs separately for **£ 5.50** only. 224

TAPE TO TAPE

Please send me a copy of **TRANS-EXPRESS** ①②③④ Please tick where applicable. I enclose cheque/PO for..... YC
(Please add £1.00 for orders outside UK)
Name.....
Address..... 215

ROMANTIC ROBOT 113 Melrose Ave, London NW2

Green Fingers GARDEN PLANTS

★ Program with details of over 350 flowers, shrubs and trees.
★ Only 80 seconds to find the ideal plant to fit your requirements (e.g. for a shrub with pink flowers, for acid soil, & starts blooming in June)

To order 'Green Fingers' Cassettes for 48k SINCLAIR SPECTRUM send cheque/postal order for £8.95 to: **PRACTICAL SOFTWARE**
Dept. GF, 40 Worple Road, London SW19
221

NOTICE TO PARENTS
from INFO-STREAM
Computer Assisted Learning

Is your son or daughter weak in Maths or the Sciences? Or perhaps in Modern Languages? Help solve their problems with your home computer.

INFO-STREAM offers software for SPECTRUM, BBC, VIC-20 AND ZX81 micros covering most subjects in the school curriculum and catering for all ages and abilities up to revision aids for CSE, 'O' and 'A' levels. The range includes 'fun-to-learn' programs for the younger members of the family.

For a 42-page catalogue detailing over 220 educational programs, please send £1 (refundable on first order) to:—

INFO-STREAM (Dept YC3),
36a Chase Green Avenue,
Enfield, Middlesex, EN2 8EB.

112

MEGASAVE FANTASTIC SAVINGS

SPECTRUM		SPECTRUM		COMMODORE	
Jet Set Willy	4.75	3D Luna Attack	4.75	Beach Head	8.00
Fighter Pilot	6.25	Death Chase	5.50	Solo Flight	12.00
Blue Thunder	4.75	Tower of Evil	5.50	Flight Path 737	6.30
Night Gunner	5.50	3D Ant Attack	5.85	Harrier Attack 64	5.55
Trashman	4.75	Hobbit	11.00	Cybotron/Zodiac	6.25
Millionaire	4.75	The Quill	10.75	Hobbit/Valhalla	11.50
Fred	5.80	Scuba Dive	4.50	Aztec Challenge	7.15
Code Name Mat	4.90	Cavern Fighter	4.75	Forbidden Forest	7.15
Krakatoa	4.50	Alchemist	4.25	Space Pilot	6.25
Psytron	6.30	Quest Probe	8.00	Scuba Dive	5.50
Blade Alley	4.50	Chinese Juggler	4.75	Pyramid/Splat	5.20
Pedro	4.25	Mugsy	5.50	Dinky Doo	6.50
Android II	4.50	Psi-Spy	5.50	Black Hawk	6.30
Blue Thunder	4.75	Lords of Midnight	8.00	Quest Probe	8.00
Stonkers	4.25	Tribble Trubble	4.75	Savage Pond	7.10
Omega Run	4.75	Caesar The Cat	7.10	Chinese Juggler	5.75
HURG	12.25	All 8.90 Quicksilva	5.80	Megahawk	5.60
Wheelie	4.50	All 5.50 Ultimate	4.85	Caesar The Cat	7.10
Thunderhawk	4.75	All 5.95 Software Pro	4.85	All 7.00 Interceptor	5.60
Glug Glug	4.75	All 5.50 Imagine	4.25	All 7.95 Anirog	6.30

FREE POSTAGE FAST SERVICE
Please state Spectrum or Commodore
Send cheque/PO to:
MEGASAVE Dept B, Westbourne Terrace, London W2. 217

HORSE RACING

Professor Frank Gecrge's **HORSE RACE FORECAST PROGRAM** is a serious punter's aid to sensible betting. Data is entered from a sporting newspaper and the program prcduces betting recommendations.

Versions available for:

Apple II, IIe
Pet 3000,4000
Sharp MZ80A,MZ80K
TRS-80
Video Genie
NewBrain
ZX81
Spectrum
BBC 'B'
Commodore 64
Dragon 32

Write to:
Bureau of Information Science, Commerce House, High Street, Chalfont St. Giles, Bucks.

Spectrum Jetset Willy. Secret start code. Plus full screens plan £1 + sae. Mr Buckley, 27 Greenfield Way, Northwich, Cheshire CW8 2YH.

DISCOUNT SOFTWARE

Commodore 64	
Chinese Juggler	£6.20
Snooker	£8.05
Hunchback	£6.20
Spectrum	
The Skull	£7.15
Fighter Pilot	£7.15
Death Chase	£6.25

SPECIAL OFFER:
QUICKSHOT I JOYSTICK £7.95

All prices include postage & packing.
Please enclose SAE for full lists to

LOADE ENTERPRISES
c/o Ensemble (YC)
35 Upper Bar, Newport, Shropshire
TF10 7EH Tel. No. (0952) 813667 or 814292 216

PROM SERVICES

Eprom Programmer NEW
£54.95p

C/W Software for ZX81 or ZX Spectrum
SAE for details of this and many other Spectrum/81 add-ons
Edge connectors £2.50p
Edge cards 75P

EPROM SERVICES
3 Wedgewood Drive, Leeds LS8 1EF
(0532) 667183

QUICKDRAW

Probably the easiest drawing program available. Use colour, lines, triangles, circles, add text anywhere, save/load and print displays. Single key commands with inlay. Superb for design work. Only £6.00 (incl).

Cheque to Selective Software, 64 Brooks Road, Street, Som. 229

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 progs.

for details:

PINEHURST DATA STUDIOS
69 Pinehurst Park. W. Moors
Wimborne, Dorset BH22 0BP

MicroDrive Users Club

CALLED Microdrive Exchange.

This news letter club is designed to help by the exchange of info and ideas.

Did you know you can pay up to £5.50 for a cassette to transfer tapes to micro-drive and then they DON'T RUN?

Issue 1 will include: How to avoid this, plus transferring programs which normally over-write the microdrive map, transferring Vu-File, Zzoom, etc, etc.

Membership is £5 per year. Europe £8 per year.

Please make cheques payable to ZX Guaranteed.

Microdrive Exchange is run by

ZX GUARANTEED
29 Chadderton Drive, Unsworth, Bury, Lancs.
Tel: 061-766 5712

DUST covers quality anti-static material Spectrum, Oric £1.50 Dragon, Vic, 64, BBC £2.50 inc P+P. Also available for printers, cassettes disc drives etc. Computacovers 26-28 High St., Sutton Coldfields, West Midlands. 170

QL Software

Microcosmic will shortly be writing games utilities and educational programs for the Sinclair QL.
For a list of available software (all on microdrive cartridge) send a large SAE to:

MICROCOSMIC
Sales Dept.
6 Robertsfield, Thatcham, Newbury, Berks. 223

Dealer enquiries welcome

COMMODORE 64 games. Pac-Man, Scramble, Escape, M.C.P., Manic Miner, Krazy Kong, Machine Code Assembler. £5 each. Huge selection of Spectrum games, e.g.: Stonkers, Jet Pac, Atic Atac. Send stamp for lists to Littlecote Software Box No. 3. 225

JET SET WILLY, obtain infinite lives. Send £1 and SAE. Microplus 7 Mansfield Avenue, Bingley BD16 3HJ. 232

SPECTRUM SOFTWARE

48K

Steve Silver adventure games.

Adventure 1	£5.95
Adventure 2	£5.95
Moolander	£4.50
16K	
Blitz + Code Breaker	£4.50
Robotic Capers	£4.50
48K Spectrum	

Prices include p&p

Send Cheque/PO to:

W B Software
192 Seamer Rd, Scarborough
North Yorkshire YO12 4HG
Tel: 0723 70074

462/9

Dear reader, my name is Simon Stable. I specialise in real-time direct data duplicating for most cassette based micro computers. Disk copying for BBC 40/80 track.

FAST TURNAROUND **0869 252831** COMPETITIVE PRICES

Dot matrix printed labels to order/blanks. Blank cassettes. Arrdee Media and Marketing Limited — 01-435 9463.

For further information about real-time cassette copying write or phone.

FREEPOST, 46 WEST END, LAUNTON, OXON. OX6 9BR.

PADLOCK. Spectrum 16/48K. Utility will save and secure basic and m/c programs. Stops 'merge', 'break' and foils copy programs. Only you can unlock them. £4.25. Fatcat Software, Applegate, Newtown, Langport, Somerset.

COPY II. Spectrum 16/48K. Take security back-ups of your software. Copies all programs including full 16/48K ones. Includes continuous load, repeat saves, autosave, verify. Simple to use. £4.25. Fatcat Software, Applegate, Newtown, Langport, Somerset.

48K SPECTRUM Kempston interface, software including Hobbit, Valhalla, Atic, Atac, H.U.R.G., Alchemist and others. Tel: 08206 24506.

THIS'LL TEACH YOU A LESSON!!

GCE O LEVEL/CSE Cassettes for the **48K SPECTRUM** with COLOUR and MOVING GRAPHICS

PHYSICS 6 Programs for £6.50
- Solids, Liquids and Gases
- Graphs of Motion
- Vectors and Scalars
- Gravity, Weight and Friction
- Acceleration
- Newton's Laws

CHEMISTRY 6 Programs for £6.50
- Chemical Change
- Chemical Combination and the Mole
- Types of Reaction
- Chemical Equilibrium
- Rate of Reaction
- Energy Changes

OR BOTH for £12

Cheque/PO to/avec THINK TANK Ltd

think tank Educational Software

Dept YCO, 35 Wellington Road, Wimbledon Park, London SW19 8EQ

JETSET Willy. Use the keyboard to select and play 35 diffarent screens. Send £1.50 plus sae to D. Boocock, 16 Chippendale Rise, Bradford BD8 0NB.

48K SPECTRUM owners "O level", S.C.E., C.S.E., Maths Test gives your children private tuition for only £3.99. Mursoft, Dept YC, 95 Girton Road, Northolt, Middx. UB5 4ST.

COLOUR ADVERTISEMENTS ATTRACT ATTENTION!

For further details ring

661 3036 NOW!

DEPENDABLE Spectrum software exchange. £1.00 per program. Send sae. Oxsoft, 82 Chorefields, Kidlington, Oxford OX5 1ST.

CREATING, writing and selling software. Helpful hints and ideas. Send £2.00 to Mr A. Shaw, 8 Yeadon Drive, Southowram, Halifax, West Yorkshire.

********TAPE COPIER 5********
(new version)

Makes BACK-UP copies of ANY type of **SPECTRUM** (16/48K) program (incl headerless, m/c, unstoppable) easily with MANY UNIQUE features.
FULL MONEY BACK GUARANTEE if you are not satisfied.
MAXIMUM 5 STARS from Home Comp. Weekly with 3 out of 4 100% RATINGS.

- *LOADS in all program parts CONTINUOUSLY — even without pressing a key. Other copiers require many loadings — MASSIVELY saving you time and trouble!
- *M/Drive — GENUINELY copies BASIC, M/CODE + arrays onto MICRODRIVE. Stops programs — VITAL to alter loading instructions to HELP make them run.
- *BREAK at any time/continue loading feature.
- *MAXBYTES makes a working copy of programs occupying the full 16K or 48K!
- *Verifies. Repeat copies, Auto, Abort, Program name plus HEADER data.
- *Copies HEADERLESS and other types. Indeed **ALL** programs that we are aware of!
- *Very user friendly and simple to use, with FULL instructions.

TAPE COPIER £4.50 TAPE COPIER WITH M/DRIVE £5.50
Old customers updates at £1.50 or £2 with m/drive plus SAE and old tape.

LERM Dept YC
10 Brunswick Gardens, Corby, Northants 110

SOFTSAVE
for the Vic-20
Allows you to back-up most commercially available software.
Tape to Tape back-up £4.95
Tape to Disc back-up £5.95
SOFTSAVE
65 Stonewood, Bean,
Nr Dartford, Kent
DA2 8BZ 222

Software makers

for Sinclair, Commodore 64, Dragon . . . any good programs or ideas?

Top royalties 10-25%.

Join us at CFEE Distribut.et Services ZA de Courtaboeuf- 527 Avenue du Québec - 91946 LES ULIS Cedex - France.

SUPER BREAKER

For the Commodore 64, this utility will back-up most popular cassette programs onto tape or disk. Supplied on cassette with full instructions. For fast turn round of orders, by First Class Post, Rush £4.99 to: -

Clarke Kent Software
26 North Cape Walk,
Corby Northamptonshire.

Strictly for personal use only.

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

COMMODORE 64 AND VIC 20 PROGRAM COPIERS

They copy most cassette based BASIC, machine code and multi-part programs of any size. Both copiers are written in machine code. Programs using a range of protection techniques can be copied easily. Audio and visual prompts are used for easy operation. Full instructions are contained in the programs.

VIC IMITATOR £6
IMITATOR 64 £6

Please state which is required and make cheques/POs payable to IAN WAITE.
Send orders to:
IAN WAITE, Dept YC,
11 Hazlebarrow Road,
Sheffield, S8 8AU.

SPECTRUM 48K * * * * HISTOGRAMS
LINE GRAPHS * * * PIE CHARTS

At last! 4 potentially very useful programs supplied on TWO cassettes or microdrive cartridges designed for 48K Spectrum users to display & record Data on Coloured charts/graphs in seconds . . .
1) CASSETTE 8410
Side 1 — Histogram Program — Up to 28 bars, clustered bars.
Side 2 — Line Graph Program — 20 lines, 28 points per line.
2) CASSETTE 8420
Side A — Stacked Bar Chart Program — 14 stacks, 12 bars.
Side B — Pie Chart Program — 12 pies, 20 segments per pie.
* User — friendly Menu—Drive options
* Selectable 1-6 alternate coloured bars/lines/segments
* Automatic scaling/labelling of the vertical axis * Exponent indicator
* Inbuilt options for labelling the horizontal axis/pies/segments
* Facility to design your own labels * Tabulation of data & descriptions
* Expansion of displayed data * Save to tape facility
* Print * Photograph * Microdrive facility
A MUST for ALL performance analysts and small businesses.
Interested? Send cheque/PO for £7.50 per cassette (incl. p&p) or £14.95 per microdrive cartridge to: R.E. MAJOR B.Tech(Hons), 49 Westbury Rd., Brentwood, Essex CM14 4JS.
Supplied with comprehensive instructions. Quick despatch. 228

MICRODRIVE owners. Let me put your tape based programs onto microdrive. Send tape, cartridge and £1.95 cheque, in Jiffy Bag to: Redbeard Computers, 2 6 Hornbeam Close, Selly Oak, Birmingham. 158

When replying to Classified advertisements, readers are recommended to take steps to protect their interests before sending money.

BBC 'B' four shaft weaving designer £7.95 cassette. Fordham, 9 St. Leonards Way, Ringwood, Hants BH24 2HS. 218

VIC-20 Tape Copier. Copies almost all games, any RAM. Money back guarantee. £3.95. Griffiths, 8 Moss Close, Rugby, Warks. CV22 6SD. 214

SHARP MZ80A, Epson MX80 Printer, Sharp Basic, software and owners manual. £500. Chesham (0494) 775400. 213

G. A. BOBKER DOES IT YET AGAIN

How long will it be before competitors begin to catch up to this program?
New TAPE 3 lets you STOP Headerless Files and unmergable Basic programs so can study them and/or transfer to Microdrive. Includes pseudo disassembler which gives all the relevant info in clear plain English.
TAPE 3 – £3.50 (£3 to MDX members)

ZX-GUARANTEED (Dept YC)
29 Chadderton Drive, Unsworth, Bury, Lancs. Tel. 061-766 5712

International Software House

seeks Hackers with original programs and ideas. We offer development assistance, loan equipment, and high international royalties. Send sample or details to:

Keith Dean
Box 100,
33 Church Street,
Rickmansworth,
Herts, WD3 1DH. 231

XyZ *spectrum software* X

WAS NUN? 48K – Grafik Adventure
– deutschsprachig – DM **29.90**

FILE COPY & 48K-Cracker DM **44.90**

Und viele andere:
Atic Atac, Mr. Wimpy, Time Machine, 1984, Knights Quest...

NOW AVAILABLE
WHAT NOW? £8.00
48K-Graphic Adventure inc p&p

XyZ Diepenbrockstr.9
D-4400 MUENSTER 230
Sinclair ZX Spectrum Software TEL. 0251/665594
Staendig die neusten Programme vorratig-Liste anfordern-Auf Wunsch auch Programme fuer andere Computersystems – Oh-Preise ZZgl Porto & Verskosten

LEADERS IN COMPUTER GAMES REQUIRE PROGRAMS AND PROGRAMMERS

1. Original game programs for the Spectrum or Commodore 64 are urgently required: Arcade, Strategy or Adventure. We pay top royalties or tailor a contract to suit your needs — world-wide sales ensure the best possible deal.

2. Programmers to work in 280 or 6502 assembly language for contract work or translation coding — best results.

Phone or write in confidence to:
Software Development
Ocean House, 6 Central Street
Manchester M2 5NS
Telephone: 061-832 6633

SUPERIOR TAPE COPIER

We are convinced that the new 007 SPY is the very best Spectrum tape copier available on cassette. Find a better one offering better value for money, and TWICE your money will be refunded.

a. Can copy multipart programs all in one go automatically.
b. Can copy a genuine 48K long program.
c. Genuinely the easiest copier to use.
d. Has copied all programs we know of.
e. Microdrive Compatible AND includes program to transfer tapes to your Microdrive AND they'll work.
f. Post free even to Europe.

007 SPY IS JUST £3.95

ZX-GUARANTEED (Dept YC)
29 Chadderton Drive, Unsworth, Bury, Lancs. Tel. 061-766 5712

ZX SPECTRUM STATISTICS. Analysis, Mean, Median, Mode, Standard, Deviation, Graphing of data. £3.00. Statistics revision, Learning course to A O level. Mean, Median, Mode, Standard, Deviation. Includes examples £2.00. Two together £4.00. Cheque/PO S. Bell, 24 Fouracres, Letchworth, Herts SG6 3UF. 201

ACT Apricot twin drives, real bargain at £1,200. Phone John on 667 2164 after 7 pm 205

FOR SALE

TRS-80 Model 100 Portable Computer for sale.
24K expands to 32K Ram, Cables, Cassettes and Manuals inc.
£550.00
Tel. 01-741 9157 after 7pm.

DRAGON 32 BBC MODEL/B TRS80 C/C 32K

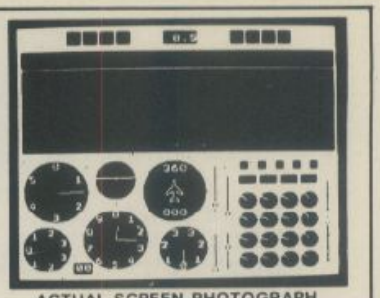
747 FLIGHT SIMULATOR

Superbly realistic instrumentation and pilot's view in lifelike simulation which includes emergencies such as engine fires and systems failures. This program uses high resolution graphics to the full to produce the most realistic flight-deck display yet seen on a home computer. There are 21 real dials and 25 other indicators (see diagram). Your controls operate throttle, ailerons, elevators, flaps, slats, spoilers, landing gear, reverse thrust, brakes, etc. You see the runway in true perspective. Uses joysticks and includes options to start with take-off or random landing approach. "A real simulation, not just another game." (Your Computer Apr. 83). Now on Commodore 64.

Cassette £9.95 (P&P and VAT included)

D.A.C.C. Ltd (Dept. YC)
23 Waverley Road, Hindley, Gtr. Manchester WN2 3BN

154/4



ACTUAL SCREEN PHOTOGRAPH

WANTED
COLOUR GENIE SOFTWARE

Top royalties paid for original programs.
Send cassette tape for immediate decision.
APEX SOFTWARE
Hastings Road,
St. Leonards-on-Sea,
E. Sussex TN38 8EA.
Hastings (0424) 53283

BUG-BYTE Manic Miner. Practise with endless lives on any sheet. For instructions send £1 and SAE to Supa Software, 5 Nield Court, Upton, Chester CH2 1DN. 227

STUDYING FRENCH?

From 1st Year to 'O' level, your 48K Spectrum can help you to learn the easy way.

FRENCH VOCAB TUTOR
Multiple-choice or direct testing from the hundreds of words on tape, or type in your own word lists. £5.50

FRENCH VERB TUTOR
50 common verbs in six tenses. A full tutor/tester. £5.50

"Order both programs together for only £7.50"

TEACHER'S MARKBOOK (48K)
Holds all your classes and marks; automatic totals, percentiles, mean & S.D., orders of merit, graphs etc. etc. £5.50 with manual and demo

MENTOR SOFTWARE 219
69 Beech Rd, Halton, Lancaster

QUANTUM HARDWARE
Sinclair Repair Centre

We have the spares for all repairs to:
SPECTRUM's ZX81, RAM PACK & ZX PRINTER

All repairs carried out by qualified staff, units repaired to origiral standard

ZX81 £11.50
RAM PACK £9.95
SPECTRUM £18.00
ZX PRINTER £18.00
(subject to received conditions)

Prices include return postage and packing.

Also available C10 Computer Tapes 65p
C15 Computer Tapes 70p
Cassette Lead Spectrum £2.20
TV Lead Spectrum £2.20

All prices include postage & packing

Spares subject to availability

Cheques & postal orders made payable to: QUANTUM
Self addressed envelope for enquiries to:

QUANTUM
33 CITY ARCADE, COVENTRY CV1 3HX.

NEW! NEW!

COLOUR GENIE 32K SPACE TREK

Defeat the Klingon invasion fleet. Includes 5 skill levels, hi-res. graphics quadrant display, 8 x 8 galaxy, phascrs, photon torpedoes, long range scans, and must more. Full instructions included.
Only £6.50 incl. p&p
Send cheque or P.O. or telephone with Access/VISA for immediate despatch.

APEX SOFTWARE

Hastings Road,
St. Leonards-on-Sea,
E. Sussex. TN38 8EA.
Tel. Hastings (0424) 53283

SPECTRUM ADULT GAME – "Forfeits". Two games in one for 2, 4, 6 players. Hours of exciting fun. Send £6.50 to N. Pearn, 48 Greenbank Drive, Bollington, Cheshire. Cheque/PO. Over 18's only. 206

EACH ZX81 program its own fast loader through GMSAVE. 12X to 22X faster. Cassette £5. G. Mannaerts, Kluislaan 5, B-2070 EKEREN (ANTW). 198

SHARP SOFTWARE

Free Basicode Converter with D700 Basic (£12 for MZ-700.

S.A.E. for software catalogue for MZ-700 or MX-80A/K.

DCS, 38 SOUTH PARADE, BRAMHALL, STOCKPORT, SK7 3BJ.

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

any Ocean HUNCHBACK £6.90 less £1.50
any Visions SNOOKER £8.95 less £1.50
any Melbourne HOBBIT £14.95 less £3.00
Lots more special offers in our lists, most computers, write, ring, anytime.
TECHNIPLAY SOFTWARE
74 Dornoch Drive, Hull, HU8 8JL
Tel. 0482 712958 226

BEGINNING PIANO? Our suite of programs (48K Spectrum, 16K ZX81) will help. 'Keyboard' (11K) and 'Stave' (16K) teach and practise notes, C Clef included. 'keystave' (12K) combines them, with scoring and printout. £6.95 complete. For details SAE to Fair Software, 30 Fair Lane, Robertsbridge, East Sussex. 209

ATARI 400/800, 600XL/800XL. If you have any of these home computers and are interested in cheap games and utilities of a high quality, then telephone David Sutherland on 031-337 1547 after 6pm for details. 212

SHARP MZ-80A software. Excellent games and adventures. The Dragonslayer £4.50. The Zarwian Disaster £4.50 or £8.00 for both. No postage. Eric Hallsworth, 26 Frankwell St., Tywyn, Gwynedd LL36 9EW. 208

ORIC 1 Imitator. Tape copier with audio visual prompts. Machine code routine occupying rarely used memory. Including "Froggee" £3.50. Skelmersdale 26072. 204

SPECTRUM REPAIRS

£18 inclusive of labour, parts, p&p etc. ZX81 for £11. Rampack £10. Fast reliable service by qualified computer engineers. Send computer only to:
H S COMPUTER SERVICES 220
22 Blenheim Drive, Warton, Lancs. PR4 1DM. Tel. 0772 634897

QUALITY program listings for Dragon 32 and Spectrum. First 3 programs £1 each, second 3 50p each, then 25p each. Also graphic dumps and specia stationery. Write for free estimate. M & M Listings, 30 Romford Avenue, Morley, Leeds. 151

MULTI-INTERNATIONAL COMPANY REQUIRE SPECTRUM PROGRAMS

Our client, one of the most well known internationa companies require new, original programs for most home computers, especially the ZX Spectrum. An excellent opportunity to obtain worldwide recognition.
Please contact:
Mr R. J. Purssglove, Marketing Consultant, 48 Woodford Road, Bramhall, Cheshire SK7 1PA.
Replies treated in strictest confidence.

BACKUP 64 TAPE TO TAPE COPIER FOR THE CBM 64

Copy most programs currently available including M/C and BASIC. Easy to use graphics prompt system.
Cheques, P/O for £5.00 to:
D. JOHNS
5 Woodsley, ASH, KENT, CT3 2HF
Ph. (03041) 813098 for UPDATE prices.

COPYMATE TWO

Back-up utility for the COMMODORE 64 now comes with extended facilities including SAVE TO TAPE OR DISK. Two programs on the one cassette gives an EXTENDED COPYING RANGE. Will make personal back-ups of most software supplied on tape with full instructions for speedy delivery send £5.75 to:
HORIZON SOFTWARE (Dept YC)
15 Bamburg Close, Corby, Northants NN18 9PA.



POOLSWINNER
THE ULTIMATE POOLS PREDICATION PROGRAM



PREDICTS IT WORKS Not just SCOREDRAWS, but NOSCORES, AWAYS and HOMES We **guarantee** the program performs significantly better than chance

ADAPTABLE "Poolswinner" allows the precise prediction formula to be set by the user – you can develop and test your own unique method. Probabilities are given on **every** fixture – choose as many or as few selections as you wish

EASY TO USE DATABASE Fully menu driven, with detailed instruction booklet The program comes complete with the largest database available – over 20,000 matches. The database automatically updates as results come in

APPLE, BBC (B), COMMODORE 64, DRAGON, SPRECTRUM (48K), ZX81 (16K)
***£15** (all inclusive)*

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

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

Selec Software

37 COUNCILLOR LANE, CHEADLE, CHESHIRE 061-428 7425
DEALER ENQUIRIES WELCOME 101



Height 11¾"
Width 20½"
Depth 13½"

Solid Pine T.V. & Computer/Video Stand

Suitable for most computers & videos
Ready to stain or paint
Drawer for tapes/disc and sliding tray
Only **£14.95** + **£3.00** P&P
Send cheque/P.O. for £17.95 to:

Woodcraft Products (Brentford) Ltd.
10 David Road, Poyle Industrial Estate,
Colnbrook, Slough SL3 0DG

Please allow 28 days for delivery

NAME _____

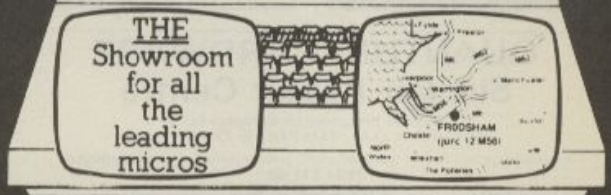
ADDRESS _____

_____

_____ POSTCODE _____

CLASSIFIED
Tel: 01-661 3036

totally confused?
made comparisons?
nearly compromised?
come to
northern
computers
completely committed!



BBC Electron Sinclair VIC64
Dragon Printers Disk Drives
Plenty of Software
Books/Games Help & Advice
Secondhand Computers

Churchfield Rd
FRODSHAM Ches.
WA6 6RD

northern computers

Telephone:
FRODSHAM
0928 35110 10 Lines

THE computer centre of the NORTH

SELL IT WITH YOUR COMPUTER

CLASSIFIED ORDER FORM

Classified Rates

Linage: 40p per word (Min 15 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	:	£8.50
Three insertions	:	£8.20
Six insertions	:	£8.00
Twelve insertions	:	£7.50

Display advertisers should provide separate copy and preferably reserve space by phone (01-661 3036).

Method of Payment

Cheques etc, should be made payable to Business Press International Ltd, and crossed. I enclose herewith cheque/PO for

£.....

Please debit my Access/Visa Barclay Card/American Express/Diners Club Int/ as below

Please insert the following advertisement in Your Computer Classified Section					
					LINAGE
					£6.00
					£8.00
					£10.00
					£12.00
					£14.00
					£16.00
					£18.00
					£20.00

No. of insertions required ☐ Box No. required YES/NO

NAME *(Please include initials)*. .....

ADDRESS .....

.....

.....

Payment by credit card please state address card is registered

Daytime tel. no .....

SIGNATURE

Post to:
Cut out the order form and return together with your remittance to: Classified Department, Your Computer, Room H211, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. (01) 661 3036

THIS FORM SHOULD BE RETURNED BY 23 MAY FOR JULY ISSUE PUBLICATION

Company Registered Number: 151537 (England) Registered Office: Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

RETAILERS

For fast speedy distribution service contact Drake Distribution on 0752 671606

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
36 New Street, Barbican, Plymouth.

70

DISCOUNT SOFTWARE

Huge Discount off all Computers.
12 Page Catalogue including

	R.S.P.	OUR PRICE
SPECTRUM		
HOBBIT (Melbourne)	14.95	11.99
MANIC MINER(Bug Byte)	5.95	4.95
COMMODORE 64		
EVEREST ASCENT (Shephard)	6.50	5.00
SKI RUN (Boom)	5.50	4.50
BBC		
SLICKER PUZZLE (D.K.Tronics)	6.95	5.95
ORIC		
ASTEROID (Artic)	5.95	4.95
DRAGON		
CHESS (J Morrison)	7.95	6.95

C.W.O. P + P 55p 1 Tape. 2 or more post free
S.A.E. for 12 page catalgoue of software.

For Most Computers to:
DISCOUNT SOFTWARE
45, Drunswick, Bracknell, Berks.

1/53



Control John's simple fellow movements to retrieve the Emeralds. Your King has sent you a lowly peasant to he castle of the Evil Baron Dog Breath. Each stage of your quest becoming harder as you leap the ramparts. When the bell rings you move to a higher level. Five levels of play with many varied obstacles becoming harder as you progress. **£7.00**



This game has 7 levels which you have to progress through with the hazard of radio active barrels, guards etc. Each level is harder until eventually, if you are good enough, you have to face XP2. Great entertainment with a built-in hall of fame **£6.00**



Get Betty The Bug Eyed Beasty, through the mine field to collect enough UFOs to get home. Multi-level. **£4.50**

LYNX BUS-TECH

UK + OVERSEAS TRADE ENQUIRIES 0705 735310

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

Please tick boxes and send cheques/PO to:
Bustech,
19 Landport Terrace,
Portsmouth, Hants.
ALL ORDERS DESPATCHED WITHIN 14 DAYS
Dealer enquiries welcome

WANTED SOFTWARE FOR LYNX AND MTX

REPRINTS

a ready made sales aid









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

Ring Michael Rogers on 01-661 3457

Hot lines

Acorn Computer
Telephone: Cambridge 0223-245200

Atari
Telephone: Slough 0753-24561

Camputers
Telephone: Cambridge 0223-315063

Commodore CBM
Telephone: Slough 0753-74111

Dragon Data
Telephone: Bridgend 0656-744700

Oric Products
Telephone: Ascot 0990-27686

Sharp
Telephone: Manchester 061-2052333

Sinclair
Telephone: Camberly 0276-681666

Sord
Telephone: London 01-930 4214

Tandy Corporation
Telephone: Birmingham 021-5566101

Texas Instruments
Telephone: Bedford 0234-63211

DATEBASE June

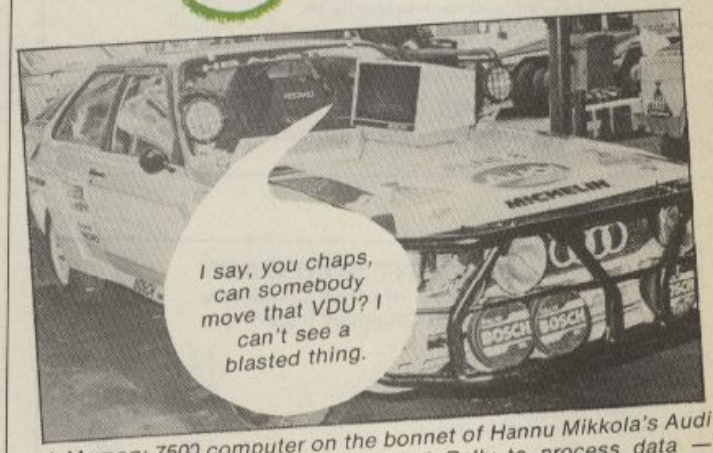
Local, national and international micro events are updated here. To publicise your event, phone Paul Bond on 01-661 3472.

Computer Fair

From June 14-17 at Earl's Court, sponsored by *Practical Computing* and *Your Computer* — this is the place to be seen if you have a microcomputer. Telephone Reed Exhibitions on 01-643 8040 for more information.

International Commodore Computer Show

From June 7-9 at The Novotel in Hammersmith. Commodore hardware and software. Contact Novotel in London for more details.



A Memory 7500 computer on the bonnet of Hannu Mikkola's Audi Quattro. Used in the Nairobi Safari Rally to process data — hopefully not on the bonnet of a car. This is very bad practice ergonomically, especially if you are sitting in the driver's seat.

Educational Software Fair

On 18 and 19 June there will be an Educational Computing and Software Fair at John Taylor Teachers' Centre, Headingley Lane, Leeds. Teachers and all interested in education — in an ideal world, this would include pupils too, I guess — are welcome and it's free. Contact Mr G Creighton, Computer Development Team, at the above address. Telephone 0532-782181.

INDEX OF ADVERTISERS

A
AGF Hardware 28
ASP 30
Acorn Computers 4, 5
Addictive Games 138
Advance Technology 178
Audiogenic 62, 63

B
Beebug 172
Betasoft 128
Beyond Software 18, 19
Birds Eye, Walls 46
Brother Industries 152
Bugbyte Software Back Cover

C
CDS Microsystems 110, 111
CP Software 22
CRL 58, 206
Cambridge Micro Electronics 202
Carnell Software 20, 21
Chartsearch 185
Cheetahsoft 125
Choice Software 172
Commodore 48
Compusound 158
Computer Fairs 200
Computer Link 33
Computer Tutor 114
Creative Sparks 141
Crystal Computing 201
Currah 210

D
D.A.C.C. 7
DK Tronics 23, 25, 27
DRG Peripherals 191, 193, 195
Dean Electronics 192
Digital Integration 208
Dorling Kindersley 16, 17
Dragon 74, 75
Durrell Software 6

E
Earls Court Computer Fair 204, 205
Electronica 35

F
First Byte 33
Fox Electronics 168

G
GCC Cambridge 190
Galaset 195
Gem Software 26
Gilsoft 198
Griffin & George 68

H
Hama 54
Hisoft 84

I
ISP 151
Industrial Process 116
Inmac 15
Interceptor Micro Inside Back Cover
Interface 182

J
John Wiley 199

K
Kempston Micro 95
Kuma 73

L
LCL 146
Lawton 128
Level 202
Level 9 104
Llamasoft 194

M
MDR 52
Mail Order Protection Scheme 198
Marketing Micro 92
Mayfair Micro 84
Melbourne House 162, 164
Memotech 12, 14
Micro-X 195
Microanswers 76
Microdeal 90
Micromanagement 86-89
Micropower 29, 31, 33, 35
Micropower 176
Mikrogen 126
Mirrorsoft 24
Mr Micro 207

N
National Software Library 116

O
Oasis 196, 197, 166
Ocean Publishing Inside Front Cover
Oric 100, 102
Oxford Computer Publishing 7

P
PAS Computer Services 156
Phimag 60
Picturesque 128
Protek 50, 54, 144, 181

Q
Quicksilva 107, 149

R
Ram Electronics 203
Renault Cars 83
Rose Cassettes 29

S
SMT Rotronex 29
SciUK 188
Scotcade 56
Selec Software 184
Silica Shop 209
Sinclair 119
Skywave 137
Software Exchange 7
Software Farm 112
Software Library 202
Spectravideo 132
Spectre 31, 158
Spectrum 36, 41
Stack 31
Storm Software 92, 116
Swanley 172

T
Terminal Software 67
The Microworkshop 198
Timescape 134
Tremiver 175

U
US Gold 155, 157, 159
Ultimate Play the Game 123, 136

V
Visions 131
Visionstore 170

W
WH Smith 8, 11
William Stuart 146
Wizard Software 184
Woking Computer Centre 190
Wood Green School 146
Worldwide 54

Y
Your Computer Subscriptions 211

Z
Zeal Marketing 35
Zero 84

AQUANAUT

AN UNDERWATER EXPERIENCE YOU WON'T BELIEVE

FROM
INTERCEPTOR
SOFTWARE



WRITTEN BY IAN GRAY

PRODUCED BY RICHARD PAUL JONES

MUSIC BY CHRIS COX

ONLY
£7.00
ON CASSETTE
£9.00
ON DISK

SUITABLE FOR THE
commodore 64

AVAILABLE NOW
FROM
ALL GOOD COMPUTER
RETAILERS

INTERCEPTOR
MICRO'S
LINDON HOUSE, THE GREEN, TADLEY, HAMPSHIRE
TEL (07356) 71145

Ian Hoare's Computer Cookbook . . . a Family Program for the Family Computer

Ian Hoare, Chef to British Routiers, and Bug-Byte have together produced a world first, the Computer Cookbook. It makes an ideal gift for any member of the family, particularly those who spend a lot of time in the kitchen. It is also great fun for the computer addict who can't tell the difference between a silicon chip and a french fry!

The Computer Cookbook:

- Uses Computer power to suggest the ideal meal for any occasion – you just select the main ingredients.
- Chooses recipes according to price, preparation, cooking time and country of origin.
- Selects the right wine for any meal.
- Works out quantities, in imperial or metric units, for up to 200 people.
- Gives detailed cooking instructions, including helpful hints.

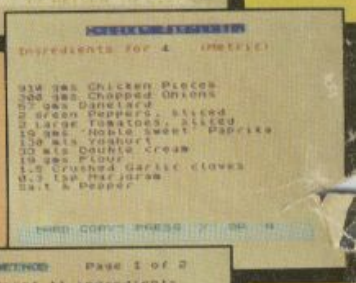
The Computer Cookbook is simple for any member of the family to use, no previous computer knowledge is needed.

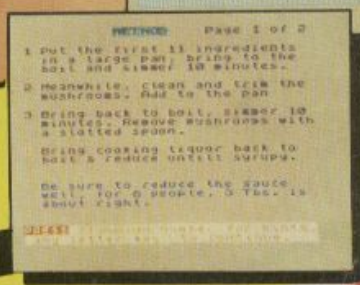
BUG-BYTE











The Computer Cook Book

For the 48K Spectrum. (on 2 cassettes).

ANOTHER FIRST from BUG-BYTE

£9.50

Available from selected branches of Boots, W. H. Smith, Menzies, etc., and all good computer shops.
In case of difficulty, Contact: Bug-Byte Ltd. Mulberry House, Canning Place, Liverpool Tel: 051-709 7071.

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