

# YOUR

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	360.00
Sweden	SKr	22.20
Switzerland	SFr	6.40
U.S.A.		\$3.95 (D72163)

85p

# COMPUTER

JULY 1984

BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE

Vol. 4 No. 7

## BREAKING ON THROUGH

### Micros move into the fast lane



**Oric Destroyer**  
**Bipods and**  
**Panel on ZX-81**

**QL controversy: Sinclair's new ROM antic**  
**Creepy-crawlies for Dragon and CBM-64**  
**Software — Spectrum tapes, BBC Plug-ins**

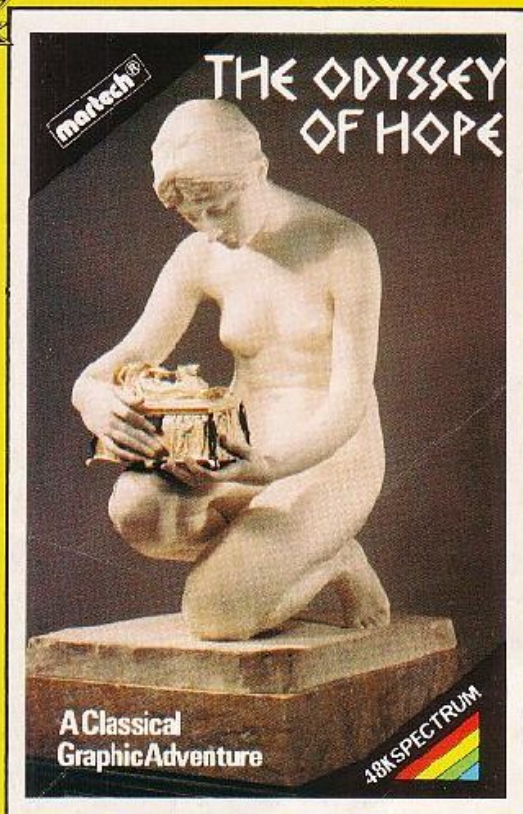
**Vic Jetman and**  
**Hi-res Drawer**



# martech®

## ...spectacular games

NEW



*Pandora by Harry Bates. Reproduced by kind permission of The Tate Gallery, London.*

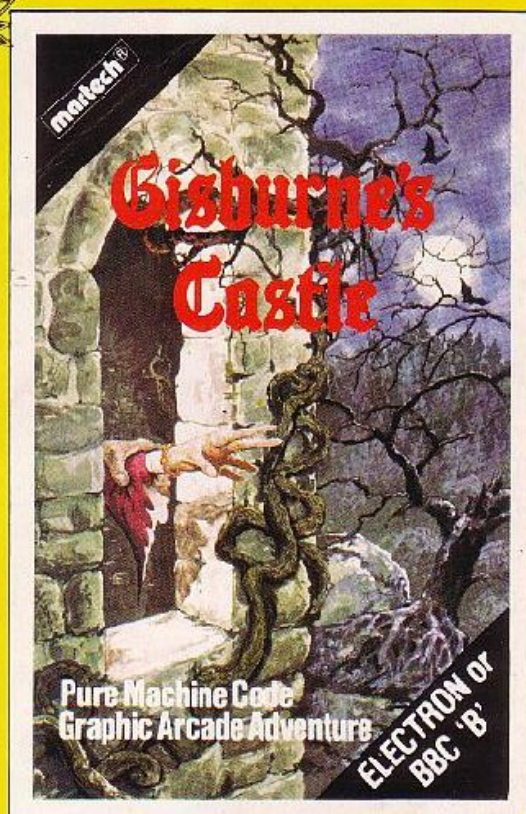
### SPECTRUM 48K

£5.95

Once upon a time, Zeus had one of his master craftsmen fashion a mortal of perfect beauty — the first woman — he called her Pandora — meaning "all gifts". Zeus presented her with a golden casket, but bade her promise never to open it, but Pandora grew curious and one day she lifted the lid. With a rush and a cry, out came all the ills that now beset man; disease and sorrow, hate, jealousy, theft, lies and many more. Pandora rushed to close the lid, but all of its contents had escaped, save one, "Hope". Since that ill-fated day when Pandora infested the world with terrible woes and suffering, Hope has always remained a comfort to this troubled world — until now! Someone has stolen Hope, and famine, disease and violence have taken over the world.

Enter the magnificent and dangerous world of Ancient Greek Legend in this amazing hi-res graphic adventure. One-eyed giant Cyclops and the many headed Hydra are but a few of the incredible creatures you will meet as you sail treacherous seas and cross dangerous landscapes in your struggle to return Hope to its guardians on Mount Olympus, the home of the Gods.

NEW



### BBC 'B' or ACORN ELECTRON

£7.95

Guy of Gisburne, treacherous henchman of the Sheriff of Nottingham, has captured the lovely Maic Marion. In his heavily defended castle — he holds her as bait!

Become Robin of Loxley, the hooded man, on a mission of rescue and vengeance.

Written in 100% machine code and making full use of the sound, colour and hi-res capabilities of each computer, Gisburne's Castle blends the action of the arcade with the challenge of an adventure, into one outstanding game.

#### Features:

- \* Hundreds of different graphic locations
- \* 20 different animated and intelligent characters
- \* 15 different objects to be found and used
- \* Joystick option and user definable keys

Available from most leading retailers or directly by mail order

Martech is the registered trade mark of

# Software Communications Ltd.

Martech House, Bay Terrace, Pevensey Bay, East Sussex BN24 6EE

Dealer enquiries welcome. Tel: (0323) 768456 Telex: 87465 EXIM Brighton



#### MAIL ORDER

THE ODYSSEY OF HOPE — SPECTRUM 48K ☐  
 GISBURNE'S CASTLE — BBC 'B' ☐  
 ELECTRON ☐

Tick

Name .....

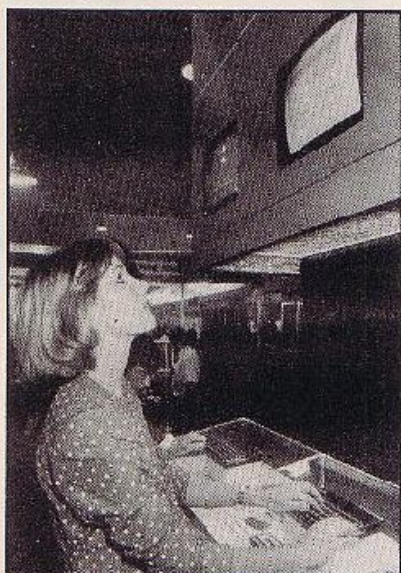
Address .....

Postal Orders or cheques payable to SOFTWARE COMMUNICATIONS LTD., DEPT. YC  
 Prices include VAT, post and packing. Add £1 extra for overseas orders.



# YOUR COMPUTER *Contents*

JULY 1984



Computer Fair — page 35



Breaking on through — page 66



Destroyer — page 114

**32 YOUR LETTERS:** Unhelpful dealers; making your Dragon go faster; non-violent games; MSX — too little, too late?

**35 NEWS:** Computer Fair; double trouble — Computers and Dragondata; gold for the Game Lords; two from Commodore.

**39 FIRST BYTES:** Starting with machine code; choosing a printer.

**43 COMPUTER CLUB:** Paul Bond plays away at Fulham.

**45 SOFTWARE SHORTLIST:** New commercial releases.

**49 QUEST CORNER:** Hugo North guides you to your goal.

**52 QL REVIEW:** Kathleen Peel tries out the latest QL (with the new ROM) but is still not happy, especially with the speed of the word processing package.

**56 SPECTRUM SOFTWARE:** Survey of the latest games.

**59 BBC ROMS:** Richard Lambley looks at graphics facilities available in ROM.

**66 BREAKING ON THROUGH:** How micros are getting into motorcycling.

**69 WATSON'S WORDS:** John Watson's reactions to racing games.

**70 SECOND-HAND MICROS:** John Dawson guides you through the second-hand micro jungle.

**79 DANGEROUS GARDENS:** Jason Charlesworth discovers something nasty at the bottom of his garden.

**82 VIC JET MAN:** Stop the deadly Whizzers in David Hodgett's game for the unexpanded Vic-20.

**84 WRIGGLY:** Be kind to worms. Help Wally find his way in Keith Suddick's game for nature lovers and Commodore owners.

**87 BIPODS:** Destroy the Martian pods before they destroy you in D E Thorpe's game for the ZX-81.

**90 SNAKY:** M North squirms around the screen in this machine code game for the Dragon.

**97 WORD GAME:** It's not Scrabble but N. Pearce's game is fun if you have a 16K Atari computer.

**100 THE BEANSTALK:** Recover the three treasures from the giant in this Spectrum game by Colin Carruthers and Ronald Sellar.

**104 GRID WORZ:** Simon Phipps and his BBC micro take on more than even three Shredded Wheat can handle.

**109 VIC DRAW:** A high resolution drawing routine for the Vic-20 from Arnie Blomberg.

**114 DESTROYER:** In this game for the Oric Miles Dunlop takes to sea in an attempt to sink the fleet.

**117 BBC SPRITES:** Bobby Rao follows up last month's sprites routine with an article which tells you how to use them.

**123 HEAD-UP DISPLAY:** Alan Lee's ZX Panel program for the ZX-81 helps you to enter and debug machine code programs.

**127 CBM-64 EXTENDED BASIC:** Alex Start explains how to extend CBM-64 Basic with routines which do the Pokes for you.

**133 SPECTRUM EXTENDED BASIC:** A method of adding Basic commands without using Interface I is described by Robert Newman.

**141 DRAGON FORTH:** A program which allows the Forth language to be used on the Dragon from Brian Watson.

**145 COMPETITION:** Results of May's Coleco Adam Competition.

**147 RESPONSE FRAME:** Tim Hartnell answers your problems.

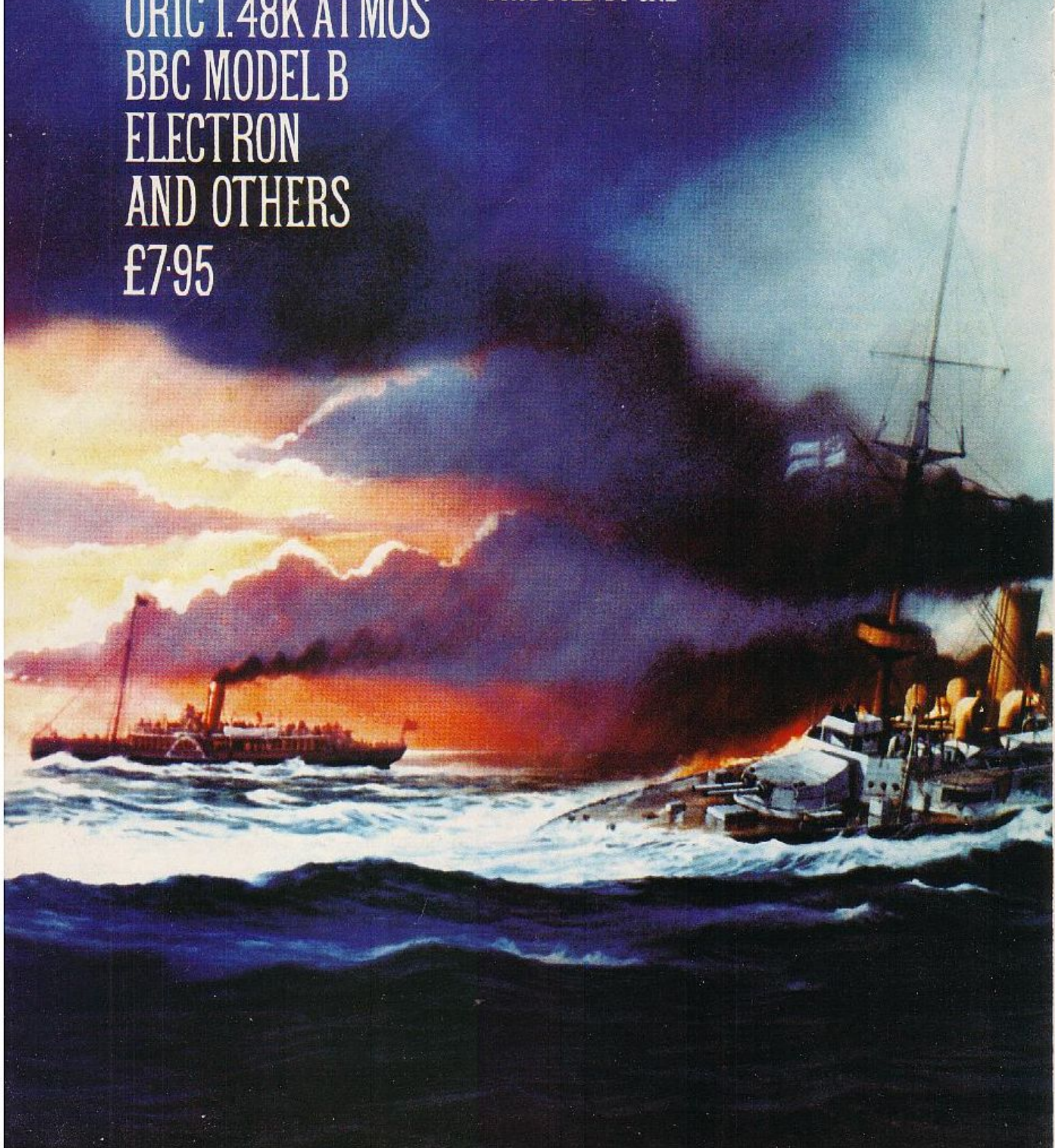
**149 SOFTWARE FILE:** Programs for most home micros.



AVAILABLE FOR  
**ZX SPECTRUM 48K**  
TO BE CREATED FOR  
**COMMODORE 64**  
**ORIC 1.48K ATMOS**  
**BBC MODEL B**  
**ELECTRON**  
**AND OTHERS**  
**£7.95**

Following in the tradition of superb adaptations of the H. G. Wells classic: CRL in association with ORP proudly presents to the world of home computing the strategic arcade adventure '**The War of The Worlds**'. Based on Jeff Wayne's internationally successful double album.

PRODUCED BY CRL





JEFF WAYNE'S VIDEO GAME  
VERSION OF

# THE WAR OF THE WORLDS



**CRL**

**THE DREAM MAKERS**

Jeff Wayne's version of the 'The War of The Worlds' copyright Ollie Record Production, New York, 1984.

CRL House, 9 Kings Yard, Carpenters Road, London E15 2J ID. Tel: 01-533 2919



# 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 colour – a true arcade adventure.

Another great quality game from the house which brought you  
**"Harrier Attack!"** and  
**"Jungle Trouble!"**

## DURELLSOFTWARE

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 TILES:

1)

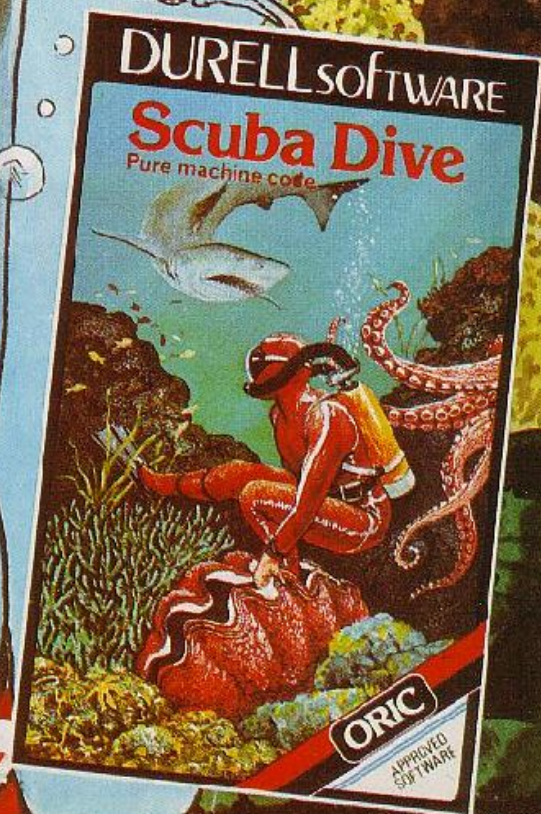
2)

3)

NAME:

ADDRESS:

Overseas customers please allow £1.00 extra





campbell systems

for spectrum 48k

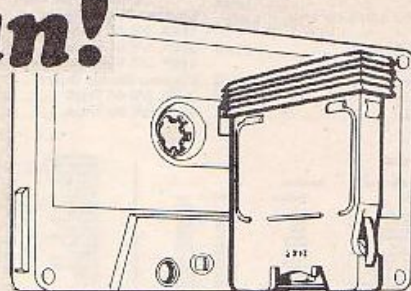
# Can YOUR Database Handle This?

With MYRMIDON'S  
Micro-Print  
up to 51 columns!

PROFESSIONAL FILE MANAGEMENT, DATA RETRIEVAL AND PRESENTATION  
ANY ADDRESS LISTS, INVENTORY, CUSTOMER OR PERSONNEL RECORDS...

## MASTERFILE can!

Microdrive commands included: 32, 42 or 51 characters per line!; 26 fields per record; Unrestricted number of records; 36 user defined Display/Print formats; Fast search & sort facilities; Around 32K of RAM available for data!



Now with **MF-PRINT** and MASTERFILE version 09, you can format your data for a full width printer!

Works with most popular printer interfaces. Fully variable report widths (over 100 columns) and lengths. Powerful numeric editing and column totals. Almost no reduction in space available for data.

*Many more products available. Send SAE for details!*

MASTERFILE version 09 £15.00

MF-PRINT £ 6.95

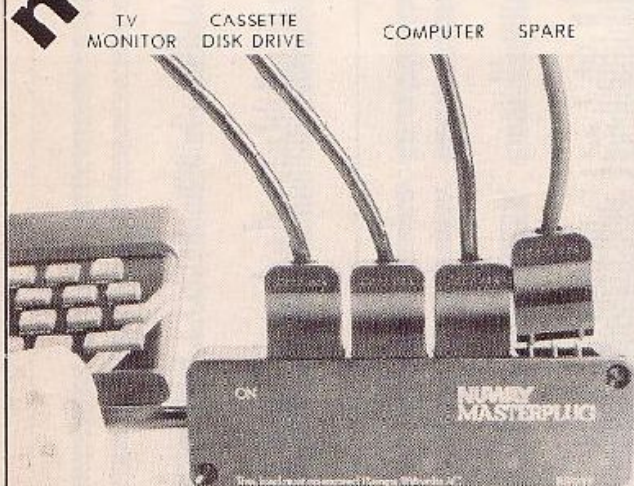
MASTERFILE with MF-PRINT £19.95

All programs mailed 1st class by return.  
Prices include VAT and postage within Europe.  
New Address: Campbell Systems  
(Dept YC) 57 Trap's Hill, Loughton,  
Essex. IG10 1TD. England 01-508 5058



## new MASTERPLUG

ELIMINATES ALL THAT UNTIDY WIRING



- ★ Neon on-off indication.
- ★ 1.5 metre lead with mains plug supplied.
- ★ Enables 4 appliances to be connected safely, compactly and economically into one mains outlet socket.
- ★ Complete with four special easy to connect plugs — no more to buy
- ★ Safe — complies with BS 5733 and Electrical Equipment Safety Regulations 1975 (amended 1976).
- ★ Easily fitted to any surface with screws provided.

Send Cheques PC's now to:

H & K Supplies, 322 Guildford Road,  
Bisley, Surrey, GU24 9AD

**£10.99**  
including postage  
and VAT  
Buy 2 for £20.00  
and save almost  
£2.00

## Walters COMPUTERS

# LOOK

## GAMES PROGRAMMERS

You could be earning

**£20,000**

for your games  
whatever the machine

**SEND YOUR GAMES  
IN NOW!**

Send tape and instructions to:  
Ian Smart, Software Development Manager,



Walters Computer Systems Limited,  
12 Hagley Road,  
Stourbridge,  
West Midlands DY8 1PS.



**THOUGHTS & CROSSES**  
37 MARKET STREET, HECKMONDWIKE, WEST YORKS  
Telephone 0924-402337

## COMPUTERS

Spectrum 48K .....	£25
Spectrum .....	£97
386 B .....	£399
with FIC software free - your choice	
Commodore 64 .....	£199
Commodore Cassette Recorder .....	£40
MTX 500 .....	£269
MTX 512 .....	£299

## MONITORS

Fidelity 14" Monitor T.V.  
med res.....£199  
Sanyo 2" Green Screen.....£95

## DISK DRIVES

<b>Cumana Single Drives</b>	
100K S/S 40 Track .....	\$165
200K S/S 80 Track .....	\$205
400K D/S 809 Track .....	\$230
<b>Cumana Double Drives</b>	
200K S/S 40 Track .....	\$355
400K S/S 80 Track .....	\$395

## 800K D/S 80 Track .....

Commodore 100K S/S 1541	
with free software	£210
3" Mini Drive S/S 100K .....	£175
Torch Disk Pack .....	£800

## PRINTERS

Commodore 1520	
Printer Plotter.....	£95
Epson RX80.....	£279
Epson RX80 F.T.....	£319
Epson FX80.....	£399
Epson MX 00 II.....	£450

## JOYSTICKS

Epson FX10C.....	£30	Pro Ace Commodore 64,	
Dye Colour Printer.....	£129	Vic 20.....	£12
Sinclair Printer.....	£39	Cartridge (Complete)	
		Spectrum.....	£33
		Clas (Pair) Proportional	
		8BC.....	£17
		C11 Cassettes 10 for £4.50	
		Wabest Disks 5 1/4"	
		S.S.S.C 40.....	10 for £17
		S.S.D 40T.....	10 for £20
		D.S.D 40T.....	10 for £22
		S.S.D 80T.....	10 for £28
		3" Disks Single.....	£4.50

[illegible][illegible][illegible]

Suzuki	1.66	1.78	1.86	1.94	2.02	2.10	2.18	2.26	2.34	2.42	2.50	2.58	2.66	2.74	2.82	2.90	2.98	3.06	3.14	3.22	3.30	3.38	3.46	3.54	3.62	3.70	3.78	3.86	3.94	4.02	4.10	4.18	4.26	4.34	4.42	4.50	4.58	4.66	4.74	4.82	4.90	4.98	5.06	5.14	5.22	5.30	5.38	5.46	5.54	5.62	5.70	5.78	5.86	5.94	6.02	6.10	6.18	6.26	6.34	6.42	6.50	6.58	6.66	6.74	6.82	6.90	6.98	7.06	7.14	7.22	7.30	7.38	7.46	7.54	7.62	7.70	7.78	7.86	7.94	8.02	8.10	8.18	8.26	8.34	8.42	8.50	8.58	8.66	8.74	8.82	8.90	8.98	9.06	9.14	9.22	9.30	9.38	9.46	9.54	9.62	9.70	9.78	9.86	9.94	10.02	10.10	10.18	10.26	10.34	10.42	10.50	10.58	10.66	10.74	10.82	10.90	10.98	11.06	11.14	11.22	11.30	11.38	11.46	11.54	11.62	11.70	11.78	11.86	11.94	12.02	12.10	12.18	12.26	12.34	12.42	12.50	12.58	12.66	12.74	12.82	12.90	12.98	13.06	13.14	13.22	13.30	13.38	13.46	13.54	13.62	13.70	13.78	13.86	13.94	14.02	14.10	14.18	14.26	14.34	14.42	14.50	14.58	14.66	14.74	14.82	14.90	14.98	15.06	15.14	15.22	15.30	15.38	15.46	15.54	15.62	15.70	15.78	15.86	15.94	16.02	16.10	16.18	16.26	16.34	16.42	16.50	16.58	16.66	16.74	16.82	16.90	16.98	17.06	17.14	17.22	17.30	17.38	17.46	17.54	17.62	17.70	17.78	17.86	17.94	18.02	18.10	18.18	18.26	18.34	18.42	18.50	18.58	18.66	18.74	18.82	18.90	18.98	19.06	19.14	19.22	19.30	19.38	19.46	19.54	19.62	19.70	19.78	19.86	19.94	20.02	20.10	20.18	20.26	20.34	20.42	20.50	20.58	20.66	20.74	20.82	20.90	20.98	21.06	21.14	21.22	21.30	21.38	21.46	21.54	21.62	21.70	21.78	21.86	21.94	22.02	22.10	22.18	22.26	22.34	22.42	22.50	22.58	22.66	22.74	22.82	22.90	22.98	23.06	23.14	23.22	23.30	23.38	23.46	23.54	23.62	23.70	23.78	23.86	23.94	24.02	24.10	24.18	24.26	24.34	24.42	24.50	24.58	24.66	24.74	24.82	24.90	24.98	25.06	25.14	25.22	25.30	25.38	25.46	25.54	25.62	25.70	25.78	25.86	25.94	26.02	26.10	26.18	26.26	26.34	26.42	26.50	26.58	26.66	26.74	26.82	26.90	26.98	27.06	27.14	27.22	27.30	27.38	27.46	27.54	27.62	27.70	27.78	27.86	27.94	28.02	28.10	28.18	28.26	28.34	28.42	28.50	28.58	28.66	28.74	28.82	28.90	28.98	29.06	29.14	29.22	29.30	29.38	29.46	29.54	29.62	29.70	29.78	29.86	29.94	30.02	30.10	30.18	30.26	30.34	30.42	30.50	30.58	30.66	30.74	30.82	30.90	30.98	31.06	31.14	31.22	31.30	31.38	31.46	31.54	31.62	31.70	31.78	31.86	31.94	32.02	32.10	32.18	32.26	32.34	32.42	32.50	32.58	32.66	32.74	32.82	32.90	32.98	33.06	33.14	33.22	33.30	33.38	33.46	33.54	33.62	33.70	33.78	33.86	33.94	34.02	34.10	34.18	34.26	34.34	34.42	34.50	34.58	34.66	34.74	34.82	34.90	34.98	35.06	35.14	35.22	35.30	35.38	35.46	35.54	35.62	35.70	35.78	35.86	35.94	36.02	36.10	36.18	36.26	36.34	36.42	36.50	36.58	36.66	36.74	36.82	36.90	36.98	37.06	37.14	37.22	37.30	37.38	37.46	37.54	37.62	37.70	37.78	37.86	37.94	38.02	38.10	38.18	38.26	38.34	38.42	38.50	38.58	38.66	38.74	38.82	38.90	38.98	39.06	39.14	39.22	39.30	39.38	39.46	39.54	39.62	39.70	39.78	39.86	39.94	40.02	40.10	40.18	40.26	40.34	40.42	40.50	40.58	40.66	40.74	40.82	40.90	40.98	41.06	41.14	41.22	41.30	41.38	41.46	41.54	41.62	41.70	41.78	41.86	41.94	42.02	42.10	42.18	42.26	42.34	42.42	42.50	42.58	42.66	42.74	42.82	42.90	42.98	43.06	43.14	43.22	43.30	43.38	43.46	43.54	43.62	43.70	43.78	43.86	43.94	44.02	44.10	44.18	44.26	44.34	44.42	44.50	44.58	44.66	44.74	44.82	44.90	44.98	45.06	45.14	45.22	45.30	45.38	45.46	45.54	45.62	45.70	45.78	45.86	45.94	46.02	46.10	46.18	46.26	46.34	46.42	46.50	46.58	46.66	46.74	46.82	46.90	46.98	47.06	47.14	47.22	47.30	47.38	47.46	47.54	47.62	47.70	47.78	47.86	47.94	48.02	48.10	48.18	48.26	48.34	48.42	48.50	48.58	48.66	48.74	48.82	48.90	48.98	49.06	49.14	49.22	49.30	49.38	49.46	49.54	49.62	49.70	49.78	49.86	49.94	50.02	50.10	50.18	50.26	50.34	50.42	50.50	50.58	50.66	50.74	50.82	50.90	50.98	51.06	51.14	51.22	51.30	51.38	51.46	51.54	51.62	51.70	51.78	51.86	51.94	52.02	52.10	52.18	52.26	52.34	52.42	52.50	52.58	52.66	52.74	52.82	52.90	52.98	53.06	53.14	53.22	53.30	53.38	53.46	53.54	53.62	53.70	53.78	53.86	53.94	54.02	54.10	54.18	54.26	54.34	54.42	54.50	54.58	54.66	54.74	54.82	54.90	54.98	55.06	55.14	55.22	55.30	55.38	55.46	55.54	55.62	55.70	55.78	55.86	55.94	56.02	56.10	56.18	56.26	56.34	56.42	56.50	56.58	56.66	56.74	56.82	56.90	56.98	57.06	57.14	57.22	57.30	57.38	57.46	57.54	57.62	57.70	57.78	57.86	57.94	58.02	58.10	58.18	58.26	58.34	58.42	58.50	58.58	58.66	58.74	58.82	58.90	58.98	59.06	59.14	59.22	59.30	59.38	59.46	59.54	59.62	59.70	59.78	59.86	59.94	60.02	60.10	60.18	60.26	60.34	60.42	60.50	60.58	60.66	60.74	60.82	60.90	60.98	61.06	61.14	61.22	61.30	61.38	61.46	61.54	61.62	61.70	61.78	61.86	61.94	62.02	62.10	62.18	62.26	62.34	62.42	62.50	62.58	62.66	62.74	62.82	62.90	62.98	63.06	63.14	63.22	63.30	63.38	63.46	63.54	63.62	63.70	63.78	63.86	63.94	64.02	64.10	64.18	64.26	64.34	64.42	64.50	64.58	64.66	64.74	64.82	64.90	64.98	65.06	65.14	65.22	65.30	65.38	65.46	65.54	65.62	65.70	65.78	65.86	65.94	66.02	66.10	66.18	66.26	66.34	66.42	66.50	66.58	66.66	66.74	66.82	66.90	66.98	67.06	67.14	67.22	67.30	67.38	67.46	67.54	67.62	67.70	67.78	67.86	67.94	68.02	68.10	68.18	68.26	68.34	68.42	68.50	68.58	68.66	68.74	68.82	68.90	68.98	69.06	69.14	69.22	69.30	69.38	69.46	69.54	69.62	69.70	69.78	69.86	69.94	70.02	70.10	70.18	70.26	70.34	70.42	70.50	70.58	70.66	70.74	70.82	70.90	70.98	71.06	71.14	71.22	71.30	71.38	71.46	71.54	71.62	71.70	71.78	71.86	71.94	72.02	72.10	72.18	72.26	72.34	72.42	72.50	72.58	72.66	72.74	72.82	72.90	72.98	73.06	73.14	73.22	73.30	73.38	73.46	73.54	73.62	73.70	73.78	73.86	73.94	74.02	74.10	74.18	74.26	74.34	74.42	74.50	74.58	74.66	74.74	74.82	74.90	74.98	75.06	75.14	75.22	75.30	75.38	75.46	75.54	75.62	75.70	75.78	75.86	75.94	76.02	76.10	76.18	76.26	76.34	76.42	76.50	76.58	76.66	76.74	76.82	76.90	76.98	77.06	77.14	77.22	77.30	77.38	77.46	77.54	77.62	77.70	77.78	77.86	77.94	78.02	78.10	78.18	78.26	78.34	78.42	78.50	78.58	78.66	78.74	78.82	78.90	78.98	79.06	79.14	79.22	79.30	79.38	79.46	79.54	79.62	79.70	79.78	79.86	79.94	80.02	80.10	80.18	80.26	80.34	80.42	80.50	80.58	80.66	80.74	80.82	80.90	80.98	81.06	81.14	81.22	81.30	81.38	81.46	81.54	81.62	81.70	81.78	81.86	81.94	82.02	82.10	82.18	82.26	82.34	82.42	82.50	82.58	82.66	82.74	82.82	82.90	82.98	83.06	83.14	83.22	83.30	83.38	83.46	83.54	83.62	83.70	83.78	83.86	83.94	84.02	84.10	84.18	84.26	84.34	84.42	84.50	84.58	84.66	84.74	84.82	84.90	84.98	85.06	85.14	85.22	85.30	85.38	85.46	85.54	85.62	85.70	85.78	85.86	85.94	86.02	86.10	86.18	86.26	86.34	86.42	86.50	86.58	86.66	86.74	86.82	86.90	86.98	87.06	87.14	87.22	87.30	87.38	87.46	87.54	87.62	87.70	87.78	87.86	87.94	88.02	88.10	88.18	88.26	88.34	88.42	88.50	88.58	88.66	88.74	88.82	88.90	88.98	89.06	89.14	89.22	89.30	89.38	89.46	89.54	89.62	89.70	89.78	89.86	89.94	90.02	90.10	90.18	90.26	90.34	90.42	90.50	90.58	90.66	90.74	90.82	90.90	90.98	91.06	91.14	91.22	91.30	91.38	91.46	91.54	91.62	91.70	91.78	91.86	91.94	92.02	92.10	92.18	92.26	92.34	92.42	92.50	92.58	92.66	92.74	92.82	92.90	92.98	93.06	93.14	93.22	93.30	93.38	93.46	93.54	93.62	93.70	93.78	93.86	93.94	94.02	94.10	94.18	94.26	94.34	94.42	94.50	94.58	94.66	94.74	94.82	94.90	94.98	95.06	95.14	95.22	95.30	95.38	95.46	95.54	95.62	95.70	95.78	95.86	95.94	96.02	96.10	96.18	96.26	96.34	96.42	96.50	96.58	96.66	96.74	96.82	96.90	96.98	97.06	97.14	97.22	97.30	97.38	97.46	97.54	97.62	97.70	97.78	97.86	97.94	98.02	98.10	98.18	98.26	98.34	98.42	98.50	98.58	98.66	98.74	98.82	98.90	98.98	99.06	99.14	99.22	99.30	99.38	99.46	99.54	99.62	99.70	99.78	99.86	99.94	100.02	100.10	100.18	100.26	100.34	100.42	100.50	100.58	100.66	100.74	100.82	100.90	100.98	101.06	101.14	101.22	101.30
--------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

[illegible]

Large range of programs available for Dragon Oric, ZX81, MTX — send for list.  
Please order stating: (1) Programs required; (2) Computer; (3) Amount enclosed; (4) Name & Address.  
All prices include packing & VAT. Overseas orders welcome.



# 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 CEM 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.

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

### £34.95

(p+p £2.00)

#### ORDER FORM

Please send \_\_\_\_\_ Rotronics audio/data recorder(s) at £34.95 (inc. p & p) each. All prices inclusive of VAT. Please make cheques payable to SMT. Allow 28 days for delivery.

Name \_\_\_\_\_

Address \_\_\_\_\_

YC7

## BETA BASIC 1.8

### ENHANCED BASIC FOR SPECTRUM 48K FOR GRAPHICS – STRUCTURED PROGRAMMING – DATA HANDLING

Release 1.8 is more powerful than ever! We don't have space to do this program justice – if you can't believe the ad, send us a large S.A.E. for further information.

Features: Commands are single-entry keywords in graphics mode. Syntax is checked on entry. Fully compatible with Spectrum Basic. Microdrive compatible. Comprehensive manual.

NOTE: Release 1.0 is still available for 16/48K Spectrum at £11.00.

**ALTER** screen colours (general or specific)  
**AUTO** line numbering  
**BREAK** out a code loop  
**CLOCK** digital clock  
**CURSOR CONTROL CODES** allow usings to have complete control  
**DEF KEY** use definable keys  
**DELETE** a block of lines  
**DO-LOOP** structure  
**DPOKE** double poke  
**EDIT** specified line  
**IF** test with **IF... THEN**  
**EXIT** leave DO-LOOP

**END** enclosed area with specified link or page  
**GET** wait for keyboard  
**JOIN** two program lines  
**KEYIN** a string  
**KEYWORDS** new keywords added  
**LIST** all lines from 1 to the  
**USED** lines with **GOTO**, **GOSUB**, **ON ERROR** trap errors  
**LINE** (with **LIVE**, **SAT** and **ERR**)  
**ROUT** a string (may contain control codes)  
**POKE** a value  
**POP** Basic's stack  
**PROC**, **DEF PROC**, **END PROC** (or named procedures)

**RENUM** versatile renamer  
**ROLL** all or part of screen in any direction by specified number of rows, with or without attributes  
**SCROLL** like **ROLL**, but without wrap round  
**SUNT** screen (very fast)  
**SPLIT** program lines  
**TRACE** program execution  
**UNTIL** used with **DO** or **LOOP**  
**USING** used with **PRINT**  
**WHILE** used with **DO** or **LOOP**  
**XOR**, **YOR** move **LOT** lines  
**XRG**, **YRG** change **PLOT** scale

#### FUNCTIONS

**AND** (bit-by-bit)  
**BIN** decimal to binary  
**CHAR** number to 2 characters  
**CODE** out cosine  
**DEC** hexadecimal to decimal  
**DPOKE** double PEEK  
**FILL** filled hex

**HEX** decimal to hexadecimal  
**INSTR** string search  
**LEN** line memory  
**MEMORY** all of memory as a string  
**MOD** modulus  
**NUMBER** 2 characters to number  
**OR** (bit-by-bit)

**RND** fast RND  
**SCREEN** recognises user graphics  
**SIN** fast sine  
**STR** 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: \_\_\_\_\_

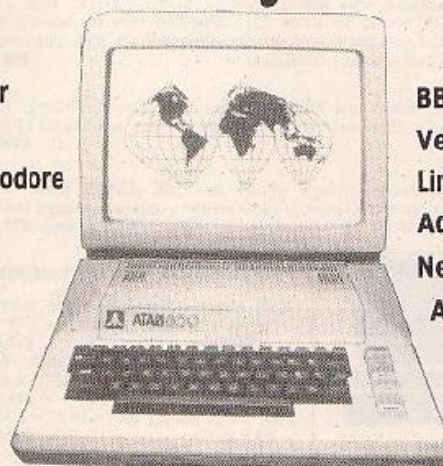
ADDRESS: \_\_\_\_\_

**BETASOFT**  
92 OXFORD ROAD, MOSELEY,  
BIRMINGHAM B13 9SQ.

## 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**



# 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 2x28 pin sockets and a Reset button allows up to 16K of Basic or M/C program to RUN or LOAD instantly from EPROMS. Cabled connector and full extendable d. 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 4xPP3 batteries £19.95

**DHOB1** UV ERASER  
Compact. Mains powered. Safe. Fully cased. Up to 3 EPROMS £18.95

**DHOB12** 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 SAVING, 10yr storage and instant retrieval of programs. Resides in 8-12K or 12-16K of ZX81. £29.95

**CRAMIC-81**  
Ingenious hardware/software allows this 16K CMOS RAM with lithium battery to co-exist in same memory area as ordinary RAM. ZX81 can multitask on two completely independent programs. £79.95



STATUS NO. OF SYSTEMS - 001  
EPROM TYPE - 27128  
RAM START ADDR - 0000  
EPROM START ADDR - 0000  
JOB LENGTH - 4000  
ASK - CHECK

WHICH TASK DO YOU WISH TO DO?  
W) CHECK THE EPROM IS CLEAN  
X) READ THE CONTENTS OF EPROM INTO RAM  
Y) BLOW AN EPROM WITH DATA FROM RAM  
Z) VERIFY THAT EPROM IS A TRUE COPY  
AC TO RAM  
B TO CPU  
R TO RESTART

FAST CODES AVAILABLE:  
D H PQR WXYZ

### PRINTER/MONITOR ACCESSORIES

**MSB Monitor Stand** for BBC micro. Sits over the Beeb 17" x 12" x 3.75". P&P £3.50 £19.95  
**PSS Standard printer stands** for OKI, Epson etc. 15" x 12" x 4.5". P&P £3.50 £16.95  
**PSL Large model** 17" x 14.5" x 3.75". P&P £3.50 £19.95



**PSC-3** for Epson MX-100 etc. e.g. 21" x 14" x 3.75" P&P £3.50 £22.95

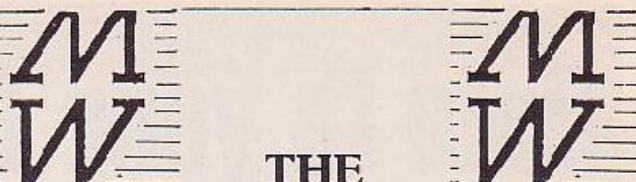
**CUSTOM PRINTER STANDS** for larger printers P.O.A.

**POT Printer Output Tray** for 11" fanfold paper P&P £3.50 £16.95



UK. VAT extra. No VAT on exports P+P UK. Free. Europe + 5% — overseas + 10% TLX 81574 CML

Cambridge Microelectronics Ltd. One Milton Rd. Cambridge CB4 1UY Tel: (0223) 314 814



## 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
- \* JOYSTICKS
- \* KEYBOARDS
- \* TAPES
- \* RAMPACKS
- \* BOOKS
- \* DISCS
- \* 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

## Educational Software LCL



NEW

**BBC Micro  
ZX Spectrum  
unexpanded VIC  
Electron  
ZX81  
Apple  
PET  
Commodore 64  
Dragon**  
All software for the above computers.

**SIR FRANCIS DRAKE ADVENTURE GAME** (BBC, Spec. Electron, C64). Authentic, historical, graphics adventure game. £7.95.  
**MICRO MATHS** 24 program revision or self-tuition course to O-Level. £24.50 (except ZX81 £12.00).  
**BRAINTEASERS** (BBC, Electron, CEM 64, Spectrum, Dragon, Vic). Book of 20 tests and puzzle programs. £5.05.  
**PICTURE PUZZLES** (BBC & Electron, CBM 64). Early learning fun using educational tests. 3C 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 on y). 50 program O-Level course or teacher's aid, amazing graphics. £90.00.  
"... 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 (distributors in 24 countries).

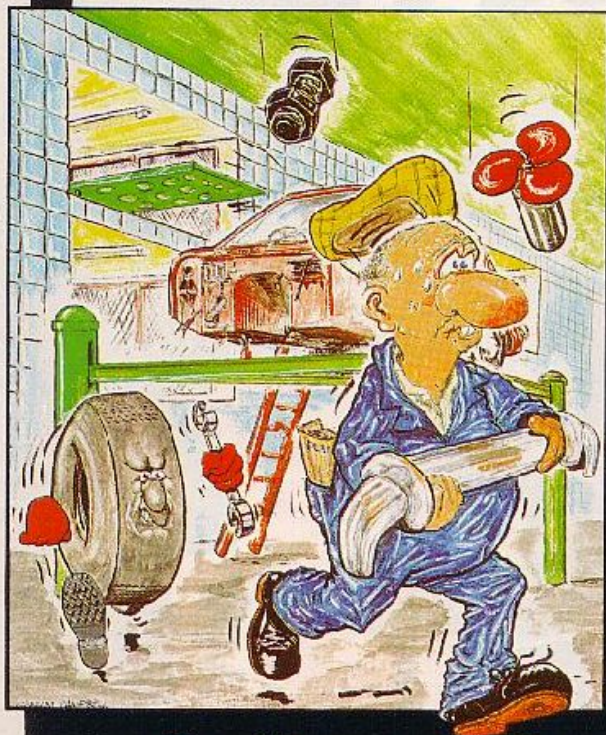
**LCL**  
26 Avondale Ave.  
Staines, Middx.  
Tel: 0784 58771  
24 hrs. Orders



GENEROUS TRADE DISCOUNTS



# This week—it's **Wally Week!**



**Wally Week is here – starring in  
Mikro-Gen's great new game**

## **Automania**

Meet Wally Week – the incomparably incompetent hero of Automania. Help him climb the ladders and jump the gaps whilst rebuilding ten cars – and avoiding a hailstorm of nuts and bolts, an avalanche of tyres, and a Tidy Robot which clears everything up – including the car pool Wally is rebuilding. And if you can do it, start again at a harder level – it soon gets very difficult . . .

**Ten screens ★ Superb graphics ★ Great animation!  
It's all on Automania, starring Wally Week**

## **Automania ONLY £6.95**

For 48K Spectrum

Just part of Mikro-Gen's great range – look out for Laserwarp (and see if you can win £100 for the month's highest score), Genesis II, Paradroids, Drakmaze, and lots more at Co-op, Boots, W H Smiths, Menzies and other leading retailers, or order direct (plus 40p post & packing) from:

**PHONE YOUR  
VISA/ACCESS  
NUMBER**

# **MIKRO-GEN**

44 The Broadway, Bracknell, Berks RG12 1AG Tel: 0344 427317



# ANIM



**G**raphics— This program enables you to paint and draw on the screen by controlling a simulated pencil and brush which can be manoeuvred either by keyboard or joystick. This utility can be used to create and edit background pictures stored in half the normal memory space by use of innovative data compression techniques. Together with its automated drawing techniques; circle, line and centring routines; background colour options, and tape load and save choices; this makes the creation of an artistic wonder possible for ALL USERS.



**A**nimation— The animation utility allows easy manipulation of sprite data pictures, several sprite designs, and a multitude of musical compositions and everyday sounds. This facility is a compilation of all the facets of the graphic and sound utilities.



# R GAS- KIT-64 G

**S**ound — This section of the package turns your Commodore 64 into an intelligent synthesiser on which you can choose to play solo or duel on a piano, organ, harpsicord, xylophone, harp, bagpipe, harmonica, violin, banjo and flute with variable tempo and pitch. The sound routine includes replay, store, fetch, load and append options, so making the composition of superb audio effects an extremely simple task.



**£14.95**  
INC. VAT.

## 3 New Utilities from ANIROG in One Package GAS-KIT-64

Develop the artistic and musical capabilities of your Commodore 64 with an astounding extension of its Basic by 23 commands, allowing you to use the monitor as a canvas to generate high resolution pictures and the keyboard to compose music for your own programs/entertainment. This completely interactive package enables you to create masterpieces quickly thus shortening and simplifying program writing. For instance, create a work of art to use as a backdrop, add your sprites, then compose a musical piece for background music together with a few everyday sounds, bring them all together, and you've produced an animated cartoon to music in a short time, by use of a simple extended Basic Program. GAS-KIT-64 even allows incomplete tunes and designs to be stored and finished later, and to help you on your way, educational and demonstration programs and help instructions are included together with full menus and picturegrams. When all is complete you can store your productions on your own Basic programs.

# ANIROG

Trade Enquiries: Anirog Software Limited, 29 West Hill, Dartford, Kent (0322) 92513/8  
Mail Order: 8 High Street, Horley, Surrey. 24 hour Credit Card Sales, Horley (02934) 6083  
Payment by Cheque: PO Access Visa Postage and Packing 50p Overseas £2.00



Write your own machine code adventures

Without any knowledge of machine code whatsoever



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

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

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

**FOR THE 48K SPECTRUM AT £14.95**

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

SAE for full details of our range.

Dealer enquires welcome.

## GILSOFT

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

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



## YOUR ONE-STOP SOURCE OF COMPUTER BOOKS

and

## SUBSCRIPTION AGENCY FOR ALL BRITISH AND AMERICAN COMPUTER MAGAZINES

Here is your chance to subscribe to one or more of the 50 leading magazines on

### COMPUTERS - ELECTRONICS - VIDEO

Also NEW Books on Programming Languages and Techniques, Graphics, Microelectronics, Software Eng., etc. from all publishers.  
All countries served throughout the world.

Please write for catalogues.

Computers Books and Magazines  
Haulterm Ltd. 91 Exeter House,  
Putney Heath, London SW15, England  
Telephone 01-788 8746

Ring for sample Printout, Full Spec and latest Price

## PRINTER BARGAINS

STAR DP 8480 (RS232) 197 .....	£207.00 INC VAT
STAR GEMINI 10X .....	£235.00 INC VAT
STAR GEMINI 15X .....	£390.00 INC VAT
STAR DELTA 10 .....	£368.00 INC VAT
JUKI 6100 .....	£420.00 INC VAT
CANON PW 1080A .....	£385.00 INC VAT

Securicor delivery £8.00

CJE Micros BBC Printer Packs for Star, Canon & Juki Printers.

Include 1. the Printer. 2. Delivery by Securicor.  
3. Cable to the BBC 1-3 Meters.

4. Screen Dump Program (M/C Source).

5. Text Dump Program.

6. Function Key Set Up Program, for use with word wise.

7. Function Key Label Printing Program for use with above.

8. View Printer Driver.

9. 100 Sheets of Paper.

10. A Mains Plug with a 3 amp plug.

11. Booklet giving details of using the Printer with a BBC.

PRINTER PACK PRICE .....

CJE Printer Packs for other Micros include - Printer Cable, Paper, Mains Plug & Delivery.

BBC Model B .....

BBC Model B - D .....

ELECTRON .....

Phone Credit card orders welcome

## CJE MICROCOMPUTERS

Dept YC, 78 Brighton Rd, Worthing,  
West Sussex.  
(0903) 2139100

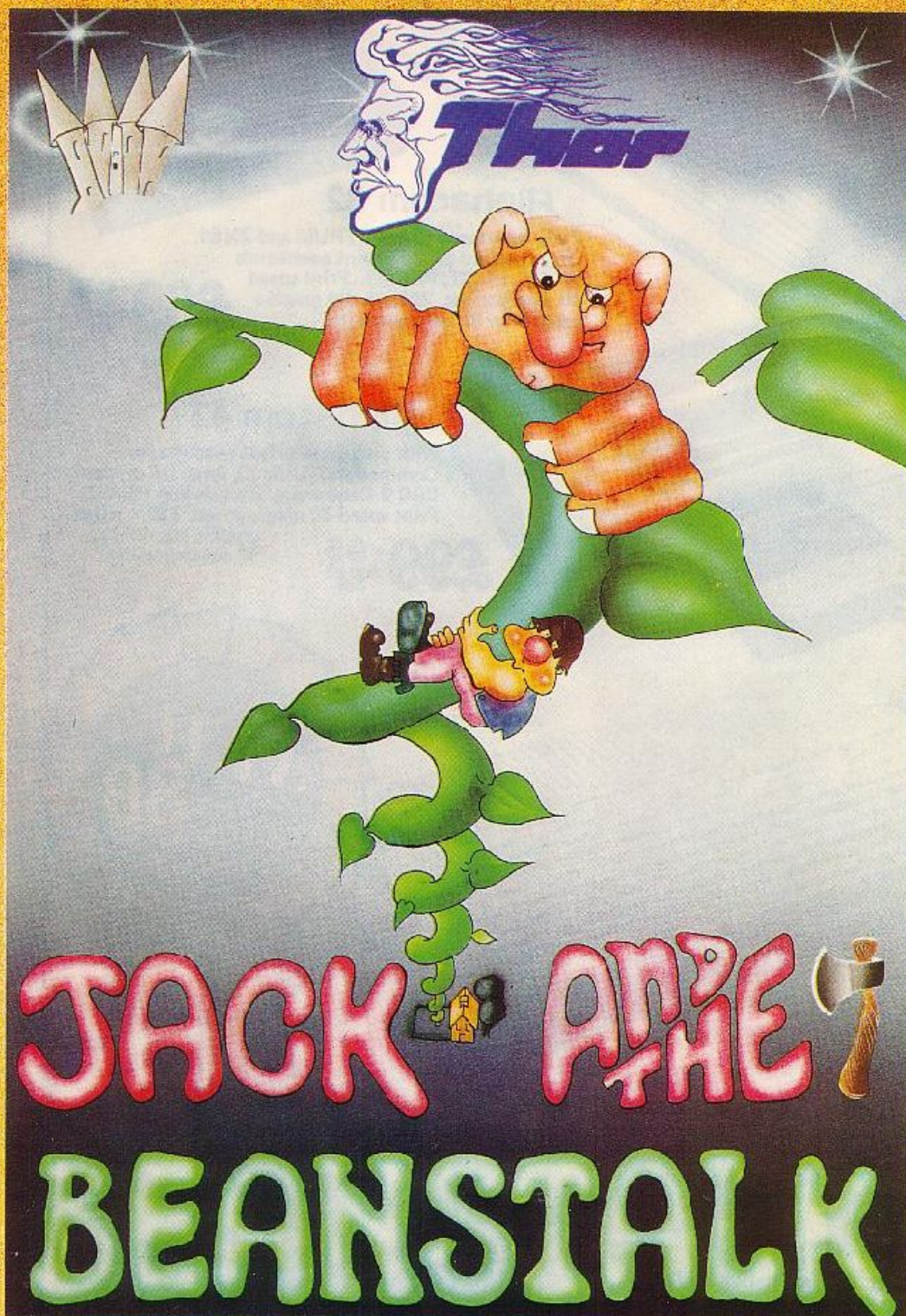


# GOD'S GREATEST!

48K Spectrum

Available soon for CBM 64

This is  
no Fairytale  
it's for  
REAL!



ACTUAL SCREEN DISPLAYS  
The Most Graphical  
Arcade Simulation  
Ever Produced

AVAILABLE FROM SELECTED BRANCHES OF:

John Menzies

WHSMITH

Boots

makro

Edons  
SOFTWARE  
EXPRESS

Greenchip

at DEBENHAMS

LASTY

ALSO AVAILABLE AT ALL  
USUAL SOFTWARE OUTLETS.

RETAILERS CONTACT:

MICRO DEALER UK Ltd

Tiger trader

Lightning

PRISM

CentreSoft

PCS DISTRIBUTION

Bulldog

SOL

by CHRIS KERRY

If you have difficulty in obtaining your copy, just fill in the Coupon below.

Post coupon now to: Thor (Computer Software) Co. Ltd.,  
Erskine Industrial Estate, Liverpool,  
Merseyside L61 1AP Tel: 051-263 0221/2

Enclose Cheque/PO for £ \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Credit Cards - Orders accepted by Phone -  
(01 263 0221/2)

DISTRIBUTORS AND OVERSEAS ENQUIRIES CONTACT PAUL 051-236 8521/2



# Alphacom

range of 32, 40 and 80 column  
**HIGH-SPEED THERMAL**



## Alphacom 32

Fully interfaced to SPECTRUM and ZX81. Uses standard Sindair 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 RS 232. 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 (8 1/2 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)  
To be used with computer ..... ALPHACOM 42 @ £101.95 }  
Total £ ..... ALPHACOM 81 @ £152.45 and ..... rolls of paper @ £5.50 (2 rolls)  
Card Account No ..... POI/Cheque enclosed or debit Access/Barclay  
Name/address .....

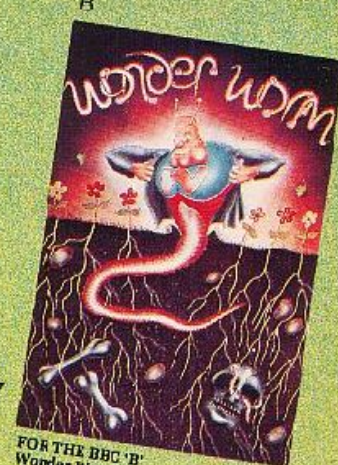
Or from branches of:  
W H Smith, John Manzius,  
Greens, John Lewis  
Group, Spectrum  
Group.



# GOD'S LATEST!



**FOR ANY SPECTRUM**  
Twilight Zone by Nick Outram  
You have now entered the Twilight Zone against your wishes. Your only thoughts are of escape but the powers that be have decreed that to be set free you must compete and win in the games. You have to reach the Ultima Zone. We wish you all the best Earthling.



**FOR THE BBC 'B'**  
Wonder Worm by Kevin Brumhill  
Help Wally the worm turn into the mighty Wonder Worm by moving him around his garden eating the special porcs as he goes. But beware not everything is Wally's Garden is friendly as you will soon find out.

AVAILABLE FROM ALL  
GOOD COMPUTER STOCKISTS

ALL PROGRAMS ONLY

**£5.95**

Including VAT 1s: Class Postage  
& Packing by return



**FOR ANY 48K SPECTRUM**  
Gremlins by Chris Kerry  
Uranium has become the main fuel for Earth. Unfortunately Earth's supply of Uranium is dwindling fast. Jupiter has unlimited supplies of the precious metal, only one problem faces the intergalactic miner robots from earth: GREMLINS.



**FOR ANY SPECTRUM**  
Night Stalker by Frankie Dunn  
While working on a top secret experiment for the government, Professor Amron dropped some of his special formula onto the floor. Within minutes, the insects that were on the floor, became noticeably large. Your mission, to kill the insects before they can breed, but beware of the deadly Centipede.



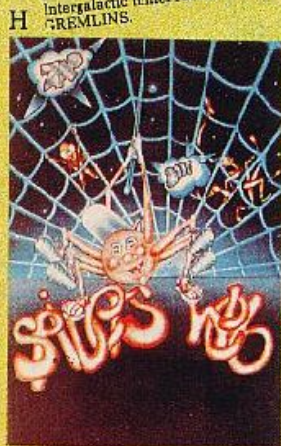
**FOR ANY 48K SPECTRUM**  
Jack and the Beanstalk by Chris Kerry  
Will Jack get the riches from the Giant's castle without being stomped on. Will he climb the beanstalk without falling off; only you (and Jack) will know as you rush around looking frantically for the treasures you desire.



**FOR THE 3K OR 8K EXPANDED VIC 20**  
Luv Bug by John Parker  
Dudley is a bit of a Romeo, now try telling that to his girlfriend Bertha; she'll kill you. And that's what she intends to do to Dudley if she ever catches him. Linda is the new woman in Dudley's life and Dudley will need all your skill to help him avoid Bertha and still see Linda. Oh for the joys of Love!



**FOR THE BBC 'B'**  
Bomber by Martin Sykes  
Poor Oswald is trapped inside a video game; by the evil arch enemy the Bomber. His only chance of survival lies in your hands as you guide him around his ever decreasing grid.



**FOR ANY SPECTRUM**  
Spider's Web by Peter Milne  
Micky is a greedy little spider. He traps lots of Flies and Wasps on his web and then sores them to eat later but it's tough for Micky, as the Flies bite back.



**FOR ANY SPECTRUM**  
Mega Fruit by Bob Hitching  
This is the ultimate fruit machine with all the features of the real Arcade machines, such as Nudge, Hold, Gamble etc.



**FOR THE UNEXPANDED VIC 20 and the CBM 64 (CBM with Adman Speech)**  
3D Silicon Fish by Chris Stamp  
Silko has to collect Silicon and return to Earth before the Krlyon destroys him. Will he make it and collect his reward? Only you can tell.



**FOR THE BBC 'B'**  
Pyramid Painter by Chas Smith  
Can you help Bert the painter finish off the pyramids before the balls or Thin Man finish him?



**FOR THE BBC 'B'**  
Desperate Dan by Reiter Djeckel  
Deep down in Dan's dungeon are the ghastly monsters, he keeps them at bay with liquid dardanium. This liquid is very awful and is liked by several rodents, Dan is desperate for help to keep the creatures at bay. Can you help?

SELECTED TITLES  
AVAILABLE FROM SELECTED BRANCHES OF:

**John Menzies**

**WHSMITH**

**Boots**

**makro**

**Dixons**

**Greenchip**

**at DEBENHAMS**

**LAZARUS**

ALSO AVAILABLE AT ALL  
USUAL SOFTWARE OUTLETS.

RETAILERS CONTACT:

**MICRO DEALER UK Ltd**

**Tiger trader**

**Lightning**

**PRISM**

**CentreSoft**

**PCS DISTRIBUTION**

**Bulldog**

**SOL**

DISTRIBUTORS AND OVERSEAS ENQUIRIES CONTACT PAUL 051-236 8521/2

If you have difficulty in obtaining your copy, just fill in the Coupon below.

Post coupon now to: Thor (Computer Software) Co. Ltd., Eskine Industrial Estate, Liverpool, Merseyside L6 1AP Tel: 051-263 8521/2

<input type="checkbox"/> A	<input type="checkbox"/> D	<input type="checkbox"/> G	<input type="checkbox"/> J1	<input type="checkbox"/> L
<input type="checkbox"/> B	<input type="checkbox"/> E	<input type="checkbox"/> H	<input type="checkbox"/> J2	
<input type="checkbox"/> C	<input type="checkbox"/> F	<input type="checkbox"/> I	<input type="checkbox"/> K	

I enclose Cheque/PO for £ \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Credit Cards - Orders accepted by Phone - 051-263 8521/2



# The new Electron from Acorn.

## Ask any child at school why it's worth £199.

Most British children have one thing in common with the new Electron microcomputer: they speak the same language.

You see, the Electron is the first micro remotely in this price range to use BBC Basic, the computer language that is rapidly becoming the standard in British schools.

But that's not all. Most children will feel at home with the Electron as soon as they lay hands on it.

This is because it has developed out of the Micro that has been chosen by over 80% of schools participating in the Government's current Micros In Schools project. It has a similar keyboard and has most of the functions of this much acclaimed (but naturally, more expensive) machine.

So now children will be able to continue their computer studies at home. They'll be able to use the same educational programs they use at school. And, if asked nicely, they'll be able to help willing adults take their first steps into computing.

All this for only £199.

### A micro technology break-through.

And now a few reasons for adults why

NOW YOU'VE MASTERED MONSTERS,  
WE COULD MOVE ON TO MONEY  
MANAGEMENT.

the Electron is such an exceptional machine at the price.

The Electron is neat and compact. Yet it is fast and powerful. (Full details, for the technically minded, are in the box opposite.)

It produces high quality sound using its own internal speaker.

And it offers a range of facilities many larger more expensive machines just cannot match.

For example the Electron's colour graphics have the highest resolution of any home computer.

This is because the chip that controls the graphics, specially designed by Acorn, is one of the most advanced of its kind. As a result, the Electron delivers twice as many characters across the screen as its closest competitor.

### Built to last and to grow.

The Electron has been designed and built to be a permanent part of the family, year in year out.

Particular care has been paid to the keyboard. It is electric typewriter style; robustly constructed with a good, solid 'feel'. It has a space bar, and single entry keys for key commands.

In other words it's comfortable and easy to use, avoiding the need for the manual gymnastics sometimes associated with calculator style keyboards.

And it will grow with you via expansion modules, that Acorn are developing, to take peripheral additions such as printers and disc drives. So as your knowledge, interest and ambitions develop, the Electron can develop with you.

Additionally, to give you all the support you'll need to generate your own applications software, we've established a phone-in service attended by specialists to give advice, encouragement and practical help.

### A gentle teacher.

The Electron plugs straight into virtually any TV set and cassette player so you will be





ready to go as soon as you get it home.

It comes not only with a comprehensive user guide, which describes the machine and its functions, but also with a book that takes you step by step through the basic principles of programming.

A free taste of its versatility.

You will also receive an "Introductory" cassette which will put the Electron through its paces showing you a little of what it can do with its 64k of memory (32k ROM, 32k RAM).

The cassette will give you a taste of those exceptional colour graphics we mentioned earlier; of its ability to play and notate music, and show you how it might help in home accounting. It will challenge you to a few games and will, if you ask it, do your whole family's biorhythms in a matter of seconds.

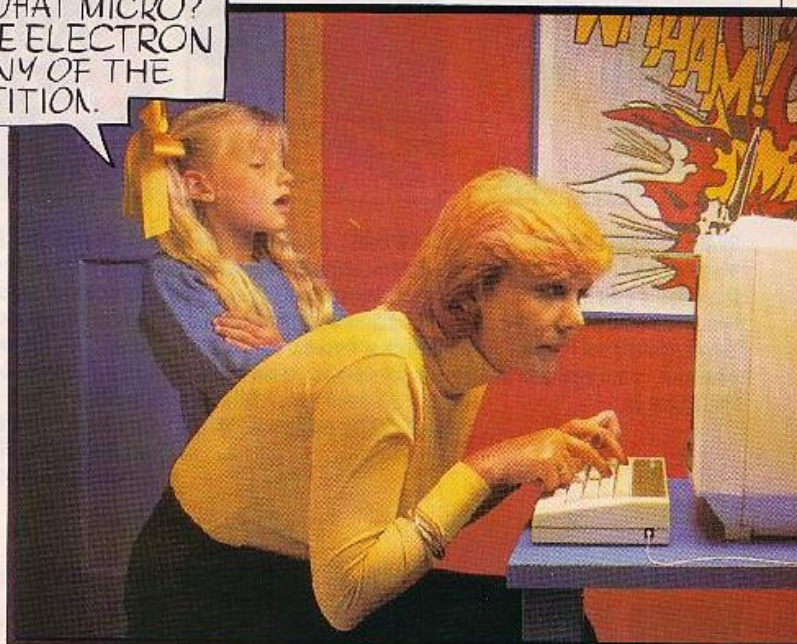
You will in short, through the 15 separate programs it contains, get a glimpse of the Electron's potential. But only a glimpse, for that potential is as limitless as your own interest and imagination.

A widening range of software.

To help you realise some of that potential, Electron software already ranges from "Personal

Money Management" through "Starship Command" to "Creative Graphics" (which, incidentally, includes some spectacular three-dimensional rotating shapes). Naturally, with its strong educational links, educational software will be extremely

EXPERTS LIKE 'WHAT MICRO?'  
AND ME RATE THE ELECTRON  
HIGHER THAN ANY OF THE  
COMPETITION.



important for the Electron and even now O and A Level revision papers are being processed for Electron users.

How to get your Electron.

The Acorn Electron can be found at local Acorn dealers and major high street stores. However, if you would like to order one with your credit card, or if you would like the address of your nearest supplier, just phone 01-200 0200.



#### Technical Specifications

##### Hardware.

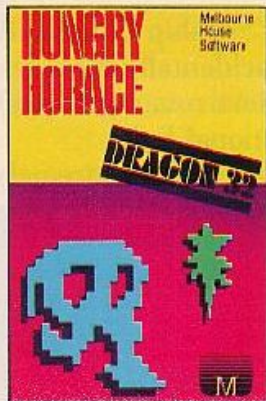
2MHz 6502.  
32K ROM 32K RAM (64K total).  
High resolution graphics 640 x 256 max.  
Seven display modes.  
8 colours and 8 flashing colours.  
1200 baud CUTS tape interface with motor control.  
Expansion bus for add-on interface modules.  
Internal loudspeaker.  
PAL UHF output to colour or black and white domestic TV.  
RGB output for colour monitor.  
56 key full travel QWERTY keyboard with spacebar.

##### Software.

BBC BASIC.  
Extensions include interger, floating point and string variables, multi dimensional arrays: IF... THEN... ELSE, REPEAT... UNTIL, procedures with local variables.  
Operating system allows plot, draw and fill commands.  
Event timing.  
Built-in assembler.  
6502 assembly language can be mixed with BASIC.

The Acorn  Electron.





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



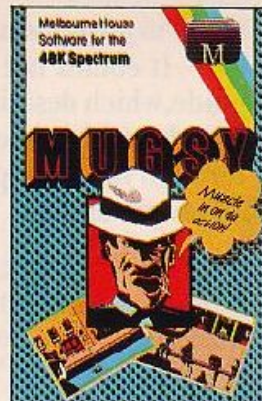
**COSMONAUT.** Written entirely in Machine Language, Cosmonaut is an exciting and challenging game of arcade strategy. Works with joystick or keyboard and features moving elevators, storm troopers, laser guns and more. A full screen game for the unexpanded VIC 20.



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

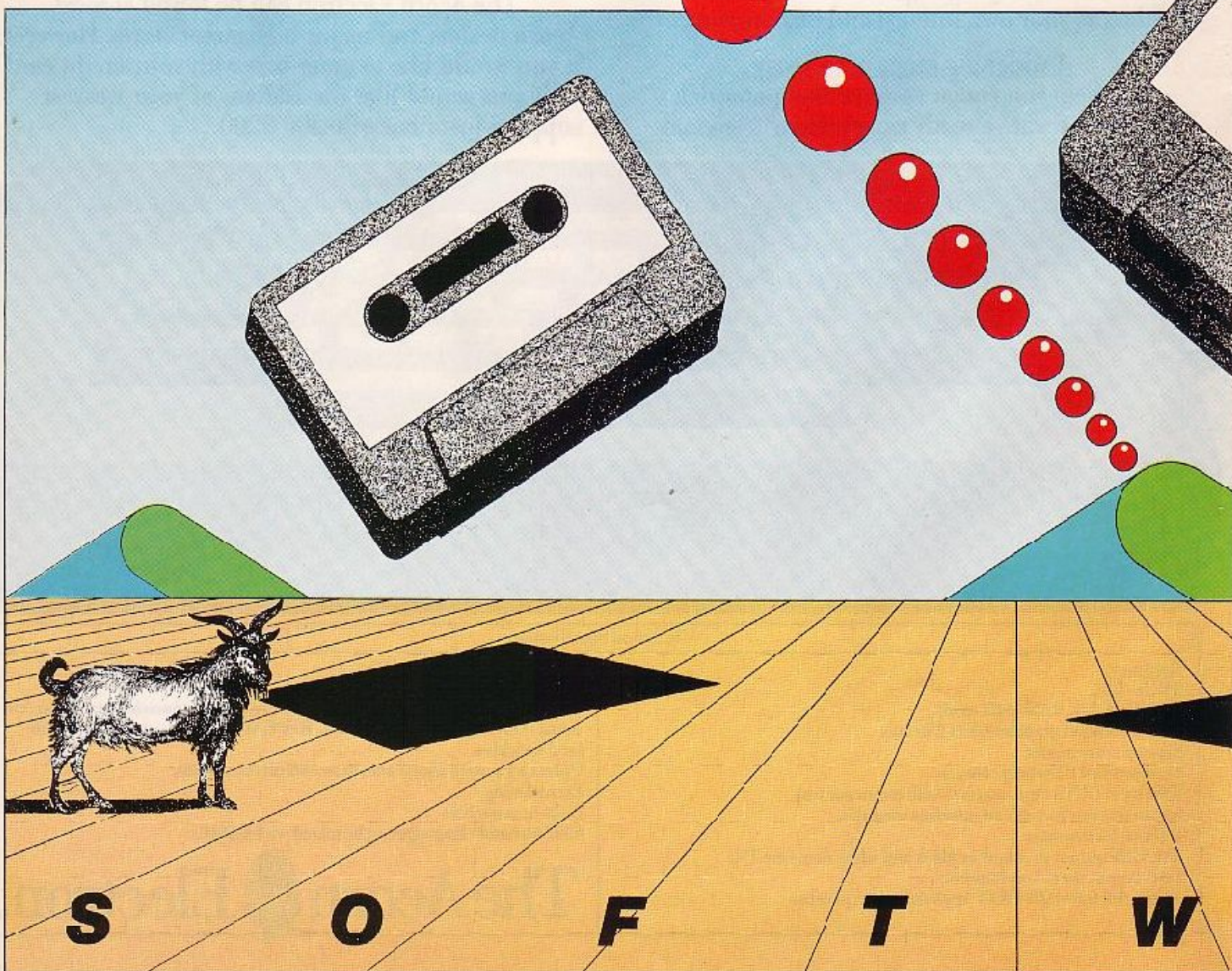


**H.U.R.G.** A revolutionary piece of software for your 48K Spectrum which allows you to develop high quality Machine Language arcade games with absolutely no programming experience. "It is difficult to find fault with such a complete games generation program." — Crash.

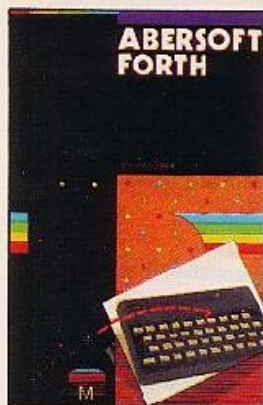


**MUGSY** gives a totally new direction for thrill seekers — comic animation in text, stunning graphics and a full arcade game! Mugsy is your one and only chance to become the greatest gang leader with definite ill repute.

# MELBOURNE







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



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



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

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

Correspondence to:  
Church Yard  
Tring  
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

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

#### 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

#### VIC 20

- ☐ VIC Cosmonauts ..... £5.95
- ☐ The Wizard and the Princess ..... £5.95

#### DRAGON 32

- ☐ Hungry Horace ..... £5.95
- ☐ Horace Goes Skiing ..... £5.95

#### ORIC-1

- ☐ Oric-1/48K The Hobbit ..... £14.95

#### BBC

- ☐ BBC Mode B The Hobbit ..... £14.95

#### SPECTRUM

- ☐ Spectrum The Hobbit 48K ..... £14.95
- ☐ Spectrum Penetrator 48K ..... £6.95
- ☐ Terror-Daktul 40 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
- ☐ Spectrum Mugsy 48K ..... £6.95

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

£ .....  
Please add 80p for post & pack £ .....80

TOTAL £ .....

I enclose my ☐ cheque  
☐ money order for £ .....

Please debit my Access card No .....

Expiry Date .....

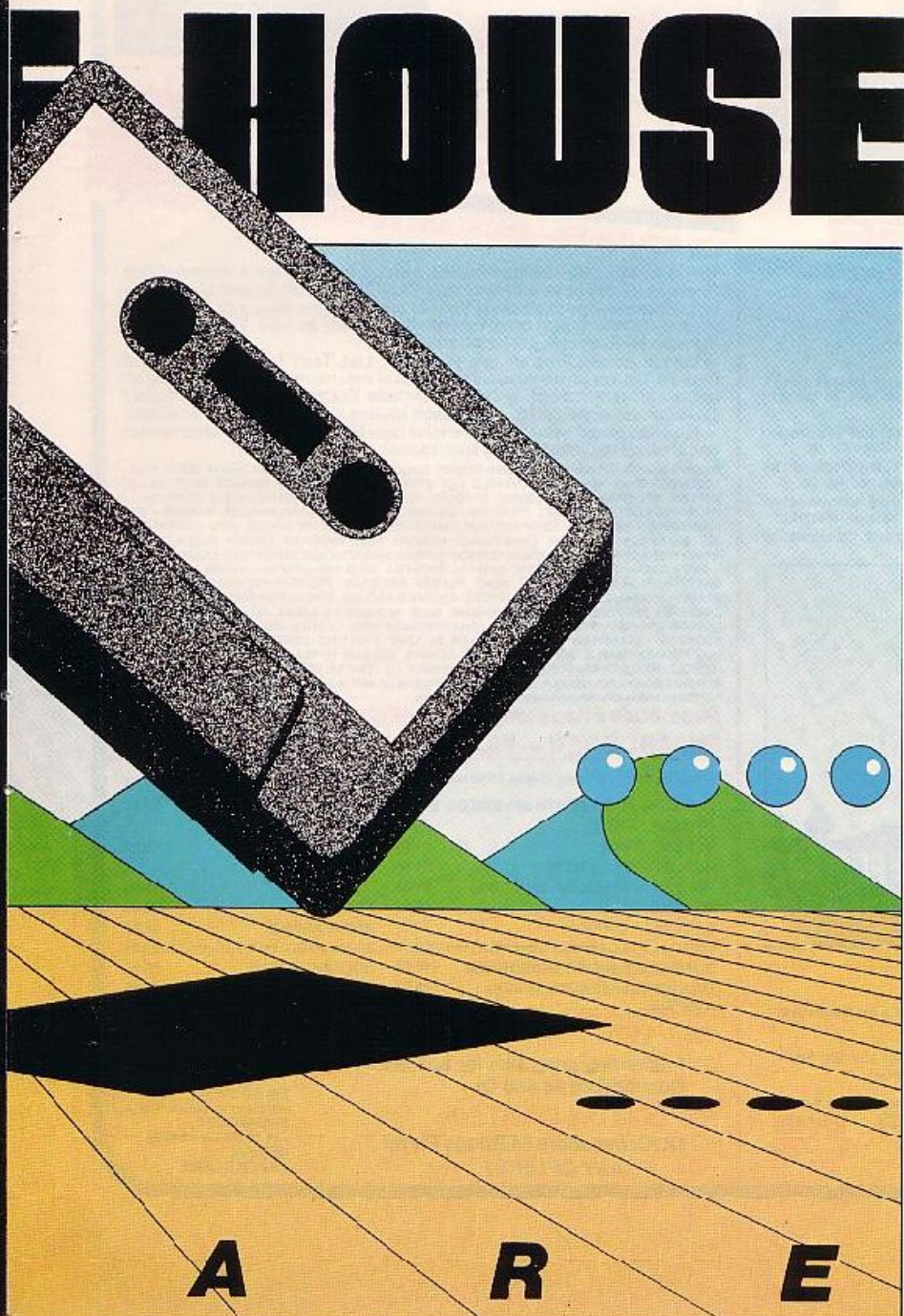
Signature .....

Name .....

Address .....

Postcode .....

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





## 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!

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

At the tournament level Superschess 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 Superschess 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, Superschess 3.0 is not just a brute-force calculator, but employs artificial intelligence techniques to a low degree 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 on display.
- 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— FINAL IMPROVED 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.

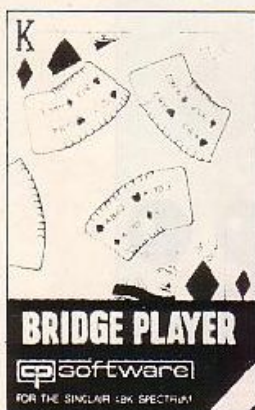
**Scoring**—at the end of each hand the score is calculated, including honours, slam and rubber points. Both the old and new scores are displayed in the usual manner.

**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 ENQUIRIES

0895 31579

Send Cheque, Postal Order or Access No. to:  
**CP SOFTWARE, Dept YC3**  
2 Glebe Road, Uxbridge  
Middlesex UB8 2RD



## PINBALL WIZARD

**Available for any SPECTRUM or COMMODORE 64**

Superb colourful fast-action graphics and sound give this game the feel of a real arcade pin-table. Realistic launch flippers, bumpers, high-score, bonus scores and freeball features. Be a Wizard!

"...I thought that a few minutes would suffice, and then found that a couple of hours had passed and I was still at it. Excellent... Pinball Wizard has it made."

**CRASH MAGAZINE**

"A brilliant idea that's totally absorbing and so addictive..."

**YOUR SPECTRUM**

"The display is well-designed and colourful, and ball movement is very realistic."

**PERSONAL COMPUTER GAMES**

**48K SPECTRUM—£5.96  
COMMODORE 64—£6.95**



## SUPERCODE II

**—for 16K and 48K Spectrum**

**NEW!**

**120 ROUTINES—MICRODRIVE COMPATIBLE 100%**

This is the Ultimate Spectrum Toolkit, with 120 State of the Art Machine Code Routines for use in, or with, your own BASIC programs! Supercode II needs no prior knowledge of Machine Code to operate. If you have a ZX Microdrive, you can transfer Supercode II to Microdrive as easy as 1-2-3...if you do not, all the other features of Supercode II still work.

★ Unique Access Program lets you Index, List, Test, Tailor, Relocate and Save (to Tape or Microdrive, with original or new name) + Verify routines, all under software control. ★ Options include Example/Repeat/Jump/Again/Cont/Demo/Diagnosis/Tfr. ★ See each routine work—all details onscreen. ★ Supplied boxed with Comprehensive User Manual. ★ Guaranteed fastest and shortest routines for every application!

**Routines include:** TRACE (with Variable Program Speed); ON ERROR GOTO ON BREAK GOTO; FULL RECALL; (Does everything); VARIABLE LIST; STRING SEARCH; STRING REPLACE; PAINT; FILL; SUPERB PROGRAMMALE; SOUND EFFECTS; RECORD & REPLAY; SOUND/MUSIC; CONFUSE & UNCONFUSE; LISTING; REWIND; PROGRAM CONTRACT/EXPAND; PROGRAM ANALYSE; NUMBER; VAL; \$COMPRESS; CHARACTER; SWOP/SCRAMBLE/INVERT/REVERSE/ROTATE; WHOLE; NEW; CHARACTER SET; \$C/FI; FLASH; BRIGHT; ONCE/ISWOP; MEMORY FREE; PROGRAM LENGTH; BLOCK; LINE & MEMORY; ERASE/FILL/COPY; APPEND; CURSOR; SCREEN SAVE/LOAD; SWOP/MERGE/FILL; SEARCH; HEX; DEC; \$DEC; HEX/CONVERTERS; REFILL; DATA/FILL; GRD; INK; PAPER; CHANGE; ATTRIBUTE; SWOP/FILL/INVERT/RESET; TARE; HEAD; READER; PROGRAM PROTECT; PROGRAM BREAK-IN; HEADLESS FILE CREATE; AU; ORUN; CODE; PROGRAM AS CODE; TAPE COPY; DEFEAT; MICRODRIVE; DIAGNOSIS; FAST LOAD; MICRODRIVE; SURE SAVE; MICRODRIVE; ADAPT TO MICRODRIVE; SURE CLOSE; \$STRINGS; PROGRAM CASE; CHANGE; SWOP; HEX; LOADER; ANALYSE; MEMORY; LINE ADDRESS; STARDRAW; FREE; SCROLLER; 24 LINE PRINTING; LOWER SCREEN; CLS; NEW JIG; PROGRAMMABLE; TONER; EFFECTS; REMOVE; COLOUR; RIFFLE & SHUFFLE; SHUFFLE; \$H; SCROLL; \$XELS; CHARACTERS; ATTRIBUTES; SINGLY OR JOINTLY; UP/DOWN/LEFT/RIGHT; WITH OR WITHOUT WRAP-AROUND; IN A USER-DEFINED WINDOW OF ANY SIZE POSITIONED ANYWHERE ON THE SCREEN...and much, much more besides. It's Incredible...

**Supercode II has many many imitators—but no equals!**

**SUPERCODE II — £9.95**

<b>Plus for 48K Spectrum unless otherwise stated</b>	<b>SUPERCHESS I (Lynx)</b>	<b>£8.95</b>
<b>FLOATING POINT FORTH with EDITOR</b>	<b>SUPERCHESS I (Jupiter Ace)</b>	<b>£8.95</b>
<b>INTEGER FORTH</b>	<b>PINBALL WIZARD</b>	
<b>SUPERCHESS II</b>	<b>(48K Spectrum)</b>	<b>£5.95</b>
<b>SUPERCHESS I (16K ZX81)</b>	<b>PINBALL WIZARD</b>	
<b>16K SUPERCHESS (16K Spectrum)</b>	<b>(Commodore 34)</b>	<b>£6.95</b>
<b>REVERSI</b>	<b>DRAFTS</b>	<b>£5.95</b>
<b>SPECIAL OFFER:</b>	<b>BACKGAMMON</b>	<b>£5.95</b>
<b>LOGO and FLOATING POINT FORTH</b>	<b>SNAIL LOGO (Turtle Graphics)</b>	<b>£9.95</b>
<b>SUPERCODE and EXTENDED BASIC</b>	<b>GOLFING WORLD</b>	<b>£5.95</b>
<b>DRAFTS and BACKGAMMON</b>	<b>SPECTRUM EXTENDED BASIC</b>	<b>£9.95</b>
<b>YAHTZEE</b>		<b>£4.95</b>

### WANTED:

**Interesting programs for Spectrum,  
Commodore 64 and QL**

**ESPECIALLY WANTED:**

**QL/Commodore 64 Bridge Player  
ANY OFFERS?**

French translated  
versions available from:  
**SEMAPHORE**  
CH-1283 LA PLAINE  
GENEVE  
SWITZERLAND



# SABRE WOLF


**ULTIMATE**  
PLAY THE GAME

48K SINCLAIR ZX SPECTRUM  
£9.95



Now for 6  
major Home Computers

# ARENA 3000



It is the year 3000. Can you destroy each wave of Killer Robots as they attack and rescue the Humanoid Survivor? Wave after wave of different robots try to corner you in the Galactic Arena. Will you win? High speed arcade action game. Full colour graphics with sound. Machine Language.

AVAILABLE FOR:

COMMODORE 64—Tape £8 Disk £9.95; ATARI 16K—Tape £8 Disk £9.95; BBC MODEL B—Tape £8 Disk £9.95  
ACORN ELECTRON—Tape £8; ORIC 16/48K—Tape £5.50; SPECTRUM 48K—Tape £5.50

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





# 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 43K 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 Bools • 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**



# Small business can now stop going by the book.

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

(All tax deductible by the way.)

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

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

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

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

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

## The Invoicing package.

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



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

## The Order Processing package.

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



## The Accounts Receivable package.

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

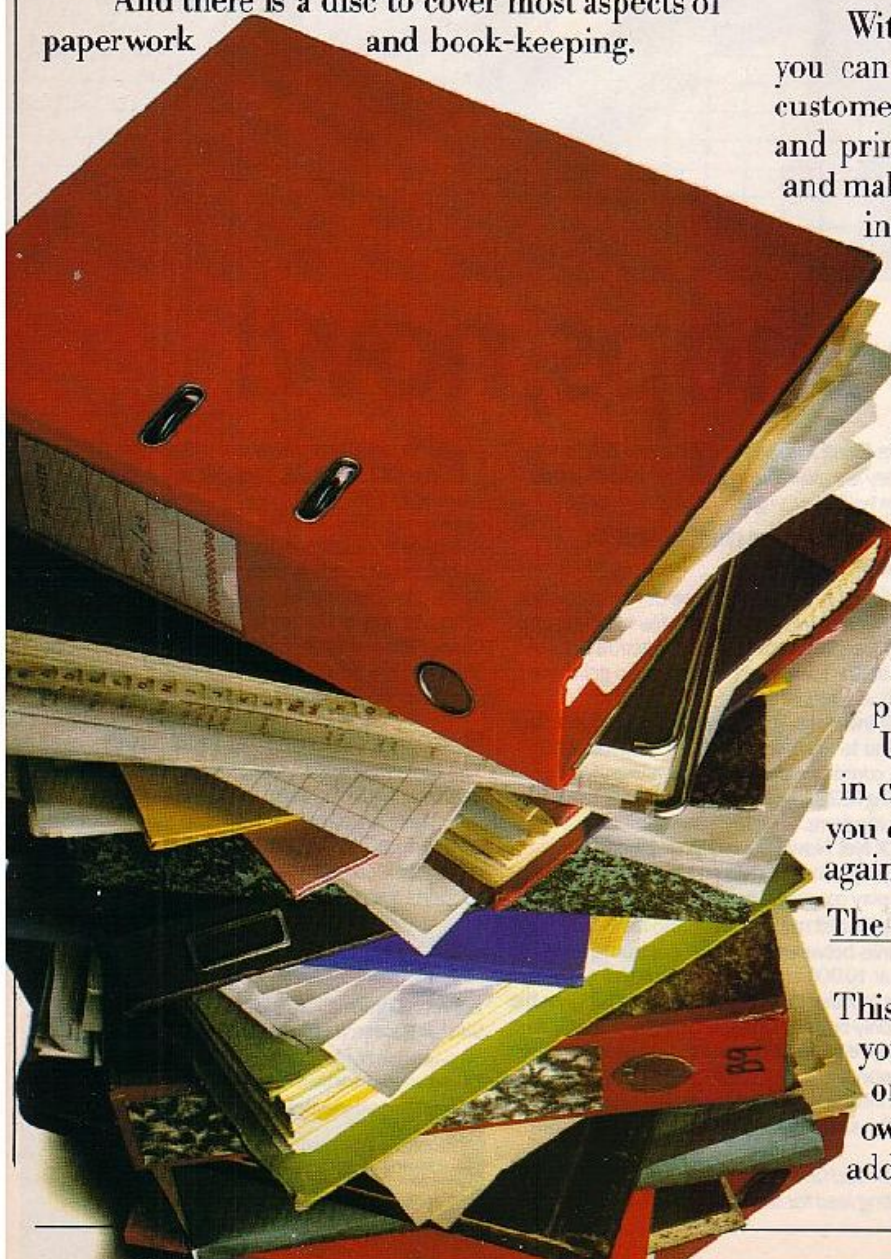
In an instant, you can analyse debtors, produce statements, keep a check on any credit limit and calculate VAT output automatically.



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

## The Accounts Payable package.

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



•  
ke  
rar  
col  
dis  
su  
de.

101  
105  
102  
102

M  
Co

PH  
FI  
SA  
mo  
SA  
mo  
SA

TI  
tor  
M  
like  
that  
mer  
valu

Si  
ing?  
resp  
with  
ther  
ATV  
it u  
prin  
com  
you

W  
acce  
for-  
Driv  
the  
Orig  
now



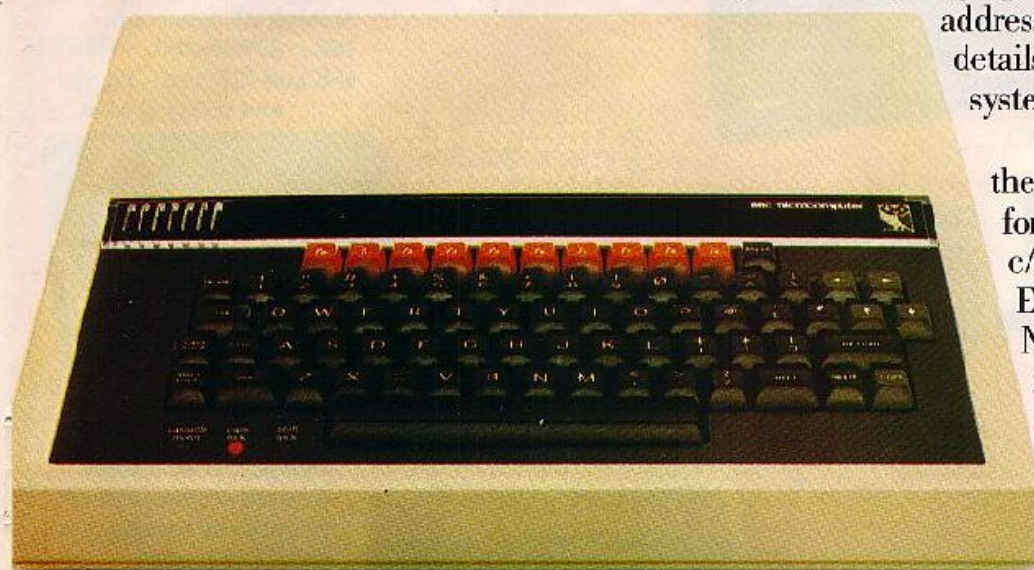
input VAT and, used with the Accounts Receivable package, produces instant VAT returns.

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

### The Stock Control package.

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

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



### The Purchasing package.

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

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



### The Mailing package.

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

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



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

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

At £24.95 each, these packages could be priceless.

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

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

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

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

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

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

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

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

Card Number \_\_\_\_\_

Amex/Diners/Visa/Access (Delete)

Please send me details of the BBC Microcomputer System ☐

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

Signature \_\_\_\_\_

Registered No. 1524763

VAT No. 215 8123 85  
YC7

# ACORNSOFT



# Low Prices

**TORCH Z80 - Disk Pack**  
800K - £839.50  
Dual disk drive with Z80  
second processor and  
CPM for BBC. Gives  
BBC 64K of usable  
RAM.



**£839.50**  
**TORCH Z80**  
**Disk Pack**  
**800K**



**£229.00**  
**Commodore**  
**64**

**Commodore 64 - £229.00**  
Colour sophisticated  
ROM/RAM user, UHF/  
Composite video, high  
resolution graphics.

**Sinclair ZX**  
**Spectrum**  
**from**  
**£99.95**

**Sinclair ZX Spectrum -**  
16K - £99.95, 48K - £129.95  
16K and 48K basic, colour  
and text graphics.



**BBC**  
**Model B**  
**£399.00**



**BBC Model B - £399.00**  
Full colour 32K ROM  
Computer with text and  
graphics 80 column text  
screen, extended  
Microsoft basic, built in  
assembler 1MHz and tube  
interface, sideways ROM,  
RS 423, A/D converter.

## MONITORS

RGB Colour Monitor STD/RES £228.85

RGB Colour Monitor H/RES £632.50

12" Green Monitor £99.00 12" Amber Monitor £120.75

Fidelity MTV1400 Monitor/TV £247.25

**MONITORS**  
**from**  
**£228.85**



**Double Density DFS - £120.00**

Disk controller for the BBC Micro. Up to  
2MB on line storage. Auto internal format  
programs for 5 1/4" and 3" drives. Acorn  
compatible runs basic, wordwise, BCPL,  
view forth etc. 25% faster than Acorn  
DFS on file access. Auto 40-80 track  
switching. Compatible with .1 DFS view  
and sideways ROM.

**Double**  
**Density**  
**DFS**  
**£120.00**

## The Big International

**Altrincham**  
Pharmacy Computer Systems  
37 Stamford New Road  
Altrincham  
Cheshire  
Tel: 061 928 0087

### Ashford

Tallgate Video  
241 Beaver Road  
Ashford  
Kent  
Tel: 0233 37187

### Beverley

Beverley Computer Centre  
1 Windmill Passage  
55 Linigate  
Beverley  
N. Humberside  
Tel: 0482 881911

### Bishop's Cleeve

County Computer Stores  
95c South Street  
Bishop's Cleeve  
Leics  
Tel: 0279 506801

### Bolton

Selects Video  
5 Belmont Road  
Asley Bridge  
Bolton  
Lancs  
Tel: 0204 52804

### Braintree

Braintree Computer Centre  
Massey Road  
Braintree  
Tel: 0376 24922

### Bridgend

Automation Services  
42 Durnaven Place  
Bridgend  
Mid Glam  
Tel: 0656 3550

### Brighton

Game  
24 Gloucester Road  
Brighton  
Sussex  
Tel: 0273 679424

### Brixham

Computer Systems (Torbay)  
Pump Street  
Brixham  
Devon  
Tel: 0804 56565

### Bromley

Data Store  
6 Chatham Road  
Bromley  
Kent  
Tel: 01 468 8991

### Bury

Entertainment & Leisure  
88 The Rock  
Bury  
Tel: 061 757 3463

### Cambridge

G.C.C. Cambridge Ltd  
66 High Street  
Sawston  
Cambridge  
Tel: 0223 533336

### Canterbury

Canterbury Software Centre  
9 The Friars  
Canterbury  
Kent  
Tel: 0227 53531

### Cardiff

Stevens Computer Centre  
Castle Arcade  
Cardiff  
Tel: 0222 41905

### Chelmsford

Essex Computer Centre  
211 Moulton Street  
Chelmsford  
Essex  
Tel: 0245 358702

### County Antrim

Evergreen Computers  
80 Charlotte Street  
Ballymore  
Co. Antrim  
N. Ireland  
Tel: 02651 62115/62658

### Croydon

Concise Computer Consultants Ltd  
1 Carlton Road  
South Croydon  
Surrey  
Tel: 0 481 4842

### Dartford

Anirap Computers  
29 West Hill  
Dartford  
Kent  
Tel: 01222 92513

### Derby

First Eye Computers  
10 Castlefields  
London Road  
Derby  
Tel: 0332 365280

### Dover

Duval International Computer Centre  
18/19 The Charlton Arcade  
High Street  
Dover  
Kent  
Tel: 0 1323 212433

### Dyfed

Computer Centre  
13 Riverside Market  
Faversford West  
Dyfed  
Tel: 0437 2776/68218

### Harlow

County Computer Stores  
5c West Square  
Harlow  
Tel: 0279 41492

### Hastings

The Computer Centre  
37 Die Robinson Street  
Hastings  
East Sussex  
Tel: 0424 439 90

### Harpurden

Hobby  
133 Grove Road  
Harpurden  
Ferts  
Tel: 0587 3547

### Heckmondwike

Thoughts and Crosses  
37 Market Street  
Heckmondwike  
W. Yorkshire  
Tel: 0924 402 337

### Hemel Hempstead

Farnisher Ltd  
25 Market Square  
Hemel Hempstead  
Herts  
Tel: 0442 55044

### High Wycombe

South Bucks Computer Centre  
Hull Loosley & Pearce  
120/123 Oxford Road  
High Wycombe  
Bucks  
Tel: 0494 142311

### Hornchurch

Comptel Computer Systems  
112a North Street  
Hornchurch  
Essex  
Tel: 0402 46741

### Horsham

The Micro Store  
13b West Street  
Horsham  
W. Sussex  
Tel: 0403 52297

### Horsham

Orchard Business Systems Ltd  
34 East Street  
Horsham  
W. Sussex  
Tel: 0103 60161

### Ipswich

Braintree  
24 Crown Street  
Ipswich  
Suffolk  
Tel: 50965

### London

Computers of Wigmore Street  
87 Wigmore Street  
London  
Tel: 01 486 1373



# Best Service

**DISK  
DRIVES  
from  
£159.95**



**DISK DRIVES**  
Disk Drive 100K Single £159.95  
Disk Drive 200K Single £241.50  
Disk Drive 400K Single £396.75  
Disk Drive 800K Dual £711.85

**£895.00  
Commodore  
SX64  
Portable**



Commodore SX64  
Portable - £895.00  
9" full colour screen,  
Commodore 64 compatible. Built in  
Disk Drive, Easy Script, Future  
Finance Easy File and High Flyer.

**PRINTERS**  
Astron JP80 (as ill.) £199.00  
MCP40 (Colour Printer) £171.35  
Epson RX-80 Printer £314.00  
Epson FX-80 Printer 160cps £399.00



**PRINTERS  
from  
£199.00**

**Joystick  
& Cassette  
Players**



**Joystick & Cassette  
Players -**  
Many joysticks and  
cassette players available  
from stock. Just in ...  
The BBC Compatible  
Crack-Shot. £10.95

**SOFTWARE**

all leading chart  
software available



**LYNX 96K - £299.00**  
Full high resolution  
colour, it offers 37.5K of  
RAM in basic, and 24K  
more to programs using  
machine code.

**LYNX 96K  
£299.00**



Many more hardware, software  
and peripheral products coming  
your way from the "Big M"

## ional Dealer Network

**London**  
Malmes  
18/16 Childs Place  
Earls Court  
London  
Tel: 01-373 5100/6007

**London**  
Henry's Radio  
Computer Department  
404 Edgware Road  
London  
Tel: 01-402 6822

**Maidenhead**  
Chiswick Organs  
45 Nickolsars Well  
Maidenhead  
Tel: 0628 31755

**Marlow**  
Citybench  
2/4 Eaton Place  
Marlow  
Bucks  
Tel: 06284 75244

**Merseyside**  
Source Computers Ltd  
4 Essex Lane  
Newton-Le-Willows  
Merseyside  
Tel: 09252 29019

**Milton Keynes**  
Micro Land  
Weatherburn Court  
Byrnest Centre  
Blitchley  
Milton Keynes  
Tel: 0901 368018

**Norwich**  
ALucus  
12a Poltersgate  
Norwich  
Norfolk  
Tel: 0603 614441

**Paterlee**  
General Northern Computing  
8 Whitworth Road  
South West Ind. Estate  
Paterlee  
Durham  
Tel: 0783860314

**Preston**  
Format Computing  
47 Foor Lane  
Preston  
Lancs  
Tel: 0772 561952

**Taunton**  
Sinewave Computer Services  
Corporation Street  
Taunton  
Somerset  
Tel: 0823 51526

**Tewkesbury**  
Solus Computers Ltd  
103 High Street  
Tewkesbury  
Glos  
Tel: 0684 248866

**Scunthorpe**  
Ashby Computer Centres  
186 Ashby High Street  
Scunthorpe  
S. Humberside  
Tel: 0724 81756

**Skipton**  
Skipton Computer Systems  
16 Swadlow Road  
Skipton  
N. Yorkshire  
Tel: 0756 68192

**Southend**  
The Home Computer Centre  
761 Victoria Avenue  
Southend-on-Sea  
Essex  
Tel: 0702 43568

**Southall**  
Twistler Computers  
17 Reginald Road  
Southall  
Middlesex  
Tel: 01-574 5271

**St. Austell**  
Compulovision  
4 Market Street  
St. Austell  
Tel: 0726 5297

**Stirling**  
Mira Store  
18 The Arcade  
King Street  
Stirling  
Central Region  
Tel: 0786 4571

**Stoke-on-Trent**  
Town Computer Store  
30 Town Road  
Hastley  
Stoke-on-Trent  
Tel: 0782 187541

**Stroud**  
The Model Shop  
22 High Street  
Stroud  
Glos  
Tel: 04536 5920

**Uxbridge**  
J.K.L. Computers  
7 Windsor Street  
Uxbridge  
Middlesex  
Tel: 0895 11815

**Welling**  
North Kent Computer Centre  
52/53 Redgrave Road  
Welling  
Bedfordshire  
Tel: 01-301 2677

**Whitley Bay**  
Video & Home Computers Centre  
3 Rosburgh House  
Park Avenue  
Whitley Bay  
Tyne & Wear  
Tel: 0632 534725

**Wolverhampton**  
Wolverhampton Computer Centre  
17/19 Light Old Street  
Wolverhampton  
Tel: 0902 29907

**Worthing**  
Worthing Computer Centre  
82 Liverpool Road  
Worthing  
W. Sussex

For your nearest European  
Dealership telephone Belgium or  
Holland

**Belgium**  
Micro Management  
Belgium  
Balperstraat 75  
2015 Antwerp  
Belgium  
03-138 9284

**Holland**  
Micro Management  
Netherlands  
Roodhuysstraat 98 2404  
Ah Alphen-aan-den-rijp  
01726-72580



# Low Prices

# Best Service



- ★ 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



**Another Winner From the Big M Stable**

**The  
Electron  
£199.00**

The Electron – A thoroughbred from the manufacturers of the BBC, who have incorporated all their experience and knowledge to conceive another winning computer. Many BBC programs are compatible. This full colour 32K ROM and RAM computer with text and graphics includes a cassette input, and a multi-way connector for the addition of expansion units containing interfaces to additional hardware. It has a 56 key full travel QWERTY keyboard, 10 user-definable and 29 pre-defined keys enabling BASIC keywords to be entered in a single keystroke. The Electron comes with free introductory cassette containing 19 programs including a number of exciting games. £199.00







## HOW NOT TO SELL A COMPUTER

I would like to bring to your notice the attitude of certain computer dealers and their sales representatives towards younger people with an interest in computers.

This attitude is clearly illustrated in the following case which happened to me a few weeks ago. At that time my father had just decided to buy a personal computer with the specific application of word-processing in mind. My father, however, knows nothing about computers, and is also very busy, and asked me to do some research for him into the best computer he could get for his money. I acted accordingly, and narrowed the field down to three computers.

I eventually found a dealer who sold all three computers and phoned them up. I spoke to a very helpful man who fully realised my age and after a short discussion suggested that I came down to their showroom at some point that day for a demonstration. I was very pleased at this suggestion and went down to the showroom in Hammersmith later that afternoon. When my friend and I arrived we were greeted by a very fat, patronising man who told us that they did not stock all the computers they claimed to stock, we could not have a demonstration of the computers we were interested in, and could we please bring our "old man" down to the showroom; and then he would take, not us, but my father seriously.

Yet, earlier that day we had been told by a man working for the same people that we would be welcome to a demonstration, whether or not we were with my father. We had spent an hour and a half getting there and back, and had done absolutely nothing. What annoyed me most about this was that the dealer in question did not have a definite policy on whether or not to serve children, and accordingly missed out on making a sale of a £2000 computer. This seems to me to be a typical case of bad salesmanship in a country where there are so many young computer users. Dealers should judge their customers by knowledge rather than age.

Dominic Young (15).

## FASTER DRAGON

As you may know the Dragon has three speeds built in, but the fastest and most least used speed is of great value to utility and number crunching programs. Although the video chip is interfered with, the program still operates as normal but at a higher speed.

Everybody knows the Poke 65495,0 to speed up the program and Poke 65494,0 to slow it down again, and still use the screen as normal. With the exception of the cassette interface, more about that later.

To work at an ever faster speed with the loss of the screen, you must place Poke 65497,0 in your program. It will not work any other way as you lose control of the computer if it is not running a program. Also I cannot stress the importance of the Poke 65496,0 when you wish to return to normal as if you do not you will have to Reset to regain control but your program will not be lost.

To show you some results I have used a stop watch to time these results for a loop of 10,000 and it would appear that the internal clock is not changed by the speeding up.

At normal speed time taken is 9.7 seconds  
After POKE 65495,0 time is 7.05 seconds  
After POKE 65497,0 time is 4.6 seconds

If you have ever used Poke 65495,0 before then you must, at one time, have saved a program at that speed

and switched off without checking the program by SKIPF — as this does not New the program.

To reload a program saved this way type Poke 65497,0: CLOAD (Enter). The screen will go blank so you will have to watch the tape to see when it has finished loading and then either type Poke 65496,0 or reset and List. Your program should be alright but sometimes corruptions may take place as the cassette interface was not designed to operate at that speed.

Then be sure to re-save your program to avoid another loss of hard work!

Bruce Low,  
Hanston,  
Renfrewshire.

## SAVING VU-FILE

My most useful program is Psion's Vu-File. I eagerly awaited the arrival of my Microdrive to speed up operations, but trying to save files on the Microdrive resulted in failure as Vu-File had overwritten the Microdrive channel. After several attempts I hit upon the following method of using Vu-File with the Microdrive, which means that existing files can be loaded from cassette and saved on Microdrive or cassette. Vu-File itself can also be saved and loaded from Microdrive.

Proceed as follows:

- 1) Load Vu-File from cassette as normal.
- 2) Break out of the program by select-

- ing "Load a file from tape" and pressing Break when loading starts.
- 3) New the Basic, the machine code is safe beyond RAMtop.
- 4) Save the machine code on the Microdrive with the command SAVE "m"; 1; "C" CODE 25083,5E40
- 5) Enter a new shorter Basic program:  
50 CLEAR 25000: LOAD "m"; 1;  
"C" CODE DIM f\$(32):LET a = 29785: GOTO USR 29721  
1000 CLS:PRINT "SAVE FILE":  
GOSUB 3000:GOTO USR a  
1005 PRINT "ENTER SAVE  
COMMAND g\$ CODE s, 1 THEN  
GOTO USR a":STOP  
2000 CLS: PRINT "LOAD FILE":  
GOSUB 6000:PRINT "ENTER  
LOAD COMMAND g\$ CODE s  
THEN GOTO USR a":STOP  
3000 LPRINT "(S(TO 32):GOTO  
USR a  
6000 INPUT "FILE NAME",LINE  
c\$: LET f\$(TO 10) = g\$: LET s =  
CODE f\$(1) + 256 \* CODE  
f\$(12): LET i = CODE f\$(13) +  
256 \* CODE f\$(14): RETURN  
Do not alter the line numbers.
- 6) Save on Microdrive with:  
SAVE "m"; 1; "VU-FILE" LINE  
50

Vu-File can now be loaded from the Microdrive with the normal Load command. It will behave normally until a Load or Save situation occurs, then it will return to Basic. At this point enter an appropriate Load or Save command for cassette or Microdrive operation with g\$ CODE etc as printed on the screen. When completed return to Vu-File by entering Goto USR a.

Not only does this method save the cost of buying another filing program, but it also means that all existing Vu-File files are compatible, and do not have to be re-entered.

F.J.S. Lewis,  
Abbots Langley,  
Hertfordshire.

## NON VIOLENCE

Play for Life is currently compiling a guide and it is intended to include a section on computer programs. Our primary concern is for playthings for the five to 12 year olds, but our interest extends to children of all ages. I would be most grateful if any software houses who feel they publish suitable programs would send me these.

The criterion for inclusion is that the programs should be constructive, creative entertainment. Thus we are looking for utilities that encourage the users to extend themselves, and their imaginations. Graphic and music utilities are excellent examples.

The sort of games that we're looking for may be harder to qualify, perhaps because there are so few of them? Alien zapping, dragon slaying games are definitely out! Dictatorial power simulations are similarly excluded. A lack of overt violence is no qualification, such games may still be aggressively competitive. So what are we looking for? Simulations that deepen understanding, role play games where the player helps others, arcade games that encourage co-ordination and swift reaction, but

not if they depend on or include violence and aggression, and how about multi-player games that require the participants to work together?

We are greatly encouraged by the increasing media interest in Play for Life. Its first meeting in February received extremely sympathetic coverage on BBC Radio 4 and positive interest has been already shown by some of the quality press, not only in the Play for Life idea, but also specifically in appropriate computer software.

Keith Ollert,  
Computer Games Researcher,  
Hookstead, Goldsmith Avenue,  
Crowthorne, East Sussex TN6 1RG.  
Telephone (08926) 5832.

## QL VALUE

I write with reference to Anthony Briggs' letter in your May issue concerning the Sinclair QL computer.

I totally agree with his point about Sinclair's poor customer service record, although I cannot say that I personally have had any cause for complaint.

I would also agree with his view of Sinclair hardware — I too find it a joy to work with. However, the fact that he can consciously reject Sinclair hardware in favour of the Japanese MSX computers amazes me, especially in light of the QL. In the same issue of your magazine we are told a few of the features of the QL that the advertisements don't reveal: definable character size, number range 10<sup>-615</sup> to 10<sup>615</sup>, strings to length 32K, etc, etc. Show me an MSX computer which does all this for a better price and I'll eat my QL when it arrives!

With all due respect if Mr Briggs feels happier bashing Japanese plastic on a games-orientated machine, then who am I to say? When deciding what hardware I buy, I base my decision largely on getting value for money, and I consider paying £399 for a machine with features belonging to a £1000 machine an incredible bargain, even if I do have to wait three months for delivery.

Kevin Ball,  
Shepshed,  
Leicestershire.

## VIC THINGS

I feel I must write to complain about the misleading comments made in Your Computer, June 1984.

I am referring to the article on page 39 by Andrew Bacon entitled Things to do with your Vic.

In this article Andrew gives some interesting tips, programs and ideas. It is only the following comments that I wish to rectify.

Graphic 4 does not exist. If it did it would be in the Super Expander manual. It is a repeat of Graphic 0 which resets the Vic, giving back the memory that a graphic mode uses up. The computer logically And's the parameter after Graphic with 3 to obtain a number in the range 0-3. Following this argument both Graphic 0 and Graphic 4 are valid and so can be used before a Graphic



# YOUR LETTERS

command as well as after. I have done this and my Vic-20 doesn't crash.  
☐ Andrew says that to unplot a pixel on the Super Expander, a non-system word can be entered, preceding the colour register number.

Any computer fan will realise that a non-system word is a floating point variable name and thus what Andrew has done is to replace the colour register number with an undefined variable name, effectively a colour register number of zero. In the manual zero uses the screen colour. Making a pixel the same colour as the screen effectively unplots it.

Using his example:  
 CIRCLEOVER 2, 512, 512, 320, 460 is actually CIRCLE CV2 512, 512, 320, 460

Obviously if OV2 is 0 unplotting will result. If it is greater than 0, plotting will result according to the value of OV2.

☐ Peek(650) — Location 650 may contain other numbers causing no keys to repeat. I may be wrong, but I believe the coding is:

0 = no keys repeat  
 64 = Cursor/Space Bar repeat  
 255 = all keys repeat

This leads me to suggest that the most significant bit affects all keys except Cursor/Space Bar ie:

128 bit set = keyboard keys repeat

64 bit set = Cursor/Space Bar repeat;

☐ Peek(37159), Peek(36967). These locations do change the speed of the cursor but this is due to the fact that it represents the Hi Byte of Clock Generator 1 which generates the IRQ interrupt signal. I doubt very much that programs can run faster, only apparently slowed down.  
☐ Peek(36867). This location does not just change the length of the screen, but also affects the size of the characters. The selection of different size characters is done by the least significant bit.

If it is set then 8 by 16 characters result — not 16 by 8 as stated in the user guide. 16 by 8 would have been more useful. If it is not set, normal 8 by 8 characters are apparent. The normal value here is 46 which means  $46/2 = 23$  screen lines and normal 8 by 8 characters. Poking 36867 with 47 would give 8 by 16 size characters.

Lee Borrell,  
 Audenshaw,  
 Manchester.

## VIC PROTECTION

I have noticed that as far as program protection is concerned on the Vic-20 that we have been limited to disabling the Run-Stop key with a simple Poke.

However all this is about to change, with the aid of the following:

Disable List: If, for some reason, the program concerned caused an error it would be nice to prevent anyone from listing the program. There are two ways of doing this and they are as follows:

POKE 774,34:POKE 775,253

This will cause a warm start if List occurs.

POKE 774,116:POKE 775,196

This will give a syntax error if List occurs.

Disable Save: Now that your program is un-listable you must prevent it from being saved and then re-loaded later in order to gain a listing. Again there are two methods of doing this:

POKE 818,34:POKE 819,253

This will cause a warm start if Save occurs.

POKE 818,116:POKE 819,196

This will give a syntax error if Save occurs.

Disable Load: This will stop anyone loading a program which will re-set the above locations and enable them to copy your program. This is done as follows:

POKE 816,34:POKE 817,253

This will cause a warm start if Load occurs.

POKE 816,116:POKE 817,196

This will give a syntax error if Load occurs.

Disable Run-Stop: This is included for completeness and is done as follows:

POKE 808,127

Kevin Willers,  
 Rotherham,  
 South Yorkshire.

## CORRECTIONS

Listing 7 in July's BBC Sprites article contains an error. The second part of line 540 — starting with N5 — belongs instead to line 550 and should be tagged on to the end of the line after BCS.

## MSX — TOO LITTLE, TOO LATE?

I found your criticism of the MSX project — June Editorial — bang on target. With the arrival of home systems such as the Sinclair QL and the Advance 86A, I see only dark clouds gathering for anyone daring to launch a new eight bit micro, standard or not.

The MSX lobby also fail to take into account the following, which clearly shows their improvident approach to market domination.

A. The large number of present users who will upgrade to the more powerful systems now becoming available; which will cause an expansion in the second-hand market, of proved micros with software and add-ons aplenty.

B. A price war between manufacturers, of presently produced eight bit micros.

C. The growing acceptance of the user-friendly concept, which by its very nature makes demands on memory that the eight bit is unable to comply with.

D. A first time user can learn equally as well on a 16-bit, running Basic.

E. Who wants to buy a "Model T" when a "Rolls Royce" is available for a few pounds more?

The MSX project can be summed up in four words, *too little, too late*. However, I believe UK consumers will welcome it as it will force home manufacturers to produce 16-bit systems. I would also be to the good if they adopt a 16-bit standard with the CPUs being produced here to prevent embarrassing component shortages of the type which occurred last year.

A future article from *Your Computer* would not come amiss addressing the following: Why are there so few powerful systems of the above type in the home users price range? What type of CPUs could be used? What type of advantages/disadvantages does a 16-bit offer in terms of software, useable RAM, graphics, sound and storage?

B. Brecknock,  
 Nottingham.

## 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: 01-361 3144

Subscriptions: U.K. £11.50 for 12 issues.

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

ABC

122,642 July-  
 December, 1983.

Advertisement Manager

SHOBHAN GAJJAR 01-661 3127

Assistant Advertisement Manager

NICHOLAS RATNIEKS 01-661 8548

Advertisement Executives

NIGEL BORRELL 01-361 3680

JULIAN BIDLAK 01-661 8458

KAY FILBIN 01-661 8484

Northern Office

RON SOUTHALL 061-872 8861

Advertisement Secretary

MAXINE GILL

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



# 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.

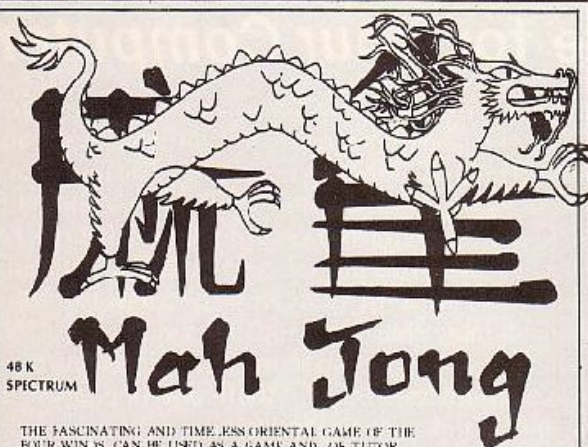
So as well as saving you pounds in having someone check through the whole system for a fault, 64 Doctor will give you peace of mind.

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: 0-75 462721



48 K  
SPECTRUM

THE FASCINATING AND TIME-LESS ORIENTAL GAME OF THE FOUR WINNS. CAN BE USED AS A GAME AND OF TUTOR WITH SAVE GAME FEATURE. SUPERB GRAPHICS. EXPERIENCE THE CHALLENGE OF FAST AND COMPETITIVE PLAY. A COMPREHENSIVE INSTRUCTION BOOK IS INCLUDED WITH EACH PACKAGE. THIS IS THE MOST COMPREHENSIVE VERSION WE HAVE EVER SEEN FOR A MICRO COMPUTER!!

**YAHTZEE**

16-48 K  
SPECTRUM

AN EXCITING GAME OF CHANCE FOR 1-4 PLAYERS.

**PENTOMINOES**

16-48 K  
SPECTRUM

THE "JIGSAW" WITH A SUBTLE DIFFERENCE!!

**Spectre**

ENFIELD HOUSE, SWAKELISTON  
NORWICH, NORFOLK.

ALSO AVAILABLE

48K DIGITAL CIRCUIT DESIGNER £ 9.95  
48K A.C. NETWORK ANALYSER £ 14.95  
48K MULTIFUNCTION MATHS AID £ 8.95  
48K PERSONAL DIETARY ADVISOR £ 12.95  
48K INVESTMENT MONITOR £ 19.95



**TOP  
SAVINGS**

## PRINTERS

BROTHER HR 15  
TRACTOR  
SHICETFEEDER  
KEYBOARD

EX VAT INC VAT

349.00 401.35  
68.00 78.20  
195.00 224.85  
142.00 163.30

EPSON RX80T  
EPSON RX80F/T  
EPSON FX80P/T  
EPSON MX100P/T  
EPSON FX100P/T  
FX80 TRACTOR

215.00 247.25  
242.00 278.30  
329.00 378.35  
375.00 431.25  
430.00 494.30  
30.00 34.30

JUKI 6100

345.00 396.75

MANNESMANN TALLY MT 80

199.00 228.85

OKI MICROLINE 8CAP  
OKI MICROLINE 82A  
OKI MICROLINE 82A  
OKI MICROLINE 92P

180.00 207.00  
289.00 332.35  
435.00 500.25  
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  
COMMODORE 1341 DISK  
COMMODORE C2N CASSETTE  
INTFACE 04-PANEL

156.51 179.99  
165.21 189.99  
36.51 41.99  
99.00 114.45

APRICOT 2"D-MON

1575.00 1811.25

SANYO M8C566

799.00 918.85

EPSON QX10

1600.00 1840.00

**MAYFAIR MICROS**  
362 YORK ROAD, LONDON SW18 1SP  
01-870 3255



## Computer Fair provides first public showing for Sinclair QL

DESPITE NERVOUSNESS throughout the home computer business caused by the financial problems affecting Campsters and Dragondata (see next page) and some slackening in demand for software, the Computer Fair at Earls Court got off to a resounding start on June 14 and was generally regarded as a successful exhibition.

Encouraged, no doubt, by the presence of Susan Hampshire, star of the new TV series *Leaving*, who opened the show, the Press were very much in evidence on the first day with no less than four TV camera crews in attendance. The results of their labours were seen on the Thames TV Database programme and the Channel 4 Earsay programme, among others.

However, apart from Miss Hampshire, undoubtedly star of the show was the Sinclair QL appearing for the first time in public — and what is more without the add-on ROM which was the source of considerable comment when the early models were delivered.

Now, with the QDOS operating system comfortably accommodated within the casing of the machine and with the four applications packages for word processing, spreadsheet, database management and business graphics, all operational, the QL looks what it is — incredible value for money — a view which was certainly shared by the crowds who thronged the Sinclair stand.

Also attracting favourable comment were the new Commodore 16 and Plus/4 computers which were



*Susan Hampshire not only opened the Computer Fair at Earls Court but also visited the Sinclair stand where she helped promote the Dyslexia Beater cassette reviewed in last month's issue and found time to cast an appreciative eye over the QL computer.*

featured on the Commodore stand. The Plus/4 in particular, with four business programs included in the £249 price of the computer, was being viewed as a possible rival to the Sinclair QL, despite being based on a less powerful processor.

The tendency for home computers to move upmarket into business applications was also apparent on the Acorn stand. There the Z80 add-on processor for the BBC micro attracted considerable attention. This enhancement for the BBC computer comes with its own 64K of RAM. Under the CP/M operating system some 55K of this is available for applications programs.

Putting a brave face on their financial problems were Dragondata who under the GEC Dragon marketing banner showed the extended

range of Dragon hardware including the Dragon 64 complete with disc drives and the OS-9 operating system which transforms it into a versatile business system.

Also mounting a very professional presence at the Computer Fair were Oric whose Atmos computer is moving upmarket with the addition of a Hitachi disc drive and business-orientated database and spreadsheet software.

Perhaps a sign of developments to come, as European home computing markets begin to catch up with the UK, was the presence of No Man's Land, a French software company providing games software for a range of popular micros but with particular emphasis on the Oric 1/Atmos, now France's most popular home computer.

## Joysticks on show

TWO PRODUCTS launched at the Computer Fair by Kempston Micro Electronics were the Pro Joystick Interface for the Sinclair Spectrum and the BBC Pro Joystick.

The main features of the new Spectrum joystick interface are three 9-way D plugs allowing any of the Competition Pro range or standard Atari type joysticks to be connected. Two of these plugs allow compatibility with Sinclair/Psion software (ie simulate keys 1 to 5 and 6 to 0) while the third offers the dual facility of both Kempston Joystick software and Cursor key software.

A further feature is the built in cartridge slot which allows the use of ROM-based software.

The Interface simply plugs into the expansion port of the Spectrum; additionally it can be used in conjunction with ZX Interface 1 and microdrives.

The BBC Pro Joystick is based on the Competition Pro 5000 series which so far has been available only

in standard Atari-type format.

The BBC version contains micro switches allowing movement in eight directions together with twin fire buttons for right and left-handed play. The joystick plugs into the analogue port on the BBC and is compatible with a wide range of software.

Prices of the new Kempston products are £19.95 for the Pro Joystick Interface and £16.95 for the BBC Pro Joystick.

## Game Lords go for gold

NO DOUBT to keep themselves in appropriately lordly style the Game Lords aka Quicksilver have sold out to the Argus Press Group, publishers of Computing Today and Home Computer Weekly.

Quicksilver will continue to operate from its present location in Southampton and director, Mark Eyles says that the company will continue to trade under its own name

as an independent member of the Argus Group.

The take-over by Argus has provided Quicksilver with finance for further development one of the first fruits of which is the formation of QED — Quicksilver Education Dimension — (Sorry about the name) a new division which aims to produce games "with a serious educational content, but presented in a 'fun' way". QED games for Sinclair, Commodore, Atari, Acorn MSX and Enterprise micros are in the pipeline, scheduled for an Autumn launch.

An indication of the way in which the software business is developing is Quicksilver's conclusion of a licensing deal with Atari. First fruits of this deal will be the conversion of the arcade game Battlezone for the Spectrum. Its origins will be clearly credited and rather than ripping off other people's ideas Rod Cousens, managing director of Quicksilver hopes that the agreement with Atari "may establish a trend in seeking licensing approvals in the promotion of authorised versions for... home computers".

## SORRY

We apologise to our readers and advertisers for late publication of this issue of Your Computer and for the omission of certain regular features. The cause is a dispute between the National Union of Journalists and Business Press International.

## Oric looks to business

FOR £299 Oric 1 and Atmos owners can now add a 3 inch disc drive. For £100 they can buy a modem to link up to Prestel, and for a further £250 they can round off their system with an 80 column dot matrix printer.

With these new peripherals Oric Products International claims the Oric has the makings of a viable small business system.

To highlight the Oric's business potential the company has included in the disc pack, database and spreadsheet programs as well as games software. These come together with the disc operating system and a Hitachi drive which uses double-sided, double-density discs to give a capacity of 320K.

The price of the modem also includes the 6K program necessary to convert the Oric or Atmos into a Prestel terminal and to enable them to download software.

Both these products are available now. The dot matrix printer will be released at the end of the summer.

## Machine code revealed

FOR THOSE wishing to learn machine code help is at hand in the form of a software package covering four leading micros — the 48K Spectrum, Commodore 64, 32K BBC micro and 32K Atari.

Entitled the Compute: Machine Code Tutor, the package is available in two versions — one for the Spectrum which is based on the Z80 microprocessor and the other for the Commodore, BBC and Atari computers all of which are based on the 65C2 microprocessor.

Each version of the Tutor comprises two cassettes which load the tutor and then take the user through a series of lessons and exercises. The Spectrum version, which contains over 100K of data on the two cassettes, includes 33 separate lessons, while the 65C2 version contains 70K of data and includes 27 lessons.

A simulator routine takes the user through all aspects of the Tutor to give a thorough understanding before starting the lessons.

Both versions come with manuals explaining the instruction codes of the Z80 and 6502 processors respectively. Prices at £14.95, the Tutor has been introduced by New Generation Software.



Trade enquiries welcome.



## Micro Mouse contest Dibley does it again

THE MICRO MOUSE contest is now an established feature of the Computer Fair and the sight of microprocessor-based mice threading their way more or less purposefully to the centre of a maze is familiar to those with a contemplative side to their nature.

Like coarse fishing, watching micro mice pattering around a maze is not for those with a taste for action.

On the side lines things are different. Mouse builders who have toiled over their electronic marvels during the long winter evenings go quietly bananas as their mice turn in the wrong direction, lose their memory maps or refuse to budge at all.

At this year's British micro-mouse final held at the Earls Court Computer Fair Alan Dibley, doyen of mouse builders, experienced just such a blow when T5, the latest of his stable of mice, having performed well was improved to death by a misplaced screwdriver.

It seemed that the honour of the Dibley team rested on Thezeus, a grizzled veteran from the pre-history of mouse building who plodded resolutely to the centre of the maze in 9 minutes 48 seconds. Hardly a winning time. However, help was at hand in the form of T4 a more recent Dibley development which after one or two false starts zoomed to the centre in 15 seconds.

It was too much (or too little) for Dave Woodfield, Britain's other main mouse builder. His pride and joy, Thumper, having put up a fantastic qualifying time during the morning nosed in a desultory fashion around the first few metres of maze before quietly giving up. It seems that its batteries were flat.

All depended on Woodfield's other mouse Known Aim, a skeletal

creature with the look of a purposeful stick insect. But despite some fast times Known Aim was handled by his maker incurring penalty points which left Dibley's T4 as the outright winner. Alan Dibley thus represents Britain in the Euro-mouse Maze Contest to be held at the Euromicro Conference in Copenhagen.

As winner of the British heats at the Computer Fair, Alan Dibley received an Oric Atmos computer, membership of the Oric Owners Club and a cheque covering his fare to Copenhagen, all of which were generously donated by Oric Products.

The winner in the Novices category of the micro-mouse contest was Bill Urmenyi who is now the proud owner of an Acorn Electron donated by Acorn Computers.

The runners up in both Expert and Novice categories received cheques for £30 from the publishers of *Your Computer* who are also sponsors of the Computer Fair, and those who came third received £30 worth of books donated by Sunshine Publications.

## Quick load routine

RELIEF is at hand for CBM owners who are tired of waiting an age for cassettes to load in. Software companies are now starting to accompany tapes for the Commodore 64 with a quick load routine which loads in programs up to eight times faster than normal.

The routine precedes the game on tape and works by altering the machine's cassette operating system. Using this technique Thorn-EMI's Turbo Tapes load in a 16K program in under a minute. The company is also offering the same facility on some of its Vic-20 games.



Getting the best of both worlds. The Commodore Plus/4 computer is intended to appeal to home and business users alike. Leaving you to work out which this characteristic picture of Snoopy represents, we would only add that at £249 it seems good value — even if it's not exactly peanuts.

## 16 Plus 4 = 2 new micros

COMMODORE HAS launched two new computers, the 16 and the Plus/4, to sell alongside the Vic-20 and the CBM 64.

Despite the fact that the 16 appears to offer a higher specification for the same price, the company maintains that it will not replace the Vic. Commodore's software manager, Gail Wellington, said that as long as there is a demand for the Vic they will continue to manufacture it.

Both machines contain 32K ROM which includes a new Basic interpreter. Basic 3.5 improves on Commodore's existing version of the language by supplying graphics and sound commands.

They also share the same text and graphics resolution — 40 rows by 25 columns together with 320 by 200 pixels. 15 colours are provided and each can be set to one of eight levels of luminance.

Sound is catered for by two tone generators, one of which can be used to produce white noise.

The two machines are based around Commodore's 7501 chip. This combines the 6509 processor — a version of the 6502 — with the Vic display chip. For machine code programmers there is a built-in Monitor with 12 commands.

The Commodore 16 will sell for £129.99 in a starter pack comprising the computer, a cassette unit, Introduction to Basic Part 1 and four games tapes. It offers 16K RAM and 12K is available to the user.

The Commodore Plus/4 costs £249 and is intended to appeal to home and business users alike. It comes with 64K RAM and four QL-style software packages, a spreadsheet, a wordprocessor, a database and a business graphics program.

Unlike on the QL these four programs are stored in a further 32K ROM, and are available at the touch of a function key. Each can exchange information with the others, while a screen window facility allows the user to view two packages at the same time.

## YOUR COMPUTER TOP 20

Game	Company	Machine
<input type="checkbox"/> Atic Atac	Ultimate	Spectrum
<input type="checkbox"/> Avator	Acornsoft	BBC
<input type="checkbox"/> Black Hawk	Thorn EMI	CBM 64
<input type="checkbox"/> Blagger	Alligata	CBM 64
<input type="checkbox"/> Blue Thunder	Foundry Systems	Spectrum
<input type="checkbox"/> Chariot	Micro	Vic-20
<input type="checkbox"/> Race	Antics	
<input type="checkbox"/> Chaquered Flag	Psion	Spectrum
<input type="checkbox"/> Duck Shoot	Master- tronics	Vic-20
<input type="checkbox"/> Fighter Pilot	Digital Integration	Spectrum
<input type="checkbox"/> Forbidden Forest	Cosmi	CBM 64
<input type="checkbox"/> Fred	Quicksilver	Spectrum
<input type="checkbox"/> Hunchback	Ocean	Spectrum
<input type="checkbox"/> Jet Set	Software Projects	Spectrum
<input type="checkbox"/> Willy Krigepiel	Beyond	Dragon
<input type="checkbox"/> Manic Miner	Software Projects	CBM 64
<input type="checkbox"/> Ore Attack	Atari	Atari
<input type="checkbox"/> Percy Penguin	Superior Software	BBC
<input type="checkbox"/> Tank Commander	Thorn EMI	Vic-20
<input type="checkbox"/> Trashman	New Generation	Spectrum
<input type="checkbox"/> Zaxxon	Starzone Software	Spectrum

## Double trouble

THE NEWS THAT two home computer manufacturers — Computers and Dragondata — have experienced severe financial difficulties has sent a tremor through the micro business.

Computers, manufacturers of the Lynx home computer and the recently announced Laureate business system has been looking for additional sources of finance for some time and it now appears that it has reached the end of the road with liquidation as the most likely outcome.

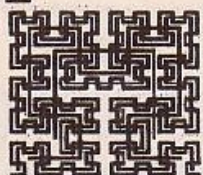
In the case of Dragondata the situation appears slightly more hopeful. Having gone into voluntary receivership a buyer for the whole company is being sought. At present Dragondata has a marketing agreement with GEC which is continuing pending the possible emergence of a new owner to carry on the business.

Paradoxically, news of the problems encountered by these companies comes after a very buoyant period in the home computing market. Figures released by AGB Home Audit, a market research company, reveal that home computer sales in the UK rose by 75 per cent in the first quarter of 1984 compared with 1983. This represents sales of 200,000 home computers in the first quarter of the current year as against 114,000 for the same period last year.

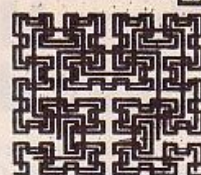


Dave Peachey of Oric in interviewing mode at the Computer Fair: "What's it feel like to win the Micro Mouse competition, Alan?" "I'm over the moon, Dave" which is understandable because Alan Dibley had just won an Oric Atmos computer and membership of the Oric Owners Club together with his fare to Copenhagen where he will represent Britain in the Euromouse finals. The first prize was generously donated by Oric Products.





# HISOFT PASCAL DEVFAC



## 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's Pascal, you can reap all these benefits on a wide range of home computers, including the 48K Sinclair Spectrum. Hisoft Pascal produces programs that run typically 40 times faster than equivalent ZX BASIC programs and, sometimes, up to 1,000 times faster!  
 Hisoft Pascal supports FOR... DO, WHILE... UNTIL, CASE... OF, INTEGERS, REALS, CHARACTERS, RECORDS, POINTERS, SETS, ARFAYs 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, DEFB, 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 £45 inc.  
 Hisoft DEVPAC 3 (ZX SPECTRUM) £14 inclusive  
 (NewBrain) £25 inclusive

\*\*\*STO>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 Goosecreech, Cheddington  
 Leighton Buzzard, Beds. LU7 0SR  
 Tel: (0295) 648995



\*and others



### micro technology support centre

micro technology support centre Phone (0962) 51837  
 14 Vernham Road, Winchester, Hants. SO22 6BS

## FIRST TIME EVER!!



0962  
 51837



WE ARE NOT A USER GROUP.  
 We are EVERYTHING you would ever need. Just 1 place to go to. Phone or write now!!!

Membership: BBC/COM64/MTX/  
 ELECTRON all £11.50. COM  
 VIC/Dragon/ORIC/ZX SPEC all  
 £8.50. ZX81 £5.75 price all per  
 annum.

INTRODUCTION OFFER:  
 £25.00 BBC model B, MTX  
 500/512 LYNX 48/96k



0962  
 51837



**micro technology  
 helps you do it!!!**

## 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,  
 Chertsey, 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

XY7



# 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...

This month's problem is an old favourite. Write a program to print out all the prime numbers below 1000. There are a number of ways of tackling this problem. We are looking for the program that does the job in the fastest time. In awarding the £15 prize we will make allowances for speed differences between Esasics.

"I've been using a computer for some time now, and I know Basic pretty well. Now I want to start programming in machine-code, but the trouble is that I don't know where to start. I wonder if you could help me?"

BEFORE YOU CAN start writing machine-code programs you have to find out which machine language — machine-code — your computer uses. This depends on the processor inside, and so the first thing to find out is which processor you've got.

There are many microprocessors, but only a handful of these are used as the heart of home computers. The most common one is probably the Z-80, as it is this that makes the Spectrum tick as well as the Lynx and many other more expensive computers. The next most widely used is the 6502, used in the BBC, Electron, Apple and all the Atari home computers. A modified version of it is the 6510, used in the Commodore 64. Other processors in home computers include Texas Instruments' TI9908 — used in the TI99/4A — and Motorola's 6809 — used in Dragons — and 68008 — used in the new, low profile, QIs.

So, before you go any further, find out what processor you are using — this will tell you what machine language to learn.

Unfortunately it isn't quite as simple as finding out the processor you've got and then learning the language to fit it. An awful lot depends on how the memory of the computer is arranged and accessed by the chip, and also on the special facilities your micro has got.

These might include dedicated processors to look after the graphics or sound — the 64 has both, in the 6566/9 video chip and the dedicated 6581 SID chip — sound interface device — or unusual ways of accessing memory, particularly if there is more memory than can be seen if one goes by the chip.

So, the next step is to find out how the memory of your micro is arranged. This is best seen with a memory map, which is a schematic picture of what the memory looks like. There is usually some kind of map in the user manual, though the best ones are often to be found in the

## Getting started on machine code

technical manuals or books about your micro.

The best memory maps tell you not only what the memory looks like, but how the processor uses it too. They should list what the specific locations in memory do, or at least those that are important. It is particularly useful for example to be able to know where the start of the Basic program is, or where a pointer to it can be found, as well as knowing where the colours are stored or what their values are.

A good memory map can also be very helpful to your Basic programming, as you can then use efficient Pokes to put variables or numbers exactly where you want them. You can also use the information to help you protect your programs from theft by hiding pointers and replacing them later.

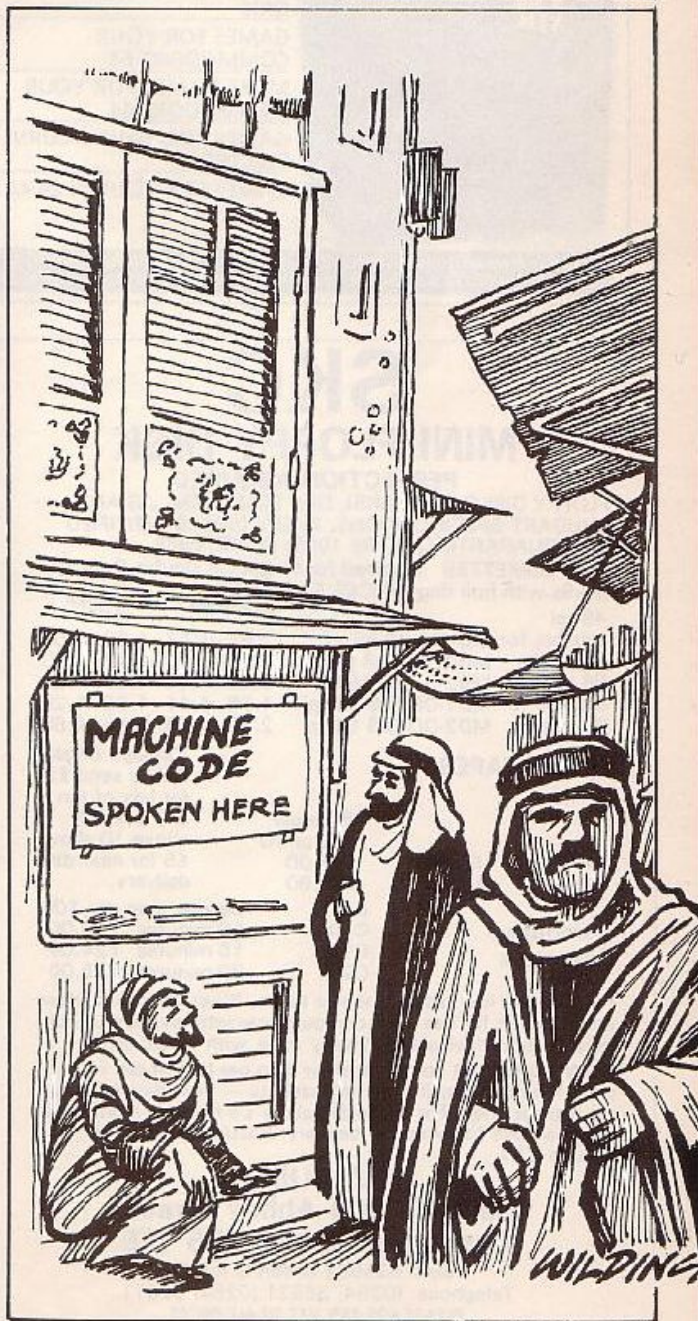
Sadly, even if you have a complete memory map and you know the machine language that you want to use, you are still a long way from knowing how to program your micro in machine-code.

The main obstacle facing you now is that of getting the machine-code into the machine. The ease with which you can do this is entirely dependant on the micro you are using. The most helpful ones, like the BBC, have been designed to allow you to do this very simply, even to the extent of being able to write machine code programs from within Basic.

Micros like the BBC have a built in assembler. What an assembler does can be understood best by looking at what happens to any program that you type in in Basic.

What happens is that as you type it in it gets stored in the computer's memory, and when you come to type Run the processor looks at each instruction and interprets it. With machine-code programs it is slightly different — when running these the processor looks at the individual bytes, and so individual bytes or

(continued on page 41)





## GAMES... GAMES... GAMES

### THE VIRGIN COMPUTER GAMES SERIES

£££££'s of  
Entertaining Games  
for only £2.95

Each book contains more than 20 quality games programmes, each one specially written for the series and unavailable elsewhere. Moving graphic games, arcade games, reflex flexers and brain stretchers are all here and guaranteed to provide hours of entertainment.

Only £2.95 each



GAMES FOR YOUR ZX 81  
MORE GAMES FOR YOUR  
ZX 81 (£3.50)  
GAMES FOR YOUR  
ZX SPECTRUM  
MORE GAMES FOR YOUR  
ZX SPECTRUM (£3.50)  
GAMES FOR YOUR VIC 20  
MORE GAMES FOR YOUR  
VIC 20  
GAMES FOR YOUR  
BBC MICRO  
MORE GAMES FOR YOUR  
BBC MICRO  
GAMES FOR YOUR DRAGON  
MORE GAMES FOR YOUR  
DRAGON  
GAMES FOR YOUR ATARI  
GAMES FOR YOUR  
ATARI 600XL  
GAMES FOR YOUR TRS 80  
GAMES FOR YOUR ORIC  
MORE GAMES FOR YOUR  
ORIC  
GAMES FOR YOUR  
COMMODORE 64  
MORE GAMES FOR YOUR  
COMMODORE 64  
GAMES FOR YOUR ACORN  
ELECTRON  
GAMES FOR YOUR TI 99/4A

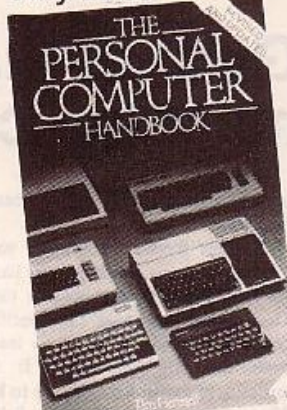
Available from all good bookshops, or direct from the publishers adding 12½% to the price of each book ordered to cover our postage and packing. Please make cheques/P.O.s payable to Virgin Books and send to: Computer Books Offer 1, Virgin Books, 61-63 Portobello Road, London W11 3DD

## THE PERSONAL COMPUTER HANDBOOK

TIM HARTNELL

The complete guide to selecting and using small computers, including an explanation of how they work and what they can do for you, a detailed analysis of the available systems on the market and how to buy them, and how to get the most from your computer with an extended step-by-step guide to programming.

Only £3.95



## SPECTRUM MACHINE CODE

STEVE WEBB

BASIC has its limitations. Machine Code programmes are written in the Spectrum's own language, facilitating access to the most sophisticated programming and stretching both the ZX SPECTRUM and its user to new horizons in computer programming. This book fully explains what Machine Code is and how it works, before exploring the incredible versatility of the ZX SPECTRUM.

Only £3.95



## SKC MINI FLOPPY DISK

### PERFECTION ASSURED

FLOPPY DISKS MEET ANSI, DIN, ECMA, IBM, JIS AND SHUGART SPECIFICATIONS. EVERY DISK IS CERTIFIED AND GUARANTEED TO BE 100% ERROR FREE.

5¼" DISKETTES Certified for Single OR Double Density media with hub ring. PRICES EXC VAT

	QUANTITY	PRICE PER DISC
48 tpi		
suitable for MD-S/S 48 tpi	1.61 1.17 1.12 1.06	
40 track MD-D S/S 48 tpi	1.70 1.23 1.17 1.10	
96 tpi MD2-D D/S 48 tpi	2.00 1.44 1.37 1.29	
suitable for MD1-DD S/S 96 tpi	1.86 1.41 1.35 1.28	
80 track MD2-DD D/S 96 tpi	2.33 1.76 1.68 1.60	

### VIDEO TAPES

		Price per Box of 10	Carriage Chgs. Please send £2 for box of ten — any quantity above 10 allow £5 for next day delivery.
VHS	E-180	£35.00	
Beta	L-750	£38.00	
Computer	C10	10 minutes	£23.00
Cassettes	C15	15 minutes	£24.00
	C20	20 minutes	£25.00

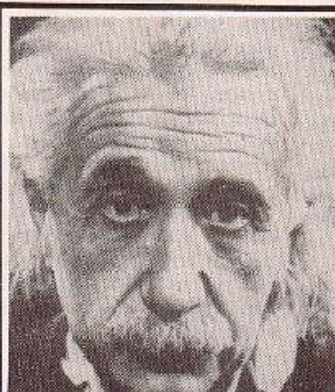
High quality low noise cassette tapes. Short play, leaderless construction for use with computer cassette systems. Each tape in individual plastic library case with index card.

**HOW TO ORDER** For disks allow 50p per box of ten for p&p. First class mail for small packets — next day delivery for heavier ones. For cassettes allow £5 carriage costs (min. order is 100) for next day delivery. Post/carriage costs include VAT.

### P.V. TUBES

Dept. C, 104 Abbey Street,  
Accrington, Lancs BB5 1EE

Telex: 635562 Griffin G for PV  
Telephone: (0264) 36521 (0264) 32611  
PLEASE ADD 15% VAT TO ALL PRICES



We use only  
10% of  
our mental  
potential

These are the words of Albert Einstein, the greatest physicist of recent times. ... Ron Hubbard's discoveries in the field of the mind prove today that Einstein was right!

In his book **DIANETICS® The Modern Science of Mental Health**, L. Ron Hubbard takes one more giant step in this direction. He demonstrates how anyone can use his discoveries to get rid of the barriers that have so far prevented him from using his mental potentials fully.

More and more people from all walks of life including technicians, artists, G.P.s, scientists, workers and managers alike, use DIANETICS technology today. And the thousands of written reports on their success are the best proof for the quality of this book. Get your own copy today.

**BUY AND READ DIANETICS** by L. Ron Hubbard.  
Ask for it in your local bookshop, or send directly £3.95 to:

**DIANETICS** Dept. C., Freeport,  
St Hill Manor, East Grinstead, Sussex RH10 4ZB

Your copy of this 470 page book will be sent by return post.

DIANETICS is a registered name



pairs of bytes are what you have to put into the memory.

Without any software assistance you can simply Poke the information into memory, but this does require you to be working at bit level. On some machines — notably the Spectrum — this is not too difficult, once you get used to it, but compared to writing Basic programs it is very slow.

An assembler allows you to use semi-helpful words as instructions — mnemonics — although you are still working at byte level. For example the instruction

LDA,8

The machine-code instruction above would be turned by an assembler into two bytes, the first of which would contain an instruction to load the second byte (8) into the register A. In true machine-code this would be just 16 bits, or one

hexadecimal number — as you can see it is much easier to use an assembler.

Most assemblers are simply a piece of translation software, and can take a lot of getting used to — it is best to buy carefully here, though if you have a BBC you can use the built in assembler.

So, to start using machine-code you need to know which processor your machine uses, all about the memory of your micro, and either the pure machine language or an assembler for it. This takes time, but the results, as you've probably seen from the best games around, can be superb. It is worth the effort, but be prepared for a struggle.

Getting machine-code programs typed in is only about half of the battle. As you know from Basic programs debugging takes up nearly as much time as programming. But how can you debug single bits, which is usually where the mistakes are?

# BEGINNERS

## first bytes

One way is to Peek the locations, and check the results with what you expected.

A software tool that helps you do this is the machine-code monitor, which lets you look at the memory, and if it's a good one, it also lets you trace through your programs step by step, and look at or change the registers at the same time.

If you are serious about getting into machine-code then I would recommend that you get a book specifically for this purpose, and for your machine. Books on machine code are usually a lot more helpful than the manuals, and are worth the investment — after all most of them are no more expensive than a piece of software.

## Choosing a printer

A PRINTER is the first big purchase a new computer owner is likely to consider. Large numbers of all kinds of printers are being bought by home computer users, and the combination of competition and high sales has brought prices down over the past few years.

More people than ever before can now seriously think about buying a printer. This is marvellous, but the variety of the choice does bring confusion. Instead of being limited to the little — lamented, or little-lamented? — Sinclair ZX printer, Spectrum owners can now look up thermal, multiple pen, dot matrix, daisywheel, or combined typewriter/printers to their machines.

What are the pros and cons of the various types? Which will best suit me? What are the questions I need to ask myself to reach a sensible conclusion? First, a summary of the differences between the types of printers.

1. Thermal printers: The Sinclair ZX printer works by using a spark to burn through the aluminium film on the special paper rolls. Other makes use a special heat-sensitive paper. The ZX printer can be used on many other popular micros using adaptors costing below £30.

If you want program listings and screen dumps, and already have a ZX printer, you could use it with one of these adaptors on your new micro. While this printer could not be described as reliable by the most loyal Sinclair user, Alphacom thermal printers give a much better print quality, and they are reliable.

The Alphacom 32 is made for Sinclair machines — with adaptors to hang it on to other machines — and the Alphacom 42 is available for most popular micros. They give either blue or black print on 11cm wide paper. Printing speed is also appreciably better than the ZX. A new 80 column version is coming.

2. Dot matrix printers: Pins hit an inked ribbon making patterns of dots on plain paper. Normal text is printed very fast, and programs are available for most micro/printer combinations to print copies of screen displays — but slowly!

For many purposes, they are ideal. Program lists, work-sheets for teachers, letters, draft articles for computer magazines, the list of application is huge — that is why this group of printers dominates the market.

If you are willing to pay between £200 and £300, you enter the range of high quality dot-matrix printers like the Mannesmann Tally Spirit 80. These printers will be faster and more flexible, more special — italics, enlarged, condensed, super- and sub-script characters, etc. I know several businesses that use them for invoices and letters.

3. Daisywheel printers: They use interchangeable discs containing the preformed character set, the ones used on modern electronic typewriters. Print quality is really first class, and

by changing the wheels you can switch between three sizes of print, and between character types, in the same document.

But printing speed is slow. Falling prices bring the Juki and Daisystep machines within the reach of many home micro users. However, think hard before buying one. Do you really need that quality? In the shop the printing speed may seem alright, but wait until you need to list a big program, or print the draft of a four-page document!

Remember that the brochure's 20cps may turn out to be closer to 10 (Trades Description Act — where are you?). If you can afford a simple dot matrix (or an Alphacom) as well, then go ahead.

4. Multiple pen, Ink dot printers: Don't think I am dismissing them. The option of producing a multi-colour print-out is amazing. In the not too distant future, they will form a much bigger part of the market. But right now, multi pen plotters are too slow, and ink jet printers not reliable enough to be generally recommended.

5. Combined typewriter/computer printers: At first sight, these seem to be an obvious choice. A real electronic typewriter, doubling up as a printer for your listings. Marvellous! Or is it? The slow speed makes it a very poor choice for listing programs, and bashing out rough drafts.

Also, if you have a reasonable word processing program for your micro, you will find it hard to go back to an ordinary typewriter, and you could have bought a white elephant. Of course, there are circumstances when this option will make very good sense. Does someone else in your home really need a typewriter?

You would sometimes appreciate the superb print quality of a daisy-wheel. The extra cost of the interface will then be money well spent.

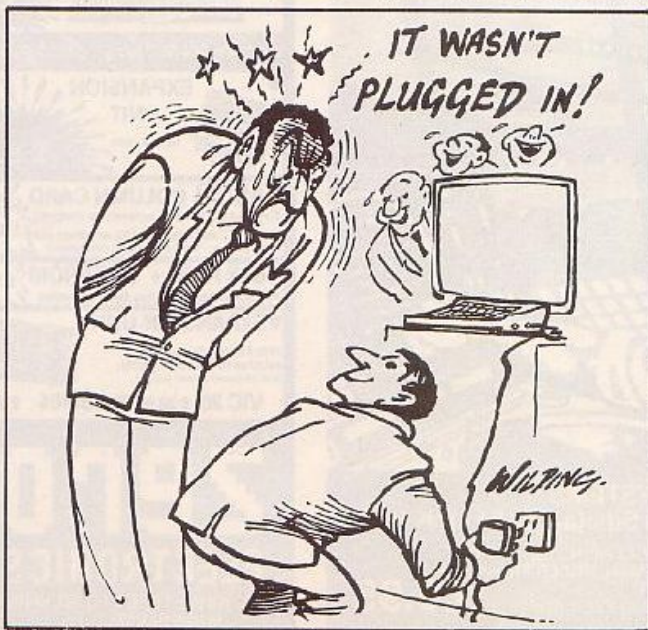
● Under £100. You will find it hard to beat the Alphacom for a balance of price and quality, with a good printing speed.

● £100-£200. There is a gap here. The new 80 column Alphacom or the Brother HR5 may fill it. There are lower price dots in this range, but think hard about the benefits of those in the next group. Will it be worth waiting until you have saved the extra cost?

● £200-£350. You will find here some good quality printers, like the Epson RX30 and the Mannesmann Tally Spring 30, giving flexibility and high printing speed. The Daisystep daisy-wheel is in this range, if you can tolerate the slow printing speed.

● £350 and upwards. In this range you begin to meet printers designed to flourish in the 9 to 5, five days a week, week in, week out world of commerce. Are you sure you need this rugged construction? But then, most people don't need Quads, Nikons or Porsches — they're not essential, but very nice if you can afford them!

Whatever choice you make, even if it's only the little ZX wonder, this is certain: Once you plug a printer on to your micro, your computing enters a wonderful new dimension, and you'll wonder how you managed before you bought it.



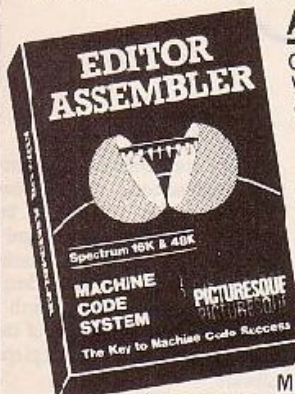


# The Key to Spectrum Machine Code Success.

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, DEFW, 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

## THE SKY'S THE LIMIT WITH... AIR TRAFFIC NEW! CONTROL

Try this absorbing game



LIVE  
SITUATIONS  
TOTALLY  
COMPELLING

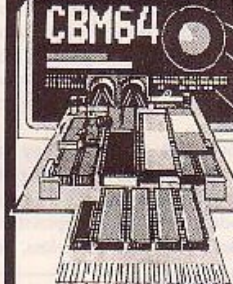


By HAMA SYSTEMS  
For use with Sinclair ZX81 (16K RAM)

ON SALE AT MOST LEADING COMPUTER  
OUTLETS. OR BY MAIL ORDER FROM:  
SACKVILLE PLACE,  
41 45, MAGDALEN STREET, NORWICH.

**£6.95**

## SPECIAL OFFER for CBM 64 80-COLUMN/GRAFICCARD



- Digital clock
- Mix possibility of 80-column screen with Hires CBM64-screen (also in colour)
- Gratic 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

<b>EXPANSION UNIT</b> with 2 slots <b>£ 5.95</b>	<b>EPROM CARD</b> two 2W4 k EPROM sockets Addresses are changeable <b>£ 5.95</b>
<b>40/80 COLUMN CARD</b> 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! <b>£ 55.95</b>	<b>EPROM PROGRAMMER</b> for 2716, 2732, 2764, 27128, 2532 EPROMS Can be easily connected to your computer. Control software in EPROM £ 6.50 <b>£ 31</b>
<b>64k RAM + 2k EPROM</b> With software for RAM-files. Easily connected. <b>£ 55.95</b>	<b>EPROM-ERASER</b> erases 4 EPROMS simultaneously <b>£ 26.50</b>
<b>EXPANSION UNIT</b> With 5 slots, fully buffered, switches for deselecting slots, and on-board power supply <b>VIC 20 £29.95 * CBM64 £36.95</b>	<b>MACH3 PRINTER BUFFER</b> 16k 32k 48k par. input - par. output £ 84 £ 98 £ 109 serial input - par. output £ 94 £ 109 £ 123 for all our products. Dealer inquiries invited.

# zero

## ELECTRONICS

149 KINGSTREET + GT. YARMOUTH NR30 2PA + TEL: (0493) - 2023 (NASH HOUSE)

- All prices exclude VAT. Shipping costs £ 1.50
- Supplier to schools, universities and government departments.
- We have good documentation of all our products, free of charge.
- All equipment can be tried out without obligation; if returned undamaged within 10 days, you only pay postage and packing costs.



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

## Local news

### Tamworth

Taking its name from the Tamworth Voluntary Activities Centre, Ludgate Street, Tamworth, Staffordshire, the Tame Computer Club meets on the first and third Friday of each month. All types of machine from home-made to professional business systems are welcome. For further details contact Tony Beckett on Tamworth 53473 or Alan Wiseman on Tamworth 69537 — after 7.00 pm.

### Walsall

Every second and fourth Monday of the month — the Walsall Computer Club meets at Park Hall Community School, Park Hall Road, Walsall, Staffordshire. For more details contact Walsall 23875.

### Wolverhampton

Despite being called the West Midland Sinclair Users Group, people with CBM-04s or Aces are welcome to the weekly meetings at Ounsdale School, Wombourne, near Wolverhampton. For more details contact Graham Walden, WMSUG, 80 Planks Lane, Wombourne, West Midlands.

### Coventry

The Coventry & Warwickshire Commodore Computer Club is one of the Midlands' most lively user groups. It meets on the fourth Wednesday of each month except August and December at Stoke Park School and Community College, Dane Road, Coventry. For more details phone regional ICPUg on 0203-413511.

# COMPUTER

Paul Bond discovers a novel idea to help kids get hands-on experience of micros — the Hammersmith and Fulham Playbus Scheme.

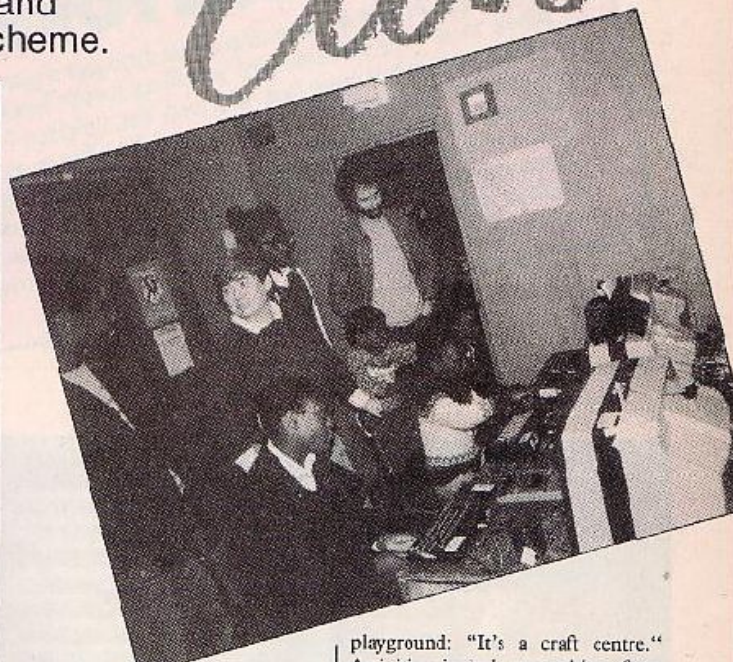
THE HAMMERSMITH and Fulham Playbus Scheme may not sound like a computer club to you — and to some extent you would be right. But as part of its important function of making various recreational and educational resources available to a community that might not otherwise even get to know about them, let alone use them, the project has started carting computers round to various youth centres in order that kids get some hands-on experience.

But don't they have this sort of thing in schools? Ian Miller, whose brainchild this is, maintains not — at least not with the Sinclair ZX Spectrums which are the group's staple micro at the moment.

"There are very few ZX Spectrums in London schools, or BBCs for that matter," he says. "The problem is not grants, particularly, but that Inner London Education Authority maintenance people will only deal with Research Machines." Teachers new to micros are shy of taking on something without ILEA backing, it would seem. Nevertheless, ILEA did cough up enough to buy two of the group's four Spectrums.

"We chose this machine because it was the best thing around at the time. We wanted to prove it could withstand rough treatment — being shoved in vans and moved from place to place, plus being pounded by kids."

But before you can teach the children, you have to teach the teachers, so Ian Miller is taking his micros round to various youth centres and playschemes: first, to see who they are accepted, and secondly, to create enough knowhow in the playleaders so they can oversee computer activities on their own.



Derrick Wauchope has been a playleader "for years and years" — he started when at school and has been doing it full-time for four years. Grappling with a game of Voice Chess — using the Currah speech synthesiser — was less of a problem for him, though, both because he is a keen chess player and because he studied business computing while at college.

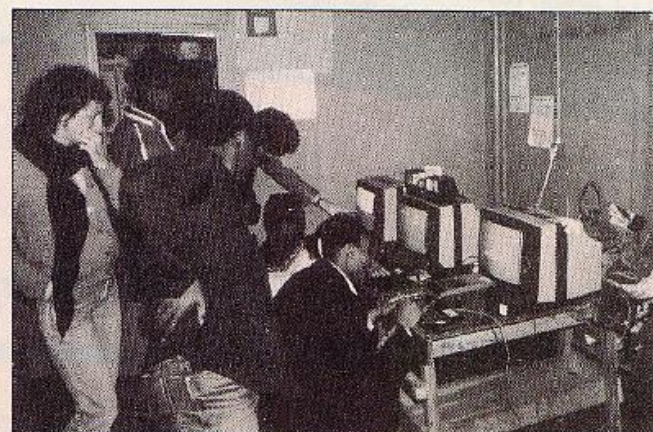
Wendy Copeland — a playleader for eight years — was a little less successful with her first stab at the Hobbit adventure game, completing 2.5 per cent and being devoured by a hideous troll. Such are the hazards of community work.

Peggy, who very quickly became at fault with hooking and unhooking all the various computer leads, pointed out that Coningham Road was more than just an adventure

playground: "It's a craft centre." Activities include everything from sculpture to horseriding — in Finsbury Park. They try and organise three or four holidays a year for the children, together with day-trips and outings to sports events. There is a lot of interest in musical activities "but it's all sound systems and electronic instruments. Teaching guitar is pretty dated".

At one youth centre, the Playbus organiser had already had a great deal of success in getting kids who were already computer-orientated to do more in the way of graphics and speech synthesis programming. He was also working on ways of using the TasWord system to give unemployed people some experience of word processing. "I could really do with some contact and help from local computer clubs, though. There don't really seem to be any in West London. I was approached by a group of community workers who wanted to know how to use a Commodore for office work. I'm snowed under with these kinds of requests for help."

Future aims include specific projects like working on graphics programming and using Logo — hopefully with a real Turtle. "Logo is useful for learning about graphics and programming by the back door, without realising that they're doing it. It's good for handicapped kids — teaches the about direction and length and space." Hammersmith and Fulham Playbus Association can be contacted at Project Enterprise, 16 Askew Crescent, London W12 9DP. Telephone 01-740 7271.





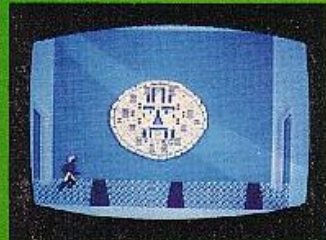
# DON'T JUST SIT THERE - PLAY SOMETHING!

## 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! The quest is to seek out and destroy the Demogorgon, mystic ruler of the Forbidden Forest. Before 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!



**SS018**



## AZTEC CHALLENGE

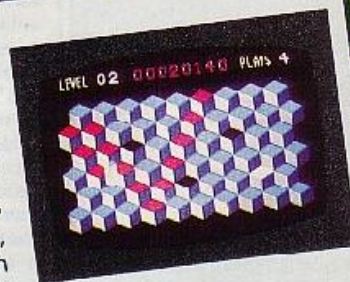
A challenge on an epic scale! Aztec Challenge takes you on a journey to Mexico and the ancient pyramid of Tenochtitlan. The ancient Aztec gods and their devotees have ensured that no ordinary human can learn the secrets of the temple and live to tell the tale. The pyramid is protected by all

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!

**SS019**

## 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?



**SS020**

**ON CASSETTE £8.95**

**ON DISK £12.95**

FOR THE **commodore** 

**Audiogenic** LTD

P.O. BOX 88. READING, BERKS.

SEND FOR FREE COLOUR CATALOGUE!



# Star★ chart

## Tank Commander

Vic-20 + 8K  
Strategic Action  
£5.95  
Creative Sparks

★ ★ ★

Puts you in the driving seat of a tank. Screen display shows an overhead view of your manoeuvres as you drive into enemy territory and blow up the enemy fuel dumps. Under continual attack from tanks and aircraft, each round is of increasing difficulty. It's like Eastern Front insofar as the terrain scrolls, but it's a lot less intellectual. So if you must drive around shooting at things, why not play this game instead?

## Red Meanies

Dragon 32  
Eat-'em up  
£6.50  
Salamander

★ ★ ★

A kind of three-dimensional Pac-Man with cheese instead of power pills. If you eat any green cheese as you perambulate around the maze, this turns the red meanies blue and renders them edible. Strangely enough, they tend to jump down your throat in this state; meanwhile another red meanie is released into the maze. Useful display shows how many meanies and lives are left. Nice idea, shame about the graphics.

## Stock Car

BBC B  
Car race  
£7.50  
Micro Power Ltd

★ ★ ★ ★

I have been waiting for the ultimate car race — this is near to it. A one or two player game which requires a certain amount of learning and skill leaving the player weary and hot! A tip: if you have BBC joysticks, use the keyboard!

# SOFTWARE

## Encounter

□ CBM-64  
□ £7.50

★ ★ ★

OUT FOR A SPIN in the old laser tank you cruise through an alien landscape in which the green grass and blue sky are interrupted by a network of tall black cylindrical structures which look like the sort of architecture that Prince Charles would probably complain about.

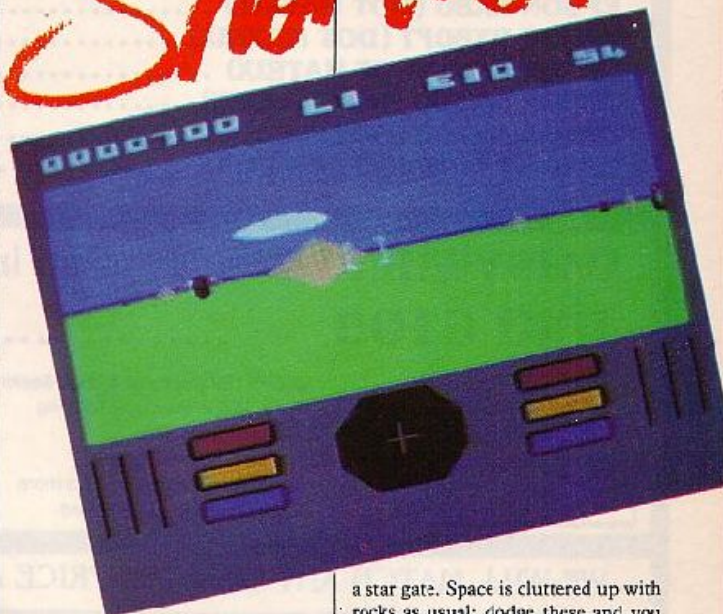
Sooner or later the locals turn out to cause trouble but, unlike housing estates, here they do not have Harringtons and crewcuts, rather they bear a strong resemblance to flying saucers.

Encounter is similar to games of the 3-D tanks genre, except that your assailants are not armoured vehicles with tracks. Sensation of speed and manoeuvrability as you charge through the maze of mysterious black cylinders is very strong. At the bottom right-hand side of the screen is a display giving a plan view of hostile forces around you.

Using the joystick you swivel around until you have visual contact with one of the blighters, usually a small blob skimming over the plain near the distant mountains.

They zoom towards you and will cause you a certain amount of damage if you fail to destroy them before they hit you; they start shooting at you. If you do hit them

# Shortlist



they disintegrate in a haze of triangles. Homing missiles appear periodically: the warning panel flashes red and the best tactic is to reverse away from them while firing. They never miss unless destroyed. Try not to back into a pillar.

Once you have eradicated all the malcontents from the forest of cylinders you are catapulted through

a star gate. Space is cluttered up with rocks as usual; dodge these and you arrive at a new scenario, which is basically the first one in different colours.

Little touches like the warning siren that goes off as the homing missiles approach add a new dimension of interest to this game. I found it addictive; a pity that the scenery is so boring. An unusual place to visit, but I wouldn't want to live there.

## Carnival Massacre

□ Atari  
□ £15.00  
□ Creative Sparks

★ ★ ★

"FUN TURNS TO FEAR" proclaims the Friday the 13th style cover which shows a couple of disturbed adolescents hurtling off a fairground switchback. Butcher Bill and Ruthless Rick are out to turn all the cries of pleasure to cries of blood-curdling terror, we are told. Slipping quickly into Mary Whitehouse mode, I get ready to lay waste yet another evil threat to the tender minds of the nation's youth.

In fact, it is all pretty twee. "When you are in love, it's the most wonderful night of the year" burlles away relentlessly in the background as the pretty fairground Ferris wheels spin on-screen. Every so often someone falls off and you have to catch them. Bill specialises in missiles on the wheels while Rick plants bombs on the roller coaster. When you have saved everybody you grab your gun and shoot the egregious pair as they cruise overhead in the sky-lift.

This is a game that plays on the



frustration side of your reflexes, rather than the aggression. It's much harder to save things than it is to blast away at them. But you can work all that tension off when you consign Rick and Bill to oblivion. You have to have saved at least six passengers to be able to do this.

A gun appears at the side of the screen — fetch this and an egg-timer appears to register how much time is left for you to gain bonus points for shooting Bill down from the Ferris wheel. The same applies to toppling Rick from the roller coaster. Attractive graphics and not as grisly as it is painted on the cartridge cover.

## Bath Time

□ CBM-64  
□ £7.95  
□ PSS

★ ★ ★

BATH TIME IS PART of a new wave of "wet" computer games designed to clean up the software market, rather than just clean up money. Along with Dirty-Doo and the Snowman, they form part of a thoroughly soppy development in computer games, which the staff of Your Computer, thoroughbred pacifists and bath-takers to a person, can only applaud.

(continued on page 47)



# SUMMER MADNESS SALE FROM SCI(UK)

Order Today  
Print Tomorrow  
24 HOUR DELIVERY

We challenge you to find a better deal!

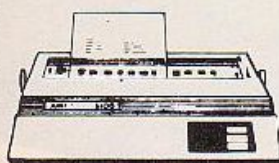
OPEN  
7 DAYS  
A WEEK

## EPSON PRICE SPECIALS

EPSON RX80 (DOT MATRIX) .....	<del>£249.00</del> £199 + VAT =	£228.85
EPSON RX80FT (DOT MATRIX) .....	<del>£285.00</del> £229 + VAT =	£263.55
EPSON FX80 (DOT MATRIX) .....	<del>£438.00</del> £324 + VAT =	£372.60
EPSON MX100 (DOT MATRIX) .....	<del>£475.00</del> £355 + VAT =	£403.25
EPSON RX100 (DOT MATRIX) .....	<del>£450.00</del> £385 + VAT =	£442.75
EPSON FX100 (DOT MATRIX) .....	<del>£560.00</del> £499 + VAT =	£573.85

**DAISYWHEELS** . . . . at an incredible new LOW PRICE!

**JUKI 6100** ..... just **£329 + VAT = £378.35**



20 CPS : BiDirectional & Logic Seeking  
10, 12, 15 & Proportional Spacing  
Wordstar Compatible  
2K Buffer : 13 Inch Paper  
Underline : Backspace - Lots more  
Centronics Interface Standard

**THE DAISYWHEEL THAT  
HAS NO COMPETITION  
OPTIONAL RS 232  
TRACTOR AND SHEET FEEDER**

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

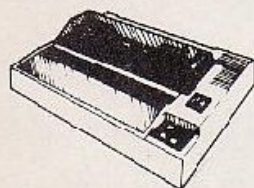


for cheapest prices telephone **0730 63741** or **0730 61745**



### MORE SCI(UK) BARGAINS

**SHINWA CP80** ..... **£179 + VAT = £205.85**

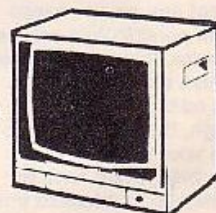


Friction and tractor feed as standard  
80 c.p.s.  
Bi-directional logic seeking.  
13 x 9 dot matrix giving true descenders.  
Sub and superscripts.  
Italic printing and auto underlining.  
Condensed, emphasised, expanded and  
double strike printing (can be mixed in a  
line).  
Parallel interface fitted as standard.

**FIDELITY 14"**

**COLOUR MONITOR  
& COMPOSITE VIDEO**

**£189 + VAT = £217.35**



New from the world famous **CANON** Company

**CANON 1080A NLQ DM** best value ever at ..... **£289.00 + VAT = £322.35**

We have interfaces for all types of  
computers, including CBM 64, VIC 20,  
APPLE, TRS 80, IBM, BBC, SPECTRUM, QL, etc.



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 CONTRACTS ARRANGED  
EDUCATIONAL DISCOUNTS VERY WELCOME

**Its SUNDAY - Do you realise you can order NOW - We are open 7 DAYS A WEEK.**

RANGEKEY LTD. Trading as SCI(UK)

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. 16, Inmans Lane, Sheet, PETERSFIELD, Hants. TELEX 86626 MYNEWS G



# Star★ chart

## Frenzy

BBC B  
Novelty  
£7.50  
Micro Power Ltd

★ ★ ★

This game is indeed a novelty and also fairly difficult in its later stages and higher scores. The only description I can think of is that it is similar to the "Painter" type of game. If you like those, try it.

## Tube Way Army

Dragon 32  
Shoot-'em up  
£6.50  
Crystal

★ ★ ★

Nothing to do with Gary Numan — this is a rather uninspired Defender. You fly across a landscape bombing and rocketing fuel dumps, and there is a cavern. I found the game frustrating rather than challenging, and in joystick mode, the only way I could drop bombs and keep manoeuvring was to bash the spacebar with the joystick. The response to controls is very slow. Nevertheless, this is not too bad an effort when you consider the game is implemented on a Dragon.

## Mission XK1

Dragon 32  
Shoot-'em up  
£6.95  
J Morrison Micros

★ ★

Drop from the mothership and dodge the deadly asteroids to siphon up Zyphoneum from the planet Zyphon to keep you and your buddies in orbit. Landing pads are different sizes — the smaller the pad, the bigger the score: an excellent rendition of Richard Strauss's Also Sprach Zarathustra, but really only worth playing on excessively boring trips out to Clavius Base.

(continued from page 45)

Ecological stabilisation would seem to be the underlying theme of this game. The aim is to keep a fish and a swan alive in the bath. Not one of your old zinc jobs but a large Graeco-Roman effort with sluices operated by angles with wings and halos. Combined with the pacifying funeral music and the pastel colours the game creates a general air of tedium that makes you realise why Satan got so fed up sitting around on clouds knocking back the ambrosia and exploring new chord progressions on the harp that he decided to form his own chapter.

If the water level in the bath gets too high the swan will swim away; if it gets too low the fish dies. In this game you do not seek to contend against the empire but only to

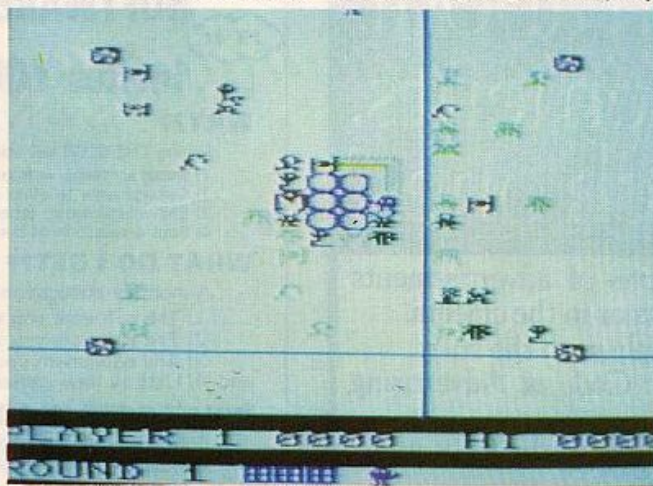
## Buzzard Bait

□ Dragon  
□ Microdeal  
□ £7.95

★ ★ ★

THE GAME WITH added software protection in the form of a dongle. A dongle, for the uninitiated, is a hardware fix — a gadget that plugs in to the machine without which your program will not load or run properly. You have to pay a little bit extra for the privilege of not being able to break into the program, although you can make back-up copies. You just need to use the same dongle to run them.

Having said all this, is Buzzard Bait worth protecting? It seems a little strange to have gone to all this trouble just to protect a game on a machine whose graphics capacity is not exactly stunning. Microdeal say they are test-marketing the concept



## Mutant Herd

□ Vic-20  
□ £8.00  
□ Creative Sparks

★ ★ ★

THIS CARTRIDGE game for the Vic-20 puts you in the shoes of a ruthless mutant slayer determined to keep the plutonium-crazed mutants out of the powerhouse. You manipulate two laser barriers to keep them out and use the same two barriers to guide your character to the mouth of the

# SOFTWARE

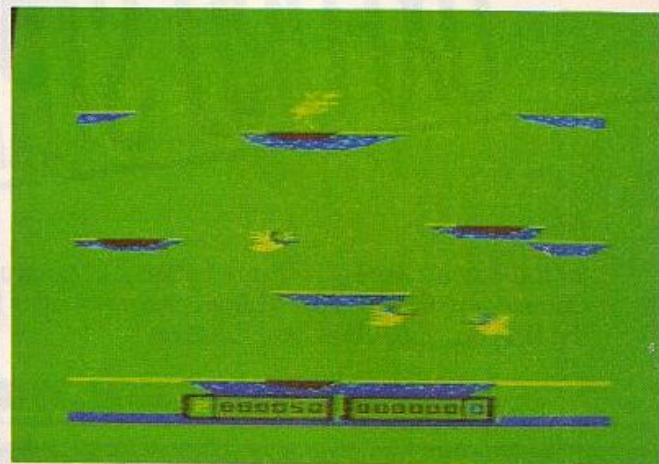
## Shortlist

harmonise various natural forces — the elephant who drinks the water and the little boy who pours bucketfuls of water in at inopportune moments. You have to stolidly maintain the water level listening to more of the kind of music that makes Vangelis sound like a rock musician.

Peaceful harmonies and good graphics — but lacking the kind of addictive quality that games like

Chinese Juggler can build up. That is a game about maintaining balance far excellence. It also has some kind of progression in it providing incentive. Non-violence is great, but not when it's merely allied to maintaining the status quo.

So full marks to PSS for not trotting out another space game as sequel to their excellent — but violent — Blade Alley for the Spectrum; however, there must be more to life than this.



and want to see how Buzzard Bait's sales fluctuate from the norm of a new Dragon game.

Exactly how you predict average sales of a computer game is a mystery

to me — these things are conditional on release timing, what other software is about and what other machines are about. The fact that Dragon Data who make this home computer have recently admitted severe financial difficulties shows how quickly the microcomputer market can change.

The graphics are well-implemented showing a skyborne joust between riders on an overgrown buzzard. The game also has a one-player option. Both players are flying at the same time — birds can be distinguished by their different colours. The object of the game is to destroy all the white birds by keeping your lance above that of the enemy and flying into him. If your lance is lower then you have a long fall; if both lances are level neither rider is dismounted.

The screen displays clustered "and-masses" which hover in the air and which you can bounce around on. As the same goes on these start to disintegrate creating more room for manoeuvre. To get the bird to flap its wings you press the fire button on the joystick.

After a certain amount of time has been spent fighting a single wave, a pterodactyl appears on the screen. A mere touch from this creature spells death. If a player is knocked from his mount, the empty bird flies off the screen and — if you have a life left — player and bird rematerialise on one of the four white phasing pads.

mutants' burrow.

Once you succeed in pushing the little man down one of the holes you get a second screen showing a side view of a mine with a vertical shaft on the left and a number of horizontal tunnels running off it. You have to pick up a bomb from the top, place it in the bottom tunnel where there are a number of eggs guarded by a giant ant then run back to the top and detonate the bomb by pushing a plunger without being eaten alive.



# STOP PLAYING AROUND GO TO

**22 VIRGIN GAMES CENTRE**  
01-637 7911

**OXFORD STREET LONDON W1.**

for the widest range of software for the ZX Spectrum, Commodore 64, VIC 20, and Atari plus many titles for the Dragon, Apple, BBC and Electron.

New titles are stocked within hours of release – call our friendly knowledgeable staff for details.

**VIRGIN GAMES CENTRE, 22 OXFORD ST, LONDON W1. 01-637 7911**

## It's easy to complain about advertisements. But which ones?

Every week millions of advertisements appear in print, on posters or in the cinema.

Most of them comply with the rules contained in the British Code of Advertising Practice.

But some of them break the rules and warrant your complaints.

If you're not sure about which ones they are, however, drop us a line and we'll send you an abridged copy of the Advertising Code.

Then, if an advertisement bothers you, you'll be justified in bothering us. ✓

**The Advertising Standards Authority.**  
If an advertisement is wrong, we're here to put it right.

ASA Ltd, Dept 2 Brook House, Torrington Place London WC1E 7HN

VIC 20

SPECTRUM

ORIC

CBM 64

BBC

ZX 81

DRAGON

### SOFTWARE EXCHANGE...

... invites 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

**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
- 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 M20 9PU.**

I own a ..... (micro)

FULL NAME.....

ADDRESS.....

.....

YC7

This space is donated in the interests of high standards of advertising.



# NEWS

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

## The crystal ball

Duckworth's latest book is entitled *The Adventurer's Companion*, a guide to solving four popular adventures — The Hobbit, Colossal Cave and Scott Adams' Adventureland and Pirate Adventures.

Dragon owners are well catered for. Dungeon Software have Temple of Zoren and The Crystal Chalice of Quoron for the older adventurer and Giant's Castle for 7-11 year olds.

## A helping hand

Scott Graham of Lchmaben is having a few problems with Colossal Cave while Craig Williams of Staines is finding Voodoo Castle a little tricky

### Colossal Cave

- Can't open the clam?  
TNEIRT A DEEN UOY
- Dwarf a problem?  
MIH TA TI WORHT DNA  
EXA SIH PU KCIP
- Bear too heavy for bridge?  
DNIHEB TI EVAEL,  
LLORT EHT FFO  
DERACS  
S'IT ECNO

### Voodoo Castle

- Unfinished rhyme a mystery?  
EGAP GNISSIM EHT  
DNIF
  - Lucky charm causing a pause?  
LLOD NO TOOF PORD
- If you're baffled, ink your quill and write to yours in mazes and monster-filled mines.

## Classic Adventure

48K Spectrum  
£5.95  
Melbourne House

APTLY NAMED, this text adventure is closely based on the famous Crowther and Woods Colossal Cave.

If you've never played it before, you're in for a treat. There are a large number of problems to solve and locations to explore, the latter being described in some detail.

Among the old favourites are the

# 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.

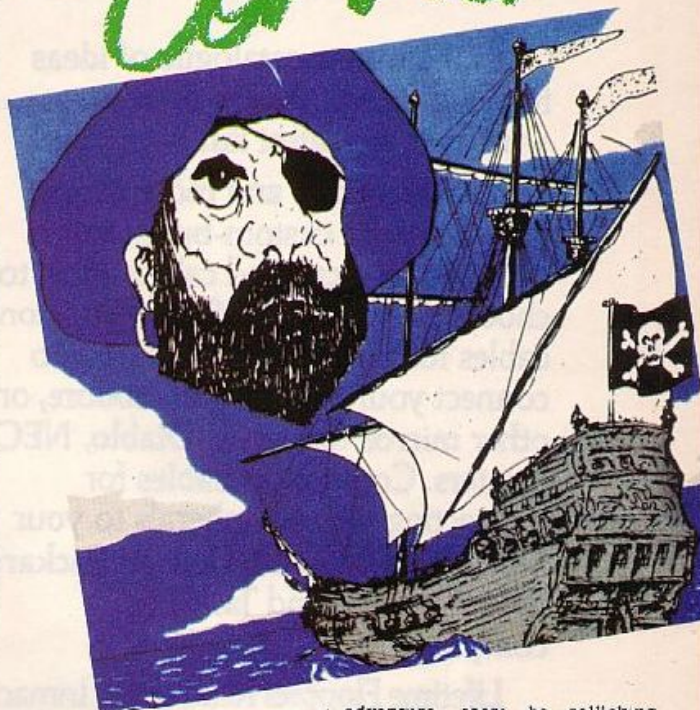
## Flint's Gold

BBC B  
£6.95  
Micrograf

AHOY THERE, Jim lad, move that parrot, pull up a chest and harken to me while I tell 'e a tale of pirates bold.

'Tos come to my ears that old Flint buried some of his booty on yonder island. Now, me bucko, all that treasure can be yours but first ye'll have to climb aboard one of those ships moored in the harbour. Mind 'e don't get shanghaied or worse — they be a rough lot of swabs in these parts.

If 'e manages to make it to the island with your gizzard unslit, there



be plenty more danger awating. Long John'll likely be pegleggin' alongside of 'e and you don't need me to tell 'e to keep a weather eye out for Ben Gunn and Flint's ghost.

Though this be mainly a text

adventure, there be rollicking shanties, squawking seagulls and crashing waves thrown in for good measure. Arr, Jim lad, that son of a sea-dog, Ardy Mitchell, has come up with one of the finest yarns this side of the Spanish Main.

## Waydor

48K Oric  
£7.50  
IMS Software

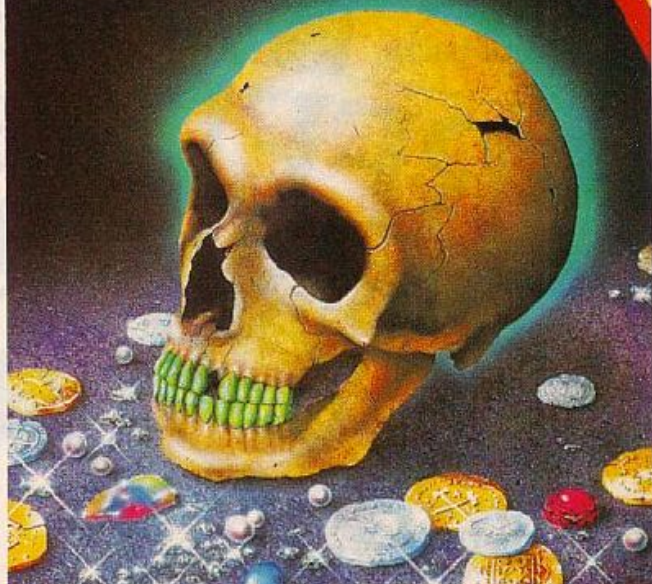
THERE ARE not too many adventures around for the Oric but here's a pretty good one with both text and high-resolution graphics. Your quest is to journey through the strange land of Waydor and recover the legendary eight treasures.

The graphics and interesting full-screen depictions of the locations and are drawn rapidly. The text screen replaces the graphics screen at a touch of a key.

well house, the locked grate, the black rod and the hall of mists. Those pesky dwarves are there as well, still sneaking up and hurling axes at you. Seasoned adventures will know how to best deal with these nuisances.

Although not as comprehensive as Level 9 Computing's version (Colossal Adventure), it does include most of the flavour and delights of the original classic. Definitely one for your collection.

## Classic Adventure





# 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

24 hour tel. no.

☎ 09285-67551

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

Name \_\_\_\_\_

Company \_\_\_\_\_

Title \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_ Tel. \_\_\_\_\_

Computer System \_\_\_\_\_

753



# Inter NOT JUST A PRETTY FACE!

**T**he new **dktronics** Parallel Centronics Interface will link your Spectrum to any printer with a standard centronics input. As the choice is vast, you can select the printer exactly suited to your needs.

## Features of the Interface include:

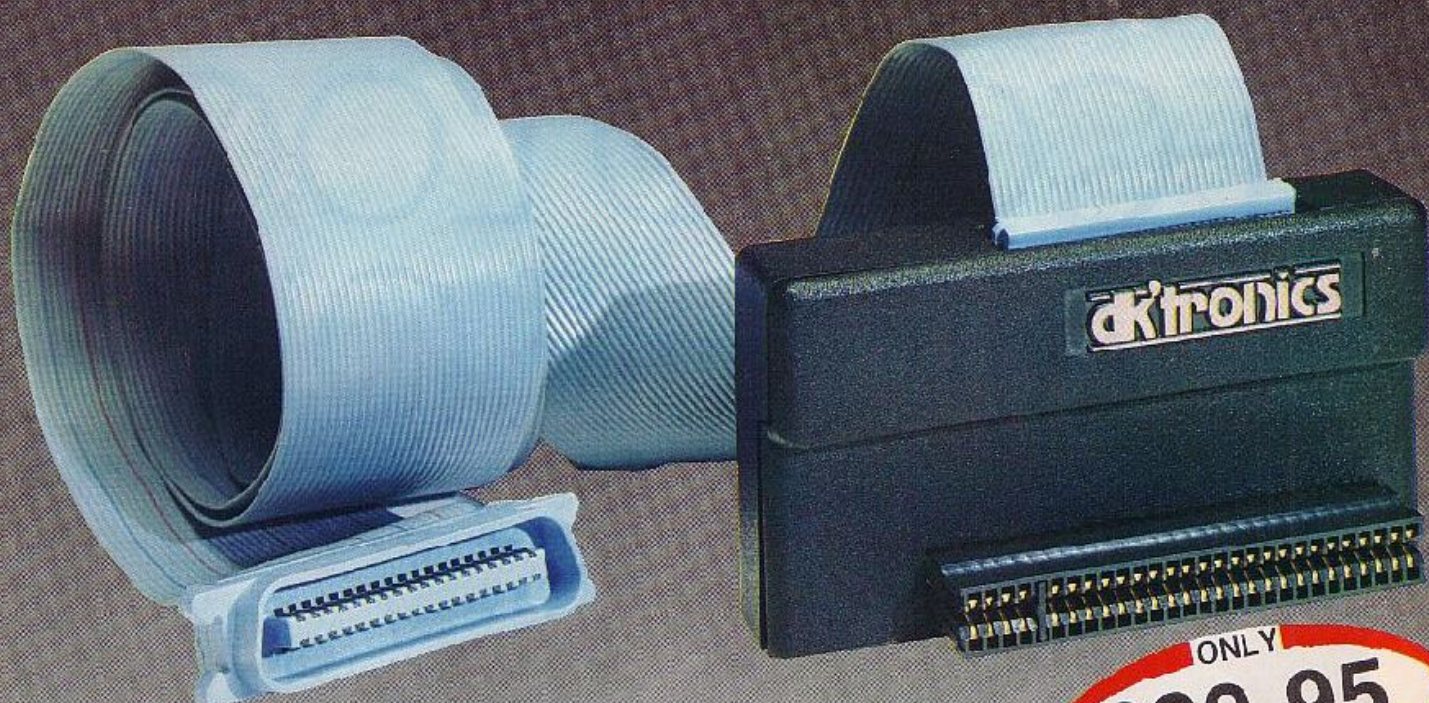
- Runs all parallel centronics type printers
- Controlling software fully relocatable
- Interfaces with any software using the

printer channel e.g. Tasword Dev pack etc.

- LLIST LPRINT recognised. High res screen dumps
- All control codes allowed through to printer
- Fully microdrive compatible
- Supplied with full instructions and controlling software

All **dktronics** products are covered by a comprehensive guarantee.

Available now! Post the coupon today



ONLY  
**£39.95**

Please rush me the following

..... Parallel Centronics  
Interface(s) ..... £39.95

Please add post and packing ..... £1.25

I enclose cheque/PQ/Cash for Total £ .....

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

Signature .....

Name .....

Address .....

# dktronics

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

## The Spectrum Connection



THE QL AS RELEASED initially was not really suitable for business or pleasure as it had far too many faults and kept crashing. The final version of the QL incorporates the ROM set AH which has overcome some of the criticisms levelled at the first QLs, which were fitted with the FB ROM set.

Those criticisms covered all aspects of the QL: it was slow, had an unfriendly editor, the microdrives were prone to lose files and data, there was no documentation other than for the Psion packages, the network would not allow integration of Spectrums, the RS232 interface had bugs in it, microdrive files in a well-used cartridge would take an age to load, the keyboard felt a bit clattery with a sticking enter key, and so on.

The AH version of the ROM is Sinclair's answer to most of the problems, but it does not present a cure for all the QL's troubles and can not make any difference to the hardware faults.

normally the predominant functions are not mathematical.

The editor although a substantial improvement over the earlier effort is still not good enough. A full screen editor is the minimum requirement for a "next generation" user-friendly computer, not something that requires setting up to provide anything more than basic facilities.

There is about 4K of ROM unused, which makes it hard to understand why a full screen editor has not been implemented.

If a basic input line exceeds three lines in length in the command and error channel window, error messages associated with the line will not be seen unless that window is expanded to the detriment of output and listing channels. Although the user is able to scroll the window forward, it does not appear possible to scroll back up the line.

The loss of data from microdrives was extremely serious and previously prevented

the time to load Quill in a "ready to start a new letter" state and the shortest time taken to load Quill and this article, that includes pre-typing and buffering commands to reduce the time to a minimum.

Loading times:

	QL-FB	QL-AH	article
Quill	70s	42s	3m 40s
Abacus	77s	38s	
Archive	73s	42s	
Easel	72s	50s	
Install-bas	68s	32s	(300 lines)

The article is about 2900 words long which is approximately 18k. The Spectrum microdrives only take an average of seven seconds to load an 8k program so what on earth is going on? Even allowing for a considerable improvement in knocking, on average, 30 seconds off the loading times, these figures are in no way comparable with disc-drives and frankly are not good enough.

The documentation supplied with the QL is

## REVIEW

Following last month's review of the QL, Kathleen Peel takes a close look at the final version incorporating the new ROM set

# SECOND LOOK AT THE QL



The first improvement to look at is speed, the new ROM QL's are quicker and the following table gives the benchmark times and puts them into perspective by comparing with other well-known computers.

Amstrad	BBC	IBM	Advance	QL-FB	QL-AH	ZX80
£330	£399	£1570	£400	£400	£400	—
1	1.1	1.0	1.2	1.0	2.0	1.9
2	3.3	3.1	4.8	3.4	6.0	5.5
3	9.2	8.3	11.7	7.4	11.0	9.4
4	9.6	8.7	12.2	7.5	10.0	9.2
5	10.2	9.2	13.4	8.2	14.0	11.7
6	19.0	13.9	23.3	14.8	27.0	24.0
7	30.2	21.9	37.4	23.6	69.0	43.4
1	34.2	52.0	30.0	26.0	23.0	21.0

There is no getting away from the fact that despite all that is said about the QL, comparatively speaking, it is slow other than when performing mathematical calculations, and

me from using the QL in word processor mode. This problem was a little mystifying as the Spectrum microdrives have worked perfectly for the last nine months without any problems.

Fortunately the QL's (AH version) microdrives appear to be working normally without the problems that were apparent on the very early FB version of the QL.

The other microdrive problem of program loading times, is improved slightly by using a scatter load technique, but the user is still left with the distinct impression that the QL is slower than the Spectrum microdrives. This is not helped by the frequent microdrive accessing that takes place while using the Psion packages.

A problem exists in determining at what stage a package is loaded, so I have provided





reasonably comprehensive in terms of content and suitable for the average computer user. It is not really ideal for a novice who will find many of the sections difficult to understand.

The keywords are provided in alphabetical order with examples of each keyword showing some of the types of syntax used by the keyword.

There are some notable omissions from the list of keywords. The ones I found most irritating were the lack of an ON ERROR and RENAME. The ability of the QL to work with a procedural list which may be local to the current program or globally setup on system boot via RESPR is very very useful but it is short-sighted to restrict use of this powerful concept to machine code for want of a few hundred bytes of code in ROM.

While Formatting a drive, the type-ahead buffer appears to be limited to seven characters.

The mathematical functions ASIN and ACOS are present in ROM but not in the Keyword list. Trying the standard scientific calculator test of taking sine, cos etc and then the inverse gave results with an accuracy about the same as the Spectrum. The scientific accuracy seems to depend on look-up tables which do not give highly accurate results. As in any test, arbitrary values are chosen to evaluate and the real accuracy may be worse.

There is an error in PI which gives a value of greater than one at 90° i.e.

```
PRINT (SIN(90*PI/180))-1 IS POSITIVE
```

This results in a whole range of errors with trigonometric calculations that use PI.

The only way to find out how good Superbasic is involves using it, so I wrote a 68000 disassembler. I must admit that Superbasic was very easy to control and helped produce a Basic program which looked better in readability, the only real difficulty was in trying to alter procedures and not being able to view the remainder of the procedure. This just emphasized the lack of a screen editor.

Unfortunately, it is still possible to crash the system, the fault lies somewhere in the renumber and auto commands after having aborted a procedure with "break".

The output was extremely difficult to format, there was no special print control similar to the IBM PC's "print using". One other rather strange point was that the QL rewrote "lprint" in a program in capital letters indicating that it was a keyword, which it is not.

Interfacing via the non-standard telephone plug type BICC RS232 sockets now appears satisfactory and all RS232 communications tried were successful. The lack of split speed 1200/75 working does put a limitation on use that seems hard to justify but other than that there is no criticism of the interface.

The network interface still does not allow what one would have thought of as normal operation, i.e. A QL main station with many slave Spectrums and QL's, a situation that one might expect in an educational environment. The Spectrum sends down the net tokenised keywords, which the QL cannot understand. Considering that early publicity mentioned such a networking capability, it is a little disappointing to find that it still cannot be done.

Multi-tasking is a claimed feature of the QL, which the literature omits to explain is only available via machine code, again a great pity as the stack control necessary to provide multi-tasking from Basic does not appear too difficult or greedy in terms of machine code length.

The documentation provided gives an insight into the capabilities of the QL, which are very considerable. As long as the development of the QL continues, then within a six month period all the necessary improvements could be made and a computer that would compare with other Sinclair products for innovation and technical expertise would be available. However, failure to make these improvements could have serious consequences for Sinclair. There are better, faster and cheaper 8-bit machines for the games enthusiasts and on the business front, competition is already intense.

Sinclair appears to be moving into the single board OEM market. A manufacturer buys the bare board, adds his own operating system in ROM, puts a different case around the board and sells it as an own-brand business computer. The advantages to the QL user could be quite substantial, if some of the alternative operating systems were floppy disc based and used an accredited operating system like UNIX, a field which Motorola are keen to exploit. There would be ample opportunity to upgrade to a standard operating system and

*Sir Clive Sinclair has come in for some hard words over late delivery of the QL. Will criticism be stilled now the final version is being delivered?*



perhaps a better high-level language as it is unlikely that OEM equipment would contain Sinclair SuperBasic.

Some pertinent observations should be made regarding the performance of Quill. This package certainly does most of the things you would expect, but the overriding impression is one of its slowness. In providing a wide range of facilities someone forgot that the principle requirement is one of speed, and that sitting around waiting for the drives to stop and release the keyboard while you take a temporary copy, and move through the text, or the agonising wait, question and answer routine to load Quill and a document is not what it is all about. I can do better with Tasword on a microdrive working with a Spectrum.



The problem is that the package is not matched to the hardware, both items appearing to have been developed in isolation.

Quill should be better on a half megabyte QL. But that's not available and puts the QL into another price range. Regrettably it's present size makes it unsuitable except as an occasionally used word processor.

The Psion packages are inconsistent in command entry syntax, sometimes requiring just the first letter to be typed, at other times ENTER must be typed as well, some commands are selected from a menu and others are toggled on and off, the same letter can mean different things depending upon the menu currently in force, which can be very confusing.

Deleting backwards is very hit and miss as the user invariably tries to delete a word with five or six quick key presses only to find that the display lags rather a long way behind.

As an example of the use of the Psion package, imagine I am working on a short article of 1000 words. I already have one copy of 500 words on microdrive 2 and I wish to take an interim copy of the latest version which is up to 750 words. This is the sequence of events:

1 Press F3 key followed by 6 (this calls up the command menu s=save. A period of 35 seconds elapses by which time the computer has found the save section of Quill and then asks if I wish to save the default file, i.e. the file I am working on.

*(continued on next page)*



(continued from previous page)

#### 2 Press ENTER

(after a further 10 second the computer finds that the file already exists and asks if I wish to overwrite it.)

#### 3 Press Y

(a period of 100 seconds elapses while the old file is erased and the new one saved and verified in its place, the user is then asked if he wishes to carry on with the same document.)

#### 4 Press ENTER

(Why a further 25 seconds is required here is beyond me as the file must be in memory as we have just saved it). Unfortunately, the file is now at the start, so to get back where I was:

#### 5 Press F3 key then G following by B.

(The Goto procedure to get to the Bottom of the file, a further 28 seconds).

For a larger file, item 3 becomes:

3000 words 200 secs.

That's a total of 3 minutes 18 seconds for a 750 word document, and all I wanted was to save a document form and then continue.

The commands can be typed into the buffer and executed in sequence but they still take over three minutes to complete.

### CONCLUSIONS

- ☐ The new ROM has improved times for benchmark tests compared with the earlier FB version, but the QL is comparatively slow other than when undertaking mathematical calculations.
- ☐ The Quill word processing package has a comprehensive range of facilities but in practice is slow to use.
- ☐ Program loading times via the microdrive appear to be slower than on the Spectrum.
- ☐ Despite the fact that it is a multitasking machine the QL does not provide spooling of printing with input operations.
- ☐ In hardware terms the QL currently represents the ultimate in technical achievement in computers priced at £400.

If after saving the file the user does not press ENTER to the request "save, same document", which is in fact asking if the user wishes to continue with the same document, the data file is dumped and the user ends up with a blank page — not exactly user friendly.

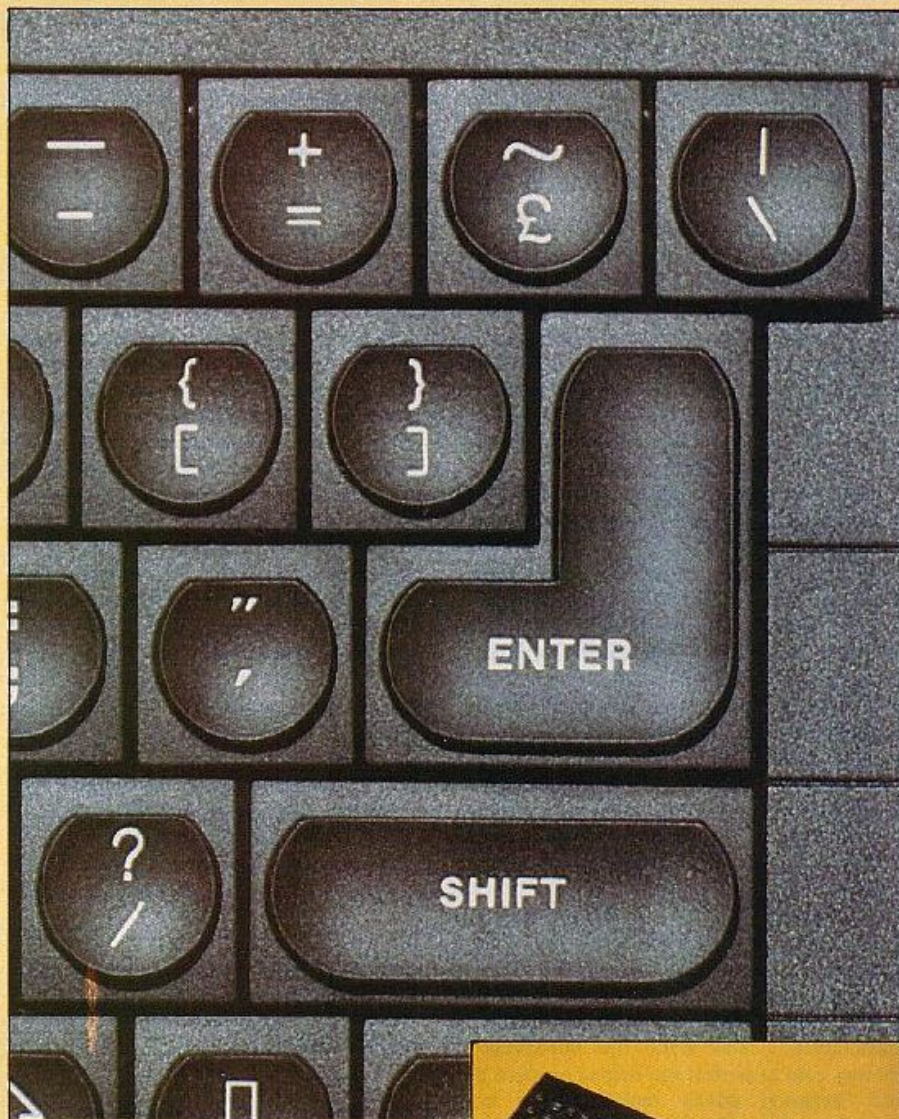
I had hoped to be able to recover a document from microdrive in the same system state as when the file was saved, unfortunately Quill requires the user to reconfigure much from the default set-up every time.

I had also hoped to be able to load the "default" automatically instead of having to specify the document I wished to use.

Quill does not support wild card operations and the search and replace facility is not automatic, requiring a response from the operator at every occurrence.

It does not appear possible to import program files into Quill although files can be imported from the other Psion packages.

Perhaps printing is better? But no, even with this multitasking machine, while the printer was working, I could not. I had hoped



that the document could be printed whilst I worked — it's just a case of spooling a copy as a lower priority job. Worst of all, it sends me back to the beginning of the document when it is finished.

This document takes over six minutes to print at 1200 baud on an 80 character per second printer.

When the part of the document in memory reaches a certain size, either all or a part is dumped to microdrive and although while this occurs the user can still type, nothing happens on the screen until the drives stop.

The block erase facility is controlled by the cursor keys which enable the user to "surround" the text to be erased. Unfortunately, if the user overscans the block to be erased, it does not appear possible to reduce the size of the text block to be erased and the user is forced to ESC and restart or to complete the erasure and re-enter the text deleted, but still required.

In spite of what is claimed in the manual, a default page size of 3 does leave breaks in the document, at steps of 256 lines, although it does not number the breaks as pages.

The Quill designers have to make up their minds as to whether Quill will include all the facilities of the best word processors or try and produce a more realistic match between software and hardware in an attempt to obtain a reasonable level of performance.



If you already have a monitor it probably will not be compatible with your QL. The picture will overscan on most monitors and some TV's. This is a function of the flyback time and to cover the problem Microvitec are producing a special QL compatible monitor.

There has been a lot of discussion about the speed — or lack of it with the QL. This review is based on the usual set of tests used in all the reviews I prepare. In this instance, more detail is given to provide the reader with enough information to come to a personal view about the QL.

What appears to be out of keeping with such an advanced hardware design is the retrograde step of going back to a line editor to support a very sophisticated but unfortunately slow Basic.

That said, it must be conceded that the hardware represents the ultimate in technical achievement in the under £400 range and probably some way beyond.



# OUR B.B.C./ELECTRON GAMES ARE'NT JUST GOOD TO LOOK AT



## NIFTY LIFTY



**NIFTY LIFTY**  
BBC MODEL B — VB-09-32  
ELECTRON — VE-04-32

Your prime objective is to rush through a department store collecting as many goodies as you can without getting squashed flat by seemingly unending and uninterrupted lifts. The only controls involved are left and right and the only skills needed are lightning fast reactions and an over developed spatial co-ordinating ability.

£5 95

## PENGI



**PENGI**  
BBC A/B — 32K RAM OS1-2  
VB-04-32

Enormously absorbing and highly challenging, a great favourite for any age of player.

£5 95

## DARE DEVIL DENIS



**DARE DEVIL DENIS**  
BBC MODEL B — VB-03-  
ELECTRON — VE-02-32

The game comprises three scenarios on land, sea and snow with six different skill levels from Novice to Ace. The object of the game is to take Denis through each different scenario doing various stunts and combatting the hazards. For each hazard successfully overcome the day's wages are incremented. The game automatically gets harder as you get better, and as you will find when you play it, it is extremely challenging.

£7 95

## DEMOLATOR



**DEMOLATOR**  
BBC MODEL B OS1-2  
VB-10-32

Demolator is a great game for any age but requires a marked degree of skill as you control movement left and right and up and down and also the fire control system.

A marvelous game for anyone with 3 arms or more.

£6.95

## SNOOKER



**SNOOKER**  
BBC MODEL B — VB-01-32  
ELECTRON — VE-01-32

The game is currently at No 5 in the FCN charts, no mean achievement as it was launched in September of 1983.

The game requires a high degree of skill for proper enjoyment, and it is possible to have a good game with an opponent which would depend purely upon your skill and not luck. However the game can be readily enjoyed from the start because of the extensive instructions and options.

£8 95

# Visions

THE NAME IN VIDEO GAMES

AVAILABLE FROM ALL GOOD SOFTWARE STORES

VISIONS (SOFTWARE) FACTORY LIMITED 1 FELGATE MEWS STUDBAND STREET LONDON W6

SEND S.A.E. (A4)  
FOR FULL COLOUR CATALOGUE



# SPECTRUM SOF

IN THE HEART of the city the seven leaders of the industrial west talked world affairs. Across the river, in a darkened room, a Spectrum worked overtime. Two days and 25 programs later its owner reappeared, unshaven; blinking into the light. Battle had been done, but had he won?

Among these Spectrum games it's tough picking a winner, but any prize, if prize there must be, should go to Melbourne House, for their excellent new game, Mugsy.

Mugsy ain't nuttin' special in da concepts — gangsters, can ya play da Godfather and live etc. — but da production is da best. Graphics to keep ya lookin', animation to astound and gangster scenes and gangster talk all combine to make this irresistible. Which is odd, as the logic behind the gameplay is simple, and there aren't that many different possibilities. The wit sustains the game, the presentation does the rest. The chances are that you'll be rubbed out pretty soon anyway, but play while ya can.

About a dozen games into the weekend Airbase Invader, from CP Software, popped up on my screen. In it you're Annie, the peace woman, and your only weapon is the ability to blow kisses. You have got through the wire at Greenham Common and you're trying to stop President — aka Ronnie — Raygun clones, whose only aim is to press the red button. On your way round the bunkers you meet all sorts of vaguely familiar characters, among them: Old Bill and the Iron Lady — a heart of steel... — and have to avoid them or use kisses to send them away.

## Original graphics

In play the game is quite stimulating, but not exceptional. However, like Mugsy, the original graphics carry it off, and it's very hard to stop Raygun pressing that button. Incidentally, there's an interesting footnote — "Any resemblance of any character in this game to any person living or dead is unintended and entirely coincidental." Or dead? ... And Raygun is spelt differently on the screen too...

There are fewer new text adventures around than I'd expect — either people are running out of ideas, or the good ideas are being incorporated into graphics games. Anyway, here are three, all of which hinge round flight — Spyplane from Gilsoft, Alien Adventure from Stephen Hartley Software and Kosmik Pirate from Elephant Software.

Alien Adventure is the wittiest and therefore probably the most engaging of the three, although I never succeeded in getting far. You start on another planet and have to get back to earth. You meet a more interesting variety of creatures on your way than usual, but tend to end up dead, rather than safely home. And if you refuse to play another game you get called a spoilsport. Worth more time

than I had, and reacts well to abuse, a tactic most adventurers resort to.

Spyplane sets you up as ore, flying above the enemy, trying to get information on their military and naval forces. I spent more time flying into the sea or low mountains, and in the end got bored — it's more of a mind bender than I wanted, and required the kind of painstaking use that only the most dedicated players will give it.

## Complicated

In the same vein, but in space rather than sky, Kosmik Pirate will demand as much as you've got to give, if not more, if you are to make any progress. But I found the game too complicated, and the screen display, although more interesting than that on most text-based games, was so complicated that it would take months to understand fully. This may be a selling point, but I'm too impatient for it. And I may have spent too much time in space already.

Only two really unlikely titles in the software sack, the best of which has to be Revenge of the Killer Tomatoes, from Visions Software Factory. Unfortunately, the game doesn't match up to the title, and the storyline is ever thinner than you'd expect. Cabbages move round the garden, tomatoes chase you — and later, pumpkins and mushrooms too — and you do your best to tread between cabbages, picking weeds. Nice sprite-type animation, but it doesn't rescue a rather pedestrian game.

The other appealing title is Disco Dan, from Gem Software, which has nothing to do with discoteques, and more with leaping about from disc to disc. Quite exciting, and a starter level to whet your appetite before you even get that far. Similar in many ways to the various Q-Bert games, but more addictive, and to my mind more enjoyable too. Dance? ... I could have tried.

Three more to add to an increasing army of games that combine the fun of adventuring with the visual appeal of graphics, and all three are good value; Titanic from R&R Software, Millionaire from Incentive and Howzat! from Wyvern Software.

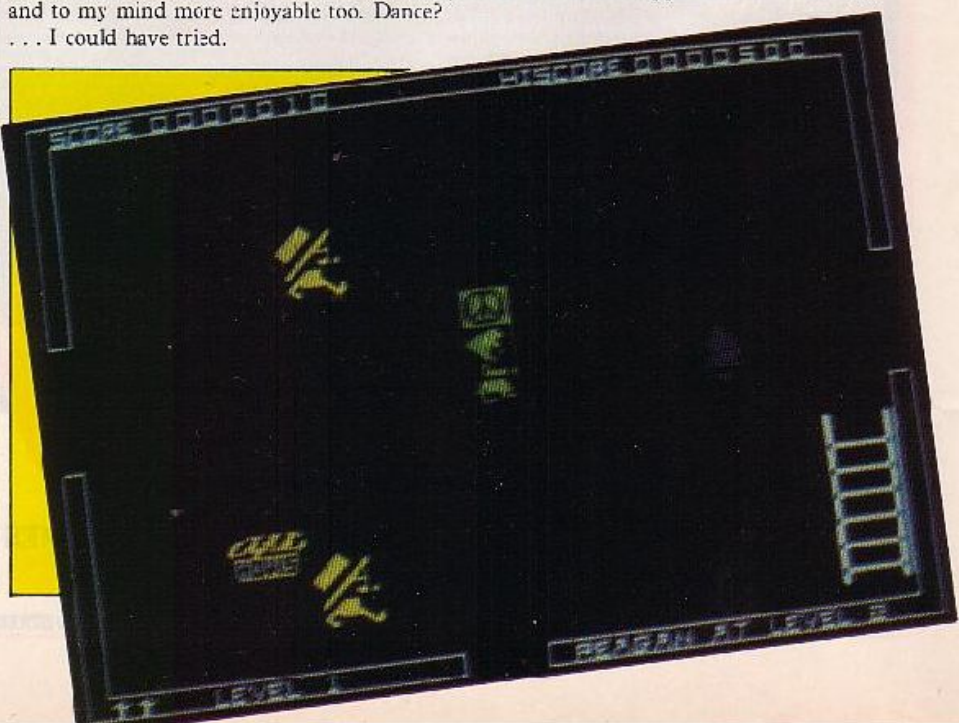
Titanic comes in several parts, all of which simulate accurately what you would have to do in real life if you were to try and find treasure aboard the Titanic. Get sponsorship, spend it, find the ship, and then find the treasure inside.

Most of the wrecks you find seem to kill off your divers, so you'll need more than one team. A pity that I found the treasure on my first trip, but in subsequent games I couldn't, so it must have been luck. Well thought out, lots of graphics, and stimulating all round.

## Making money

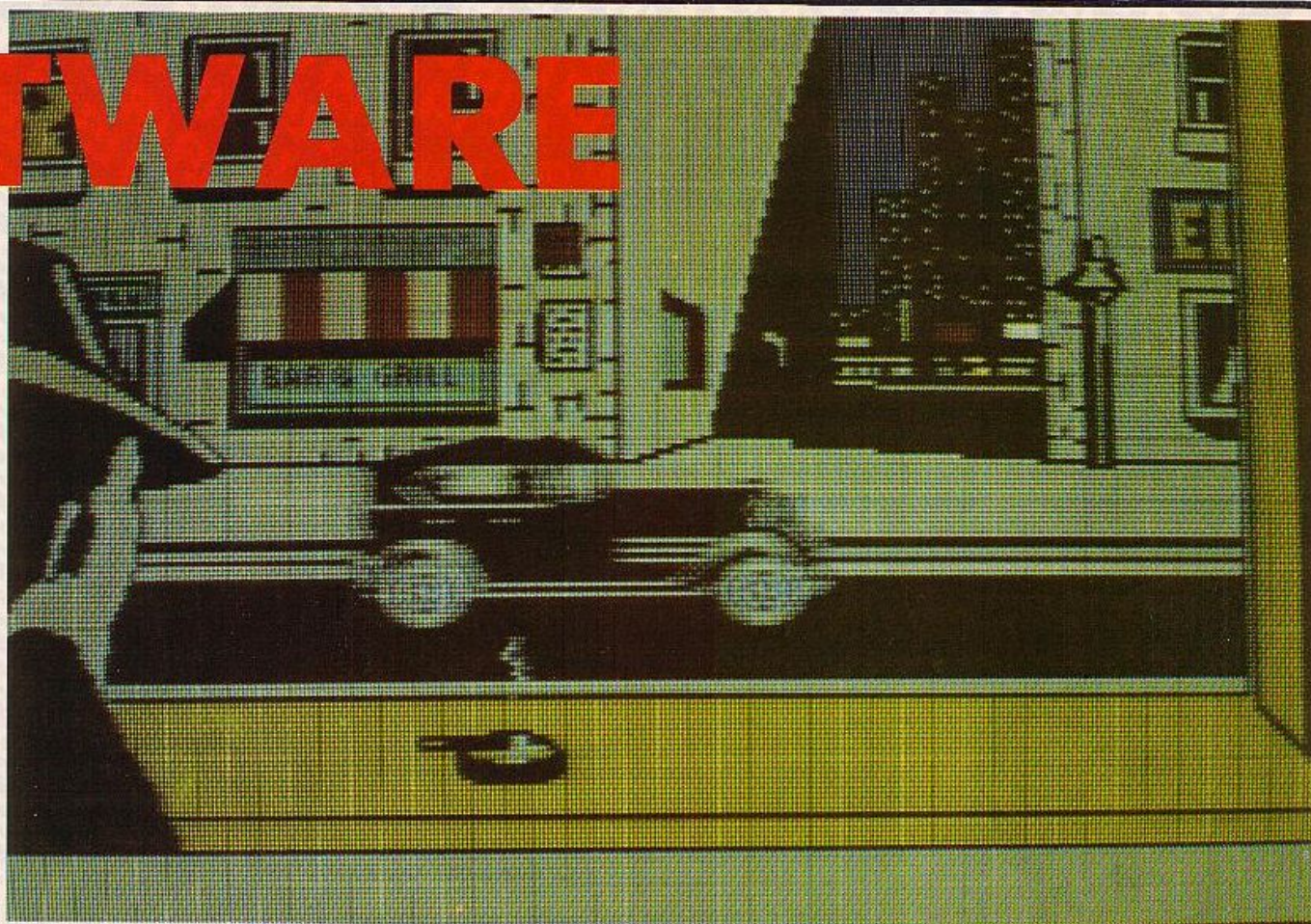
Millionaire, predictably, is about making money. Starting a software company to do so though is a novel idea. How much time do you spend programming? How much money on advertising? Can you trust Honest Harry's deals? All good stuff, and graphically sound. The only disadvantage is that you don't get much variety from month to month, and the game can get a bit wearing. Enjoyable, but for how long?

Howzat! is not technically an adventure, but is played like one. It must be the best cricket game on the market — just the thing to get out when rain stops the real play. You can have any of the County or Test sides, select from the squads, change the skill levels of players, and get full batting and bowling cards, as well as an excellent scoreboard. And the game graphics are good too — watch the players running for the ball or the wicket, and change the field. Like the real thing it takes hours; after 45 overs I stopped for tea. Excellent.





# SOFTWARE



Both Metagalactic Llamas from Salamander and Blade Alley from PSS are classic shoot 'em up games, though their origins are very different. The Llamas game is an adaptation of the arcade game which I never liked. You either love or hate this version too, and I didn't love it — although inquisitive neighbours did. Blade Alley is a 3-D shoot up version of space invaders with about as much *raison d'être*. However, it is curiously addictive, and has a wide variety of things flying at you. A shame I couldn't use it with Currah's Micro speech.

The best games are often just variations on an idea that has been going round for years. Unfortunately, so are the worst. Eric and the Floaters, from Hudson Soft, is based on an interesting idea — go round a maze, demolish bits with bombs, try to find treasure, and destroy the balloons — but although you keep playing the game you end up asking yourself why. Semi-addictive, useful graphics, some visual appeal — a rather ordinary game. Perhaps because the cover is better than the contents.

This also applies to Carpet Capers, from Terminal Software, which is fun to play, but completely pointless. Very clever, what with its smooth scrolling, and complete absence of flickering movement, but it failed to hold my attention. Laying carpets isn't my line. Neither is playing RED/Sunshine's Zipper Flipper, computerised pinball for the home. Pinball has a physical charm which doesn't translate to the screen, which is a pity, as, like Carpet Capers, it's all very cleverly done.

Three from Pulsonic — Worm Attack, Butterfly and Opposition — fall into the same

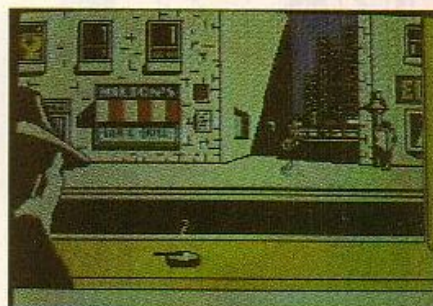
category. All very well programmed, but Opposition could be better played on a board, and Butterfly and Worm Attack just aren't that interesting. No doubt they'll be played, but will they be remembered?

And lastly, Trom from DK'tronics. An afternoon hobby, and a tricky, fast action game. After the first afternoon the novelty wears off. More screens might have done the trick...

Carnival, from Eclipse Software, puts you in the shooting gallery, but it's more fun and harder than it sounds. Blasting away randomly doesn't help, but being methodical in your shooting does. Appeal for all, and nice graphics.

And a novelty of marketing, rather than gaming must be K-Tel's Defusion and Worms, a pair of games on the same tape. You'll find them familiar, like stale bread, but the tape is good value nonetheless.

Driller Tanks, another from Hudson Soft, has an instant appeal, but turns out to be another chase/be-chased-by-the-monsters-round-the-maze-game — and the aim (saving the summer palace) hardly seems worth it. And you just can't win. Two more that are unbeatable are Van Driver and Street Racer, both from Profisoft. Although these have the novelty value of being in German — how many Panktes can you get? — neither are up to 1984's high software standards. Van Drive could have been called Ant Chase, and driving through its streets is nothing like as exciting as the real thing; Street Racer is about as exciting as washing up — you just go faster and faster until you crash. Games to keep you off your toes.





MEMOTECH BBC CBM64 SPECTRUM ORIC1 LYNX NASCOM ATARI

## Trapped in a fiendish Level 9 Adventure? Your lamp burning low? Every exit guarded?

You need escape plans! Send for one of Level 9's great new clue sheets for help. The clue sheets are free and each answers hundreds of questions: follow the instructions supplied with your adventure to get one. (Don't forget to send a stamped self-addressed envelope and tell us which game you have.)

**NEW REVIEWS:** "Level 9 are fast establishing a name for themselves among computer adventurers as the Number 1 producers of quality adventure software. All their adventures are text only, but because of a special coding they have developed, the amount of description and the number of locations packed in 32K is truly amazing."

— *Midweek*, 10 May 84

"Quicksilver call themselves the 'Game Lords'. That might be open to argument. But there can be no doubt that Pete Austin and the team at Level 9 are the 'Lords of Adventure'."

— *Central Press Features*, April 84

"Play Lords of Time and get nine times the pleasure!"  
— *Your Computer*, May 84

**AVAILABLE FROM:** WH Smith and good computer shops nationwide.

If your local dealer doesn't stock Level 9 adventures yet, ask him to contact us or: Centresoft, Drake Distributor, Ferranti & Craig, Hi-Tech, Lime Tree, Microdeal, R&R or Wonderbridge.

## Level 9 Computing

**Colossal Adventure:** the original mainframe adventure with 70 extra locations ☐

**Adventure Quest:** an epic journey across the weird landscape of Middle Earth ☐

**Dungeon Adventure:** a truly massive game which completes the Middle Earth Trilogy ☐

**Snowball:** could this be the biggest SF adventure in the world? ☐

**Lords of Time:** an imaginative romp through World History ☐

I ENCLOSE A CHEQUE/PO FOR £9.90 EACH

My name: .....

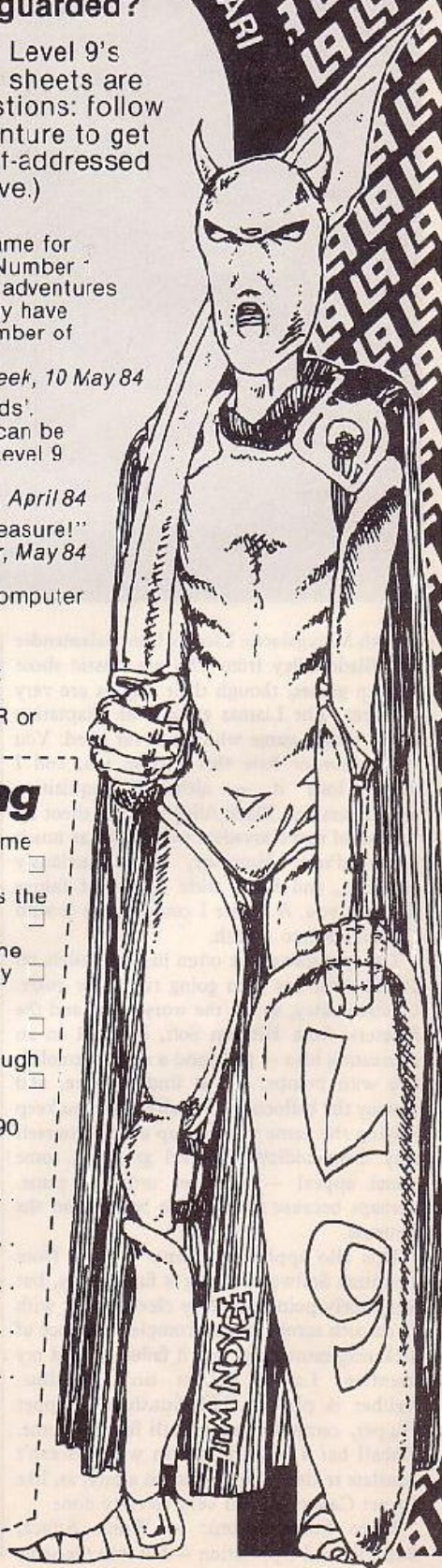
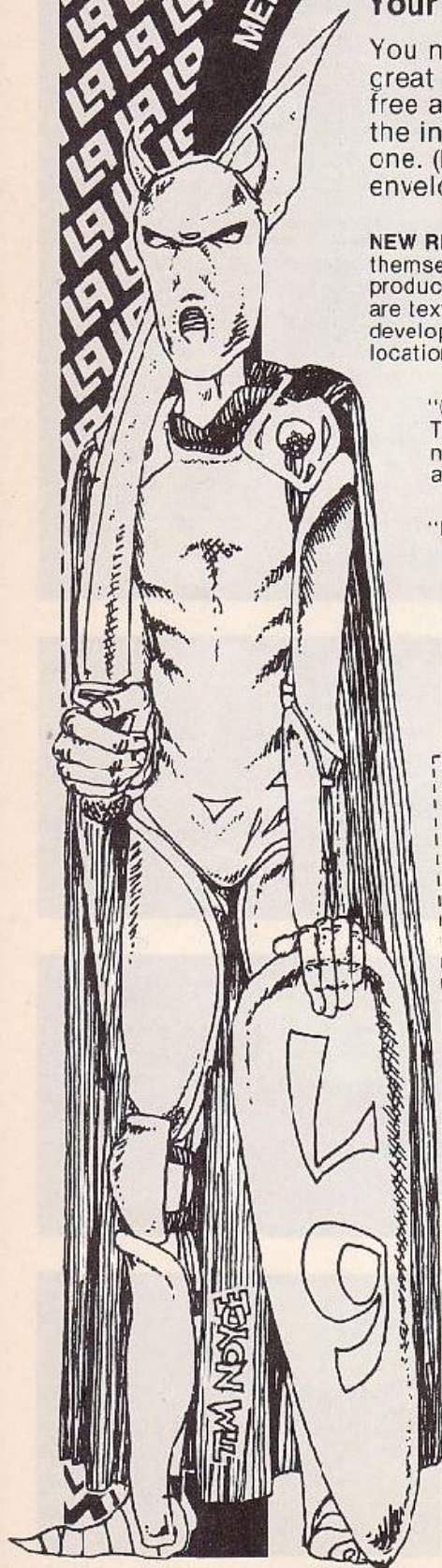
My address: .....

My micro is a: .....  
(one of those listed on the arch above,  
with at least 32K of memory).

Send to:

**LEVEL 9 COMPUTING**

Dept. Y, 229, Hughenden Road  
High Wycombe, Bucks. HP13 5PG





# BBC ROMS

Richard Lambley looks at additional facilities now available in ROM

THE BBC MICRO is the only home computer which allows you to have more than one language on board at once, and the software suppliers have taken advantage of this useful feature to provide not just languages in ROM, but a wide range of utilities.

Beebug's Toolkit ROM is a collection of routines for developing and debugging Basic programs: it is described as a Basic programmer's aid, though you don't need to be an experienced programmer to find it helpful.

Some of its functions simply enhance the resources BBC Basic already has: with it, for example, you can renumber individual sections of programs, rearranging blocks of code at will.

But there are many completely new facilities: a "bad program" recovery command, a program packer and Rem stripper, a relocater — useful for disc users — a Check command for verifying programs saved, and a quick method of merging programs together.

The great delight of Toolkit, though, is its error-trapping. Even if you use the keyboard only for typing in games listings, this could save you untold frustration in tracking down trivial mistakes.

One especially useful facility is string search, which scans the program for any sequence of characters you specify, Basic keywords included. The display shows all lines in which the sequence appears, each occurrence highlighted in colour. Allied to this is a search-and-replace utility.

Toolkit's use is restricted to Basic only — it cannot deal with machine code — so to get the most out of it, you need to pair it with a good machine code monitor — such as Beebug's Exmon, or Beebmon — of which more below.

Some of Toolkit's commands are less useful than others; nevertheless, it must be one of the most worthwhile utilities yet produced for the BBC Micro, and at £27 it represents excellent value for money. There is a discount for Beebug subscribers.

Another interesting extension to the standard BBC is provided by Computer Concepts' Graphics Rom costing £33.35. This miscellany of graphics functions falls into three parts: a collection of Logo-style turtle graphics commands for drawing patterns, some sprite utilities, and a number of useful tricks. These include a quick \*Circle command, which can whistle one up in just a sixth of a second. It's actually an ellipse, because the BBC's pixels aren't quite square; but no matter, you can always make a real circle using \*Arc.

## Not such a variable

Figure 1.

There's an intriguing \*Plot command, which extends the Basic plot command into the third dimension. And there's \*Rotate, which twists the whole screen about a point, making what follows appear on the slant. Some other useful features are a routine for filling shapes on the screen, a \*Print command which can produce letters of any size, and a way of getting an endless supply of coloured pattern effects.

The GDUMP ROM from DA Computers offers machine code graphics dumps for a variety of popular printers, including models by Epson, CTI, Star, Seikosha and NEC. The single \*Gdump command can be followed by up to nine arguments, which determine the number of shades of grey, the logical background colour, the size of the print-out, which way up it is to be and so on. Sensible default assumptions have been made, so most of the time you don't need to specify more than two or three. The last four arguments define a "print window" for dumping just part of the screen.

Gdump works in all graphics modes including mode 7: in this mode it does not give colour shading or double height characters, but it reproduces block graphics successfully and quickly in a 40-column-wide print-out. At £20, it's good value.

A fuller set of printer utilities is available from Computer Concepts in their Printmaster ROM, which at present is available only in an Epson version. Its shaded graphics dumps look much like those of Gdump, but Printmaster can do a colour dump even in mode 7. The many size and scale options do not apply in this mode, but it copes with double-height characters and separated graphics too.

Printmaster also includes a character definer; though here, I think, Computer



Picture by Graphics ROM. screenshot by Printmaster.

Concepts have for once missed a trick. Instead of giving us a definer to make downloadable characters for the printer — this is, after all, an Epson printer ROM — they have chosen to make it an eight by eight definer for the computer itself.

Another interesting package for printer owners is Beebfont from Watford Electronics. If you're bored with the character set Acorn sold you, with this you can freak out. When I tried it out in the office, it reduced everyone to helpless giggles within moments. There's something irresistibly nutty about a computer which can do things like figure 1.

Those Gothic letters come from one of six alphabets built in to the Beebfont ROM. A further font can be loaded into RAM, and letters from any of them can be mixed together on the screen or on the printed page.

Printing with Beebfont is a slow business, but the results are quite effective. You can dump Wordwise text files to the printer with the help of a spooler routine, supplied on the utilities disc/cassette. Escape commands to switch between fonts can be embedded in the text as required. Beebfont costs £39, which for a 16K-byte eeprom seems reasonable.

Incidentally, Beebfont and Printmaster both have a \*Font command, which can be a cause of conflict: if you fit both, put Beebfont in the higher priority socket. You can then eliminate any confusion by prefixing commands intended for Printmaster with a C.

(continued on page 61)

Figure 2. Vital statistics: this "info" page from Beebug's Toolkit gives a handy summary of the state of play.

### TOOLKIT 1.21

FX 3 0	FX 4 0
FX 5 1	FX 6 10
FX 9 25	FX 10 25
FX 11 50	FX 12 B

@Z=&0000090A

LISTO 7	WIDTH 0
ERR 26	ERL 30

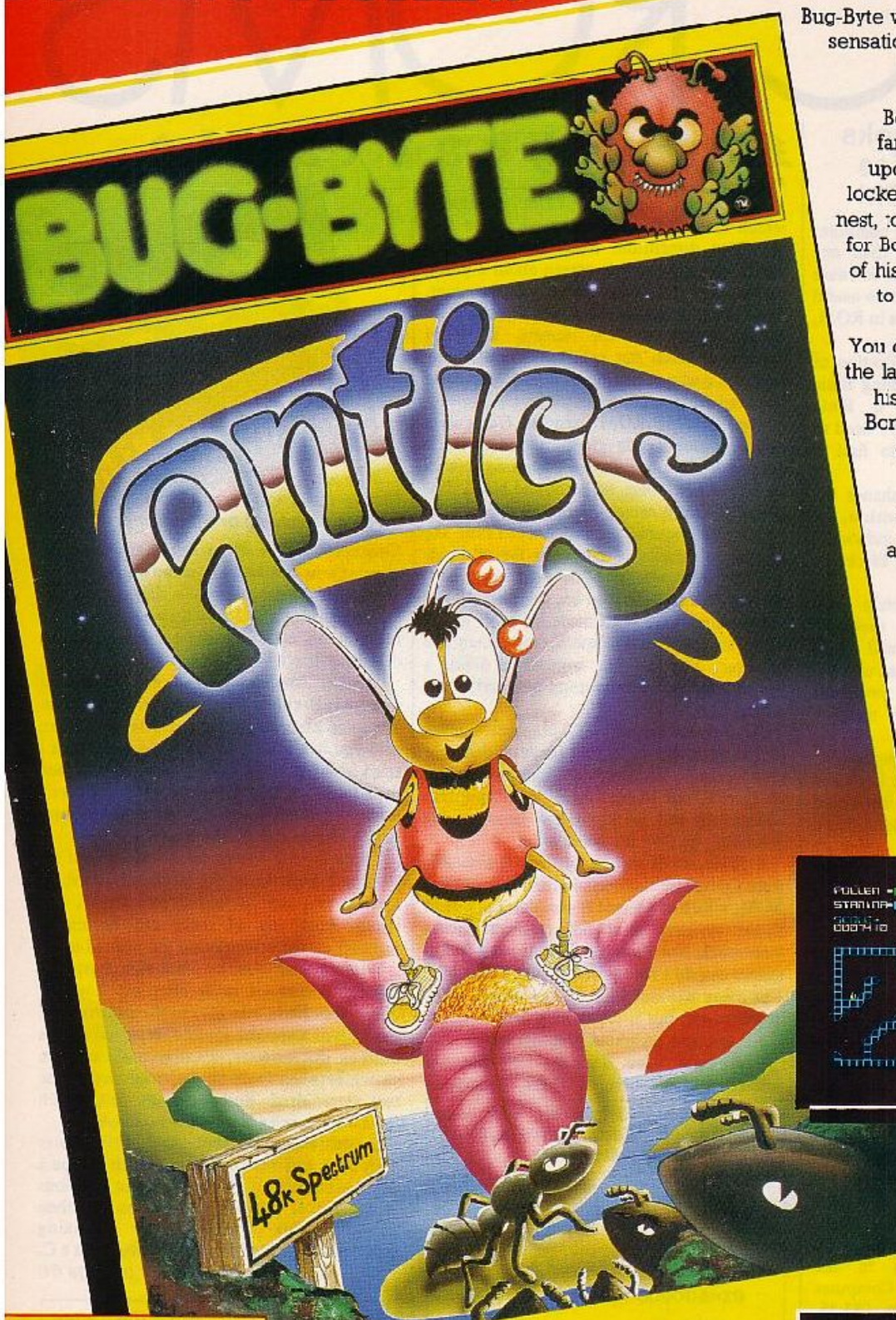
REPORT: No such variable

Free memory = 25102 bytes  
 Program size = 2034 bytes  
 Next free location = &19F2  
 PAGE = &1200 LOMEM = &19F2  
 TOP = &19F2 HIMEM = &7C00  
 OS 1.20

Beebugsoft, P.O. Box 109, High Wycombe, Buckinghamshire HP11 2TD.  
 Computer Concepts, 16 Wayside, Chipperfield, Hertfordshire WD4 9JJ. Tel: 09277-69727.  
 D.A. Computers, 104 London Road, Leicester LE2 0QS. Tel: 0533-549407.  
 S.J. Research, 108 Mill Road, Cambridge CB1 2BD. Tel: 0223-69927.  
 Watford Electronics, 33/35 Cardiff Road, Watford, Hertfordshire. Tel: 0923-40588.



# THE GAME THAT WILL GET YOUR SPECTRUM BUZZING AGAIN!



Bug-Byte welcome in the Summer with the sensational follow-up to the best-selling 'BIRDS AND BEES' ... ANTICS!

Boris Bee, the original hero of the famous arcade game has been set upon by a vicious gang of ants and locked away, somewhere within their nest, to await a terrible fate. Fortunately, for Boris, help is at hand in the shape of his cousin, Barnabee, who is about to launch a daring rescue mission.

You control Barnabee as he searches the labyrinthine ants nest in search of his missing friend. Can you rescue Boris and guide him back to safety, or will you perish underground?

ANTICS is a cartoon style maze game, with slick, machine code action, riveting sound effects and joystick compatible.



In your High Street  
NOW  
price **£6.95**

## DEALERS!

Get set for the swarm that's about to hit your shop, and order now! Registered Dealers can order direct from: CBS Distribution on 01-960 2155 or contact us direct on 051-709 7071



Bug-Byte Ltd., Mulberry House, Canning Place, Liverpool.



(continued from page 59)

The others will be claimed by Beebfont, which gets the first say. A similar idea is used by Toolkit: in this case an optional B prefix allows you to avoid tangles with the many other ROMs which have a \*Edit command.

In spite of having high-level languages such as Basic, most home computers are pretty primitive when it comes to controlling external hardware. Getting even the BBC to do a simple thing like switching your reading lamp on is far from straightforward. When you've connected up the mains switching device, you then have to work out how to

address it. You need to know which memory locations to write to and what to write, and you need more than a passing acquaintance with concepts such as data direction registers.

The Control Rom from SJ Research takes care of all these details for you. It acts as an additional filing system, so you can carry out read and write operations through it just as you would with cassette or disc files. And though it's hard to think of the 1MHz bus or

Figure 3. Same Prestel page, different screen-dumps. Gdump is six times faster, but Printmaster gives you more frills.

the user port as a file medium, making a pin on one or other of them switch "high" or "low" becomes simply a matter of opening a channel to it and putting a byte to file.

There is a small price to be paid in terms of memory: the Control Rom claims four pages for its workspace when you switch on. If you use cassettes or the Kendi disc filing system, you will find Page set to &1200. If you have teletext, an Acorn DFS and Econet, you'll find it at &2900! However, when you don't need I/O facilities you can reclaim this space by typing \*Noio followed by a hard reset. The price is £44.85.

MICRONET 800 (C)	8001212a	Op
<b>Acorn-Beeb News</b>		
GOTO		
12 Acorn venture capital	(09/3)	
13 Mistake?	(12/3)	
14 Beeb database	(12/3)	
15 Seconds out	(14/3)	
16 Level 2 Fileserver	(14/3)	
21 Second thoughts	(14/3)	
22 Bitstik reaction	(15/3)	
23 Second glance	(15/3)	
24 New Acornsoft stuff	(16/3)	
25 Acorn show	(17/3)	
26 Acornspit	(20/3)	
11 Tripos and Xenix	(01/3)	
Microtext exclusive review...GOTO 5		
SOFT FLASH		
9 Don't forget the...please sir		
7 Write to us	8 Ar	ase

MICRONET 800 (C)	8001212a	Op
<b>Acorn-Beeb News</b>		
GOTO		
12 Acorn venture capital	(09/3)	
13 Mistake?	(12/3)	
14 Beeb database	(12/3)	
15 Seconds out	(14/3)	
16 Level 2 Fileserver	(14/3)	
21 Second thoughts	(14/3)	
22 Bitstik reaction	(15/3)	
23 Second glance	(15/3)	
24 New Acornsoft stuff	(16/3)	
25 Acorn show	(17/3)	
26 Acornspit	(20/3)	
11 Tripos and Xenix	(01/3)	
Microtext exclusive review...GOTO 5		
SOFT FLASH		
9 Don't forget the...please sir		

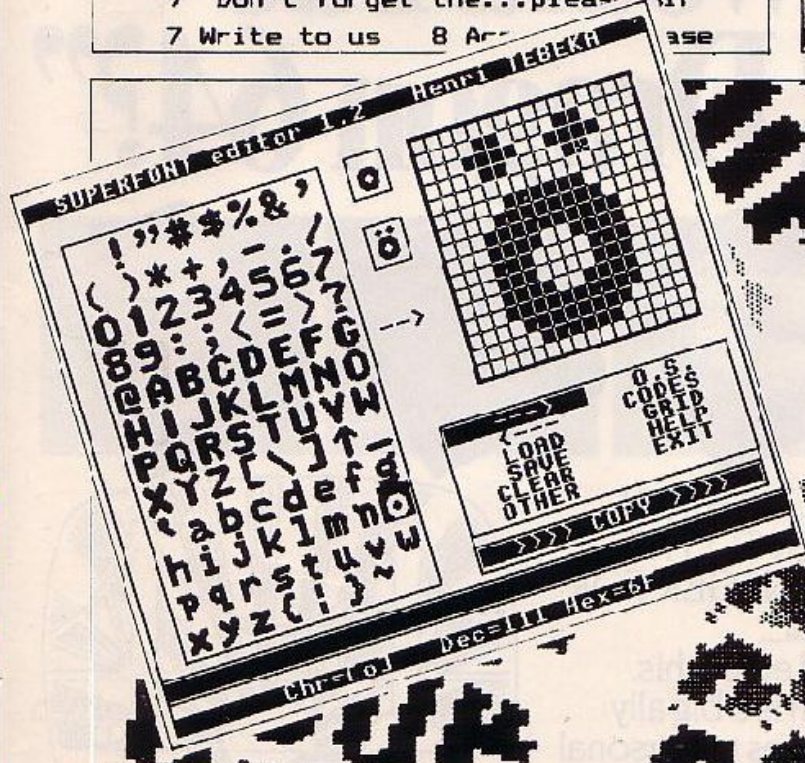


Figure 5. This font editor comes with Watford's Beebfont: it allows you to design your own alphabet or adapt the ones supplied. For comparison, the menu on the right is made up of standard mode 4 characters.

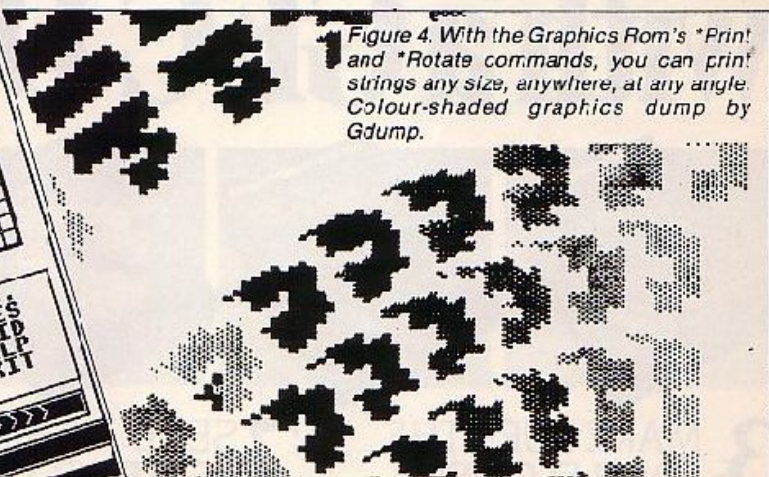


Figure 4. With the Graphics Rom's \*Print and \*Rotate commands, you can print strings any size, anywhere, at any angle. Colour-shaded graphics dump by Gdump.

Figure 6. Part of a text file from Wordwise, printed with Beebfont's spooler utility. French accents were added to the basic roman alphabet using the font editor.

DIANE:  
Pour séduire Alcène la fière,  
tu pris les traits de son mari!  
Je sais bien des femmes sur terre  
pour qui ça n'eût pas réussi!  
Ah! ah! ah! ah! ah! ah!  
Ne prends plus l'air patelin:  
On connaît tes farces, Jupin!

Figure 7. Look — no Fokes! With the Control ROM you can read or write to the I/O ports using ordinary tiling commands.

```
10 REM Selecting the Control Rom...
20 *IO
30 on=0:off=1:REM ...to control a lamp.
40 REM Write to bit 7 of the user port
50 lamp=OPENUP("BIT7")
60 BPUT lamp,on:REM switch lamp on
70 wait=GET:REM press a key to go on
80 BPUT lamp,off:REM Now switch off
90 CLUSE lamp:REM finished.
100 *NOIO
```

# YOUR COMP



## 1. KEEP TRACK OF THE GOLF CLUB ACCOUNTS.

The GEC Dragon RMS program will record all the details, and prepare the accounts beautifully typed at the end of the year. (Or any other time.)

## 2. ACHIEVE INSTANT FINANCIAL STATUS.

Whether you're in business or not, the Dragon will give you an accurate picture of your assets (or liabilities) almost instantly.

## 5. COST OUT JOBS.

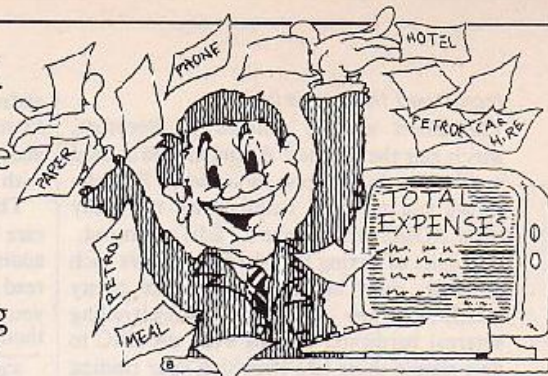
Many small businesses are using the GEC Dragon to simplify and speed up their complete job-costing operations – and saving a fortune in the process.

## 6. INTEGRATE YOUR POLYNOMIALS.

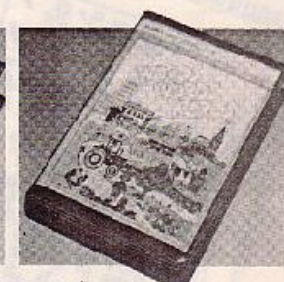
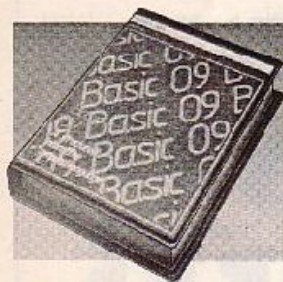
GEC Dragon's UNIX-like software to the rescue again. If you can handle the maths, the GEC Dragon will take care of all the calculations.

## 8. TURN YOUR EXPENSES FROM FICTION INTO FACT.

Keep a day-by-day account of your business expenses and credit card transactions – with instant printout at any time.



# “What else would I do with a GEC Dragon 64?”



## 3. MAKE SURE THE CASH FLOWS IN, AS WELL AS OUT.

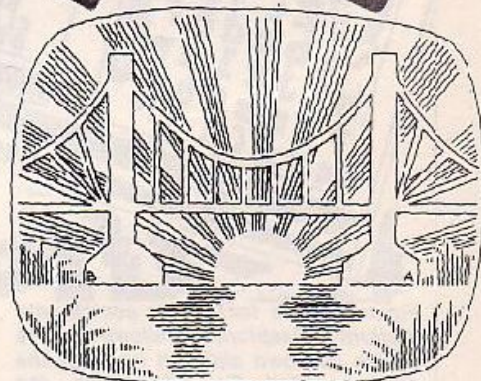
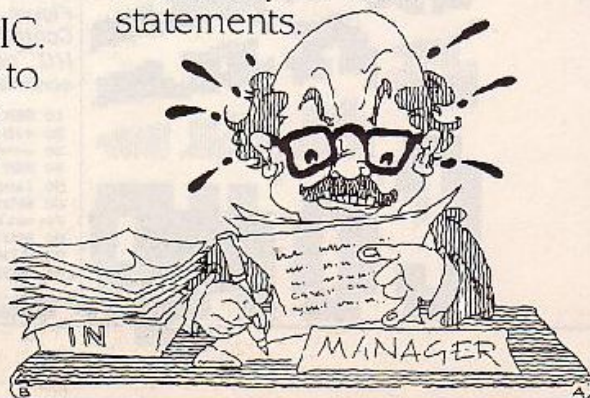
With the Sales and Purchase program soon to be available, you'll have complete control over your company's cash flow.

## 4. LEARN TO PROGRAM IN PASCAL, C, OR BASIC.

Although it's child's play to use, the GEC Dragon is certainly not limited to games. In fact it has as much brain power as some computers that cost thousands.

## 7. SEND A SHIRTY LETTER TO THE BANK MANAGER FOR A CHANGE.

You should enjoy this. The Dragon is a big ally when it comes to personal finance. It'll keep you permanently one step ahead of your bank statements.



## 9. DESIGN A BRIDGE.

GEC Dragon's UNIX-like software (based on programs which were specifically designed for universities) will help you perform stress analysis, quantity surveying and many more complex functions.

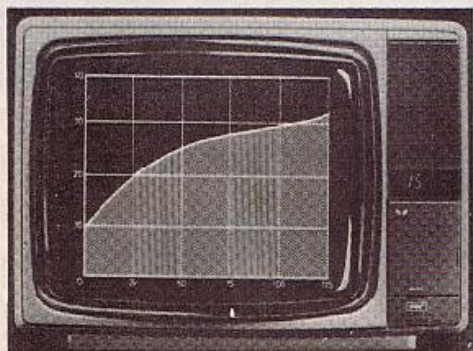


## 10. FIND A CURE FOR AMNESIA.

By keeping a personal diary, the GEC Dragon can also help you avoid life's bigger crises (Like reminding you of your anniversary before your wife does.)

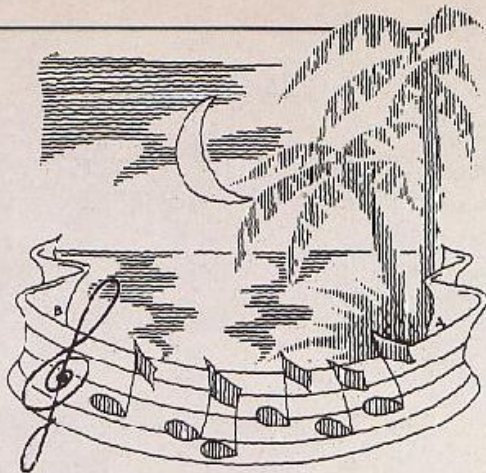
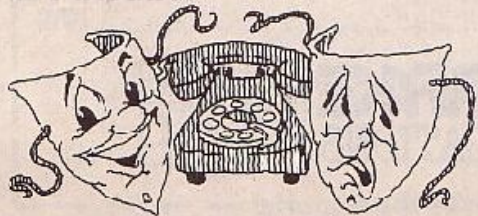
## 11. FLY TO THE MOON.

While you're taking it easy with all the spare time your Dragon has created, there are literally hundreds of space adventures and other games to pass the time.



## 12. CURE THE IMPEDIMENT IN YOUR REACH.

By linking your Dragon to Prestel and the telephone, you'll have immediate access to the very latest information on travel and exchange rates. You can even book up for plays and the theatre.



## 13. COMPOSE A MOONLIGHT SONATA - ANY TIME OF DAY.

With no less than five octaves, the GEC Dragon is musically very talented.



It's no dumb computer, either—you can even get it to talk to you.

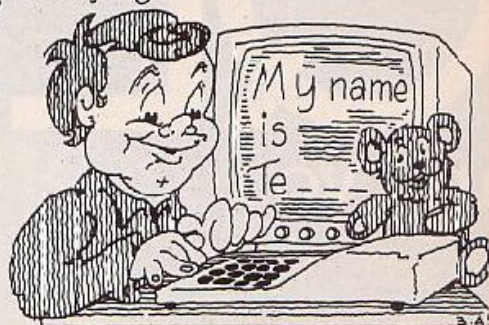


## 14. WRITE YOUR LIFE STORY.

You'll get around 30,000 words of gripping adventure or stunning success on every GEC Dragon 64 floppy disk.

## 15. TEACH THE KIDS.

From over thirty educational programs, you can teach your children to read and write from a very early age.



There are 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.

## 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.'

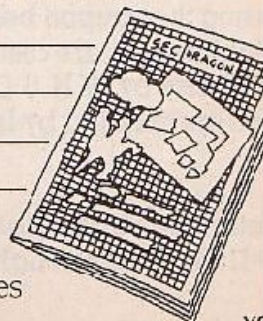
Name \_\_\_\_\_

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





# 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.)

Please send me the following books.  
I enclose a total of £ \_\_\_\_\_

- |  |       |
|--|-------|
| <input type="checkbox"/> Exploring the Sinclair QL — An Introduction to SuperBASIC — Andrew Nelson, ISBN 0 907563 84 3 | £4.95 |
| <input type="checkbox"/> 49 Explosive Games for your ZX Spectrum — Tim Hartnell, ISBN 0 907563 53 8                    | £4.95 |
| <input type="checkbox"/> Delving Deeper into your VIC 20 — Philip Campbell, ISBN 0 907563 62 7                         | £4.95 |
| <input type="checkbox"/> Creating Adventure Games on your Dragon 32 — Clive Gifford, ISBN 0 907563 57 0                | £4.95 |
| <input type="checkbox"/> Dynamic Games for your VIC 20 — Mathew Boek, ISBN 0 907563 34 1                               | £4.95 |
| <input type="checkbox"/> Creating Adventure Programs on your Computer — Andrew Nelson, ISBN 0 907563 36 8              | £4.95 |
| <input type="checkbox"/> Putting your VIC 20 to Work — Tom Lau, ISBN 0 907563 46 5                                     | £4.95 |
| <input type="checkbox"/> The Easy Way to Program your New Computer — Tim Hartnell, ISBN 0 907563 60 0                  | £3.95 |
| <input type="checkbox"/> Creating Adventures on your ZX Spectrum — Peter Shaw & James Mortleman, ISBN 0 907563 58 9    | £4.95 |
| <input type="checkbox"/> Practical Uses for the Microcomputer in the Home — David Hcle, ISBN 0 907563 59 7             | £4.95 |
| <input type="checkbox"/> Mastering Machine Code on your Commodore 64 — Mark Greenshields, ISBN 0 907563 69 4           | £7.95 |
| <input type="checkbox"/> Making the Most of your TI 99/4A — Scott Vincent, ISBN 0 907563 66 X                          | £4.95 |
| <input type="checkbox"/> Dynamic Games for your Electron — Neal Cavalier-Smith, ISBN 0 907563 67 3                     | £4.95 |
| <input type="checkbox"/> The 3-D Animated Apple — Phil Cohen, ISBN 0 907563 78 3                                       | £4.95 |
| <input type="checkbox"/> The Art of Structured Programming — Peter Juliff, ISBN 0 907563 79 1                          | £5.95 |
| <input type="checkbox"/> Dynamic Games for your TRS-80 — Gail Duns & Tim Hartnell, ISBN 0 907563 63 5                  | £3.95 |

Name .....

Address .....

QYC

**INTERFACE**  
PUBLICATIONS



— — — — — We're the experts! — — — — —

Interface Publications, Department QYC,  
9-11 Kensington High Street, London W8 5NP.



UK's Best Selling Computers  
for

**EXPORT**



Having difficulty in obtaining regular supplies? Then buy direct from one of the UK's leading hardware agents. Contact our:

**EXPORT MANAGER**  
**BOWIES, THE COMPUTER PEOPLE**  
55 BRADFORD STREET,  
WALSALL, WS1. UNITED KINGDOM  
Tel: WALSALL 611214 Telex: 335622 Spetel G  
Outstanding Back-Up Service Available

**Smooth, Cool & In Control**

### The APPLE User's INSURANCE...

Protect Your Software Investment and take steps to prevent costly, time-consuming errors NOW!

Your Apple is vulnerable to internal overheating and external mains-borne interference — either can induce malfunctions in the Apple's operating software, capable of wrecking data files and programs, losing days or even weeks of work.

Power-Core is your positive move to eliminate such problems. Designed to aesthetically complement and fit snugly on top of your Apple, Power-Core features:-

- Mains Filtering for the Micro-Processor.
- High Air-Flow Cooling Fan.
- Additional Power Distribution.

(up to 6 Peripherals)

**Power-Core** is supplied complete with fitting instructions and all necessary plugs and cables.

A.S.C. products are Fully Guaranteed for one year and covered by the A.S.C. money back if not satisfied offer. (Return goods within 7 days post date).

**\*NEW\***

**MICRO-NEAT**

A hi-spec Power Filtering & Distribution Unit, for use with ANY Micro System.

The heart of the Micro-Neat is a sophisticated high performance line filter, designed for protection against mains-borne interference as well as high energy spikes. Achieved by combining a high performance transient voltage suppressor with a high speed surge protector circuit. Micro-Neat is capable of delivering 2400VA and can handle several critical systems ensuring maximum protection to your local computer networks.

ONLY £149.50 INC P&P

Features:  
1. C.P.S. output switched separately.  
2. Printer output switched separately.  
3. Four auxiliary outlets operative when system switched on.  
4. Security Mains Key Switch.

### ORDERING

Send your order, enclosing cheque or p.p. for the total amount due, made payable to A.S.C. Ltd.

Pay by Access, send your Access No. and Cardholder details with order.

Allow 28 days for Delivery

Address All Order to:-

**ASC**

4a King Street, Mortimer,  
READING RG7 3KS, UK  
Telephone: (0734) 333400

## 48k SPECTRUM OWNERS

READ THIS FROM



### 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 on/off/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 MOST POWERFUL MACHINE CODE PROGRAMMING TOOL YET SEEN by HCME 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, syntax 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 **REVIEWED**. Standing orders can be **APPLIED, REMOVED, DESCRIBED, AMENDED, DELETED** and even **DUMMED** 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 automaton, a life-size mechanical figure resplendent in Turkish costume and seated behind a wooden cabinet on which a chess board and pieces were placed. UCP 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:**
- 5 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

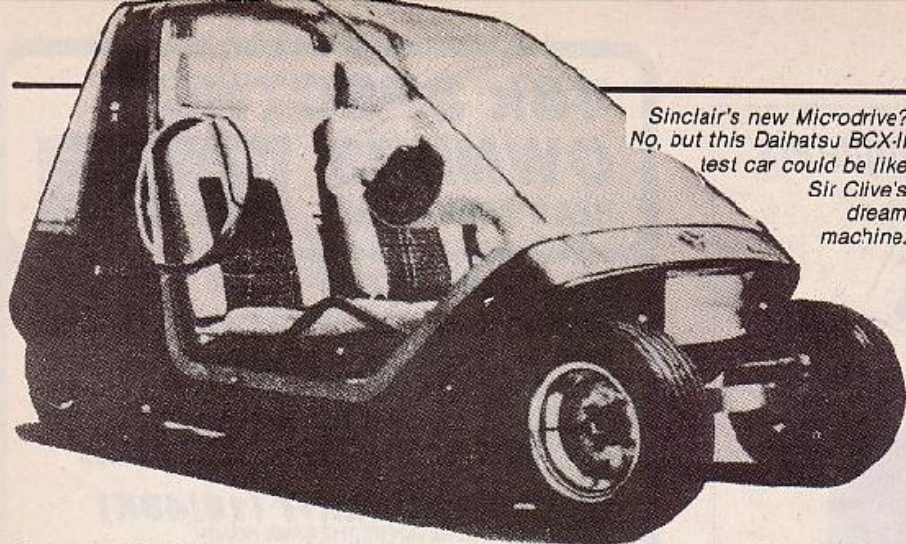
Please rush me **Machine Code Test Tool (Spectrum)** £9.95 **Machine Code Test Tool ZX81** £9.95 **Master Tool Kit** £9.95 **Chess — The Turk** £8.95 **Address Manager** £8.95 **Plus 80** £19.95 **Finance Manager** £8.95 **Plus 80** £19.95 **Full Screen Editor/Assembler** £9.95 **Plus 80** £19.95

NAME.....YQ784

ADDRESS.....

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





Sinclair's new Microdrive? No, but this Daihatsu BCX-II test car could be like Sir Clive's dream machine.

SINCLAIR'S ZX-85 is not a computer but an electric car — symbolising the fusion of micro and motor technologies.

Sir Clive believes that computer cars will be part of a golden age which micros are driving us to. "I anticipate totally automatic personal vehicles still with all the freedom in space and time of today's cars," he said earlier this year, "but guided by artificial intelligence. They need not then be restricted to 55mph or 70mph on main roads. Speeds of over 200mph should be safely and economically possible."

His Sinclair Vehicle Project is committed to producing a low-cost town runabout to be launched next spring. SVP's Managing Director Barrie Wills acted as chief executive of De Lorean Motors when its colourful founder John Z De Lorean found himself on the wrong side of a video camera allegedly discussing cocaine smuggling.

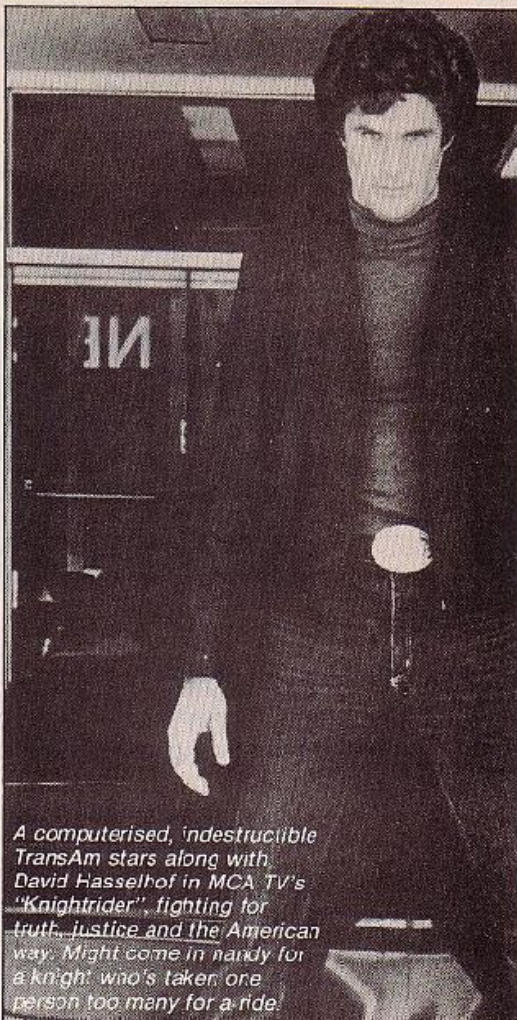
But despite Barrie Wills' experience with high-speed cars and Sinclair's enthusiasm for

robot vehicles patrolling the streets at 200mph the ZX-85 will be much less ambitious.

The first vehicle, which will be produced at the Hoover plant in Merthyr Tydfil, South Wales, is a cross between a motorbike and a car, a lightweight three-wheeler which is already being tested in prototype form.

Later Sinclair hopes to build up to a whole family of four-wheeler cars and perhaps light vans. If he achieves the level of production which our sources suggest he is aiming for — 100,000 vehicles in the first year — he will become a major force in the British motor industry almost overnight.

Although Sir Clive began thinking about electric vehicles 10 years ago, development began only in 1981. Little is known about his first machine but it is a safe bet that it will take full advantage of microchip-based gimmicks which cost little to install but substantially increase the price you can charge for a glorified tricycle.



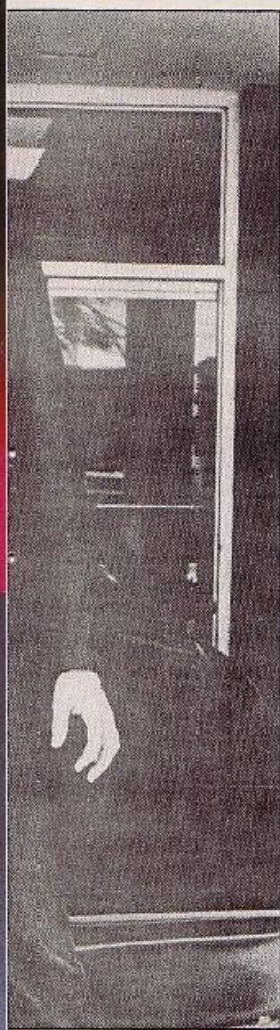
A computerised, indestructible TransAm stars along with David Hasselhoff in MCA TV's "Knightrider", fighting for truth, justice and the American way. Might come in handy for a knight who's taken one person too many for a ride.

# BREAKING O

Here are two ways computers are helping economy. The 3X6 Granada engine on the right is continuously controlled by the car's micro. This experimental engine management system closes down half its cylinders in heavy traffic. The Renault Vesta below has been designed by computer for ultra-low drag. In fact the test Vesta turned out to have half the drag of most of today's small cars.







SATELLITE NAVIGATION was only one of the wackier innovations in Ford's Continental Concept 100 show car, below right, which demonstrated some of the future uses of micros in cars. Although Ford's future — can't be fooled by its early 1960s "Thunderbirds are Go" styling — car is only just over a year old it has already been superseded in many respects.

It uses keyless entry — a remote control infrared beam replaces the key — but this year the Renault 25 was launched with that as a standard feature. The crude voice synthesiser incorporated in the Concept 100 has been bettered by the production units in cars like the Austin Rover Montego, Maestro and the new Renaults.

Voice commands which allow you to shout "Mainbeam on", "Raise aerial" or "Wipers on" once you have trained the system to identify these commands has not so far been imitated on production cars. Neither has the sonar detection system which is supposed to help you park without hitting the vehicles around you. But the array of LCD warnings of low fuel, open doors and system failures are now becoming commonplace.

The most extravagant use of a micro in the Concept is for processing signals from the aerial on the boot which receives positional information from a satellite in earth orbit.

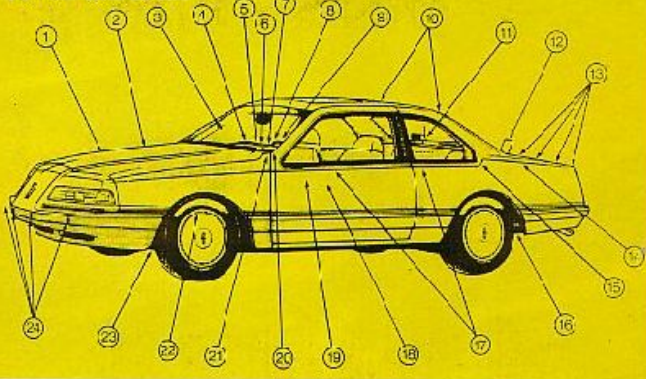
The satellite will tell you where you are to within 400 yards — not much use in central London but helpful for your occasional forays into the Sahara during a sandstorm. Several Japanese companies are working on more practical guidance systems which use loops in the road to emit signals to a car-based micro which allows it to display where you are on a scrolling map built into the dashboard.

#### Continental Concept 100.

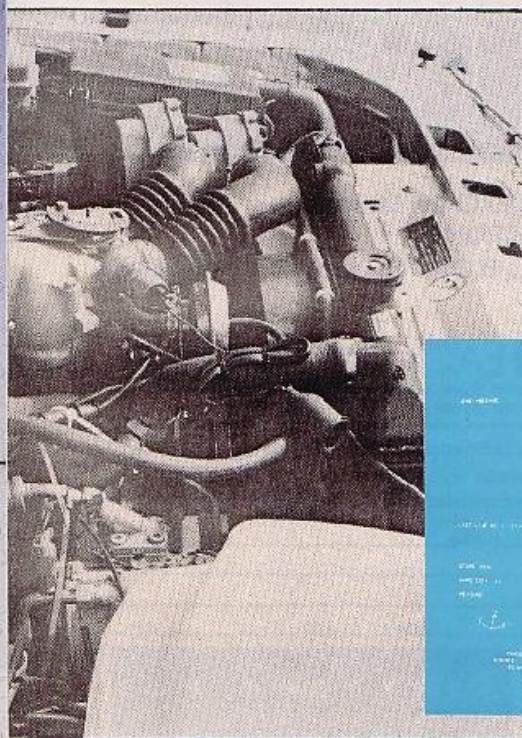
1. Electronic fuel injection
2. Electronic engine control (EEC-IV)
3. Heated windshield
4. Front sonar detection display
5. Interactive CRT display with satellite navigation
6. Voice command
7. Voice alert
8. Keyless ignition
9. Liquid crystal instrument cluster
10. Electroluminescent high-mount brake lamps
11. Rear sonar detection display
12. Satellite antenna
13. Rear sonar sensors
14. Remote convenience system
15. Rear Intellivision game
16. Electronic air suspension
17. Front/rear radio controls
18. Keyless entry
19. Programmable seats
20. Warning module
21. Electroluminescent interior lighting
22. Low tyre pressure transmitter
23. Four wheel anti-skid brakes
24. Front sonar sensors



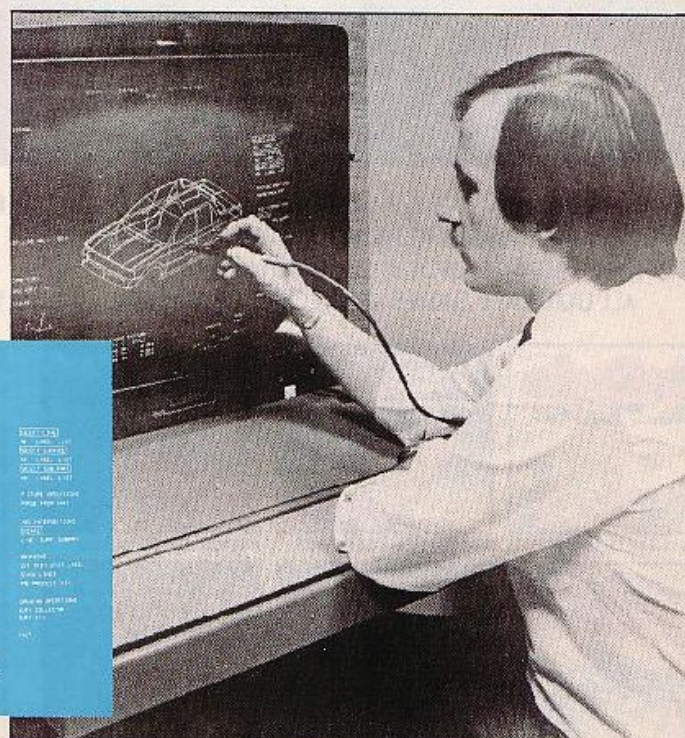
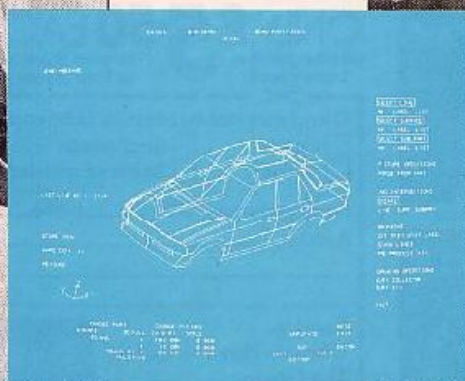
It's clunk-click every trip as *Your Computer* goes on the road to look at how micros are getting into motoring



# ON THROUGH



*Ford has been using computers to help it design cars for the last 20 years. Today's micros can run computer-aided design packages more powerful than those Ford used on mainframes to formulate whole cars two decades ago.*





# 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:

- |                                  |  |                                    |                                   |
|----------------------------------|--|------------------------------------|-----------------------------------|
| <input type="checkbox"/> Cookie  | <input type="checkbox"/> Lunar Jetman              | <input type="checkbox"/> Pssst     | <input type="checkbox"/> Tranz Am |
| <input type="checkbox"/> Jet Pac | <input type="checkbox"/> Jet Pac - Expanded VIC 20 | <input type="checkbox"/> Atic Atac |                                   |

I enclose cheque/PO for £ \_\_\_\_\_ Name \_\_\_\_\_

Address \_\_\_\_\_

Code \_\_\_\_\_

Send to:  
Ultimate Play The Game,  
The Green,  
Ashby de la Zouch,  
Leicestershire.



Ultimate Play The Game is a trade name of Ashby Computers and Graphics Ltd., The Green, Ashby de la Zouch, Leicestershire, Tel (0530) 41 485. Dealer enquiries welcome.



# WATSON'S WORDS



Above: John Watson at the controls — "Whoops. Do people actually enjoy these things?". Left: A Jaguar XJR5 similar to that which John Watson drove at Le Mans.

John Watson, Formula One driver tries out some motor racing games. But he'll be sticking to the real thing

WHEN TOP BRITISH Formula One star John Watson found himself without a car for this year's Grand Prix we tried to convince him to give up four wheels for the security of an armchair and take up computer motor racing games instead.

We failed — as his decision to spearhead Jaguar's return to endurance sports car racing at the Les Mans 24 hour shows — but we did get him to trade in his steering wheel for a joystick for an afternoon.

Surprisingly, although Watson has been racing cars for over 20 years and has appeared in adverts for Activision video games he had never laid hands on a home computer or even played an arcade game. For all his skill on the track he found Atari's Pole Position far from elementary.

Watson scooted up the first straight of the Atari Malibu Grand Prix in practice trying to set a fast qualifying time and gain pole position for the race but found himself on the grass at the first corner. "Whoops. Do people actually enjoy these things? I've never done one of these before in my life".

At first John Watson merely poured scorn on computer games and all who play them every

time he crashed a car. "This is the sort of thing that would appeal to Andrea very much" he said contemptuously. Andrea De Cesaris who now drives for Ligier was one of his rivals last season — "he's got that sort of mentality".

After a whole series of shunts and unscheduled picnics on the grass around the track he finally found his way back to the start — but was shocked to find that he had not qualified for the race. "What's happened, I've stopped now". He took a more serious attitude: "Well I'll just have to try again then".

He cradled the joystick in his hands and concentrated for a few more unsuccessful laps before admitting "these things are addictive in a way. I can see that if you do have a machine that you can get involved in it. I'm useless at it though".

Trying out other race circuit games in the hope that he would be able to master one of them immediately Watson made some cogent criticisms of the controls.

He was not worried by the deficiencies of the pictures on screen. Low resolution and a view from behind your car rather than out of the cockpit were no problem.

"Where it fails for me is sensitivity. I would

like to have some controls that move and are more obedient and responsive."

Watson is not impressed by the simple on/off switches used in joysticks. "If only they could make them more responsive. There's no feeling or gradation. You need something like a rheostat, something more progressive. The area where it needs to be improved, for me at least, is in the reaction to the controls. It doesn't react quickly enough for me."

As for keyboard controlled games Watson was not ever prepared to consider them. "You're joking" was his reaction to the multi-fingered requirements of Psion's Chequered Flag.

Games like Micromega's 3D Deathchase which add a shoot-em-up element to racing — motorbikes in this case — did not appeal to John Watson at all.

He seemed determined that his first encounter with computer games would also be his last. "As they go on they're going to get more sophisticated. But this for me is terrible. There's no pleasure at all for me."

Perhaps Watson will change his mind after his showing at Le Mans this year. There he dropped out.



# SECOND-HAND MICROS

WHERE DO OLD computers go to? Are they like elephants and soldiers — fading away without trace — or is there somewhere a municipal computer disposal squad? If you want a cheap computer, is a second-hand machine a good buy? What goes wrong with computers anyway — why don't they go on forever?

These diffuse ideas seem to boil down to four hard questions:

- Where do second-hand computers come from?
- Will a second-hand computer work as a whole or will it be fit only for spare parts?
- Are instruction manuals available and will the machine work without needing an electronic Sherlock Holmes?
- How much do they cost?

There is an increasingly large turnover of microcomputers in commerce and industry and these machines will become available as they are sold second-hand by commercial users. Good commercial advice at present is to write-off a microcomputer over two years.

At the same time as many companies are applying the laws of economics to the hardware they use, many universities are trying to squeeze as much use as possible out of their computers; using the machines past

## John Dawson guides you through the second-hand micro jungle for computing on the cheap.

the time when they become commercially non-cost effective and relying on University staff for maintenance.

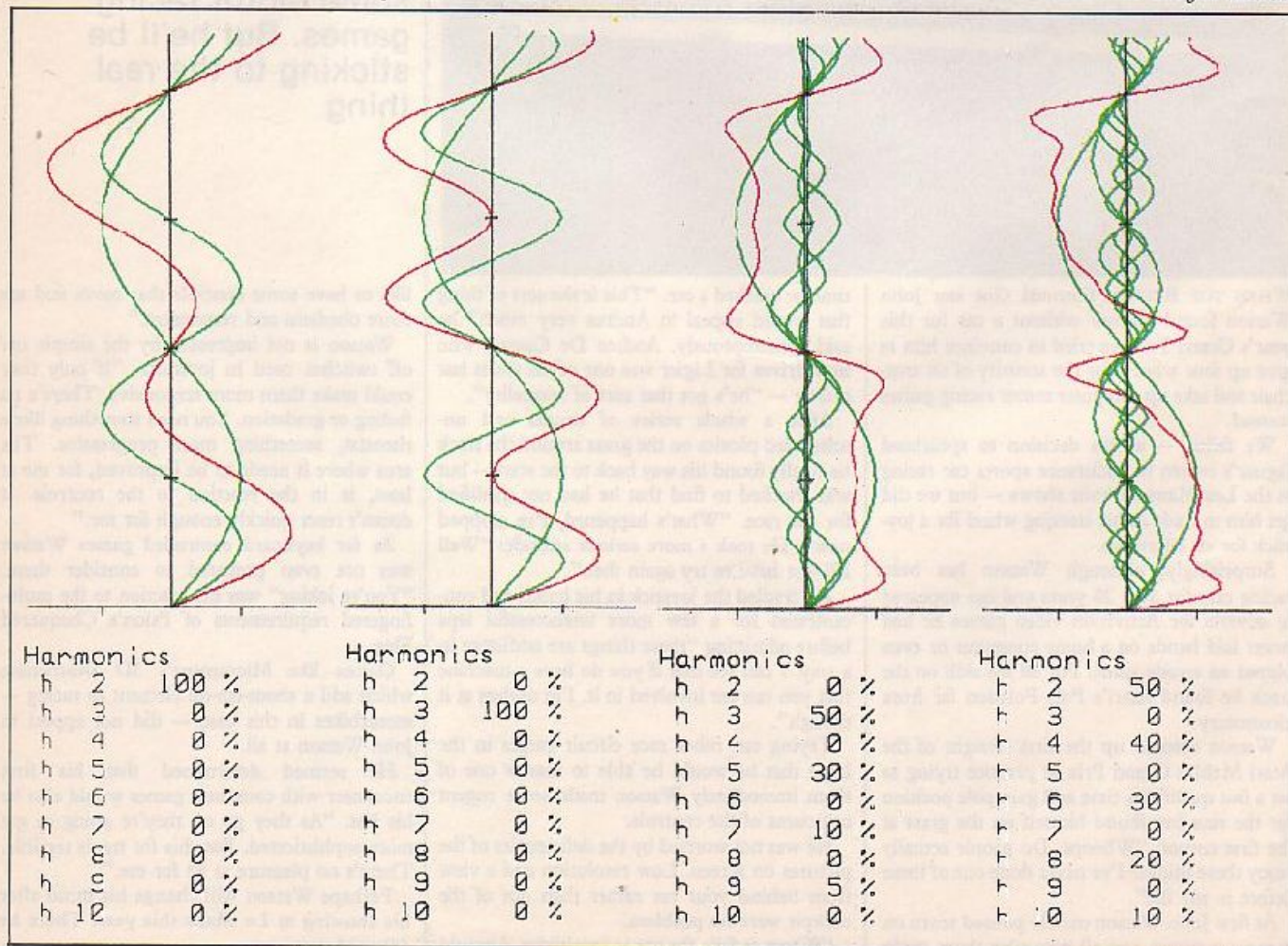
These machines may or may not be good value after they have been sold off. Demonstration computers, on the other hand, may be almost in new condition apart from scuff marks on the case.

I guess that most of the computers that are sold second-hand by private individuals go because their owner is bored with the machine — he or she has played some games, tried a little Basic programming, and moved on to something else.

The reason maybe simply that they did not appreciate that the Basic coding is the least important part of using a computer successfully — it is the analysis, the understanding of the problem that matters. In contrast, some people selling computers will have discovered the limits of a machine such as the Sinclair Spectrum and wish to exchange their machine for a more capable and sophisticated model.

Domestic computers such as the Vic-20, Dragon, Oric, Spectrum, Commodore 64, BBC Micro, Atari, Nascom, and so on, vary greatly in the reliability of their design. Many machines were launched without the necessary debugging process and it is only the second version of the computer that can be considered to be reliable and a good buy.

The Osborne suffered recurrent troubles with its disc drives until the grey-cased model was introduced. The Dragon and the







```

10: REM WAVE SYNTH
  ESIS
50: DIM K(10)
90: ON ERROR GOTO
  100
100: CLS : WAIT 0: F0
  =0
110: PRINT "Enter A
  H S or Q ";
120: A$="": A$=
  INKEY$: IF A$=
  "" THEN 120
130: IF A$="Q" THEN
  END
140: GOSUB A$
150: GOTO 100
1000: "H": CLS
1010: PAUSE "Enter
  harmonic co
  mponents"
1015: GOSUB 10000
1020: FOR U=2 TO 10
1030: CLS : PRINT "
  Enter h";
  STR$(U); " %
  ";
1035: INPUT " "; K(
  U)
1040: NEXT U
1050: RETURN
2000: "A": CLS
2010: PAUSE "Draw
  axes"
2030: GRAPH : COLOR
  0
2050: GLCURSOR (10
  5, -400)
2060: SORGN : LINE
  (-105, 0) - (10
  5, 0)
2070: GLCURSOR (0,
  0)
2080: LINE -(0, 400
  )
2090: FOR L=360 TO
  0 STEP -90
2100: LINE (-5, L) -
  (5, L)
2110: NEXT L
2120: GLCURSOR (0,
  0)
2130: LINE (-50, -6
  ) - (-50, 0)
2140: LINE (50, -6)
  - (50, 0)
2300: F0=1: RETURN
5000: "S"
5010: IF F0=0 THEN
  GOSUB "A"
5020: COLOR 2
5030: GLCURSOR (0,
  0)
5040: FOR G=0 TO 40
  0 STEP 5
5050: LINE -(50 *
  SIN G, G)
5060: NEXT G
5070: GLCURSOR (0,
  0)
5100: FOR U=2 TO 10
5105: IF K(U)=0
  THEN 5200
5107: A=K(U)/100
5110: FOR G=0 TO 40
  0 STEP 5
5120: LINE -(50 * A *
  SIN (U * G), G)
5130: NEXT G
5135: GLCURSOR (0,
  0)
5200: NEXT U
5210: CLS : PAUSE "
  Sum of harmo
  nics"
5220: COLOR 3
5230: FOR G=0 TO 40
  0 STEP 5
5235: A=0
5240: FOR U=2 TO 10
5250: J=50 * (K(U) / 1
  00) * SIN (U * G
  )
5252: A=A+J
5254: NEXT U
5258: A=A+50 * SIN G
5260: LINE -(A, G)
5270: NEXT G
5290: GLCURSOR (0,
  0)
5292: GOSUB "M"
5294: RETURN
5300: "M"
5302: TEXT : LF 2:
  COLOR 0
5305: LPRINT "Harm
  onics "
5310: FOR U=2 TO 10
5320: LPRINT USING
  "###"; " h"; U
  ;
5325: LPRINT USING
  "#####"; K(U
  ); " %"
5330: NEXT U
5340: LF 3
5350: RETURN
10000: "Z": CLS
10010: FOR U=0 TO 10
10020: K(U)=0
10030: NEXT U
10040: RETURN

```

Oric had their troubles and even the august Apple II suffers from overheating in some circumstances. Despite this, the integrated circuits used in all of these computers are reasonably stable and reliable.

Provided you acquire the machine after the first short "burning-in" period, you can expect several years of trouble-free operation. After this time the probability of failure rises again owing to thinning of the microconnections inside the integrated circuit — electro-migration — and breaks in the seal around the leads into the IC allowing water vapour to enter and corrode the chip connections.

Commercial mainframe computer operators expect about seven years operation before the rate of maintenance call-out becomes uneconomical. So, if you can pick up a micro-

computer which was originally well designed, a couple of years into its life span, you can expect good value for your money as far as the chips are concerned.

The most fragile components of any micro-computer are the electro-mechanical devices such as the keyboard, disc drives, printer and built-in tape cassette deck. The high voltages associated with the cathode ray tube in the visual display unit may also give trouble and "burning" of the screen is a common problem in ex-commercial VDUs.

My Apple computer has been used now to write two books, each of 60,000 to 70,000 words, and any number of articles. If there are six characters in each word on average and if each book required 20 percent more typing than the final text, then the keyboard has handled at least 935,000 keystrokes and I

expect that the articles have brought the total up to a round million.

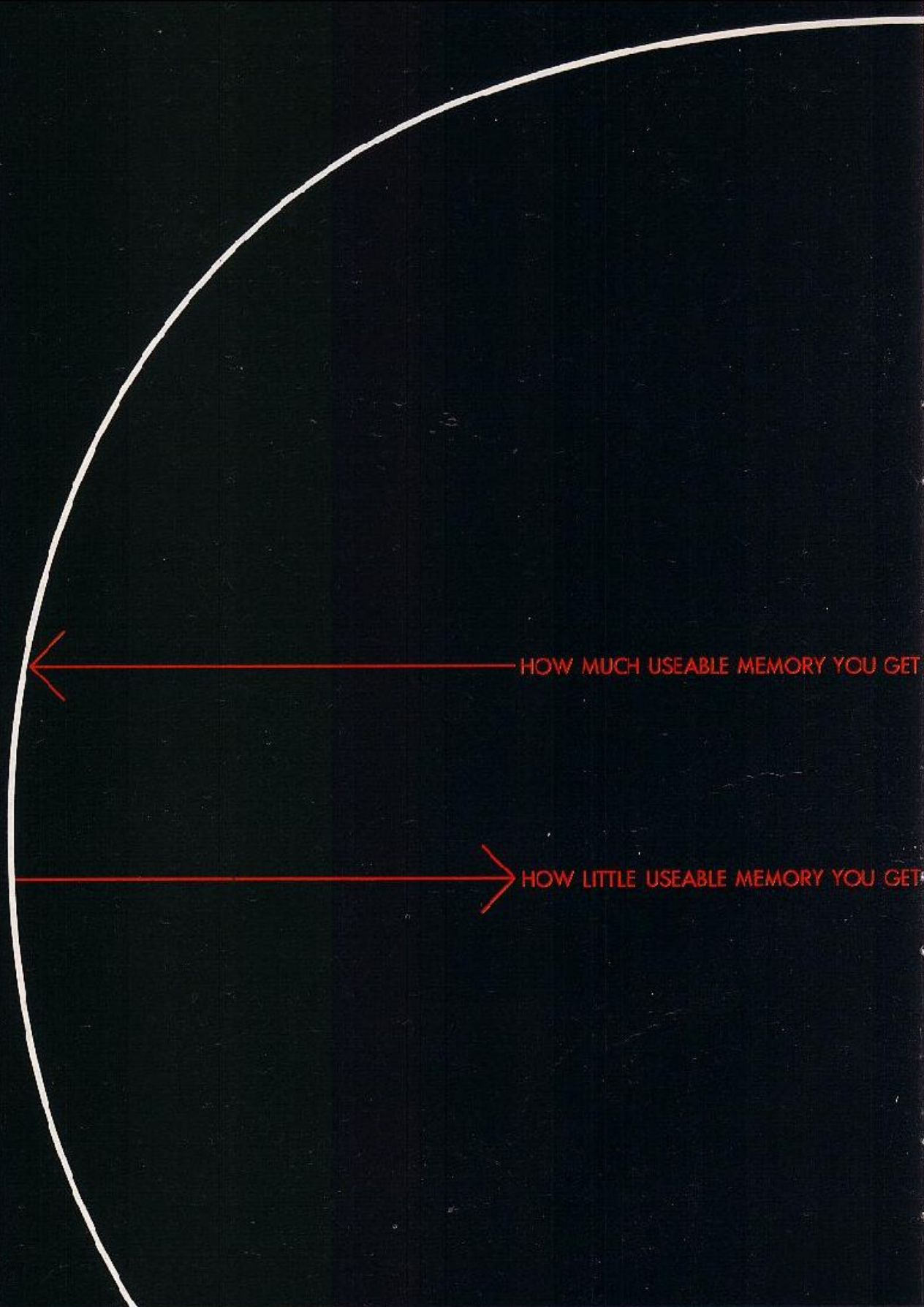
There is still no sign of bounce or missed keystrokes in the Apple keyboard — obviously a reasonably rugged and well designed component.

My Epson printer has printed both the books and many articles several times as they progressed through one draft stage after another. The printer seems fine after several million characters — a remarkable piece of engineering.

Clearly you should not expect this kind of life from a computer and its peripherals at the cheap end of the domestic range. If one or two of the keys are used heavily for playing games, for example, then the keyboard may fail earlier than you would otherwise expect.

(continued on page 75)





■ Like humans, computers have memories.

Unlike humans, their memories shrink when they work.

Simple functions like colour, sound, text and high resolution graphics use up large amounts of memory, leaving little for you to play with.

For example, the Commodore claims an "elephantine" 64K memory, yet loses 26K in high resolution graphics.

Under the same conditions, the Dragon 32K leaves 24K of useable memory, the Lynx just 14K.

And the Acorn Electron and BBC Micro leave a miserly 9K to play with.

However, there's one computer specifically designed to take all these working functions in its stride.

The Oric Atmos 48K.

Even when you plug in its sleek, new, matching four-colour printer and micro disk drive unit, its useable memory is never less than a healthy 37K.

So once you've mastered the basic techniques,

AVAILABLE AT ALLDERS, CURRYS, DIXONS, GREENS, HARRODS, LASKYS,



WITH THE NEW ORIC ATMOS.

WITH OTHER HOME COMPUTERS.

you'll have plenty of memory to expand into advanced programming and extremely sophisticated games.

What's more, at full volume, the sound on the Oric Atmos competes with most arcade games.

So you can PING, ZAP, SHOOT and EXPLODE until you frighten the aliens to death. All for just £170, including all the leads and adapters.

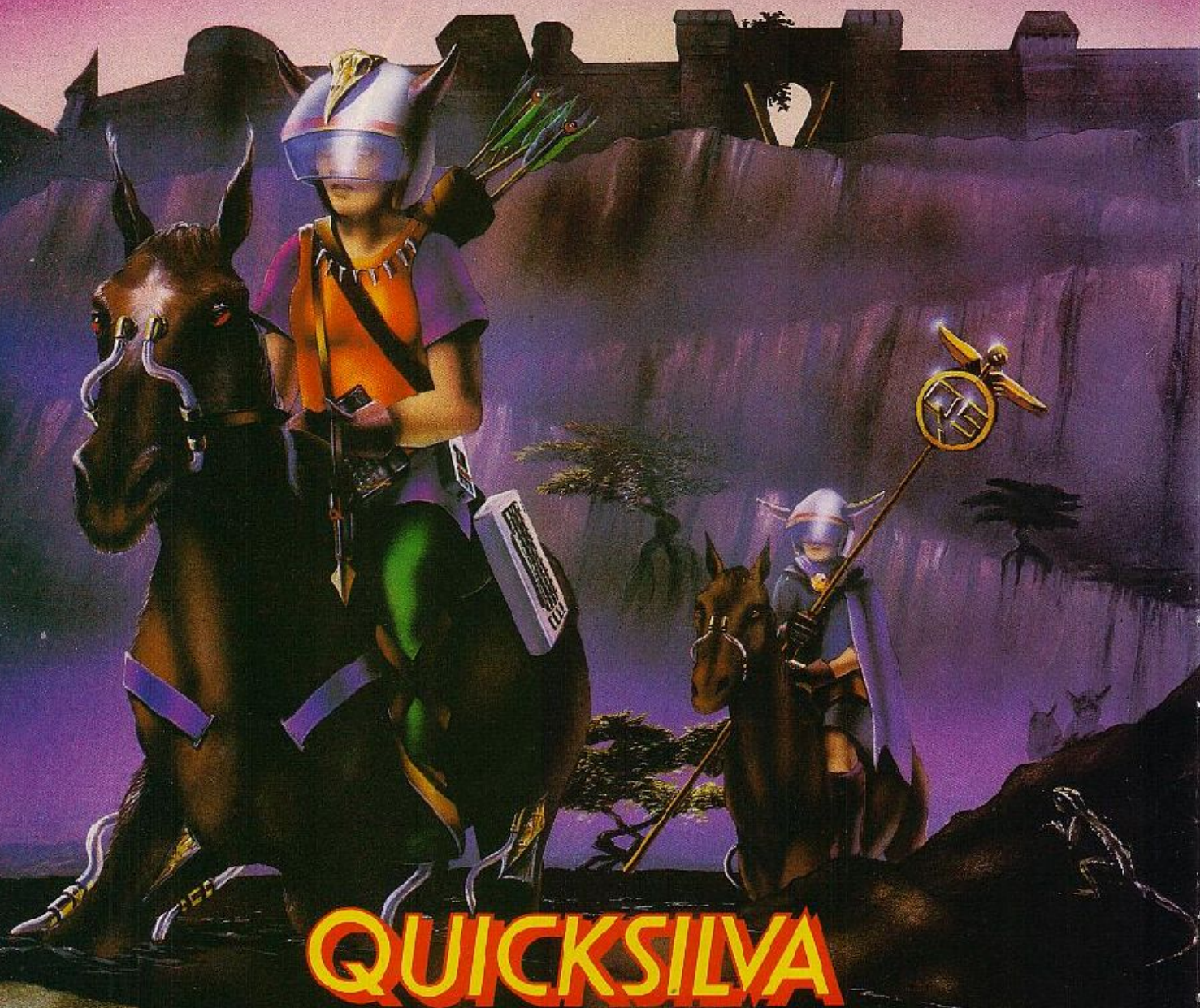
**ORIC**

RUMBELOWS, SPECTRUM AND ZAPPO COMPUTER CENTRES.





# A STEP BEYOND.



## QUICKSILVER

All Titles available mail order from:  
QUICKSILVER MAIL ORDER P.O. Box 6, Wimborne, Dorset BH21 7PY. Tel: (0202) 891744.

FRED



SPECTRUM 48K  
£6.95  
COMMODORE 64  
£7.95

SNOWMAN



SPECTRUM 48K  
£6.95

BOOGABOO



COMMODORE 64  
£7.95  
SPECTRUM 48K  
£6.95

VELVOR'S LAIR



ORIC: ATMOS £6.95  
SPECTRUM 48K  
£6.95

ANT ATTACK



SPECTRUM 48K  
£6.95  
COMMODORE 64  
£8.95

MINED-OUT



ELECTRON £6.95  
BBC £6.95  
LYNX £6.95  
SPECTRUM 48K £4.95  
ORIC: ATMOS £1.95

DRUMKIT



BBC £9.95  
(ON A BOX - BOOKLET)

GATE CRASHER



BBC/ELECTRON  
£6.95

NEW NEW GENERATION ON  
COMMODORE 64

TRASHMAN £7.95  
3D TUNNEL £7.95  
ESCAPE £7.95

NEW  
ELECTRO-ART  
ELECTRON  
£14.95

WARNING: These programs are sold according to QUICKSILVER Ltd's terms of trade and conditions of sale, copies of which are available on request.

Available at:

WHSMITH



WOOLWORTH

John Menzies

and leading multiple retailers and  
specialist computer stores

NEW GAMES 48K SPECTRUM -  
AVAILABLE NOW  
HAVE YOU JOINED THE  
GAME LORDS YET?  
Send S.A.E. for details and catalogue.



(continued from page 71)

Assuming that you decide to chance the state of wear of some second-hand equipment, where would you go to buy? Well, most of the computer and electronic magazines have a classified advertisement section but that always seems a little dangerous to me.

If you are sure that you can spot faults and find an honest seller then good luck. But remember that some faults show up only when the computer has been running for some time; others are intermittent and may occur only in certain combination of circumstances.

As an alternative to buying privately, there are a number of shops selling used computers; either domestic or commercial machines. The Morgan Camera Company, for example, is in Tottenham Court Road, London — 01-388 2562 — and from dealing in used cameras, the shop has expanded into buying and selling second-hand computers.

The current second-hand list is displayed on a blackboard outside the shop and there is a separate list inside for new and ex-demonstration computer equipment.

The people running the Morgan Camera Company say that they could sell far more computer equipment than they are able to buy, even for cash. However, unlike people selling cameras, the people who come to the shop with computers that they wish to sell often have unrealistic expectations of the price it will fetch.

## Second-hand prices

The shop expects to add 30 percent to the buying-in price and 15 percent VAT has to be added to that before the final figure is reached. In return for the 30 percent mark up, the shop checks that the machine is operating correctly, more necessary in some machines than others, and then guarantees the equipment for 30 days after the sale.

Some machines hold their value much better than others. A BBC model B, for example, can sell for £325 including VAT — new price £399 — while the Jupiter Ace can be had for as little as £15.

Other prices which are more or less typical are:

Commodore 64	£139
Acorn Atom	£40
Lynx	£115
Dragon	£65
Newbrain A	£103
Newbrain AD	£110
Spectrum	£99
Epson HX-20 with Microdrive	£325
PC-1500	£65
with printer and cassette unit	£75

Other companies deal in minicomputers such as the DEC range and more sophisticated peripheral devices. For example, Electronic Brokers Ltd, in Kings Cross Road, London — 01-833 1166 — carries a wide range of DEC central-processor units, memories and input/output devices. The DEC systems sold by Electronic Brokers are reconditioned and tend to cost a lot of money. Nevertheless, they offer enormous computing power at comparatively low prices.

Display Electronics, Biggin Way, Upper Norwood, London — 01-679 4414 — also carries a wide range of surplus commercial

computing equipment. Provided that you know how to connect it to your own machine, you might find good value, for example, in a Termiprinter, a 30-character per second, 120-column RS-232 interface printer, sold untested for less than £100.

P.R. Ralfe Electronics — 01-723 8753 — has offered 3in. Winchester disc drives in the last four months for as little as £250 plus VAT. The drives have a capacity of 19 Megabytes and are said to be brand-new — a remarkable cost/bit ratio — about 69,000 bytes per pound!

The P&R Computer Shop — 0621-57440 — has IBM Golfball printers from £70 plus VAT, but just what state that printer would be in and how much work you would have to do to connect it successfully to your own system is another matter entirely. But if you don't ask, you'll never know.

The instruction manuals are a vital part of any purchase. However poorly written they may be, an instruction manual contains a vast quantity of information that you will find great difficulty in acquiring from anywhere else. The Morgan Camera Co. emphasises that it will only pay a "top" price for a computer if it is complete with the instruction manual.

Books about a computer may well contain new and additional information to that found in the original instruction manual but are unlikely to repeat the boring but essential facts about which pins are connected to what in the printer interface.

Manuals are particularly important if you buy an older piece of equipment such as the Calcomp 565 plotter — Stewart of Reading, 0734-68041. A new A4 flat-bed plotter which will connect directly to an RS-232 interface and has some built-in intelligence might cost between £500 and £2,000.

The Calcomp plotter on the other hand, is a beautifully engineered drum plotter that will maintain its accuracy to  $\pm$  one division — 1/100 of an inch — over not only the width of the paper but also the length of the paper roll — 120 feet! The problem, and the reason why the Calcomp 565 can be bought for £165, is that there are only six things that the plotter can do:

- Pen up — pen down
- Carriage left — carriage right
- Drum up — drum down

Additionally the inputs to the plotter are not directly compatible with the usual TTL signal levels on the outputs from modern micro-computers. The Calcomp requires at least 10 volts at 20 mAmps.

The six basic movements are those of any XY plotting system without the high-level character plotting and line-drawing software that you or I would tend now to take for granted. If you know enough to write the software and construct a computer TTL-Calcomp interface, this equipment can be superb value, but you will need a complete instruction manual.

Apart from Osbornes, Apples and Atoms, the Morgan Camera Co. has less mainstream computers at very attractive prices. If you want to do some real Basic computing, the Sharp PC-1500 pocket computer with its four-colour printer/plotter and cassette interface is remarkable value.

This machine fits into part of a briefcase, has a reasonably standard Microsoft Basic interpreter, comes with 3.5 or 11.5 Kbytes of RAM, can handle two-dimensional arrays, and has 18 user-definable keys, a continuous Time statement and all sorts of other useful things.

The printer/plotter uses the same pens as the Oric/Tandy plotter although the paper is somewhat narrower. Programs can be Chained and arrays of data can be saved directly on to tape with a single instruction.

The listing shows a program that synthesises a wave-form from a fundamental frequency and up to 10 harmonics of various amplitudes. The third trace shows how third, fifth, seventh and ninth harmonics can be combined to produce a wave-form that is beginning to like a square wave.

## Good value Atom

By contrast, the fourth trace shows the result of combining even-order harmonics. The Sharp plotter would have produced finer resolution if I had set the Step instruction in lines 5110 and 5230 to one-degree intervals instead of five.

You should be able to reproduce this program on an Oric or a BBC computer keeping the following notes in mind:

GLCURSOR — 105, -400 — moves the pen of the plotter to the absolute co-ordinates X = 105 and Y = -400 without drawing a line.

SCRGN — sets the origin of the plotter to the current coordinates.

Line — -50, -6 — -50,0 — moves to the absolute co-ordinates -50, -6 and draw a line to -50,0.

Line — A,G — draws a line from the current pen position to the absolute coordinates A,G.

Pause — works like the Print command but waits for a fixed time of about 0.8 seconds. This is useful on the Sharp which has a single line display.

"S", "H" are labels that can be used with Gosub instructions, for example, or with the definable keys to isolate program segments that can be run separately.

LF — line feed. The succeeding number sets the number of line feeds to be sent to the printer.

Wait sets the time that the Print instruction will display messages or results on the computer screen.

The Status commands at the end of the program report the number bytes taken by the program, 1, and the remaining space, 0, in the 3.5K configuration.

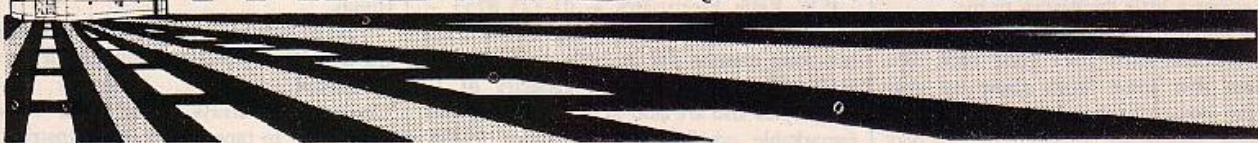
The Sharp PC-1500 has no Auto or Renummer instructions and no Procedures or Eval function. Nevertheless, it has good error messages, TRON and TROFF facilities for tracing program execution and is generally a clean and economical Basic interpreter. It is very usable and the printer/plotter adds both to the fun and the utility of this tiny machine.

Probably the best value of the second-hand computers that I have seen is the Acorn Atom for £40. Expandable, with a fast Basic interpreter, a built-in assembler and a reasonable software base, it is a machine that has simply gone out of fashion.

Consequently, it is less than half the price of a second-hand Spectrum and yet has a real keyboard and far greater potential.



# LOOKING FOR A HOME COMPUTER? ALL ROADS LEAD TO MICRO POWER



## MEMOTECH MTX500

An excellent choice for both the beginner and the Spectrum owner wishing to upgrade.

Features: 32K, Z80A processor, SN76489A sound chip (the same as in the BBC Micro), 256 x 192 graphics resolution, 16 colours, 32 sprites (easily programmed moveable objects to make games writing easier), two Atari-type joystick ports, composite video socket, number pad. Sophisticated utilities to aid programming include built-in Assembler/Disassembler and monitor.

Complete with 5 cassettes including Draughts, Toado and a Head Cleaner.

SPECIAL PRICE  
~~£275~~  
**£249**

## MEMOTECH MTX512

This computer has the same specification as the MTX500, but has 64K RAM (Random Access Memory).

SPECIAL PRICE  
~~£345~~  
**£299**

## COMMODORE 64 PLUS COMPATIBLE CASSETTE RECORDER

Features: 64K, Microsoft BASIC, 16 colours, 8 multi-coloured sprites, sound synthesiser (producing the best sound on any micro), 320 x 200 graphics resolution, four function keys, two Atari-type joystick ports, cartridge slot, parallel printer interface.

SPECIAL PRICE  
~~£268.95~~  
**£224.95**

## CASSETTE RECORDERS

(All Recorders have an integral index counter.)

Acorn Recorder (including leads) .....	£33.90
Elftone Digicorder (including leads) .....	£25.95
Sanyo DR101 Recorder .....	£39.00
Leads for above .....	£3.50

MAIL ORDER ADDRESS  
MICRO POWER LTD.  
SHEEPSCAR HOUSE  
SHEEPSCAR STREET SOUTH  
LEEDS LS7 1AD  
Tel: (0532) 434006

SHOWROOM ADDRESS  
MICRO POWER LTD.  
NORTHWOOD HOUSE  
NORTH STREET  
LEEDS LS7 2AA  
Tel: (0532) 458800

**MICRO  
POWER**



## BBC MODEL B £399

Made by Acorn and used extensively in schools and colleges.

SPECIAL OFFER:  
FOUR FREE MICRO POWER  
TAPES (worth up to £36.80)

Features: 32K, BBC BASIC (the fastest on any home computer), 8 display modes, 16 colours, 640 x 256 high resolution graphics, 3 voice sound plus noise channel, RS423 and Centronics printer interfaces, joystick port, built-in Assembler, 10 user definable function keys. Complete with a 16 program cassette and 512 page User Guide.

## ACORN ELECTRON £199

The scaled down version of the BBC Micro.

Features: BBC BASIC, 32K, 7 display modes (including 80 column text mode and 640 x 256 graphics resolution), 16 colours, 9 octave sound plus noise channel, built-in Assembler. Complete with an Introductory Cassette containing 16 programs, a User Guide, and a book: "Start Programming on the Electron".

FREE! MICRO POWER  
'CHESS' AND  
'KILLER GORILLA' TAPES

## SANYO GREEN SCREEN MONITOR DM2112 £74.95

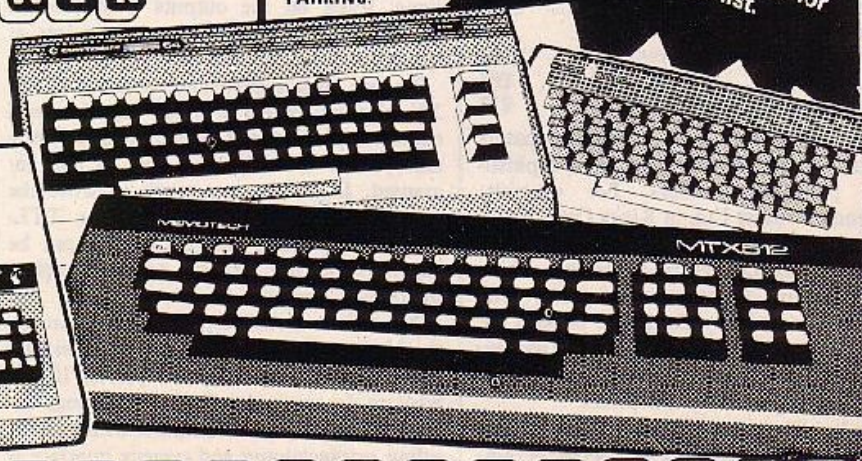
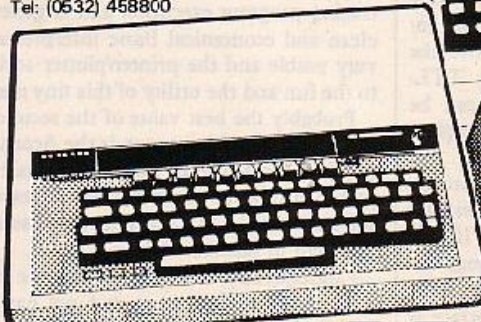
PRICES CORRECT AT TIME OF GOING TO PRESS. ALL PRICES INCLUSIVE OF VAT. HIRE PURCHASE AVAILABLE. PLEASE CONTACT US FOR FURTHER DETAILS.

CARRIAGE FREE  
FOR BBC AND  
MEMOTECH.

ALL OTHER  
COMPUTERS £5.00.

AMPLE  
FREE  
PARKING!

We also stock a  
wide range of  
printers, disk drives,  
monitors, joysticks, light pens,  
books, software and  
much more! Please send for  
our complete list.





# NEW

## COLOUR

### 32K

## GENIE

# SPACE TREK

Defeat the Klington invasion fleet. Includes 5 skill levels, hi-res graphics quadrant display, 8 x 8 galaxy, phasors, photon torpedoes, long range scans, and much 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  
Trade Enquiries Welcome



## 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
- ★ CASSETTE MAGIC SENSE
- ★ WRITTEN BY A COMPUTER PROFESSIONAL
- ★ FULL INSTRUCTIONS WITH THIS EASY TO USE COPIER

CAN YOU FIND A PROGRAM THIS WON'T COPY? — WE CAN'T!

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**

**WATCH OUT!** Coming soon from WIZARD SOFTWARE... **LIGHTNING LOAD** — A program which converts almost all your favourite software into a form which will allow loading at six times normal speed!!! A 12 minute program takes just 2 (two) minutes to load!

## ANSWER BACK SENIOR QUIZ GENERAL KNOWLEDGE

*THE ULTIMATE EDUCATIONAL QUIZ  
FOR AGES 12 & OVER*

BBC (32K)-ELECTRON

The ANSWER BACK Quiz provides an incredible adventure in education by combining a compelling Space-Age game with an immense series of questions on General Knowledge. The thought-provoking and well-researched quizzes contain an enormous total of 750 questions with 3000 answer options covering the following subjects:

- ☐ Astronomy ☐ Music ☐ Natural History ☐ Famous People ☐ Science ☐ Sport  
☐ History ☐ Art and Architecture ☐ Know your Language ☐ Discoveries and  
Inventions ☐ Legends and Mythology ☐ Geography ☐ Literature  
☐ Films, TV and Theatre ☐ Pot Luck

The highly sophisticated control program rewards each correct answer with another turn in the colourful, animated game.

### FEATURES INCLUDE

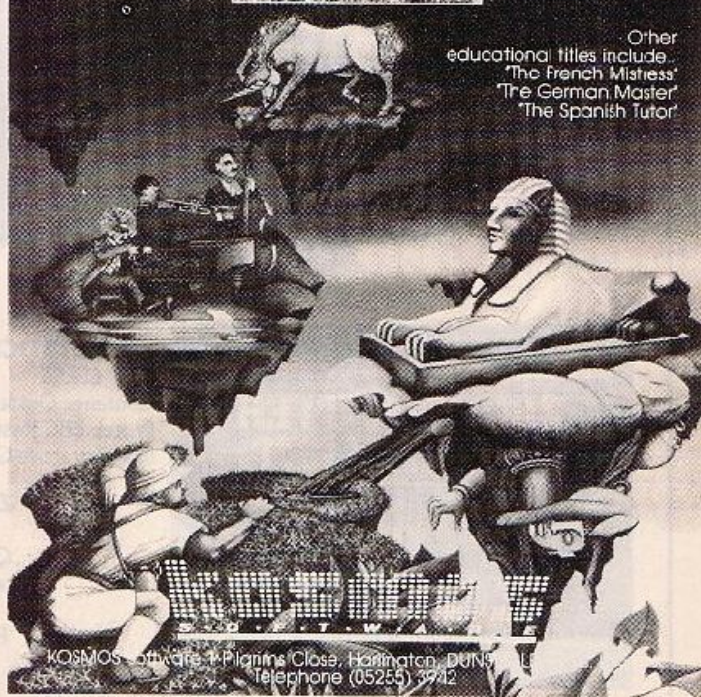
- ☐ Multiple choice answers ☐ True or False? ☐ Find the missing letters  
☐ "Pass" facility ☐ Immediate correction of errors ☐ Timer option  
☐ Performance summary ☐ Re-run of questions passed or incorrectly  
answered ☐ Full facilities for creating and saving an unlimited number of new  
quizzes

Available from your computer store or by mail order. Price £10.95.

AVAILABLE SHORTLY:  
ANSWER BACK  
Junior Quiz  
for the under 11's



Other  
educational titles include:  
"The French Mistress"  
"The German Master"  
"The Spanish Tutor"



KOSMOS Software, Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX  
Telephone (05255) 39712

The ANSWER BACK Senior Quiz will educate and fascinate ANYONE over 11 years old.

KOSMOS SOFTWARE, 1 Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX  
Please send me the ANSWER BACK Senior Quiz for the BBC/ELECTRON computer.

Mr/Mrs/Miss .....

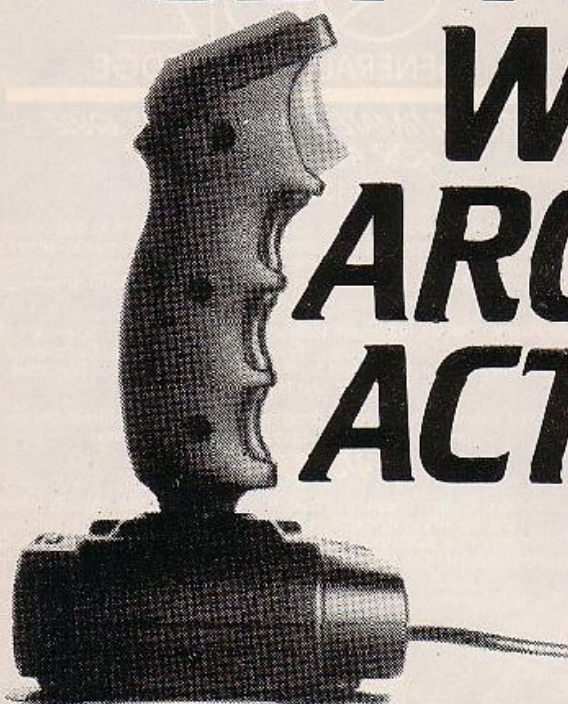
Address .....

Post code .....

I enclose a cheque/postal order for £10.95 payable to KOSMOS Software



# 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 9 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.



## prottek JOYSTICK INTERFACE

## ZX SPECTRUM SWITCHABLE INTERFACE £19.95

No programming required • Simply plugs in • No additional software • Compatible at the flick of a switch with Prottek (Cursor Keys) Kempston and Sinclair Joystick Software. Compatible with any Atari Type Joystick, e.g. Quickshot or Games Master.



## Prottek BBC COMPUTER JOYSTICK SET



## BBC JOYSTICK SET £19.95

Contents: Quickshot I Joystick • Prottek BBC Joystick Interface • In an attractive Gift Box.

## ZX SPECTRUM JOYSTICK SET £24.95

Contents: Quickshot I Joystick • Prottek Joystick Interface • Airliner — A Full Flight Simulation Program (16K) • In an attractive Gift Box.



# Prottek

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





Basic "dangerous" listing.

```
10 BORDER 1: PAPER 0: INK 7: C
LEAR 28099: PRINT AT 7,7: BRIGHT
1: "DANGEROUS GARDENS": AT 9,10: "
IS LOADING"
20 PRINT AT 11,9: "PLEASE WAIT.
": INK 0: LOAD "CODE
30 INK 7: DIM a$(5,14): DIM a(
5): DEF FN x(a)=10*INT (a/16)+a-
16*INT (a/16)
40 LET a(1)=2679: LET a$(1)="J
.Charlesworth": FOR a=2 TO 5: LE
T a$(a)="Anonymous": NEXT a
50 CLS : LET a=10: PRINT AT 1,
```

```
7: INK 7: "Dangerous gardens": AT
5,10: INK 6: "O Up": AT 7,a: INK
5: "A Down": AT 9,a: INK 4: "O Le
ft": AT 11,a: INK 3: "P Right": AT
13,a: INK 2: "Sym.Shft Fire": AT
15,a: INK 1: "O Abort"
60 PRINT AT 21,5: INK 7: "Press
any key to start"
70 FOR a=1 TO 1000: IF INKEY$<
>" THEN GO TO 1000
80 NEXT a: RANDOMIZE USR 28100
: GO TO 2000
1000 RANDOMIZE USR 28147
1010 LET sc=FN x(PEEK 23302)-100
*FN x(PEEK 23301)+10000*FN x(PEE
```

K 23300)

```
1020 FOR a=1 TO 5: IF sc(a) TH
EN NEXT a: GO TO 2000
1030 IF a<>5 THEN FOR b=5 TO a+1
STEP -1: LET a$(b)=a$(b-1): LET
a(b)=a(b-1): NEXT b
1040 INPUT "Name Please "; LINE
a$(a)
1050 LET a(a)=sc
2000 CLS : PRINT AT 0,10: INK 5:
"Hi Scores": FOR a=1 TO 5: PRIN
T AT 5+2*a,5: INK 6;a$(a): " ";a(a
): NEXT a
2010 PAUSE 200: GO TO 50
```

# DANGEROUS

Jason Charlesworth in a fight to the death.

DANGEROUS GARDENS is a game for the 16 or 48K ZX Spectrum which squeezes every ounce from the Spectrum's various features.

Listen to the music at the start of the game. Credit is due to Robert Rhodes who translated the music to Spectrum beeps.

The object of Dangerous Gardens is to rid the five gardens of the creepy crawlies which inhabit them. The problem is that the whole of the garden is radioactive — that's why the plants and animals have mutated and grown so big — and so touching anything results in the loss of a life. However, you are protected by your trusty spray-can.

This spray-can fires in the last horizontal direction it moved. Shooting a sparrow is worth 10 points, a snake 20 points, a spider 30 points, a butterfly 40 points, a wasp 50 points and shooting a widget — the bouncing creature — is worth 99 points. Each of these animals — with the exception of the widget — is featured in one of the five screens.

To set up the game, type in the short Basic listing and save it with:

SAVE "Dangerous" LINE 1

Next type

RANDOMIZE USR 0

to clear out the computer, then type in listing (continued on page 81)



# GARDENS

Listing 1.

```
20 DEF FN x(a)=(CODE a$-48-(3
9 AND a$(1)>"?"))*16+CODE a$(2)-
48-(39 AND a$(2)>"?")
30 CLEAR 30300: LET x=30335
40 FOR a=100 TO 470 STEP 10: R
EAD a$: IF LEN a$<>132 THEN GO T
O 70
50 LET t=VAL a$( TO 4): LET a$
=a$(5 TO ): FOR b=0 TO 53: LET z
=FN x(a$(b+2+1 TO b+2+2)): POKE
x,z: LET t=t-z: LET x=x+1: NEXT
b: IF t THEN GO TO 70
60 PRINT AT 0,0: "Line ";a: " OK
": NEXT a: PRINT "No errors foun
d": STOP
70 PRINT "Error in line ";a: S
TOP
100 DATA "B107cd2670cd416f06647
610+d0605bcd906f06647610fcdca57
3cd6d700664c5cd5072cd6473c110f6c
d4470c110dfc9cd416fcd875cd2670c
d906f06647610fd"
110 DATA "B942cda573cd6d70cd7e6
efefc8cd9970ed4b015bcd2d77cd87
```

```
5ed4b015bcd2d77cd9976cd5072ed4b0
15bcd2d77cd876ed4b015bcd2d77cd9
976cd6473cd9970"
120 DATA "76373a005bfe002020cd0
a70fe0028b8cd6cd4470cd906f066
47610fcdca573cd6d70cd6cf189f210
75b35cd96f3a035b3dfe00c832035b1
8d401feefed78e6"
130 DATA "714001fe01c83effc9e5f
521b26e47fe0028087e23feff20a10f
3112f7fed537b5c7efeff2806cd83752
318eef1e1c90e0d04ff13160eff13071
10404ff050e1411"
140 DATA "2937ff05081504ff110e1
40d03ff050400131411080d06ff13070
4ff120f0011110e1612ff120d000a041
2ff120f0803041112ff0114131304110
50b080412ff1600"
150 DATA "3495120f12ff0f1104121
2ff12ff130eff1213001113ff03000d0
604110e1412ff06001103040d12ff011
3ff0900120e0dff020700110b0412160
e111307ffcd6b0d"
160 DATA "602721885c3e07328f5c0
10801ed43885c3e11cd8b6e343e12cd8
```

```
b6e010603ed43885c3e13cd8b6e343cc
d8b6e343ccd8b6e010810ed43885c3e0
dcd8b6e3c34cd8b"
170 DATA "61536e3c34cd8b6e3c34c
d8b6e3c34cd8b6e0d3e07328f5c21885c010
a05ed43885c3e05cd8b6e343a075bcd8
b6e010507ed43885c3e06cd8b6e3c34c
d8b6e343a075bcd"
180 DATA "671508cd8b6e3c34cd8b6e015
bcd2d77ed4b015b06003e14cd1f763e1
476cd1f7604cd1f763a025bb820f0c90
602c521e8031119000618e5d5c5cd50
3cd1e1a7ed521b"
190 DATA "542510f1c110e5c93a205
bfef82013210f5b06057efef82009232
3232310f53e01c977c921005b0633360
02310fb21015b368c233654233603cd3
f733e0132325bc9"
200 DATA "456121205b06143600231
0fb21005b360023368c23365421075b7
e3cfe0520019777cd3f733e0132325bc
921085b4e23463e13cd1f76ed4b015bc
d2d773e05210c5b"
```

(listing 1 continued on page 81)



# The No.1 Football Game\* Now available for the BBC model 'B'

BBC Model 'B',  
ZX81 16K,  
ZX Spectrum 48K

## Addictive 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 21284

Comments about the game from press and our customers

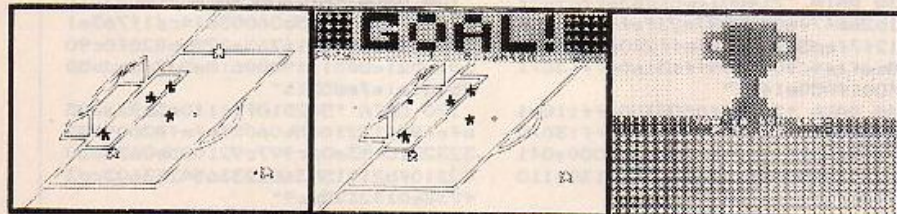
"FOOTBALL MANAGER is the best game I have yet seen on the Spectrum and my personal favourite of all the games on any micro... To the ordinary person it is an excellent view of what can be done in the field of computer games... The crowning glory of this game is the short set pieces of match highlights 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 free cash advances plus free cash 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 this is. I have spent over 45 hours on it." (Mr. D. Fearn – Gloucestershire.)

Available from computer software stockists nationwide, including **Boat** & **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 \$15.0

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.



(listing 1 continued from page 79)

```
210 DATA "5718e5f54e2346cd7572c
d1f76f1e123232323d20ecc901fe7fe
d78e602fe0220093a3232bfe002807185
832325b18533e0132325b21245b06057
efe002807232323"
220 DATA "651610f6183d3a215ba71
73d77e5d5c5cd0172cd1d1e13a025b3c2
b772b3a015d0d08473a215b878787878
0774e2346cd02793effae777c0f0f0fe
603f658b73e07ae"
230 DATA "71567721225b0605e5c5c
d1771c1e123232323d4c9e54e2346237
e5fe1fe00c8e5cd02793effae777c0f0
f0fe603f658b73e07ae777bfe01200e7
9c6084fefef8380e"
240 DATA "6748e123233600c977d60
84ffe0838f2e1e5712370cd02797efe0
0201136ff7c0f0f0fe603f658b73e07a
e77e1c93a205bfe00201621085bcdcc7
1fe01200c3eff32"
250 DATA "6212205b3e99cd3174182
2210c5b3a05e5f52323237efe04300a2
b2b2bcdcc71fe012012f1e1232323233
d20e3e1232323600cde971c9f1e123232
336ff3a075b3c87"
260 DATA "6140878787cd317418e35
e235678923813fe10300f7b0d6079:300
97bc6189138033e01c93e00921e8031
103000606e5d5e5cd5b503e11190019d
1c110f1c9215a00"
270 DATA "8511104000614c5d5e5c
db503e1d1c1a7ed5210f2c97ef8c8f8f
f2008cd7572cd1f761809d6f9a71fc61
0cd1f762323e3d77fef8c8d6f9a71fc
610cd1f76c9211e"
280 DATA "65845bfeff20cf3e13cd1
f7618e0210c5b3e05e5f5cd6472f1e12
3232323d20f2c9a2534623237e2b2bf
e0430a8cd7572182ae5237ee603573a0
75b8787825f1600"
290 DATA "3671218b72197ee1c9000
1020304050607080908090e0f0e0f0a0
b0c0dcd1f76237ee0:77237efe00200
20505fe0120020404fe0220020c0cfe0
320020d0d78fe08"
```

```
300 DATA "5426300406091819fe953
8040696181179fe0830040e081808fee
6380a0ee618002b7ee6077723b7ee50
35f7ee6fca71f1f3d2810171b3772b7
02b7123cd7572cd"
310 DATA "51361f76c93a785ce61cc
62083777b23cd4f280e3a015b938043
6021810360318pc3a0c25bb8380436011
80236007ee601ee01a7175f2b7ee6fcb
318bb214b731108"
320 DATA "5E575b0c11900ed0c978y
0fe0e0808340308963400e6963400780
83401c808340100ed4b085b3a205bfe0
0c242723e13cd1f762a0a0u7c80fe0a3
804fe9538057ced"
330 DATA "7108446778477d81fe0a3
804fee638057ded446f794fed43085b2
20a5b3e13cd1f76c93a075bcdce74cd7
f74cdef73cd3174011516ed43885c3a0
75b3cd8375cd6"
340 DATA "660273c97732f85ced4b0
15b3a035b6e603fe00c8f5e01c0b0ed4
3015bcd2d7779c6104f1d20f2c1ed430
15bc9012f7fe4d37b5c010116ed43885
c3e0f328f5c211d"
350 DATA "7709747efe00c0feff200
a3a885c3c32885c2318eed83752318e
812020e1104fffff5f01fffff110
e140d0300e5d5e5f501071cd43885c1
1df7eed537b5c21"
360 DATA "6157045b1e03232386277
7300e2b7ec601277730062b7ec601277
721045b3e0f328f5c7ef5e6f01f1f1f1
fcd8375f1e60fcd8375231d20ebf1c1d
1e1c91e030a00cd"
370 DATA "7185b6741ec00efcddb67
40606cd987406a8cd9874c90e08cd027
936ff24364f7c0f0f0e6a03f658b73a4
f79c608fef74f38e5c90606cd0279737
c0f0f0fe603f658"
380 DATA "7050a7364f0478feaa20e
bc9f597328d5cdd6b0df187212e755f1
600195e2356b7efeffc84fe6f81f1f1
4779eae07735e7f5e53885c+e0c3281
2fe04280efe0520"
```

```
390 DATA "6294023e03e5cd3875e12
318d4.10f7eed537b5cd6031e5f5fe0
028021e07b328f5c1fcd837510fb231
8b50f7a7c7ae07a207b547b217375a71
71853001246f5e"
400 DATA "64902356ed537b5c237e3
28f5c2397cd8375e02cd8375ed4b885
c0d0d04ed43885c7e328f5c3e01cd837
53e03cd8375c9df7c0402ff7c04031f7
02471f7e4141e5"
410 DATA "6480d5c3f5ed4b885c0ce
d43885c0da7cb10cb10cb10cb11c1c
b1171717ed5b7b5c833001145fcd027
960801a77132410fa257c0f0f0fe603f
658b73a8f5c77f1"
420 DATA "7068C1d1e1c9066421447
9c57ee5fef128324f0600cd2b2d0c1c80
0cd2b2def0538e123e54e0600cd2b2d0
16400cd2b2def0338cd803e123cd127
6fef120f0c110c9"
430 DATA "893018c22346e123e5761
0fd18e8c1c901:fedfed78e02fe02c83
effc9e5d5c5f5dde521457616005f191
91917e328f5c23235e23565dde1cdf
677dd1e1c1d1e1"
440 DATA "5268c90700d47b0700ff7
b0700bf7b07009f7b45001f7c45003f7
c45005f7c45007f7c45009f7c4500bf7
c46003f7d46005f7d46007f7d46009f7
d4300bf7d4300df"
450 DATA "53007d07003f7e07005f7
e07007f7e06009f7e0700b7f7eed4b015
b050d78c61257601e0acdeb78202942c
deb782023440c1d20f0ed4b015b0d057
9c60a57a1e12r"
460 DATA "5922eb784c200b4acdeb7
B2005041d20f0c932005bc91100003a2
15b6f01fedfcd78cb4720041e022e01c
b4f20041efef2e0001fefb7d32215bed7
8cb47200216fe01"
470 DATA "7540fefed78cb4720021
602ed4b015b7a80fe093805fe9730014
77b81fe093805feef30014fed43015bc
945c5d5e53e47738fcd21f7cd027
9e5286c3271777c"
```

(continued from page 79)

1 and run it. Save it to :ape directly after  
Dangerous:  
SAVE "CODE1" CODE 30355,2432  
This then needs to be repeated for listing 2

except the code needs to be saved after Code 1:  
SAVE "CODE2" CODE 30300,2240  
These two blocks of code must now be  
combined into 1 block of code so type  
RANDOMIZE USR 0

Rewind to the start of Code 1 and:  
CLEAR 28099:LOAD "CODE1" CODE  
28100:LOAD "CODE2" CODE 30532  
SAVE "CODE" CODE 28100,4667  
To run type Load "

#### Listing 2.

```
20 DEF FN X(A$)=16*(CODE A$-48
-(39 AND A$(1>"5"))+CODE A$(2)-
48-(39 AND A$(3>"9"))
40 CLEAR 27777: LET A=30000: F
OR A=100 TO 370 STEP 10: READ A:
LET B=VAL A$(TO):...ET A$=A$
(5 TO): IF LEN A$<160 THEN GO
TO 70
50 FOR B=0 TO 79: LET Z=FN X(A
$(B+2)+TO B+2*2): POKE X,Z: LE
T X=X+1: LET T=Z: NEXT B: IF T
IMEN UO IJ UO
60 PRINT AT 0,0:"Line 'ja:' OK
": NEXT A: PRINT "Nc errors foun
d": STOP
70 PRINT "error in line 'ja:' S
TOP
100 DATA "7346040f0cfe603f658b73
a8f5c5fae77237bae778b607280c7b1
12000195fae772b7bae775099e13e:00
8dd4e00602afcb191f10f623ae772b7
ea977083d28110814dd23247ce60720e
0424bcd027918d9"
110 DATA "799b7c0f0cfe603f658b7
73a8f5c5fae77237bae77e1d1c1f1c97
c0f0f0fe603f658b73a8f5c5fae7778b
7e02807b11200019ae77e159503e1:00
8dd7e0cae77083d281108dd23247c14e
60720ed424bcd02"
120 DATA "829b719e67c0f0f0fe60
3f658b73a8f5c5f18aed0279e5ca857
8ed435e78323b787c0f0cfe603f658b7
73a8f5c5fae77237bae77237bae7778b
7e028107b112000195fae772b7bae772
b7bae77e13e1008"
130 DATA "829b719e67c0f0f0fe60
3f658b73a8f5c5f18aed0279e5ca857
8ed435e78323b787c0f0cfe603f658b7
73a8f5c5fae77237bae77237bae7778b
7e028107b112000195fae772b7bae772
b7bae77e13e1008"
140 DATA "7417c97ced43d0780f0f0
fe603f658b73a8f5c5fae77237bae777
8e607280c7b112000195fae77237bae7
7e13e1008dd5e0dd5e10237eaa772b7
```

```
eaeb77083d281908dd23247c14e60720e30
85f080128103e10"
150 DATA "8257938047cd027918d5f
c0f0f0fe603f658b73a8f5c5f1852a5c
5cd0c279fe00280e477ba71710f18017
ee680c1e1c978a71f371fa714a8e6f8a
8677970707a8e6c7a807076f79e607c
9000000000000000"
160 DATA "371800000000000000000000
00000000000000000000000000000000
00000000000000000000000000000000
36c23704673236b237326236c237326
65b2350256c2373236c23704673236b2
373235b236e6973"
170 DATA "6003235b237235c236c2
36f2374235b2373235c2373235c236c2
36f2374235b2373235c2373235c236c2
36023542360236c236c236c236c236c2
378235c2378237b238446846846846846
3844684237f2381"
180 DATA "6128237c2374468146782
37a237b2378237a467c2378237c2378a
67a4678f109467e4678a6782378a6782
37323523702373467546e236e236f2
36c235e4670236c2370236c466e66c0
000000a0b010a13"
190 DATA "173010a0b130a13132b0
4c42b17042b04112b17110b04050b040
6cb04070b04080b040d0b040e0b040f0
b0c4100b1b050b1b060b1b070b1b080b1
bcd0b1b0e0b1b0f0b1b10c1b08b1c0b0
d1c12081c120d0c"
200 DATA "13360b090c0b0a0c0b0b0
cb0c0c14090c140a0c140b0c140c0f0
81d01081504080e06081b100a040a0a0
fc0a080e0d09070d150e0d031009130
89080130917132c01082c010c21a082
c1a0c0b04010b0c"
210 DATA "1559020b0d3080d040b0
d110b0d170b0d130b0d143b17010b120
20b120303012040b1210b1210b:2130
b1214ff4b04044b1304433c0913060c1
3180c4401084417081c0111c1c:10a0
4040a0c030a120e"
220 DATA "19870a09120a151208080
d08160d080f100d040cd01a0c090e0d0
```

```
910cd444304044310045b01115a14112
30e1164040d64100d140f08140f090a0
1080a1d08080408081a0809070309:70
080a0e0d1408ff"
230 DATA "12803b04c130509230a1
11c0e041c0e090b0705cb07060307070
b07080b04080c0d050c0d060c0d070c0
d080c11030c1108081a040a0f030a010
e0a05010a0710a1510ca190fa01d0ef
f000000000000080"
240 DATA "411540303b3e111b0c070
2408000000000000814d4f7c8b870e040
080c0000000000008040733e111f0f070
20203000000000040a1fde3cd8f8f0e04
0210800000000001028fb3e1f1d0e070
202030000000001"
250 DATA "7125020cd7c8d0830e04
0201000000000000f87b3c1b1f0f070
2041800000000000102e7c8b8f0e040
040c0807c725e5c3c01c3c7842efff4
f1f00000000000000000207078e8ef
cfc783c72ff70e"
260 DATA "64653e060e1c3973777f7
e7c380000000000000040e8ec7e7ef7
e7e3c000000000000000040e0e071b5
f3f1e0:3e4e7a3a3c30381e4ff7fff
f1fe0000000000000000002070e13e7f77
e7e3c3c4e4ff70"
270 DATA "60377c6070389cceeef7
e3e1c0000000000402227494f793a404
4a8a800000000020402ea92f2eac5252
515150000000000000008040217294f53
994a00000000000000102040e894f2ac
9225000003c1e1f"
280 DATA "72440f0000e1f1f1f1f1
f7f7202020404080808f1cfcfcfcfc
cf87000f5e3c03040808101078f4cfc
cf3c7840c0340a010080804041e3f3f3
f3f1e0c14f77f4ddff77303030703030
30307c0f87ef7f"
290 DATA "7379fbffcc0c0e0c0c0c
0c0e00304090a05030e5ff4ff4e49141
0090303c4018e00078a4c4e223d0000
200000001020201030edff4ff4e49141
222000044ef18e788078a4c4e2261d000
0000003344c2219"
300 DATA "7763041e255369a61c010
```

```
2020080404020a0e2f7fffef2a02041
080000e11304c621d1e255369a69c000
00000008040402020e2f7fffef2a0905
04300043249e9593ab4773487b5b48
41930204c92a5a9"
310 DATA "9462c9d5e2ced2e1ad2d2
1120c0212295554b532323334f45747
4433040894a5a4a2d2c4c4ccf2a22e2
e120c3c3c107ebdc3f1fdcfcdffdfdf
dfdf722722f2222f22200001824429
181f00000100e0"
320 DATA "7416f0783c1c020100000
000001038c7d6447c7210101c0e0204
040403e7b0ddff77f7070e0c0f05060
707057cf6bdf7f3f6e0e0e0d07060e0a
0e0200644e4e4e4a03050305a0e05020
040506050e0d7b5"
330 DATA "45445240202050500e08
022006085494244001010100001020
1040060850a5b89242400020401000209
0220286462020119393f3b1c0104081
010701c264640f0989cfcd38f020100
8030e0102071c24"
340 DATA "71897c40407c040404040
40407e060a0bec6fa0c0c18a0a0a0a0
0c0803c7e666666667e3c:8381B18181
83c3c7c7e063e7c607e7e7f74030f0f0
37f7e01e36667f7f06067f74067e7f0
37f7e3f71607e7f"
350 DATA "7758b37f3e7f7106060c0
c13183e7437f74637f3e7e74637f3f0
37f7e7f7637f746363637f74637e7e6
37f7e3f74606060607f7f7e74636363
37f7e3f7607878a07f3f3f74607878b5
060603f74606063"
360 DATA "78017f3f036363637f7f6
363637f74181818181817f7f74606666
67e3c53666c7878e666360606060606
07f3f7f7666363636363637f7b6f6
76363636363636363636363636363636
e60603e7f63637b"
370 DATA "64007f3e037e7f637f7e6
c66633f7607e3f037f7f7f7f0c0c0c0
c0c0c363636363636363636363636363
61c08363636363636363636363636363
63636363636363636363636363636363
07f7f00000000000"
```



# JET MAN

David Hodgetts shows you how to stop the deadly Whizzers.

## Listing 1.

```
1 DATA 150,0,177,0,201,32,208,36,165,38,145,0
2 DATA 150,22,177,0,201,32,208,24,230,38,165,38
3 DATA 145,0,198,39,166,0,164,1,142,61,3,140
4 DATA 62,3,169,0,141,63,3,96,141,60,3,166
5 DATA 3,164,1,142,61,3,140,62,3,96,234,234
6 DATA 234,32,240,25,206,240,2,240,1,96,169,11
7 DATA 141,240,2,32,224,26,96,0,169,147,32,210
8 DATA 255,169,8,14,15,144,169,255,141,5,144,162
9 DATA 0,169,14,157,66,30,157,154,30,157,242,30
10 DATA 157,74,31,157,162,31,232,224,22,208,234,162
11 DATA 0,138,157,234,31,160,2,152,157,234,151,232
12 DATA 224,13,208,241,162,0,169,5,157,242,150,169,7,157
13 DATA 3,157,154,150,169,5,157,162,151,232,224,22,208,226
14 DATA 74,151,169,4,157,162,151,232,224,22,208,226,31,141
15 DATA 169,10,141,131,30,141,219,30,141,51,31,141
16 DATA 139,31,162,23,142,225,31,232,142,248,31,232
17 DATA 142,227,31,232,142,225,151,142,225,151,142
18 DATA 142,249,31,162,7,142,225,151,142,248,151,142,249
19 DATA 227,151,162,6,142,247,151,142,248,151,142,249
20 DATA 151,162,21,142,43,30,162,3,142,43,150,96
21 DATA 162,66,150,30,134,0,132,1,32,80,26,162
22 DATA 242,160,30,134,0
90 PRINT "*****JET MAN PART 1*****"
95 PRINT "PLEASE WAIT...."
100 FORA=6400TO5656:READN:T=T+N:IFN=3THENS=S+1
110 POKA,N:NEXT
120 IFT<30660THENPRINT"DATA ERROR":END
130 IFS<14THENPRINT"ZERO MISSING ERROR":END
135 IFS>14THENPRINT"TOO MANY ZEROS ERROR":END
140 PRINT"NOW LOAD THE NEXT PART"
```

## Listing 2.

```
1 DATA 0,132,1,32,80,26,162,162,160,31,134,0
2 DATA 132,1,32,80,26,162,149,160,30,134,0,132
3 DATA 1,32,111,26,162,69,160,31,134,3,132,1
4 DATA 32,111,26,32,0,27,32,192,27,96,174,61
5 DATA 3,134,0,174,62,3,134,1,169,32,160,0
6 DATA 145,0,160,22,145,0,173,64,3,133,0,173
7 DATA 65,3,133,1,76,0,25,0,160,0,177,0
8 DATA 200,201,32,203,249,192,23,16,17,136,169,14
9 DATA 145,0,169,32,200,145,0,200,145,0,200,76
10 DATA 82,26,96,160,26,177,0,136,201,32,208,249
11 DATA 192,4,48,17,200,169,14,145,0,169,32,136
12 DATA 145,0,136,145,0,136,76,113,26,96,0,0
13 DATA 120,169,160,141,20,3,169,26,141,21,3,88
14 DATA 96,0,0,0,169,0,141,19,145,141,34,145
15 DATA 173,17,145,41,31,74,74,133,144,173,17,145
16 DATA 41,32,74,5,144,133,144,173,32,145,41,128
17 DATA 74,74,74,74,5,144,73,31,133,144,169,255
18 DATA 141,34,145,152,6,254,112,28,202,208,250,32
19 DATA 128,27,76,191,234,0,0,0,169,32,141,66
20 DATA 30,141,175,30,141,242,30,141,95,31,141,162
21 DATA 31,96,0,0,0,0,0,0,0,0,0,0
22 DATA 0,0,0,0,162
90 PRINT "*****JET MAN PART 2*****"
95 PRINT "PLEASE WAIT...."
100 FORA=6656TO6912:READN:T=T+N:IFN=0THENS=S+1
110 POKA,N:NEXT
120 IFT<22064THENPRINT"DATA ERROR":END
130 IFS<44THENPRINT"ZERO MISSING ERROR":END
135 IFS>44THENPRINT"TOO MANY ZEROS ERROR":END
140 PRINT"NOW LOAD THE NEXT PART"
```

JET MAN is a game for unexpanded Vic-20 and a joystick. The game comes in five parts, the first three set up the machine code, the fourth is for the graphics and the fifth is the Basic part of the program. The game itself is mainly machine code, and has 10 different speed levels. At the start of the game you are faced with five bars running across the screen, in these bars are spaces which move, and you have to guide Jet Man through them, but be careful, as you only have one Jet Man.

When you reach the top of the screen you then have to touch the switch at the top left, this then switches off the generator which supplies the energy to the Whizzers which move along between the force fields, and these will kill Jet Man if he is moving and they hit



### Listing 3.

```

1 DATA 162,110,160,30,134,4,132,5,32,45,27,162
2 DATA 198,160,30,134,4,132,5,32,45,27,162,30
3 DATA 160,31,134,4,132,5,32,45,27,162,118,160
4 DATA 31,134,4,132,5,32,45,27,96,165,4,133
5 DATA 6,165,5,133,7,190,4,160,22,177,4,201
6 DATA 10,240,8,201,12,240,4,136,208,243,96,169
7 DATA 32,145,4,145,6,136,240,19,177,4,201,15
8 DATA 240,13,201,16,240,9,169,10,145,4,169,11
9 DATA 145,6,96,169,32,145,4,160,22,169,10,145
10 DATA 4,96,0,0,32,80,25,32,144,26,96,0
11 DATA 0,0,0,0,0,0,0,162,0,160,30
12 DATA 134,2,132,3,32,145,27,230,3,32,145,27
13 DATA 95,160,255,177,2,201,11,240,8,201,13,240
14 DATA 17,136,208,243,96,169,13,145,2,136,162,12
15 DATA 145,2,200,76,157,27,169,11,145,2,136,169
16 DATA 13,145,2,200,76,157,27,0,0,0,0,0
17 DATA 152,6,254,112,20,202,208,250,162,0,160,30
18 DATA 134,0,132,1,32,219,27,230,1,32,219,27
19 DATA 95,234,234,160,255,177,0,201,15,240,8,201
20 DATA 15,240,11,136,208,243,96,169,16,145,0,76
21 DATA 231,27,169,15,145,0,76,231,27,96,95,0
22 DATA 95,0,0,0,0
90 PRINT "*****JET MAN PART 3*****"

```

him, but they will not kill him if he is standing still.

Sometimes Jet Man can survive a collision with a force field, but not too often. Jet Man has one defence against the Whizzers, these are small rotating bombs which he can lay in the path of the Whizzers and if a Whizzer hits one it is destroyed, but another Whizzer appears at the left hand side of the screen. Jet Man has an infinite supply of these bombs.

At the bottom of the screen is part of a plane: from where Jet Man starts from, and at the bottom left is the generator which supplies the Whizzers with their energy.

In the machine code is an interrupt to control the spinning of the Whizzers and one to read the joystick.

Each of the first four programs which set up the machine code and graphics has two check sums. The first check sum is to check that all of the data is correct, and the second is to check that the number of zeros is correct. If the data is wrong then you will get a data error, or if the number of zeros is incorrect then you will get a "too many zeros error", or a "zero missing error", in this case you will have to re-check the data.

After each loader has been run you will then be asked to load the next part.

### Listing 4.

```

1 DATA 0,0,0,0,0,3,30,255,0,0,0,3
2 DATA 62,245,170,85,0,0,31,245,170,85,170,85
3 DATA 3,127,234,85,170,85,170,85,255,95,170,85
4 DATA 170,85,170,85,255,85,170,85,170,85,170,85
5 DATA 192,126,171,85,170,85,170,85,170,85,170,85
6 DATA 170,85,170,85,0,0,0,192,252,87,170,85
7 DATA 0,0,0,0,120,248,95,3,15,51,193
8 DATA 193,51,15,3,192,240,204,131,131,204,240,192
9 DATA 3,12,62,255,255,62,12,3,192,48,124,255
10 DATA 255,124,48,192,255,47,230,193,47,230,193,255
11 DATA 0,24,60,78,114,60,24,0,0,24,52,119
12 DATA 110,44,24,0,12,27,30,76,254,237,237,235
13 DATA 252,170,74,170,74,10,10,15,49,216,120,50
14 DATA 127,183,183,55,63,95,82,85,82,80,80,240
15 DATA 0,19,51,11,7,3,3,3,0,3,3,3
16 DATA 7,11,51,19,0,3,6,15,28,255,244,31
17 DATA 0,255,68,255,68,255,0,252,68,252
18 DATA 0,255,68,255,68,255,0,31,31,24,27,24,31,31
19 DATA 69,255,71,252,20,31,31,24,27,24,31,31
20 DATA 68,255,71,252,20,31,31,24,27,24,31,31
90 PRINT "*****JET MAN PART 4*****"
97 FORA=7399T07679:POKEA,0:NEXT
100 FORA=7158T07399:READN:T=T+N:IFN=0THENS=S+1
110 FORA=7158T07399:POKEA,0:NEXT
120 IF T<23893 THEN PRINT "DATA ERROR":END
130 IF S<31 THEN PRINT "ZERO MISSING ERROR":END
140 IF S>31 THEN PRINT "TOO MANY ZEROS ERROR":END
150 PRINT "NOW LOAD THE NEXT PART"

```

### Main game.

```

0 POKE650,128:Q=72:POKE36879,10:PRINT "***** JET MAN *****"
1 PRINT "BY DAVID HODGETTS"
2 PRINT "JOYSTICK ONLY"
3 PRINT "PRESS FIRE TO START":SYS6800
4 PRINT "SELECT LEVEL: ";SE
5 IF (ST AND 8) THEN SE=SE+1:Q=Q+20:IF SE>9 THEN SE=0:Q=72
6 IF (ST AND 4) THEN SE=SE-1:Q=Q-20:IF SE<0 THEN SE=9:Q=232
7 FORS=0T050:NEXT:IF (ST AND 16)<>16 THEN 4
9 CH=17:POKE36878,15:POKE828,0:POKE752,1
10 POKE832,0:POKE833,30:POKE829,0:POKE830,30:POKE37159,0
11 SYS7024:FORA=0T050:NEXT
13 SYS6458:IF PEEK(828)<>0 THEN 500
14 IF (ST AND 1) THEN X=X-22
15 IF (ST AND 2) THEN X=X+22:Q=1
16 IF (ST AND 4) THEN X=X-1:CH=19
17 IF (ST AND 8) THEN X=X+1:CH=17
19 HL=8130+X:H=INT(HL/256):L=HL-256*H:POKE832,L:POKE833,H:POKE38,CH:SYS6702
20 IF (ST AND 16) THEN GOSUB 101
30 POKE35877,50:SO=SO-3:IF SO<220 THEN SO=242
60 GOTO 13
101 POKE8130+X+1,16:RETURN
500 IF PEEK(828)<>21 THEN 510
501 PRINT "SECTION: ";SE;"CLEARED":SE=SE+1
502 FORA=200T0240STEP5:FORS=10T00STEP-1:POKE36875,A-2*S:POKE36875,A-20-2*S:NEXT
503 NEXT:POKE36875,0:POKE829,0:POKE830,30:POKE828,0:SYS7024:X=0
504 Q=PEEK(37159):Q=Q+20:IF Q>255 THEN Q=255
505 POKE37159,Q:GOTO 13
510 CLR:PRINT "GAME OVER":POKE36877,0:POKE36869,240
520 FORA=0T050:NEXT:RUN

```



```

1 PRINT "WALLY THE WORM"
2 SC=0:LV=0:NM=0:ES=1000
3 NM=X:IX=20+5*INT(LV/16):NM=5
4 GOSUB 990:GOSUB 990:POKE52+14,0:POKE54+15,3
5 J=0:FORND=0TOPEEK(J):IFJ=0,THENIFJ+DAND11THEND=J
6 C=0:FORC=0TOPEEK(C):IFC=0,THENIFC+DAND11THEND=C
7 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
8 L=L+1:IFL=10,THENL=0:POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
9 FORK=1TO10:NEXT
10 BO=0:IFBO=0,THENBO=0:PRINT "LEVEL 1: BO=0: PRINT "
11 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
12 BO=1:IFNM=0,THENBO=0:GOTO 10
13 BO=1:IFNM=0,THENBO=0:GOTO 10
14 BO=1:IFNM=0,THENBO=0:GOTO 10
15 BO=1:IFNM=0,THENBO=0:GOTO 10
16 BO=1:IFNM=0,THENBO=0:GOTO 10
17 BO=1:IFNM=0,THENBO=0:GOTO 10
18 BO=1:IFNM=0,THENBO=0:GOTO 10
19 BO=1:IFNM=0,THENBO=0:GOTO 10
20 BO=1:IFNM=0,THENBO=0:GOTO 10
21 BO=1:IFNM=0,THENBO=0:GOTO 10
22 BO=1:IFNM=0,THENBO=0:GOTO 10
23 BO=1:IFNM=0,THENBO=0:GOTO 10
24 BO=1:IFNM=0,THENBO=0:GOTO 10
25 RETURN
26 IF,OR,THEN,ELSE
27 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
28 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
29 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
30 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
31 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
32 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
33 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
34 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
35 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
36 IF,OR,THEN,ELSE
37 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
38 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
39 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
40 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
41 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
42 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
43 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
44 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
45 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
46 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
47 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
48 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
49 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
50 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
51 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
52 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
53 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
54 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
55 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
56 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
57 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0
58 GOSUB 990:LV=LV+1:PRINT "LEVEL 1: LV=1: PRINT "
59 FORK=1TO10:NEXT
60 POKEV3+14,0:POKEV2+15,0:POKEV1+16,0:POKEV0+17,0

```

# WRIGGLY

WALLY THE WORM has got himself lost. While he was out looking for food he managed to stumble into a maze, which luckily was full of his favourite food, mushrooms. The trouble is he can't find his way out, so you're going to have to help him.

Slithering around the rooms in this maze is hard work and Wally needs to keep up his strength by eating the five mushrooms in each room. When the room is empty, the doors will appear and Wally can wriggle through them into the next room. The real problem is that every time Wally eats one of the mushrooms he gets a bit longer, his coactor has told him not to bump his head on anything so hitting the walls or even himself won't do Wally any good.

Don't worry though, in the same way that cats have nine lives, worms have three ... usually.

At the start of each screen after the room has been drawn, Wally the Worm will appear near the bottom left hand corner of the room, a joystick connected to port 2 will control Wally's movement.

In each room there are five mushrooms and these will appear one at a time at random positions in the room. For each mushroom that Wally eats you are awarded 20 points. In addition to this, at the bottom of the screen is a bonus counter which starts at 20 and counts down to 0 as Wally moves around the screen.

When Wally eats a mushroom the value of the bonus counter is multiplied by the number of mushrooms Wally has eaten since the start of the screen or since last bumping into something, whichever was the most recent. This bonus is added onto your score and displayed at the bottom of the screen before the bonus counter is reset for the next mushroom.

It is possible in theory to score 400 points per room but that is very unlikely to ever happen.

The other thing that happens when Wally eats the mushrooms is that he grows longer. As you progress through the game the rate at which he grows will also increase — remember Wally isn't allowed to bump into himself.

After the fifth mushroom has been eaten, the exits from the room will appear and Wally can leave by any of them; at the higher levels some of the exits may be blocked but there is always a way out.

There are 16 levels or rooms in the game but after level 16 the program repeats the patterns for rooms 8 to 16 but increases the difficulty by making Wally grow longer.

## Key sequences

You start the game with three worms and an extra worm is awarded every 1000 points up to a maximum of nine. The number of worms you have left along with your score and the current high score is displayed on the top line of the screen.

Table 1 gives the appropriate key sequences for the control characters in the program.

Some of the graphics characters in the listing may also be a little confusing but it is important to get them correct so table 2 gives details of the important ones used.

The program contains a small machine code routine in the data statements so make sure you save a copy of the program before trying to run it. The machine-code routine is called for each character that Wally moves, it makes a small change to the user-defined characters used for Wally's body to improve the impression of movement as the worm moves through each room.

Keith Suddick explains how you too can help Wally the Worm.

## Program breakdown.

lines	1-90	Initialisation for program, game and room respectively.
lines	100-170	Main program loop, reads joystick, checks for collisions, decrements the bonus counter and makes the noise of Wally moving.
lines	200-250	If there are any mushrooms left then this routine generates the position for a new mushroom on the screen and also resets the bonus counter.
lines	300-390	Calculates the points for eating a mushroom, adjusts the high score if

Table 1.

HOME	ESC
CURSOR DOWN	↓
CURSOR RIGHT	→
REVERSE ON	↵
CTRL + 1	1
CTRL + 3	3
CTRL + 5	5
CTRL + 7	7
COMMODE + 1	1
COMMODE + 3	3
COMMODE + 5	5
COMMODE + 7	7

Table 2.

line 210	! is commodore K
line 240	✓ is shift @
line 1510	= is commodore 0

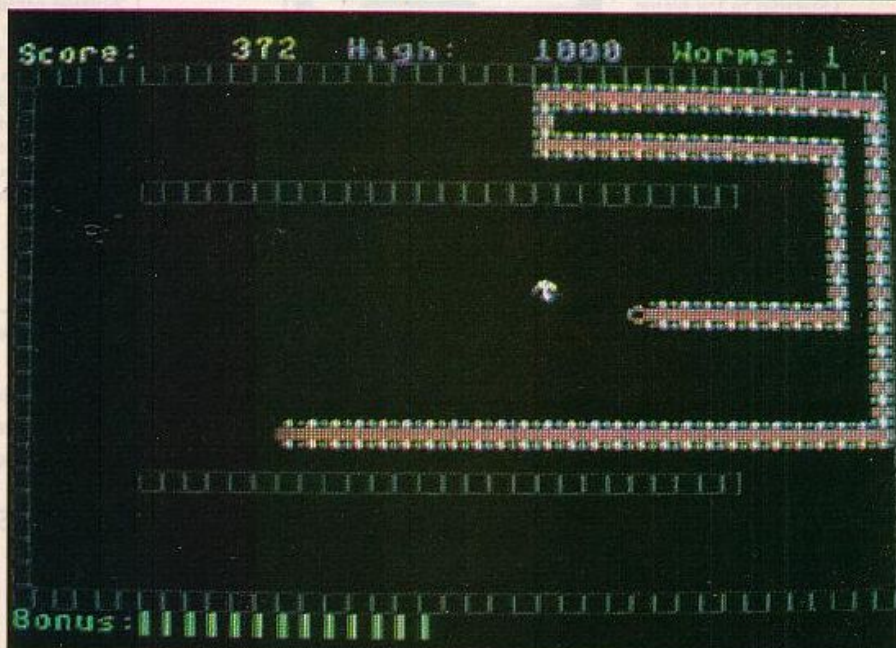


```

2140 PRINT "*****MURMURS. IE CAREFUL NOT TO LET
2150 PRINT "*****HIM BURE INTO ANYTHING .... EVEN
2160 PRINT "*****HIMSELF !
2170 PRINT "*****PRESS THE LEFT BUTTON TO START
2180 IFPEEK(JP)AND16THEV2190
2195 GO TO10
9000 DATR0,0,0,0,0,0,0,0
9010 DATR0,0,0,0,0,0,0,0
9020 DAT19,0,100,100,100,100,100,100
9030 DATR0,24,118,255,153,24,60,0
9040 DATR0,20,0,0,0,0,0,0
9050 DATR19,20,0,0,0,0,0,0
9060 DATR19,20,0,0,0,0,0,0
9070 DATR19,20,0,0,0,0,0,0
9080 DATR19,20,0,0,0,0,0,0
9090 DATR19,20,0,0,0,0,0,0
9100 DATR19,20,0,0,0,0,0,0
9110 DATR19,20,0,0,0,0,0,0
9120 DATR22,0,133,231,0,0,0,0
9130 DATA 96
9200 DATR2,10,4,1,6,5,7,8
9300 DATR1,0,0,2,1,0,1,1,1,1
9310 DATR1,1,0,1,1,1,1,1,1,1
9400 DATR7,32,12,12,0
10010 DATR6,31,0,6,31,18,0,0
10020 DATR6,31,0,6,9,9,5,10,0
10030 DATR5,12,0,11,15,34,14,19,21,32,5,0,0
10040 DATR4,7,5,0,18,20,6,9,9,21,14,18,28,38,14,22,0
10050 DATR3,32,6,5,10,13,9,22,20,32,10,14,0
10060 DATR4,39,8,9,1,13,14,15,30,30,14,22,0
10070 DATR3,10,5,14,32,34,9,20,4,31,18,20,19,21,7,9,0
10080 DATR1,9,2,7,7,38,19,12,18,30,6,7,16,33,11,14,7,8,12,10,0
10090 DATR1,9,2,7,7,15,26,5,16,26,18,19,23,7,7,17,35,34,8,16,28,32,12,10,0
10100 DATR1,8,13,13,11,15,24,4,38,13,15,7,32,29,30,34,19,19,0
10110 DATR2,12,3,8,32,39,6,22,6,26,13,14,21,23,2,9,12,17,15,20,0
10120 DATR13,25,2,9,15,23,13,22,6,5,10,11,31,32,12,13
10130 DATR1,8,6,6,27,38,17,18,30,30,8,1,10,15,16,0
10140 DATR1,6,7,14,10,9,10,12,31,38,16,22,13,4,16,22,1,35,10,22,1,31,2,6,0
10150 DATR1,16,2,4,19,29,14,8,10,11,11,22,11,38,21,22,34,30,2,20
10160 DATR1,19,11,12,1,10,5,6,14,15,16,17,24,25,2,4,0
10170 DATR1,30,2,10,10,20,22,10,13,16,19,27,30,5,14,6,20,9,9
10180 DATR2,26,14,14,1,14,14,15,21,30,17,17,35,35,5,16,0
10190 DATR7,6,10,140,10,16,143,12,10,130,16,38,143,12,13,133,16,0,0
12000 DATR19,15,15,209,18,15,195,16,15,24,14,30,289,13,15,149,12,0,0,0

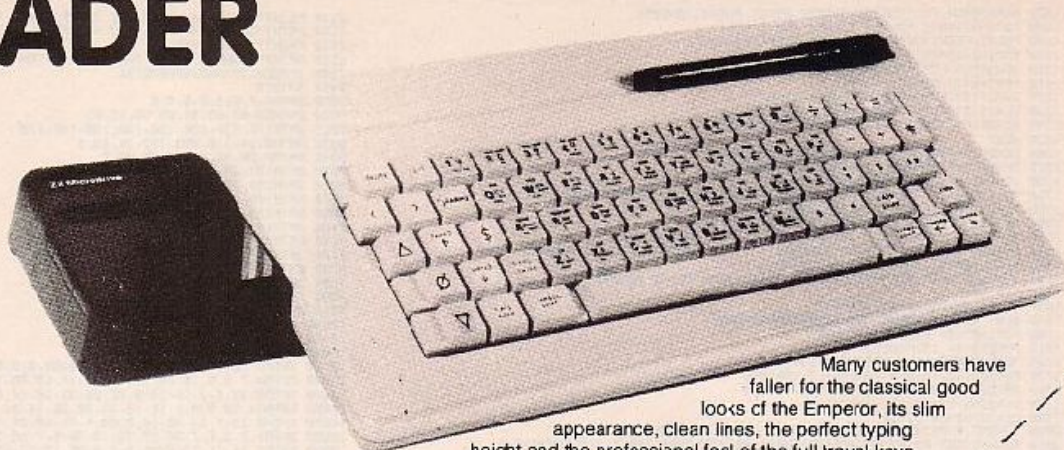
```

lines	400-460	Opens up the exits from the room on the screen and clears the bonus counter from the bottom line.
lines	500-590	Moves the worm, section by section out of one of the exits and prints message to inform player of next level.
lines	600-699	Prints a message and makes noises to indicate a collision and a loss of a worm.
lines	700-780	Game over message and option to play again.
lines	800-849	Plays fanfare for completion of room.
lines	850-899	Plays tune at end of game.
lines	900-999	Draws the current room.
lines	1000-1270	Redefines the character set including the user defined characters, installs the machine code routine and reads in the remainder of the data into the appropriate variables.
lines	1300-1640	Set up the video chip and define the remainder of the required variables.
lines	1700-1780	Set up sound chip and define variables for sound effects.
lines	2000-2999	Title graphics, instructions and wait for fire button to start the game.
lines	9000-9080	User-defined character data.
lines	9100-9130	Machine-code routine data.
lines	9200-9300	Worm colours and joystick to movement conversion data.
lines	10000-10051	Data for the construction of the 16 rooms.
lines	11000-12000	Data for the fanfare and the end of program tune.





# 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  $\times = - + \div$  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.

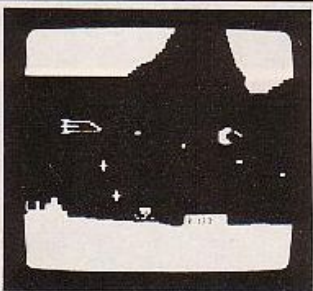
We have also maintained the easy fitting, you need 1 screw driver — and 5 minutes AND, for a quality keyboard, incredible low cost of £59.95.

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, Inc.  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
Please fill in this coupon and your address which is also block capitals to ensure prompt delivery

# SLOGGER SOFTWARE

MACHINE CODE GAMES FOR BBC 'B', ELECTRON, SPECTRUM 16/48K  
**A MAZE IN SPACE** **DOGFIGHT**

Use Joysticks or Keyboards to navigate your Starship to the planet surface and then into the maze below. Having been told in which section of the maze your target is hidden, your objective is to seek out and destroy it to complete a mission. Beware of the numerous alien defence systems. Two levels of difficulty! Horizontal and diagonal scrolling! How many missions can you complete?



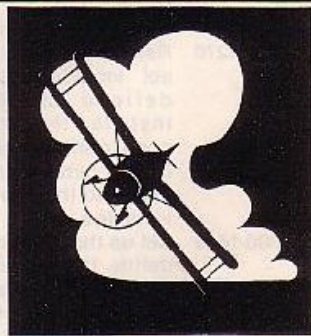
Available now	Cassette	Disc
BBC 'B'	£9.95	£11.95

Special Offer

Dogfight and A Maze In Space together  
Cassette - £14.95 Disc - £16.95

Please state 40 or 80  
Track if disc

Still undoubtedly the most exciting 2-player game available. The objective is to fire sufficient shots into your enemy aircraft to force it to explode. Eight levels of difficulty. Sun, moving cloud, lightning, ground all provide real combat environment. Can you beat your friends?



Available now	Cassette	Disc
BBC 'B'	£9.95	£11.95
Electron	£7.95	n/a
Spectrum	£5.50	n/a

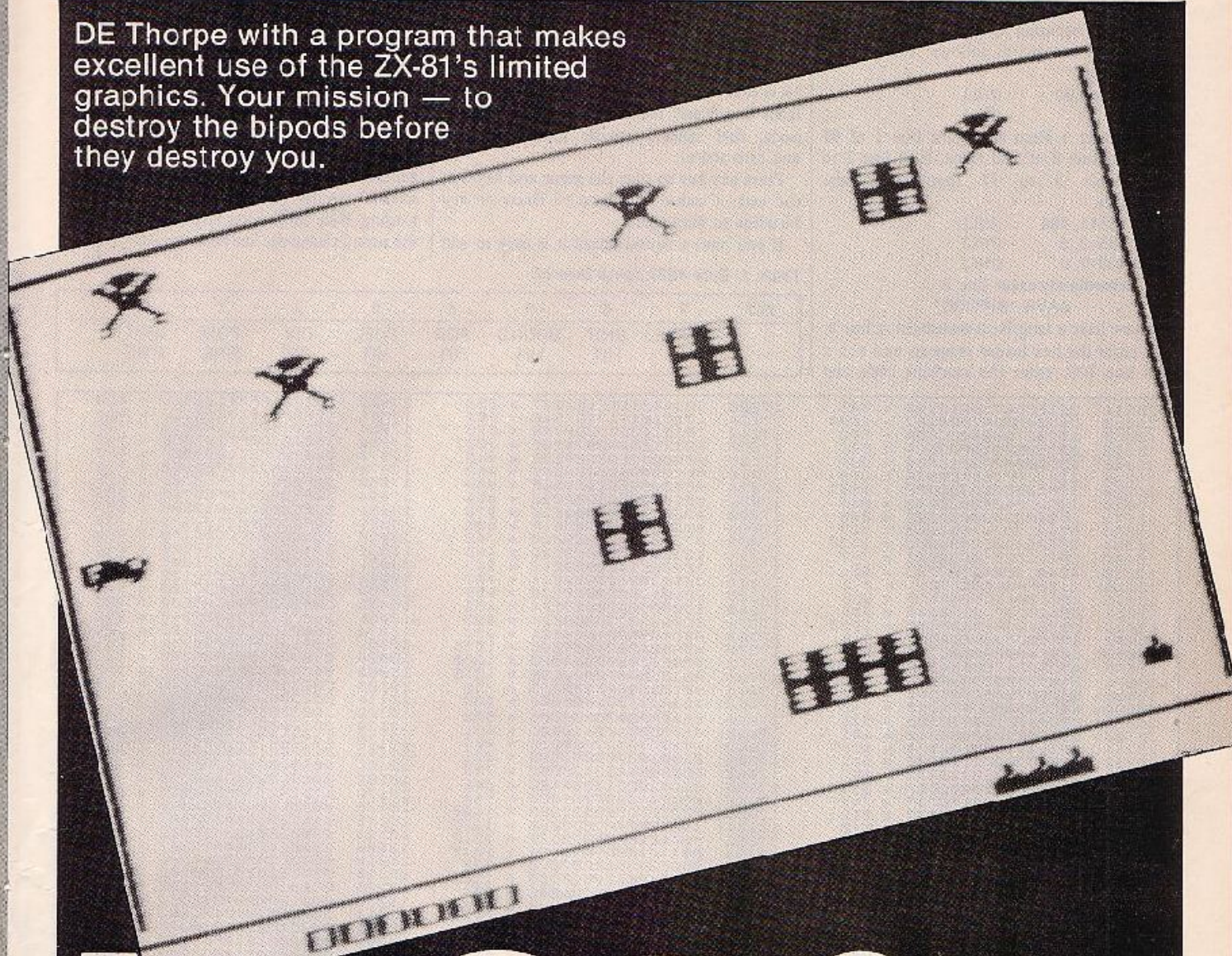
### SLOGGER SOFTWARE

215 BEACON ROAD  
CHATHAM, KENT  
Tel: (0634) 811634

All prices include  
VAT and postage



DE Thorpe with a program that makes excellent use of the ZX-81's limited graphics. Your mission — to destroy the bipods before they destroy you.



# BIPODS

MARTIAN PODS HAVE landed in your battle zone. At first they are protected by force fields but to attack they divide into deadly Bipods. You must try to destroy them using a missile launcher controlled by the cursor keys.

Don't be too trigger happy — fire is 0 — since there may be a re-loading delay at a crucial moment. The missile launcher will move until the opposite key is pressed to stop or reverse it.

You score 20 points for a bipod and 10 points every time the fuel tanker successfully crosses the screen. There are bonus points at the end of each game level.

*(continued on next page)*

Hex loader.

```

99 REM HEX LOADER
100 PRINT "START ADDRESS"
110 INPUT S
120 PRINT "FINISH ADDRESS"
130 INPUT F
140 FOR N=S TO F STEP 8
150 LET T=0
160 PRINT N;" - ";
170 INPUT A#
180 PRINT A#;" = ";
190 INPUT TOT
200 PRINT TOT

```

```

210 LET Z=0
220 FOR K=1 TO LEN A# STEP 2
230 LET C=(CODE A$(K)-28)*16+00
DE A$(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

```



(continued from previous page)

The game occupies just over 2K of machine code and is entered as follows: First, lower RAMtop by:

POKE 16389,90 (N/L)  
NEW (N/L)

Now enter a Rem statement line 1 of 97 zeros and line 2 of 128 zeros. Edit line 2 to make lines 3 to 17 then enter the commands:

POKE 16511,194 (N/L)  
POKE 16512,8 (N/L)  
POKE 16510,0 (N/L)

Now immediately enter line 2:

SAVE "BIPODS"

You now have a long Rem statement at line 0.

Now enter the hex loader program and run it from line 100, enter the machine code and

when finished, add the following Basic lines:

5 RAND USR 16592  
8 STOP

Now save the program before running it. Run from line 5 and the screen should show the pods, fuel tank, missile units, obstacles and zero score.

Press any key to start the game and key S at the end of game to return to Basic or key Newline to play again.

If you have a sound board it is easy to add

sound to this game. There is space to add to your machine-code sound routines after the main program and these can be called from:  
40d0 to set up the sound registers  
4115 to produce the sounds.

The sounds to be produced are indicated by Bits being set in Byte 4021. After creating a sound the relevant Bits must be reset. If your generator uses the AY-3-8910 sound chip the sounds can be produced simultaneously by loading Byte 4021 into Register 7 to enable the sound channels. See table 1.

Table 1: Byte 4021 comprises of:

BIT	7	6	5	4	3	2	1	0
	SPARC	UNIT	BOUND	POD	FUEL	DIV	POD	UNIT
	HIT	HIT	HIT	HIT	HIT	IDE	FIRE	FIRE

16514:	3E1EED47D0218102	= 785	17226:	3D141E1E1E1E2217	= 250	17938:	201221FFFF191815	= 654
16522:	C9308ED47D021A7	= 1000	17234:	171E1E1717221E1E	= 223	17946:	21E0FF1918102122	= 644
16530:	420321009A0EC006	= 600	17242:	1E1E143D3D3D97F2	= 575	17954:	20C9180A21200012	= 149
16538:	20389E2310FB36C9	= 691	17250:	A21E1E1E2A2979E5	= 1010	17962:	1804210E1E1E1E1E	= 943
16546:	230D20F3C9210FD9	= 997	17258:	9E00009E9E9E9E9E	= 948	17970:	20282CFE1E1E2325	= 677
16554:	112100F30E9E0616	= 539	17266:	9E00009E9E9E9E9E	= 948	17978:	7FE0A2329FE0B38	= 773
16562:	13FE05C0ED78D3FF	= 1291	17274:	9E00009E9E9E9E9E	= 948	17986:	21FE0C2310FE0D23	= 575
16570:	13C0C740C5C25040	= 946	17282:	9E00009E9E9E9E9E	= 948	17994:	13FE05C0ED78D3FF	= 1291
16578:	C92920C2D2002DD2	= 846	17290:	A0203D0B0A099E32	= 970	18002:	1CFE122823D13E08	= 654
16586:	A740C36147E90000	= 827	17298:	3333333329E91F	= 601	18010:	12FDCB21EE182471	= 918
16594:	00C09440C08B40C0	= 1030	17306:	573D3D3D209E9E20	= 746	18018:	18C03508FDCB21F6	= 849
16602:	C042C0C740C5C250	= 737	17314:	151C2410249C3E20	= 630	18026:	18C03508FDCB21F6	= 849
16610:	4040411EB421A7723	= 696	17322:	5E29E15209E9E999	= 943	18034:	3508FDCB21EE1824	= 918
16618:	1310FA3A4A403251	= 612	17330:	36E8152499E9E924	= 800	18042:	3508FDCB21EE1824	= 918
16626:	420C0420D0A44C0D	= 905	17338:	1D201CBE209E9E20	= 659	18050:	1D12EBE173237223	= 385
16634:	DE42C0D3745C0D942	= 836	17346:	1D200308209E9E24	= 601	18058:	E505C2D04810FE00	= 306
16642:	C07C423A2540FEFF	= 1063	17354:	1C9923D3D09E9E24	= 697	18066:	200CE1E13535ED48	= 318
16650:	28F8C0D83460603C5	= 949	17362:	A52495A5249E9E24	= 91E	18074:	4610CE135C9E1E1	= 1260
16658:	C09643000000C0C0	= 827	17370:	A5A52482249E9E9E	= 1034	18082:	C9A949A97FB9A0A4	= 1278
16666:	43C09047CDB645CD	= 1163	17378:	9E9E9E9E9E9E9E9E	= 1034	18090:	8785A580B0A5A4A0	= 1271
16674:	F447C10578C5FE01	= 1036	17386:	A01E1E9A9E9E9E9E	= 1016	18098:	643A4A40F0E0C85F	= 346
16682:	28E0B7280C00C036	= 770	17394:	9E1E1E9E9E9E1313	= 730	18106:	C8231608212A4219	= 408
16690:	44C05454C0474518	= 716	17402:	161A131300006802	= 200	18114:	5E23562A0C401936	= 412
16698:	0705122100775523	= 532	17410:	66027A037C009C01	= 635	18122:	1D23351011210013	= 222
16706:	551A1FE1228062310	= 481	17418:	0605055002442A00	= 461	18130:	3612233512E82A48	= 538
16714:	F5161300E5EBC0F0	= 1197	17426:	4019350523360511	= 256	18138:	4073237213237323	= 538
16722:	45E1872F313E1202	= 841	17434:	2100193605283605	= 210	18146:	72232243403D324A	= 501
16730:	3E1D127025713334	= 437	17442:	E0500E441313ED53	= 700	18154:	40FDCB2106C9E5C0	= 1402
16738:	40E0FB720C0C0B3	= 911	17450:	0E4410C1110044E0	= 642	18162:	3047C5233C400C03	= 735
16746:	45A34440CB27E51F	= 715	17458:	530E44C092F2540E	= 743	18170:	47D1A7732A3440C8	= 928
16754:	C3216005F210A77	= 511	17466:	A721F70FE22C0AEE	= 1420	18178:	45280C8A38042803	= 410
16762:	135E2C3561A1E120	= 570	17474:	7421EFF747C03E39	= 125	18186:	14115C340280A07	= 553
16770:	63E6C0F846E7C4E8	= 1466	17482:	F54421E5FA7505E2	= 1310	18194:	798B380428031C1C	= 467
16778:	41E1B197E1E122358	= 843	17490:	281421EFDFA7710A2	= 1041	18202:	10D6C1C34A477E87	= 1094
16786:	F51F2804FE2202F2	= 949	17498:	28652A3C40C87C3E	= 636	18210:	2803D1A7C34440A7	= 940
16794:	E37C0B728187D1E03	= 901	17506:	FDC04C4E020970D0	= 1401	18218:	D1F5E237A7C9A05A	= 1120
16802:	F5E028221E10FEFF	= 1107	17514:	4E46280AFC0B4E36	= 868	18226:	0C0413A7E521121	= 531
16810:	231C10FEDF03171E	= 565	17522:	2A3C40C88EC92A3C	= 862	18234:	0001000A704E052	= 491
16818:	9118137D1E0E8E01	= 612	17530:	40CBFE7FE8923A	= 1105	18242:	30FB05197D4FC900	= 734
16826:	230C10FE2128071E	= 444	17538:	F18C280FE68230E5	= 866	18250:	2A0C402317100A7A	= 323
16834:	87FE222801103A45	= 627	17546:	E523E51813E528E5	= 1037	18258:	B728031910FD7987	= 824
16842:	40FE0A2817C5E173	= 928	17554:	180E551121019E5	= 571	18266:	2804412310FD0906	= 520
16850:	F0C821CE8E8A4340	= 1103	17562:	180E5511DFFF19E5	= 1008	18274:	003404D2B7280547	= 493
16858:	2322243407732372	= 499	17570:	17FE06200A011A	= 682	18282:	0F3240F40C8A4F65	= 1002
16866:	214540341810ED58	= 585	17578:	77223C403E1012C9	= 587	18290:	280A7FDCB4E6FDC0	= 1205
16874:	3C40A7E0D522007E8	= 684	17586:	3FFE1D23F100201E	= 836	18298:	21E6C0C328047B728	= 305
16882:	3503FDCB21F6C01C3	= 1185	17594:	C9FD2821F618E7FD	= 1444	18306:	172A004211010319	= 187
16890:	0744000000002A0C	= 134	17602:	254E4200A0F0C84E	= 927	18314:	E57E30FE1D200536	= 780
16898:	42052023361F10FB	= 489	17610:	C62A3C40C8B8E92A	= 1000	18322:	132B18F577E110F0	= 931
16906:	1121000515193620	= 189	17618:	3C40C8FE7FE83A28	= 1139	18330:	C3A402C28470601	= 821
16914:	13F8061F361F28B10	= 448	17626:	39FE8C28B0F3B828	= 1241	18338:	2A0C4011F80219E8	= 645
16922:	F8381F1137FFF0515	= 858	17634:	4778A82H3C407E1B	= 833	18346:	2189710C847C901	= 1011
16930:	19362010F8C90005	= 579	17642:	7FFE002802340935	= 742	18354:	06152A0C40112200	= 105
16938:	000025005400E500	= 215	17650:	3535092A0C407E1E	= 829	18362:	19E8210358180AC0	= 631
16946:	A0000101D7012B02	= 435	17658:	7FFE002802340935	= 583	18370:	90421A7E1D221BAF	= 766
16954:	70214402H3007000	= 424	17666:	933504H3C407E1E	= 784	18378:	121323138038F0FE	= 843
16962:	A50105028C009602	= 513	17674:	E520281E8728036D	= 845	18386:	202804FE7520E805	= 925
16970:	3402A8001D020604	= 343	17682:	C821D0FE08772B77	= 803	18394:	11FE001B01131310	= 538
16978:	E0582C422A0C4019	= 581	17690:	28771317282B361D	= 378	18402:	E8C8FE0320033C18	= 814
16986:	0501233502112100	= 195	17698:	233605233607233E	= 287	18410:	06FE09220C3E101D	= 630
16994:	193804283830E058	= 511	17706:	40C928361D02B31D	= 517	18418:	18072A3C407E9E09	= 794
17002:	54421313ED355442	= 658	17714:	F0344000002A0C40	= 500	18426:	201C0D8A4800632A	= 526
17010:	18D2112C42ED5354	= 769	17722:	11C001183602333E	= 268	18434:	0C40111203197FE2	= 519
17018:	42C06513E05B0C40	= 701	17730:	07223C40C92A2540	= 511	18442:	0A28052310F8182E	= 432
17026:	21F5F913231A8723	= 680	17738:	2BA721EFFF0ED52C0	= 1458	18450:	361D0CDE42C061F1	= 814
17034:	F4FE762805CD9D42	= 1095	17746:	FDCB21C52A3C407E	= 979	18458:	2100775E23561A7E	= 647
17042:	13F1D511E170019D1	= 950	17754:	567FE0A26127E0C0	= 945	18466:	1228092310F53A4E	= 495
17050:	12E9C9C05E5E5E5E	= 1351	17762:	2816FE082805230E	= 421	18474:	108728232036407E	= 628
17058:	F84206074F81110FD	= 804	17770:	0E1813280E10180E	= 168	18482:	FE092805237FE50E	= 732
17066:	4F09E80508E11977	= 707	17778:	11DFF8190E11180E	= 581	18490:	2003C03745C90608	= 577
17074:	13D511210019D110	= 532	17786:	112100190E07FEFE	= 484	18498:	2A0C4011F0021911	= 432
17082:	F5E1D1C1C9000506	= 108E	17794:	20280E1D0280A3F	= 450	18506:	F8431A5E0CA8A830	= 1024
17090:	2A0C4011FC021923	= 449	17802:	FE0AD833FE133819	= 897	18514:	04231313F5C3B143	= 763
17098:	361310FB9C905032A	= 592	17810:	C93A4240FE0AC871	= 966	18522:	3A5142FE12280300	= 520
17106:	0C401110F03192336	= 225	17818:	5E2A404023232240	= 573	18530:	3C03C2440C0C8A48	= 723
17114:	0A10F8C92A0C4011	= 613	17826:	4073237221424034	= 543	18538:	06162A0C40237FE5	= 551
17122:	820219360A223C40	= 427	17834:	C9FD084E0FE70009	= 1284	18546:	762804350017FE10	= 502
17130:	C99E77700E077000	= 821	17842:	31C38545214340E5	= 1000	18554:	F4E1E13E1E324040	= 977
17138:	0000777040000000	= 183	17850:	31C38545214340E5	= 755	18562:	C0940000003E140	= 917
17146:	0000000000002217	= 57	17858:	28214040E5014240	= 532	18570:	3E84323414035349	= 502
17154:	80862417292297A2	= 318	17866:	21A077E50AED4346	= 925	18578:	8720FA0C9F084E58	= 1294
17162:	80AC20A2E2A27222	= 936	17874:	40B72003E1E10947	= 1004	18586:	280EFD0C34E9FE12	= 1016
17170:	363C0C9710979797	= 792	17882:	5E2356051A4FE67F	= 890	18594:	C904FDCB4EE63603	= 852
17178:	20C3C36229921E0A	= 570	17890:	E0E2818FE0F281C	= 667	18602:	C97E12231310FA08	= 671
17186:	1E0A71E0A1E1E1E9F	= 629	17898:	FE102822FE11200C	= 839	18610:	06EAD04210F80319	= 177
17194:	90AC9D1E872C9E89	= 1036	17906:	C879203621DFF5F19	= 948	18618:	11F843351E233620	= 537
17202:	B5E8E323298300807	= 928	17914:	1834C879201A0101	= 403	18626:	E1F1C0D70420C2AA	= 1102
17210:	C020F05B0008E068	= 2028	17922:	3019132ACB792815	= 489	18634:	3A2540FE0FC0D040	= 1078
17218:	0E1E2D2E55313030	= 356	17930:	2121001918200C79	= 471	18642:	FEFD20FA0C8E40C9	= 1383



# Kuma



## AMSTRAD

### ZEN 1.0 Editor/ Assembler/Debugger

The most advanced Z-80 code generating system available featuring Assembler, Disassembler, Editor, Machine code Monitor, and Debugger. Complete with full assembly listing. A full professional product.

**Home Budget.** A complete extensive home accounting system which takes care of forecasts/estimates of future expenditure/income.

**Gems of Stradus.** An amazing graphics adventure game

## TATUNG Einstein



*Wordprocessor, Communications, Databases, VAT Accounts, Expenses, Home Accounts, Arcade Games, Adventures, Entertainment, Educational, High level languages, Editor/Assemblers and much more.*

**Kuma — No. 1 for Tatung**

Send for details.



## SHARP MZ700

**Pelmanism £5.95, Moonlander II £5.95, Athlete £5.95, Startrek Plus £6.95, Cursed Chambers**

**£6.95, Speech Synthesis £14.50. Books** The MZ700 Explained £5.95, Peeking and Poking the MZ700 £5.95. ... plus lots more



## EPSON PX-8

### ZEN Editor/Assembler/ Disassembler

The first program to be released in our PX-8 Software Library **£45.43** Phone for further details.

## EPSON HX-20



**DM2 Word Processor £29.50, DM3 Spread Sheet Calculator £29.50, DM9 RAM Database £29.50, Tiny Pascal Compiler £39.50, User Definable Graphics £17.50, Home Budget £17.35, plus a full range of books, Phone for details**



## CASIO

**DM2 — Wordprocessor £29.50, Machine Code Support Pack MCS P1 £86.25, DM6 — Decision Maker £19.95, Metric to Imperial Conversion £9.95, DM17 — Pert £29.50. For further details Phone 073 57 4335**

## SIRIUS 1 apricot

**Basic Tool Kit**  
Ten major sub routines  
**£97.75**

## commodore 64

**BC BASIC £57.50**

A complete 9K extension supplied in ROM pack

**PAINTPIC £19.95**

Drawing/Painting using a multi-colour bitmap

## sinclair SPECTRUM

**Frog Shooter £6.95, Vegetable Crash £6.95, Alien Destroyer £6.95, Home Budget £6.95, Logo £9.95**

**Dealer and Distributor enquiries welcomed**

**PHONE NOW (073 57) 4335**

or **SEND FOR DETAILS**

Please

tick

box

for

information required,  
and send coupon to:

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

Hardware

☐ AMSTRAD CPC 464  
☐ SIRIUS  
☐ APRICOT  
☐ SHARP 700  
☐ SHARP A  
☐ SHARP PC-500C

Software

Hardware

☐ TATUNG EINSTEIN  
☐ CASIO FP 200  
☐ EPSON PX-8  
☐ EPSON HX-20  
☐ EPSON QX-10

Software

Hardware

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

Software

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

POST CODE .....

I use a ..... micro-computer.



# SNAKY

M. North squirms his way around a Dragon's hires screen.

## Basic loader.

```
5 REM HEX* LOADER
10 REM TYPE PCLEAR8 BEFORE ENTERING THIS LISTING
20 FOR N=8001 TO 10877 STEP 8
30 SUM=0
40 PRINT N; "=" ;
50 INPUT A$
60 PRINT A$; "=" ;
70 INPUT TT
80 PRINT TT
90 Z=0
100 FOR K=1 TO LEN(A$) STEP 2
110 C=VAL("&H" + MID$(A$,K,2))
120 SUM=SUM+C
130 POKE N+Z,C
140 Z=Z+1
150 NEXT K
160 IF SUM=TT THEN GOTO 190
170 PRINT "ERROR - PLEASE INPUT AGAIN"
180 GOTO 30
190 NEXT N
```

## Snaky machine code.

8001 : 342C3100312C3100 = 287	8361 : 2041E4420424545 = 479	8721 : 594F555220424F44 = 580	9081 : 00EFO0EFO0EFO0FF = 972
8009 : 3100224240372C38 = 381	8369 : 544C45532E425554 = 593	8729 : 5720544F20494E43 = 534	9089 : 00FF00FF00FF00FF = 1020
8017 : 3B43303852325431 = 466	8377 : 20444F204E4F3420 = 484	8737 : 3243413343204239 = 555	9097 : 00FF00FF00FF00FF = 1020
8025 : 443137374C323431 = 454	8385 : 4541542054484520 = 507	8745 : 203120554E495420 = 465	9105 : 00FF00FF00FF00FF = 1020
8033 : 5531373722002B31 = 367	8393 : 204D555348524F4F = 589	8753 : 414E442041204245 = 475	9113 : 00FF00FF00FF00FF = 1020
8041 : 2C31292C302C3000 = 318	8401 : 40532C5448455920 = 550	8761 : 45544C4520425920 = 517	9121 : 00FF00FF00FF00FF = 1020
8049 : F1C49E32729E4F1 = 1354	8409 : 41524520504F4953 = 563	8769 : 3220554E49545320 = 517	9129 : 00FF00FF00FF00FF = 1020
8057 : 8F23794E4C79238F = 752	8417 : 4F4E4F555320414E = 579	8777 : 2020202020202020 = 256	9137 : 00FF00FF00FF00FF = 1020
8065 : 813C6624809903E7 = 1111	8425 : 4457494C4C204849 = 560	8785 : 505245535320414E = 572	9145 : 00FF00FF00FF00FF = 1020
8073 : E7D399BD24665CB1 = 1111	8433 : 4C4C20594F552049 = 547	8793 : 59204845592E2020 = 464	9153 : 00FF00FF00FF00FF = 1020
8081 : C3DB127E7E12DBC3 = 1116	8441 : 4E5354414E544C59 = 637	8801 : 2020202020202020 = 256	9161 : 00FF00FF00FF00FF = 1020
8089 : E7C3B1000024E7C3 = 1017	8449 : 2E54484520202020 = 399	8809 : 202020494620594F = 439	9169 : 00FF00FF00FF00FF = 1020
8097 : DBD86681C300C324 = 1095	8457 : 204649454C442059 = 509	8817 : 5520454 : 5420414C = 508	9177 : 00FF00FF00FF00FF = 1004
8105 : DB46B1E73CE7DB3C = 1251	8465 : 4F555204 : 52452049 = 517	8825 : 4C2054484520464F = 514	9185 : 00EFO0EFO0EFO0FF = 956
8113 : FCCCFCFCFCF03030 = 1452	8473 : 4E20495320535552 = 548	8833 : 4F44204F4E205448 = 524	9193 : 00EFO0EFO0EFO0FF = 956
8121 : 30FCFCFCFCFCFCFC = 1320	8481 : 524F554E44454420 = 561	8841 : 452053435245454E = 549	9201 : 00EFO0EFO0EFO0FF = 956
8129 : 0C3DCFCFCFCFCFCFC = 864	8489 : 20425920414E2045 = 463	8849 : 2C54484520534E41 = 527	9209 : 00EFO0EFO0EFO0FF = 972
8137 : 0CFCFCFCFCFCFCFC = 1404	8497 : 4C45435452494320 = 550	8857 : 4B43203749444C4C = 520	9217 : 00FF00FF00FF00FF = 1020
8145 : FCCFCFCFCFCFCFCFC = 1272	8505 : 46454E434520414E = 528	8865 : 53544F5020414E44 = 569	9225 : 00FF00FF00FF00FF = 1020
8153 : FCCFCFCFCFCFCFCFC = 1872	8513 : 4420202020202020 = 292	8873 : 2020505245535349 = 534	9233 : 00FF00FF00FF00FF = 1020
8161 : 0C3DCFCFCFCFCFCFC = 372	8521 : 20544F554348454E = 570	8881 : 4E47205448452046 = 508	9241 : 00FF00FF00FF00FF = 1020
8169 : 3C424040423C3C42 = 506	8529 : 472049542057494C = 528	8889 : 4952452042555454 = 575	9249 : 00FF00FF00FF00FF = 1020
8177 : 4242423C7C42427C = 638	8537 : 4C20434155534520 = 509	8897 : 4F4E202020202020 = 349	9257 : 00FF00FF00FF00FF = 1020
8185 : 44427E407240407E = 702	8545 : 594F555220202020 = 463	8905 : 202047454E455241 = 498	9265 : 00FF00FF00FF00FF = 1020
8193 : 003E003E00004242 = 256	8553 : 7053434F5245204E = 528	8913 : 54455320404F4524 = 575	9273 : 00FF00FF00FF00FF = 1020
8201 : 7E4242423C080808 = 410	8561 : 4F20444543524541 = 531	8921 : 20464F4F44204255 = 511	9281 : 00FF00FF00FF00FF = 1020
8209 : 083E3C42404E423C = 464	8569 : 5345205241504944 = 552	8929 : 5420414C534F2020 = 483	9289 : 00FF00FF00FF00FF = 1020
8217 : 42427E424242003E = 518	8577 : 4C592E5448452020 = 500	8937 : 20204D4F45245204D = 480	9297 : 00FF00FF00FF00FF = 1020
8225 : 003F00001745A000 = 218	8585 : 2053414E43203448 = 514	8945 : 555348524F4F4D33 = 640	9305 : 00FF00FF00FF00FF = 1004
8233 : 0050000100999990 = 531	8593 : 494E472C48415050 = 551	8953 : 2E20594F55522053 = 528	9313 : 00EFO0EFO0EFO0FF = 956
8241 : 444F20594F552052 = 546	8601 : 454E532C49462059 = 526	8961 : 5045454420414C53 = 542	9321 : 00EFO0EFO0EFO0FF = 956
8249 : 4551554952452049 = 564	8609 : 4F55202C20202020 = 356	8969 : 4F20494E43524541 = 545	9329 : 00EFO0EFO0EFO0FF = 956
8257 : 4E55515256136447 = 636	8617 : 2041545445405054 = 575	8977 : 5345532057495448 = 583	9337 : 00EFO0EFO0EFO0FF = 972
8265 : 4F4E533F50524553 = 617	8625 : 20544F2C4D4F5645 = 538	8985 : 2020454143492053 = 452	9345 : 00FF00FF00FF00FF = 1020
8273 : 53204A4F59353449 = 597	8633 : 2041444A4143454E = 518	8993 : 435245454E2E2054 = 527	9353 : 00FF00FF00FF00FF = 1020
8281 : 4348425554544F4E = 618	8641 : 5420544F20594F55 = 564	9001 : 4B45334E414B4550 = 543	9361 : 00FF00FF00FF00FF = 1020
8289 : 20544F20535044152 = 541	8649 : 52424F444592E2049 = 535	9009 : 495320434F4E5452 = 578	9369 : 00FF00FF00FF00FF = 1020
8297 : 5420594F55204152 = 548	8657 : 4620594F55205354 = 554	9017 : 4F4C454420425920 = 511	9377 : 00FF00FF00FF00FF = 1020
8305 : 45204120534E4148 = 499	8665 : 4F5020594F552057 = 563	9025 : 5448452020524947 = 515	9385 : 00FF00FF00FF00FF = 1020
8313 : 4524494E204F5244 = 525	8673 : 494C4F4C2044494520 = 499	9033 : 4B544B414E44204A = 545	9393 : 00FF00FF00FF00FF = 1020
8321 : 455220544F202020 = 442	8681 : 2C4F462053544152 = 527	9041 : 4F5953544943482E = 596	9401 : 00FF00FF00FF00FF = 1020
8329 : 2053555256495645 = 596	8689 : 564154494F4E2E20 = 543	9049 : 000000FF00FF00FF = 749	9409 : 00FF00FF00FF00FF = 1020
8337 : 20594F5520405553 = 562	8697 : 454154494E472041 = 537	9057 : 00EFO0EFO0EFO0FF = 956	9417 : 00FF00FF00FF00FF = 1020
8345 : 5420454154705448 = 522	8705 : 2C47525642202020 = 432	9065 : 00EFO0EFO0EFO0FF = 956	9425 : 00FF00FF00FF00FF = 1020
8353 : 4520475255425320 = 520	8713 : 2043415553455320 = 516	9073 : 00EFO0EFO0EFO0FF = 956	9433 : 00FF00FF00FF00FF = 1004

THE IDEA OF THIS game for the Dragon 32 or 64 in 32K mode is that you control a snake moving around the screen, eating grubs and beetles but avoiding the poisonous mushrooms. The snake is controlled by the right hand joystick and fill instructions are included in the game.

## Written in machine code

The game is written entirely in 6809 machine code and can be entered in the following way:

First type in: PCLEAR8

then type in the Basic loader and use it to enter the machine code directly into memory. At the first input prompt enter the string of hex digits and follow it with the checksum.

When the program is correctly entered save it by typing

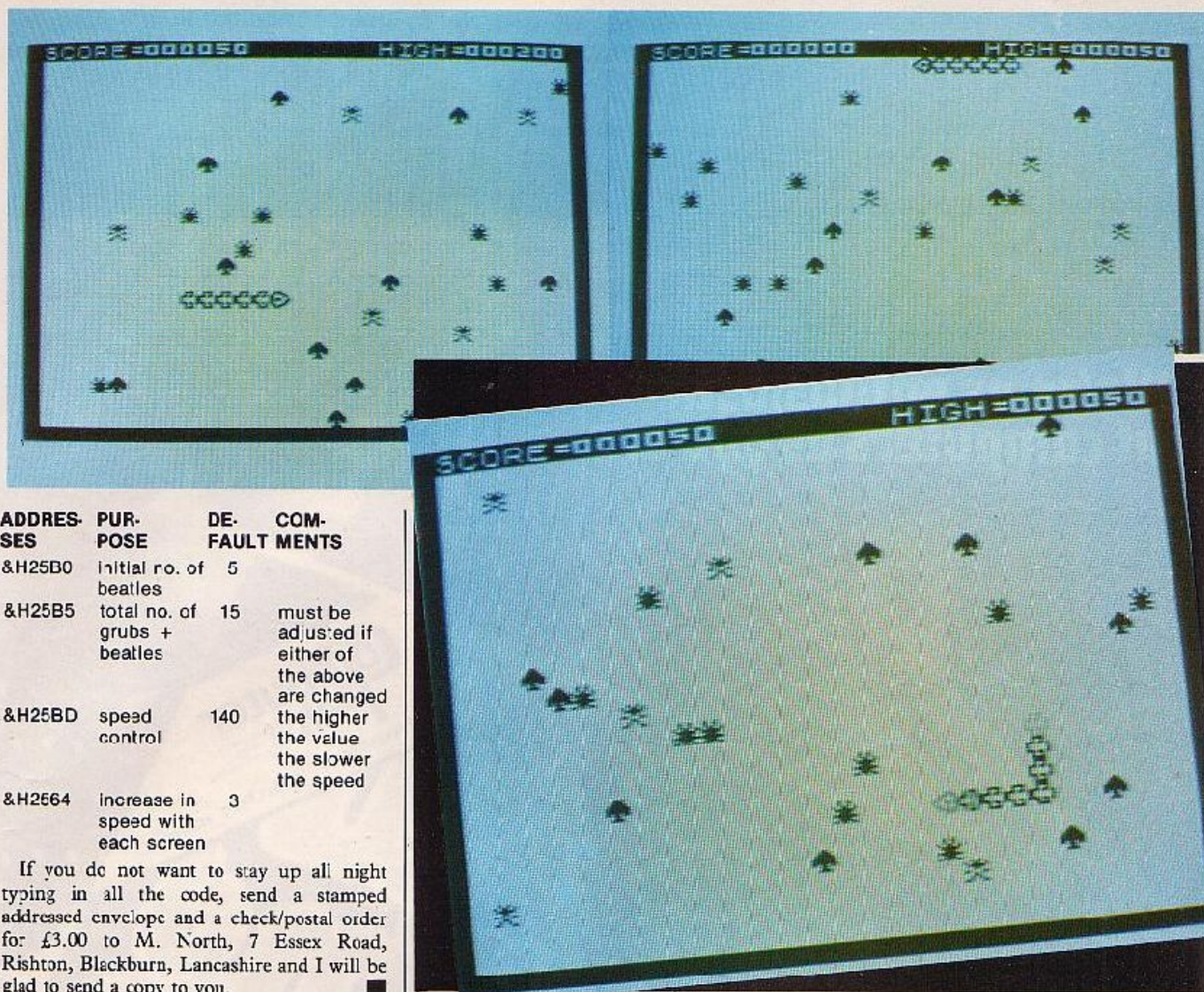
CSAVEM "SNAKEY", &H1F41, &H2A7E, &H2566

Do not attempt to run the program before saving it since the checksum is not perfect.

If you find the game too easy or too easy, you might like to change the following addresses:

ADDRESS	PURPOSE	DEFAULT	COMMENTS
&H26A8	initial no. of grubs and mushrooms	10	





ADDRESSES	PURPOSE	DEFAULT	COMMENTS
&H25B0	Initial no. of	5	
&H25B5	total no. of	15	must be adjusted if either of the above are changed
&H25BD	speed control	140	the higher the value the slower the speed
&H2564	increase in speed with each screen	3	

If you do not want to stay up all night typing in all the code, send a stamped addressed envelope and a check/postal order for £3.00 to M. North, 7 Essex Road, Rishton, Blackburn, Lancashire and I will be glad to send a copy to you.

7441 : 00EF00EF00EF00EF = 956	9801 : 1703C917033A8E06 = 491	10161 : 2605B6202743098E = 482	10321 : 2337841F811E2CE4 = 720
7449 : 00EF00EF00EF00EF = 956	9809 : 59CE235917035786 = 666	10169 : 202E1701D616FF3A = 651	10329 : 810623E0C41FC300 = 316
7457 : 00EF00EF00EF00EF = 956	9817 : 06108E07308E2363 = 495	10177 : 8E2025C603108E23 = 605	10537 : 201F01A68481FF26 = 784
7465 : 00EF00EF00EF00EF = 972	9825 : 10AFB131214A25FB = 762	10185 : 59A680A1A025152E = 808	10545 : D33986CFB7255E86 = 365
7473 : 00FF00FF00FF00FF = 1020	9833 : 8E204D108E0509A6 = 588	10193 : 035A26F58E2025C6 = 785	10553 : 0AB72558B7255C86 = 767
7481 : 00FF00FF00FF00FF = 1020	9841 : E08A40A7A0108C05 = 818	10201 : 03108E2359A680A7 = 746	10561 : 05B7255DFC256227 = 744
7489 : 00FF00FF00FF00FF = 1020	9849 : 1626F48E205B108E = 727	10209 : A05A26F5C6197F01 = 888	10569 : 06B32564FD256216 = 732
7497 : 00FF00FF00FF00FF = 1020	9857 : C52BA680BA0A07A0 = 868	10217 : 478E79E6A6801702 = 867	10577 : FD3CA66A81C32605 = 1010
7505 : 00FF00FF00FF00FF = 1020	9865 : 108C053726F486FF = 935	10225 : 80A68017027B7A01 = 693	10585 : 351C16FE63A62181 = 772
7513 : 00FF00FF00FF00FF = 1020	9873 : 00B17E2709B1FE27 = 725	10233 : 4726F1B6FF238A77 = 1201	10593 : C31C27FE33A63F81 = 913
7521 : 00FF00FF00FF00FF = 1020	9881 : C57C255920F01702 = 552	10241 : B7FF23BE0600A68A = 919	10601 : C31C27FE2BA6A901 = 983
7529 : 00FF00FF00FF00FF = 1020	9889 : 43108E1F978609E6 = 813	10249 : 43A7808C1E0026F4 = 616	10609 : 0081C31027FE21A4 = 432
7537 : 00FF00FF00FF00FF = 1020	9897 : A0E784308B204A26 = 851	10257 : 5A26F016FD7233A8 = 576	10617 : A9FF00E1C31027FE = 1057
7545 : 00FF00FF00FF00FF = 1020	9905 : F67A255B26E81702 = 791	10265 : 20A6C481DB272786 = 954	10625 : 17A6A481FF1026FD = 1044
7553 : 00FF00FF00FF00FF = 1020	9913 : 4B108E1FA1B609E6 = 797	10273 : FFC608A7A431AE20 = 1041	10633 : F8AFBDF9D010AFBD = 1353
7561 : 000000FF00FF00FF = 749	9921 : A0E784308B204A26 = 851	10281 : 5A26F08002BB25F = 631	10641 : F9C939CE2025C603 = 983
7569 : 002E003EB:70477 = 651	9929 : F67A255C26E81702 = 792	10289 : B7255F8E202B1701 = 556	10649 : 33C530851CFA6C2 = 1071
7577 : BE04223:BDFA:CA6 = 579	9937 : 33108E1FA98609E6 = 781	10297 : 5A1702127A255E10 = 402	10657 : A98219A7C45A25F6 = 1061
7585 : A08A40A7B0C043E = 863	9945 : A0E784308B204A26 = 851	10305 : 2700EF16FE8E8AFF = 1133	10665 : BE0647CE2025C603 = 695
7593 : 26F3CC00009D88BD = 1033	9953 : F67A255D26E830BD = 957	10313 : C608A7A431A82C5A = 876	10673 : A6C4444444448B0E = 789
7601 : A0E815910270464 = 771	9961 : F85A108E00A6AFA4 = 1001	10321 : 26F88601BB255FB7 = 923	10681 : 3001A6C0840F8D06 = 701
7609 : CC070EB8DFDCCED = 1331	9969 : EDA9FE8E6A60301F = 1163	10329 : 255F8E202B170133 = 421	10689 : 30015A26B593A56 = 607
7617 : BDFDCAB06A7BDFD = 1297	9977 : 26FCBE2562301F26 = 732	10337 : 1701CA7A255E1C27 = 534	10697 : C6053D38DF5E133 = 977
7625 : C6CC0735ED8DFDC0 = 1285	9985 : FCBD8012B6015A81 = 989	10345 : 00CB:6FE978608AE = 943	10705 : CBC605A6C0A7B430 = 1111
7633 : CC236DED8C80B0A6 = 1045	9993 : CA2F1F81352C2F86 = 543	10353 : BDFAE4108E1F91E6 = 1189	10713 : 88205A26F635D68E = 951
7641 : A78CAFA7BCADA605 = 1101	10001 : 015B810A102F0052 = 376	10361 : A4E784308B203121 = 825	10721 : C400868FA7808C06 = 722
7649 : A78CA99A0FA78CA5 = 1097	10009 : 8133C3C7B62560A9 = 670	10369 : 4A26F48608AE8EFA = 1063	10729 : 0126F939BE040010 = 307
7657 : CC2EE0EDBCA36FBC = 1265	10017 : 27084A27194A2723 = 341	10377 : D2E68DFDC2C10126 = 1275	10737 : BE206A6A03A40A7 = 975
7665 : 98BE20254F5FEDB1 = 908	10025 : 2040AE8DFC2D311F = 788	10385 : 06108E1F712018C1 = 557	10745 : B08C60126F5BDA0 = 907
7673 : A7844CA7BC91B6FF = 1264	10033 : 17021FB601A79DFE = 753	10393 : 022606108E1F7920 = 388	10753 : EABDC08E0400A6A0 = 1067
7681 : 0184F7B7FF01B6FF = 1236	10041 : 2617013120BCAEB0 = 646	10401 : 0EL1042606108E1F = 444	10761 : BA40A7B08C08EE26 = 917
7689 : 0384F7B7FF03863F = 1020	10049 : FC19310117020B86 = 497	10409 : 892004108E1F81E6 = 721	10769 : F516F74C606A680 = 1132
7697 : B7FF23108E00A630 = 845	10057 : 02A78DFE12170110 = 635	10417 : A0E784308B204A26 = 851	10777 : A7A431A8205A25F6 = 954
7705 : BDF955AFA48DA9AF = 1347	10065 : 16FFA7AEBDFC0431 = 1064	10425 : F6AE9F2557BF2361 = 1026	10785 : 33FE31A9FF411183 = 832
7713 : 30BDF934AFA4BDA8 = 1218	10073 : 8901001701FA8603 = 543	10433 : B62360BE25573C1E = 705	10793 : 000026B397F2561 = 588
7721 : C030BDF94DAFA4BD = 1235	10081 : A78BDFDFB17010616 = 864	10441 : 10AE8110AF84301C = 718	10801 : 7C2561F625615A26 = 766
7729 : B05130BDF960108E = 949	10089 : FF90AEBDFBED3189 = 1388	10449 : 4A26F5BE235CBF23 = 900	10809 : FDB628B7FF24F625 = 1184
7737 : 00A4AFA48DA9AF = 1024	10097 : FF001701D0860407 = 805	10457 : 63B6255F27167025 = 633	10817 : 015A26FD4F97FF24 = 1031
7745 : 025B3601BE00008E = 616	10105 : BDFDE41700EF16FF = 1161	10465 : 5F7C2360BE255730 = 712	10825 : E1256126E339C6FF = 1086
7753 : B0DF40108E1F91E6 = 1022	10113 : 79351081E7273981 = 775	10473 : 02BF2557BE2361AF = 814	10833 : F725617A2561F625 = 920
7761 : A4E7C633CB203121 = 958	10121 : C3273531D8102700 = 690	10481 : 9F2557398AFC6A08 = 935	10841 : 615A26FDB628B7FF = 1090
7769 : 301F26F34CB010626 = 409	10129 : 85B100271316FF62 = 700	10489 : B2E361A784308B20 = 837	10849 : 24F623615A26F34F = 876
7777 : E3CE0068E1FE310 = 855	10137 : 35108E20252605B6 = 553	10497 : 5A26F839FC2555BB = 998	10857 : B7FF2481256126E3 = 1050
7785 : BE06411703D6CE00 = 659	10145 : 2027271CB202E17 = 381	10505 : 255A58498B255A58 = 690	10865 : 39840147B7FF2086 = 913
7793 : 038E2007108E0654 = 434	10153 : 01E916F4D0BE2025 = 847	10513 : 49F32559C33619FD = 969	10873 : FF4A26FD39 = 677





**We're as enthusiastic  
about computers as you are.**



If you use computers at work or at home, Practical Computing magazine is essential reading. Every month it takes a long hard look at the most important issues in computing. It's informative, very useful and immensely readable.

It reviews both hardware and software, discusses the latest innovations and helps you get the most out of all the popular computers.

It's always entertaining, never dull. And it's at your newsagent now.

**Practical  
Computing**  
**At work. At home**



# SHOCK! HORROR! SCANDAL!

**SHOCK!** CITYATTAK. The seven screen, all action, machine code game. Superb graphics, smooth game play, a tough challenge for even the hardened arcade action addict.  
Now available on disk.

**HORROR!** The journey of your life ... or death! ODYSSEY. Described by Popular Computing Weekly as: 'Addictive with superb sound effects. An arcade game worthy of Jeff Minter for its pure speed of action!' Pick of the week (12th - 18th April 1984).  
Now available on disk.

**SCANDAL!** IT'S ONLY ROCK'N'ROLL. Your chance to succeed where millions of hopefuls fade. To make the big time in 'Showbiz' and show the world that you're a superstar, not just another dreamer.  
Now available on disk.

**K-tel** Software is available at:

Larger branches of John Menzies, Boots, and Computer Dealers nationwide.

K-tel Software can also be obtained by sending a cheque or postal order made payable to:- K-tel International (UK) Ltd. At 620 Western Avenue, London, W3 0TU. Allow 28 days for delivery.



**TAPE £6.95  
DISK £9.95**  
inc. VAT.



**Amazing how played out some things b**





gs become.

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

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

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

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

It's like that with micros too. The machine you thought would give endless hours of fun and interest often becomes a five minute wonder. Played out within months. Or so you thought.

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

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

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

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

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

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

Or fill in the coupon for our brochure.

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

Please send me the full facts about Micronet 800.

Name

Make/Model of Micro

Address

Telephone

MICRONET 800, Durrant House, 8 Herbal Hill, London EC1R 5EJ. Telephone: 01-278 3143. VC 7

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

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



### Making the most of your micro.



IF YOU OWN A

# 600XL

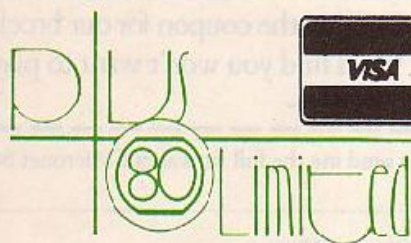
THEN YOU MUST BE WAITING FOR



# 64k

# EXPANSION

THIS EXPANSION CARTRIDGE GIVES THE 600XL THE SAME MEMORY CONFIGURATION AS THE 800XL



I WISH TO PAY BY VISA  
PLEASE CHARGE MY ACCOUNT No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

I ENCLOSE CHEQUE/P.O. TO THE VALUE OF £79.90

EXP. DATE 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

SIGNATURE \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

POST CODE \_\_\_\_\_

ALLOW 28 DAYS  
FOR DELIVERY  
1 YEAR WARRANTY  
INCLUDED

PLUS 80 LTD  
FREEPOST  
HARROW  
MIDDX HA2 0BR

TELEPHONE ORDERS: 01-423 6393/6424



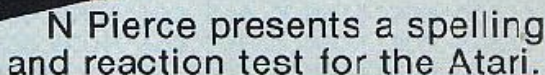
WORD GAME WILL run on a 16K Atari computer.

- underlined words should be in inverse video,
- the character £ should be a #,
- Rem statements need not be typed.

It uses memory locations 203 to 209 in page 0 and 1536 to 1586 in page 6 to hold control variables.

Briefly, its function is to: control player-missile images, cause the two cursors to flash, read and act upon input from joysticks 1 and 2, generate a periodic buzz on sound channel 3, and detect player-missile collisions.

(continued on next page)

[illegible]

(listing continued on next page)



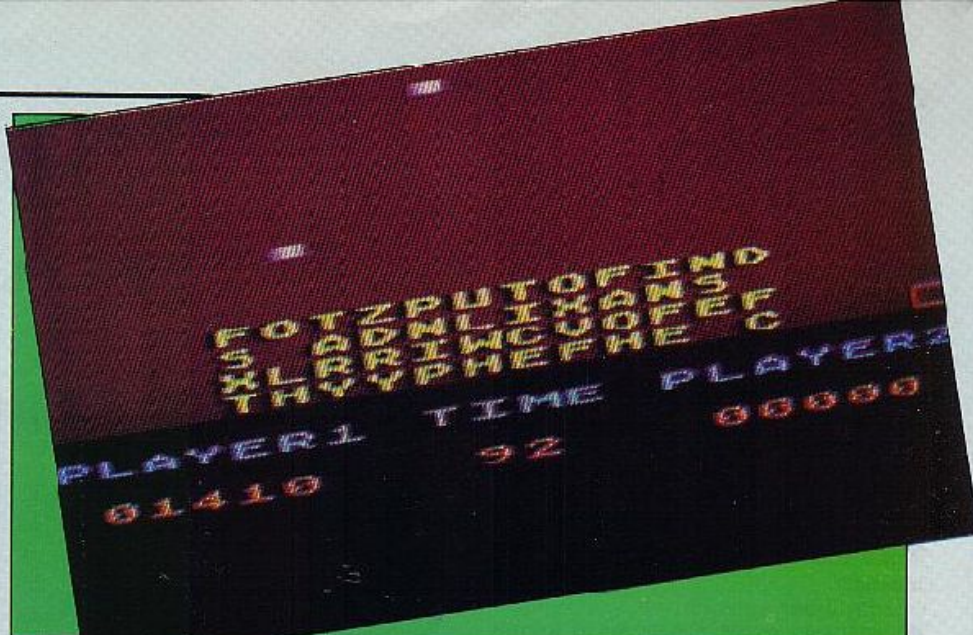
(continued from previous page)

The two flashing cursors are moved by using joysticks 1 and 2. To pick up a letter, position your cursor over the letter and press the trigger to drop the letter, press the trigger again. You can restart the game at any time by pressing the Start key.

The object of the game is to fill your six blank spaces with letters to form the word displayed at the top of the screen.

You must choose letters from the group at the bottom of the screen and carry them to the blank spaces; avoiding the missiles on the way. Points are lost if a missile hits your cursor or if you use the wrong letters. The first player to complete the word correctly gets bonus points.

The game lasts for 99 time units and the missiles gradually move faster as the game progresses.



```

10499 REM *** begin *** (listing continued from previous page)
10500 FOR I=0 TO 23:POSITION 0,1: ? £6;B$;:NEXT I
10520 POSITION 0,2: ? £6;"-----"
10540 POSITION 0,21: ? £6;"PLAYER1 TIME PLAYER2"
10550 FOR P=0 TO 1:PTS(P)=0:NEXT P:TIME=0:GOSUB SHOWPTS
10999 REM *** game over ***
11000 POKE MS,0:POKE TICK,0
11100 FOR P=0 TO 1:IF PTS(P)>=HIGH THEN HIGH=PTS(P)
11120 NEXT P
11200 FOR I=3 TO 19:POSITION 0,1: ? £6;B$;:NEXT I
11300 POSITION 5,6: ? £6;"WORD GAME"
11305 POSITION 1,9: ? £6;"HIGH SCORE IS ";HIGH
11310 POSITION 4,11: ? £6;"press START"
11320 POSITION 4,12: ? £6;"for new game"
11330 POSITION 4,14: ? £6;"press RESET"
11340 POSITION 5,15: ? £6;"to finish"
11400 IF PEEK(CONSOL)<>START THEN 11400
11999 REM *** new game ***
12000 W$="":POKE 77,0:FOR P=0 TO 1:SOUND P,0,0,0:NEXT P
12065 W$(LEN(W$)+1)="PEOPLECOUNTYISLANDANTHEMACTIVEKNIGHTTENNISZDMBIECLOSEDCHOOS
E"
12070 W$(LEN(W$)+1)="RECORDREPLAYFLIGHTGROUPSSTEADYLETTERBETTERSQUAREREFLEXCASTL
E"
12075 W$(LEN(W$)+1)="FILLERELAPSEWANTEDPOTATODNIONSSECONDSCREAMBUTTONNATIONSWITC
H"
12080 W$(LEN(W$)+1)="AUGJSTDOUBLEGROUNDHUMBLEJUMBLEKETTLEMIRROCCULTQUEUESTHOUG
H"
12085 W$(LEN(W$)+1)="UNDONEWINDOWVISIONOCCUPYBOUNCEPERIODFREEZEFRIDGEHOCKEYCAMER
A"
12090 W$(LEN(W$)+1)="QUARRYBANKERCOLOURMANUALSYSTEMDRAGONMODERNTIGERSPLANETESCAP
E"
12100 FOR P=0 TO 1:PTS(P)=0:NEXT P:SOUND 2,2,6,4:POKE TICK,68:TIME=99:GOSUB SHOW
PTS:POKE 20,255:POKE 19,156
12499 REM *** next ***
12500 FOR P=0 TO 1:POKE CARRY+P,0:POKE PHIT+P,0:POKE PCRAH+P,1:POKE PX+P+2,0:L(
P)=6:POKE PC+P,216:NEXT P
12600 POSITION 0,0: ? £6;B$;:POSITION 0,1: ? £6;B1$;
12620 FOR I=3 TO 19:POSITION 0,I: ? £6;B$;:NEXT I
12640 POKE PX,48:POKE PY,184:POKE PX+1,200:POKE PY+1,184
12999 REM *** new word ***
13000 W=INT(RND(0)*60)*6+1:IF W$(W,W)="@" THEN 13000
13020 V$=W$(W,W+5):W$(W,W)="@"
13040 X$="":FOR I=1 TO 48:X$(LEN(X$)+1)=CHR$(INT(RND(0)*26)+97):NEXT I
13080 FOR K=1 TO 2:FOR I=1 TO 6:J=INT(RND(0)*48)+1:X$(J,J)=CHR$(ASC(V$(I))+32):N
EXT I:NEXT K
13100 J=15:FOR I=1 TO 37 STEP 12:J=J+1:POSITION 4,J: ? £6;X$(I,I+11):NEXT I
13150 POSITION 7,0: ? £6;V$
13160 FOR P=0 TO 1:POKE PCRAH+P,0:NEXT P
14000 GOTO 500

```

9441  
9449  
9457  
9465  
9473  
9481  
9489  
9497  
9505  
9513  
9521  
9529  
9537  
9545  
9553  
9561  
9569  
9577  
9585  
9593  
9601  
9609  
9617  
9625  
9633  
9641  
9649  
9657  
9665  
9673  
9681  
9689  
9697  
9705  
9713  
9721  
9729  
9737  
9745  
9753  
9761  
9769  
9777  
9785  
9793



# ADD-ONS FOR SPECTRUM, ZX81 AND VIC



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.

## 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. £10.00 inc.

### 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. Jaseble with any Joystick having the standard nine pin plug. Fits snugly 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.



## PROFESSIONAL CASED KEYBOARD TYPE FD42.

Models for the ZX81 and SPECTRUM

(PLEASE STATE WHICH)

The Fuller FD42 has long been our most popular seller. Its sturdy, attractive but very tough injection moulded ABS case houses the computer and converts it into a professional unit with 42 full size long-life computer-style full-travel keys. Keys are indelibly etched with ZX81 or Spectrum legends. No skills or soldering needed and full access is maintained to the user ports etc for add-ons. Power supply can be fitted inside. Has integral LED for power ON/OFF indication. In all a thoroughly worthwhile accessory to your computer. £29.95 plus £2.00 postage and handling.



## NEW! CASSETTE INTERFACE FOR THE VIC 20 AND COMMODORE 64

Interface your Vic with any cassette player. Don't be tied to one you have to buy. If your model has external motor control capability, this interface will also control the motor/start. Simple to use, supplied with leads and inexpensive. £14.95 inc.

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'l as below



Round the clock  
7 days a week  
Telephone orders.  
0256 66116

Card No.

Signature

Name

Address

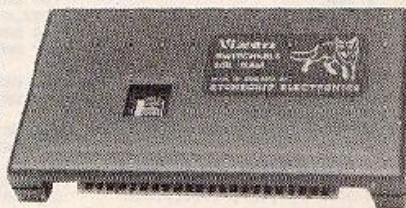
VC6

## THE VIXEN SWITCHABLE RAM £34.95

### 16K RAM CARTRIDGE

The Vixen 16K switchable Ram cartridge is unique approach to expanding your VIC 20. Being switchable from either 16K to 8K + 3K programs already in use based on the unexpanded Vic 20 are not obsolete. Supplied in attractive custom made case it simply plugs into the rear of the computer or motherboard.

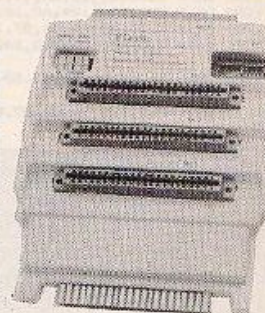
No additional power needed. High quality gold plated contacts ensure long trouble free life. Switches are recessed to avoid accidental operation. Designed and built in Britain. Guaranteed one year.



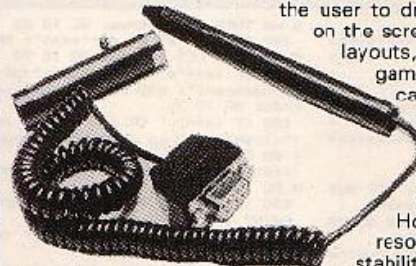
## THE VIXEN MOTHERBOARD £31.95

THE EXPANDABLE EXPANSION SYSTEM. Providing 4 additional cartridge slots PLUS ROM socket. The slots are switchable enabling cartridges to be left in place and selected as needed by switching thus avoiding constant handling and the danger of breakage. Having one socket at the rear enables further expansion. Used in conjunction with one or more Vixen Rams full expansion can be achieved. ROM socket enables ROMs and Eproms to be fitted for future software programs, toolkits etc. A range of ROM based software will soon be available from the manufacturers. Industry standard Eproms, 2716, 2732 etc are readily available and easily programmed and copied.

A sound investment for the serious user and serious games player which will not become obsolete.



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 relocated 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



## SPECTRUM UPGRADES 16K to 48K

THE KIT — Fit it yourself, a beautifully packed and presented kit with complete (Really complete in the detail you need if you've never seen inside your computer) instructions. No soldering — no wire bending — no fiddly bits. Thousands in use. Everything you need to upgrade your issue 2 Spectrum from 16K to a full blown 48K. The really economical upgrade — in stock for swift despatch. £24.00

THE PACK — A sturdily packages 16K to 48K upgrade pack that simply plugs on to the user port and works immediately. Throughport so any other accessories may be fitted as before. No need to open the case, no unscrewing, no soldering, no need to invalidate your guarantee. Designed and built in Britain. Guaranteed. Supplied in handsome carton suitable for gift wrapping. £39.95

NEW!! Upgrade your ISSUE 3 Spectrum from 16K-48K. This kit is supplied with full parts and very comprehensive instructions as to how to upgrade your ISSUE 3. Due to the change in design of the issue 3 this has not been possible with previously available kits. Not for the complete amateur as it requires two simple soldered connections to be made, anyone who has soldered before or who has a friend can fit this quite easily though. £26.50

# TREMIVER LTD.

93A PACK LANE, BASINGSTOKE, HANTS.  
Tel. (0256) 66116



# Listing 1

```

1 REM *****
2 REM * JACK U.D.B.'s *
3 REM * *
4 REM * Colin Carruthers *
5 REM * and Ronald Sellar *
6 REM *****
7 REM
10 CLEAR 00000
15 LET total=0
20 FOR a=0000 TO 60511
30 READ v: POKE a,v
35 LET total=total+v
40 NEXT a
50 IF total<>32538 THEN PRINT
**ERROR - CHECK DATA !
60 STOP
1000 DATA 0,0,0,0,126,60,60,60
1010 DATA 0,0,0,0,0,0,0,2
1020 DATA 127,127,0,0,0,0,0,0
1030 DATA 254,254,0,0,0,0,0,0
1040 DATA 0,30,30,60,56,24,0,0
1050 DATA 0,0,120,24,60,12,12,0
1060 DATA 0,30,30,60,56,57,1,0
1070 DATA 0,0,48,1,2,240,240,224
1080 DATA 56,62,53,53,53,53,53,5
1090 DATA 0,0,128,96,80,80,80,11
1100 DATA 53,53,53,53,54,60,56,5
1110 DATA 96,192,128,0,0,0,0,0
1120 DATA 0,5,7,3,1,0,3,15
1130 DATA 0,32,224,192,128,0,128
1140 DATA 15,31,31,31,3,63,31,0
1150 DATA 240,248,248,252,254,25
1160 DATA 0,0,0,0,0,0,0,7
1170 DATA 0,0,56,110,120,96,96,2
1180 DATA 51,63,63,99,3,3,7,0
1190 DATA 224,224,192,0,0,0,128,
1200 DATA 0,7,8,17,34,36,37,37
1210 DATA 0,240,1,196,36,20,2
1220 DATA 36,34,33,32,32,32,28,0
1230 DATA 4,8,240,0,0,0,0,0
1240 DATA 0,0,0,0,0,0,0,0
1250 DATA 0,0,0,0,0,62,34,34
1260 DATA 0,57,70,66,66,127,127,
1270 DATA 56,130,14,18,18,254,62
1280 DATA 0,0,0,7,15,31,63,127
1290 DATA 0,0,0,254,252,250,244,
1300 DATA 20,234,20,232,16,224,0
1310 DATA 0,32,32,48,120,120,124
1320 DATA 16,84,254,254,254,254,
1330 DATA 63,31,15,7,3,0,0,0
1340 DATA 0,123,224,248,252,254,
1350 DATA 0,1,1,1,1,1,1,3
1360 DATA 0,123,128,128,128,128,
1370 DATA 3,7,7,7,7,7,7,0
1380 DATA 192,224,224,224,224,22
1390 DATA 0,7,12,2,7,3,3,3
1400 DATA 0,128,192,192,128,0,0,
1410 DATA 3,3,3,3,3,3,3,3
1420 DATA 0,0,0,0,112,224,112,0
1430 DATA 0,128,64,74,74,126,126
1440 DATA 0,0,0,0,0,0,0,10
1450 DATA 126,126,126,126,126,0,
1460 DATA 18,34,66,130,2,0,0,0
1470 DATA 0,0,1,3,7,15,5,0
1480 DATA 0,0,0,128,0,128,192,22
1490 DATA 240,188,4,4,8,0,0,0
1500 DATA 1,7,5,29,21,21,21,20
1510 DATA 192,43,112,80,80,80,80,
1520 DATA 16,16,16,16,8,9,15
1530 DATA 61,65,130,132,72,48,16
1540 DATA 0,0,15,7,3,3,3,3
1550 DATA 0,124,252,246,222,254,
1560 DATA 1,1,1,1,1,3,7,0
1570 DATA 126,254,190,246,254,25
1580 DATA 7,7,1,1,1,1,1,1
1590 DATA 224,224,178,178,178,17
1600 DATA 1,1,7,7,7,7,3,1
1610 DATA 128,128,224,224,224,22
1620 DATA 4,192,126
1630 DATA 128,128,224,224,224,22
1640 DATA 9990 REM tape
1650 DATA 9991 SAVE "Jack.uds" CODE 60000,5
1660 DATA 9992 VERIFY **CODE
1670 DATA 9993 STOP
1680 DATA 9995 REM Microdrive
1690 DATA 9996 SAVE *n*:1;"Jack.uds" CODE
1700 DATA 60000,512
1710 DATA 9997 VERIFY *m*:1;"Jack.uds" CODE
1720 DATA 0

```

IN THIS adventure game based on *Jack and the Beanstalk* you play the role of our intrepid hero Jack; your aim is to recover the three treasures held by the evil Giant who lives in a strange land up in the clouds.

The program uses a mixture of text and graphics to represent the locations and objects you find on your travels. Owners of the

Currah MicroSpeech unit will be able to hear the Giant's thundering voice.

Each location is represented by its own subroutines where all the associated variables are set. These include a location description string, a Help message, and pointers to surrounding locations.

Commands are also handled by individual

subroutines. These routines check various flags and later those affected by the command. Table 2 gives a complete list of available command verbs.

Objects are split into two groups — those which can be picked up and carried and those which can only be examined. Portable objects

(continued on page 102)

## Listing 2

```

1 REM *****
2 REM * JACK and the *
3 REM * BEANSTALK *
4 REM * *
5 REM * by Colin Carruthers *
6 REM * and Ronald Sellar *
7 REM *****
8 REM
9 REM
10 LET a$="": LET i=0: LET set
=1000: LET pre=0: LET keys=0
15 POKE 23609,10: BORDER 0: PA
PER 0: INK 7: GO SUB 8000
20 LET i(25)=1: LET h$="You're
doing fine, Jack.": LET no=0: L
ET we=0: LET ea=0: LET so=no:
LET up=0: LET do=0
30 GO SUB set
35 IF i(20)=1 THEN LET e(4)=se
t
40 CLS: PRINT "J"
42 IF NOT i(13) THEN LET a$="ff
(see ff(11) ff(20) ff(21) ff(22) ff(23) ff(24) ff(25) ff(26) ff(27) ff(28) ff(29) ff(30) ff(31) ff(32) ff(33) ff(34) ff(35) ff(36) ff(37) ff(38) ff(39) ff(40) ff(41) ff(42) ff(43) ff(44) ff(45) ff(46) ff(47) ff(48) ff(49) ff(50) ff(51) ff(52) ff(53) ff(54) ff(55) ff(56) ff(57) ff(58) ff(59) ff(60) ff(61) ff(62) ff(63) ff(64) ff(65) ff(66) ff(67) ff(68) ff(69) ff(70) ff(71) ff(72) ff(73) ff(74) ff(75) ff(76) ff(77) ff(78) ff(79) ff(80) ff(81) ff(82) ff(83) ff(84) ff(85) ff(86) ff(87) ff(88) ff(89) ff(90) ff(91) ff(92) ff(93) ff(94) ff(95) ff(96) ff(97) ff(98) ff(99) ff(100) ff(101) ff(102) ff(103) ff(104) ff(105) ff(106) ff(107) ff(108) ff(109) ff(110) ff(111) ff(112) ff(113) ff(114) ff(115) ff(116) ff(117) ff(118) ff(119) ff(120) ff(121) ff(122) ff(123) ff(124) ff(125) ff(126) ff(127) ff(128) ff(129) ff(130) ff(131) ff(132) ff(133) ff(134) ff(135) ff(136) ff(137) ff(138) ff(139) ff(140) ff(141) ff(142) ff(143) ff(144) ff(145) ff(146) ff(147) ff(148) ff(149) ff(150) ff(151) ff(152) ff(153) ff(154) ff(155) ff(156) ff(157) ff(158) ff(159) ff(160) ff(161) ff(162) ff(163) ff(164) ff(165) ff(166) ff(167) ff(168) ff(169) ff(170) ff(171) ff(172) ff(173) ff(174) ff(175) ff(176) ff(177) ff(178) ff(179) ff(180) ff(181) ff(182) ff(183) ff(184) ff(185) ff(186) ff(187) ff(188) ff(189) ff(190) ff(191) ff(192) ff(193) ff(194) ff(195) ff(196) ff(197) ff(198) ff(199) ff(200) ff(201) ff(202) ff(203) ff(204) ff(205) ff(206) ff(207) ff(208) ff(209) ff(210) ff(211) ff(212) ff(213) ff(214) ff(215) ff(216) ff(217) ff(218) ff(219) ff(220) ff(221) ff(222) ff(223) ff(224) ff(225) ff(226) ff(227) ff(228) ff(229) ff(230) ff(231) ff(232) ff(233) ff(234) ff(235) ff(236) ff(237) ff(238) ff(239) ff(240) ff(241) ff(242) ff(243) ff(244) ff(245) ff(246) ff(247) ff(248) ff(249) ff(250) ff(251) ff(252) ff(253) ff(254) ff(255) ff(256) ff(257) ff(258) ff(259) ff(260) ff(261) ff(262) ff(263) ff(264) ff(265) ff(266) ff(267) ff(268) ff(269) ff(270) ff(271) ff(272) ff(273) ff(274) ff(275) ff(276) ff(277) ff(278) ff(279) ff(280) ff(281) ff(282) ff(283) ff(284) ff(285) ff(286) ff(287) ff(288) ff(289) ff(290) ff(291) ff(292) ff(293) ff(294) ff(295) ff(296) ff(297) ff(298) ff(299) ff(300) ff(301) ff(302) ff(303) ff(304) ff(305) ff(306) ff(307) ff(308) ff(309) ff(310) ff(311) ff(312) ff(313) ff(314) ff(315) ff(316) ff(317) ff(318) ff(319) ff(320) ff(321) ff(322) ff(323) ff(324) ff(325) ff(326) ff(327) ff(328) ff(329) ff(330) ff(331) ff(332) ff(333) ff(334) ff(335) ff(336) ff(337) ff(338) ff(339) ff(340) ff(341) ff(342) ff(343) ff(344) ff(345) ff(346) ff(347) ff(348) ff(349) ff(350) ff(351) ff(352) ff(353) ff(354) ff(355) ff(356) ff(357) ff(358) ff(359) ff(360) ff(361) ff(362) ff(363) ff(364) ff(365) ff(366) ff(367) ff(368) ff(369) ff(370) ff(371) ff(372) ff(373) ff(374) ff(375) ff(376) ff(377) ff(378) ff(379) ff(380) ff(381) ff(382) ff(383) ff(384) ff(385) ff(386) ff(387) ff(388) ff(389) ff(390) ff(391) ff(392) ff(393) ff(394) ff(395) ff(396) ff(397) ff(398) ff(399) ff(400) ff(401) ff(402) ff(403) ff(404) ff(405) ff(406) ff(407) ff(408) ff(409) ff(410) ff(411) ff(412) ff(413) ff(414) ff(415) ff(416) ff(417) ff(418) ff(419) ff(420) ff(421) ff(422) ff(423) ff(424) ff(425) ff(426) ff(427) ff(428) ff(429) ff(430) ff(431) ff(432) ff(433) ff(434) ff(435) ff(436) ff(437) ff(438) ff(439) ff(440) ff(441) ff(442) ff(443) ff(444) ff(445) ff(446) ff(447) ff(448) ff(449) ff(450) ff(451) ff(452) ff(453) ff(454) ff(455) ff(456) ff(457) ff(458) ff(459) ff(460) ff(461) ff(462) ff(463) ff(464) ff(465) ff(466) ff(467) ff(468) ff(469) ff(470) ff(471) ff(472) ff(473) ff(474) ff(475) ff(476) ff(477) ff(478) ff(479) ff(480) ff(481) ff(482) ff(483) ff(484) ff(485) ff(486) ff(487) ff(488) ff(489) ff(490) ff(491) ff(492) ff(493) ff(494) ff(495) ff(496) ff(497) ff(498) ff(499) ff(500) ff(501) ff(502) ff(503) ff(504) ff(505) ff(506) ff(507) ff(508) ff(509) ff(510) ff(511) ff(512) ff(513) ff(514) ff(515) ff(516) ff(517) ff(518) ff(519) ff(520) ff(521) ff(522) ff(523) ff(524) ff(525) ff(526) ff(527) ff(528) ff(529) ff(530) ff(531) ff(532) ff(533) ff(534) ff(535) ff(536) ff(537) ff(538) ff(539) ff(540) ff(541) ff(542) ff(543) ff(544) ff(545) ff(546) ff(547) ff(548) ff(549) ff(550) ff(551) ff(552) ff(553) ff(554) ff(555) ff(556) ff(557) ff(558) ff(559) ff(560) ff(561) ff(562) ff(563) ff(564) ff(565) ff(566) ff(567) ff(568) ff(569) ff(570) ff(571) ff(572) ff(573) ff(574) ff(575) ff(576) ff(577) ff(578) ff(579) ff(580) ff(581) ff(582) ff(583) ff(584) ff(585) ff(586) ff(587) ff(588) ff(589) ff(590) ff(591) ff(592) ff(593) ff(594) ff(595) ff(596) ff(597) ff(598) ff(599) ff(600) ff(601) ff(602) ff(603) ff(604) ff(605) ff(606) ff(607) ff(608) ff(609) ff(610) ff(611) ff(612) ff(613) ff(614) ff(615) ff(616) ff(617) ff(618) ff(619) ff(620) ff(621) ff(622) ff(623) ff(624) ff(625) ff(626) ff(627) ff(628) ff(629) ff(630) ff(631) ff(632) ff(633) ff(634) ff(635) ff(636) ff(637) ff(638) ff(639) ff(640) ff(641) ff(642) ff(643) ff(644) ff(645) ff(646) ff(647) ff(648) ff(649) ff(650) ff(651) ff(652) ff(653) ff(654) ff(655) ff(656) ff(657) ff(658) ff(659) ff(660) ff(661) ff(662) ff(663) ff(664) ff(665) ff(666) ff(667) ff(668) ff(669) ff(670) ff(671) ff(672) ff(673) ff(674) ff(675) ff(676) ff(677) ff(678) ff(679) ff(680) ff(681) ff(682) ff(683) ff(684) ff(685) ff(686) ff(687) ff(688) ff(689) ff(690) ff(691) ff(692) ff(693) ff(694) ff(695) ff(696) ff(697) ff(698) ff(699) ff(700) ff(701) ff(702) ff(703) ff(704) ff(705) ff(706) ff(707) ff(708) ff(709) ff(710) ff(711) ff(712) ff(713) ff(714) ff(715) ff(716) ff(717) ff(718) ff(719) ff(720) ff(721) ff(722) ff(723) ff(724) ff(725) ff(726) ff(727) ff(728) ff(729) ff(730) ff(731) ff(732) ff(733) ff(734) ff(735) ff(736) ff(737) ff(738) ff(739) ff(740) ff(741) ff(742) ff(743) ff(744) ff(745) ff(746) ff(747) ff(748) ff(749) ff(750) ff(751) ff(752) ff(753) ff(754) ff(755) ff(756) ff(757) ff(758) ff(759) ff(760) ff(761) ff(762) ff(763) ff(764) ff(765) ff(766) ff(767) ff(768) ff(769) ff(770) ff(771) ff(772) ff(773) ff(774) ff(775) ff(776) ff(777) ff(778) ff(779) ff(780) ff(781) ff(782) ff(783) ff(784) ff(785) ff(786) ff(787) ff(788) ff(789) ff(790) ff(791) ff(792) ff(793) ff(794) ff(795) ff(796) ff(797) ff(798) ff(799) ff(800) ff(801) ff(802) ff(803) ff(804) ff(805) ff(806) ff(807) ff(808) ff(809) ff(810) ff(811) ff(812) ff(813) ff(814) ff(815) ff(816) ff(817) ff(818) ff(819) ff(820) ff(821) ff(822) ff(823) ff(824) ff(825) ff(826) ff(827) ff(828) ff(829) ff(830) ff(831) ff(832) ff(833) ff(834) ff(835) ff(836) ff(837) ff(838) ff(839) ff(840) ff(841) ff(842) ff(843) ff(844) ff(845) ff(846) ff(847) ff(848) ff(849) ff(850) ff(851) ff(852) ff(853) ff(854) ff(855) ff(856) ff(857) ff(858) ff(859) ff(860) ff(861) ff(862) ff(863) ff(864) ff(865) ff(866) ff(867) ff(868) ff(869) ff(870) ff(871) ff(872) ff(873) ff(874) ff(875) ff(876) ff(877) ff(878) ff(879) ff(880) ff(881) ff(882) ff(883) ff(884) ff(885) ff(886) ff(887) ff(888) ff(889) ff(890) ff(891) ff(892) ff(893) ff(894) ff(895) ff(896) ff(897) ff(898) ff(899) ff(900) ff(901) ff(902) ff(903) ff(904) ff(905) ff(906) ff(907) ff(908) ff(909) ff(910) ff(911) ff(912) ff(913) ff(914) ff(915) ff(916) ff(917) ff(918) ff(919) ff(920) ff(921) ff(922) ff(923) ff(924) ff(925) ff(926) ff(927) ff(928) ff(929) ff(930) ff(931) ff(932) ff(933) ff(934) ff(935) ff(936) ff(937) ff(938) ff(939) ff(940) ff(941) ff(942) ff(943) ff(944) ff(945) ff(946) ff(947) ff(948) ff(949) ff(950) ff(951) ff(952) ff(953) ff(954) ff(955) ff(956) ff(957) ff(958) ff(959) ff(960) ff(961) ff(962) ff(963) ff(964) ff(965) ff(966) ff(967) ff(968) ff(969) ff(970) ff(971) ff(972) ff(973) ff(974) ff(975) ff(976) ff(977) ff(978) ff(979) ff(980) ff(981) ff(982) ff(983) ff(984) ff(985) ff(986) ff(987) ff(988) ff(989) ff(990) ff(991) ff(992) ff(993) ff(994) ff(995) ff(996) ff(997) ff(998) ff(999) ff(1000)

```



# THE BEAN-STALK

Colin Carruthers  
and Ronald  
Sellar give  
climbing lessons.



```

1620 LET no=3100: LET so=no: LET
  we=so: LET ea=we: LET up=1650:
  LET do=1050
1630 RETURN
1650 LET i$="You are now at the
  top of the beanstalk, in a wild,
  bare country. Not a tree or blade
  of grass can be seen. A long road
  leads north."
1670 LET no=1700: IF 1(7)+1(14)=
  2 THEN LET do=1600
1680 RETURN
1700 LET i$="The long road winds
  its way across the barren
  wasteland."
1705 IF NOT 1(21) THEN LET 1(21)
  =1: LET i$=i$+" There is an old
  lady here. She says, 'Good morn-
  ing, Jack. You are now in a
  country belonging to a wicked GIANT.
  His taste in food could be your
  downfall.'"
1720 LET no=1800: LET we=1650: LET
  ea=1750
1730 RETURN
1750 LET i$="You are still on the
  road. There is not much change
  to the countryside so I won't
  bother describing it again,
  except to say that there is a
  castle away to the north."
1770 LET no=1800: LET we=1700
1780 RETURN
1800 LET i$="You are lost in a
  maze with paths leading every
  where."
1810 LET h$="1 5.45 10 ??":
1812 IF a$="r" AND 1(22)=0 OR 1
  (22)=2 THEN LET 1(22)=2: GO TO
  1820
1814 IF a$="e" AND 1(22)=2 THEN
  LET 1(22)=3: GO TO 1820
1816 IF a$="n" AND 1(22)=3 THEN
  LET 1(22)=4: GO TO 1820
1818 IF a$="s" AND 1(22)=4 THEN
  LET 1(22)=0: LET set=1850: GO TO
  1820
1819 LET 1(22)=0
1820 LET no=1800: LET so=no: LET
  ea=no: LET we=no
1830 RETURN
1850 LET i$="You have arrived at
  the castle door. A path leads
  round the castle to the east."
1870 LET we=1750: LET ea=1900
1880 RETURN
1900 LET i$="You are now faced
  with the east wall of the castle.
  There are no obvious entrance
  s. The path continues north."
1920 LET no=1950: LET so=1850: LET
  we=1850
1930 RETURN
1950 LET i$="The back of the cas-
  tle looks much the same as th
  
```

```

e east wall. There does not seem
  to be a tradesman's entrance.
  The path continues westwards
  and there is another going north."
1970 LET no=2000: LET we=1850: LET
  ea=1900
1980 RETURN
2000 LET i$="You are in the entrance
  hall. There are four doors
  leading north, south, east
  and west."
2020 LET so=1850: LET ea=2050: LET
  we=2500: LET no=2350
2030 RETURN
2050 LET i$="The Library. This
  is a large and very impressive
  room which is full of books.
  There is a red phone on a small
  table in the corner."
2070 LET we=2000
2080 RETURN
2100 LET i$="The Kitchen. This
  is a fairly large room again.
  Indeed the furniture could be
  said to be GIANT! There is a
  cupboard to the east and stairs
  lead down."
2115 IF 1(24) THEN LET ea=2200
2120 LET no=2250: LET do=2150
2130 RETURN
2150 LET i$="There is a distinct
  smell of Bordeaux white circa
  1967."
2170 LET 1(25)=0: LET up=2100
2180 RETURN
2200 LET i$="The Cupboard. There
  are shelves all round the walls
  but you are too small to reach
  them. There is only one exit."
2220 LET we=2100
2230 RETURN
2250 LET i$="The Dining Room. The
  table in here is of epic proportions.
  Doors lead west and
  south and to the east is a sign."
2270 LET we=2300: LET so=2100: LET
  ea=1950
2280 RETURN
2300 LET i$="The Lounge. Large
  easy chairs are the main feature
  of this huge room. Doors lead
  east, south and west."
2305 IF 1(3) THEN LET i$=i$+" There
  is a GIANT sleeping in one of
  the chairs. Sssh!"
2320 LET we=2550: LET ea=2250: LET
  so=2350
2330 RETURN
2350 LET i$="The Music Room. There
  is a large portrait of Beethoven
  on the wall and the last
  movement of his ninth symphony
  is coming from the immense hi-
  fi in the corner. Doors lead
  north, west and south."
2370 LET we=2450: LET so=2000: LET
  ea=2300
2380 RETURN
2400 LET i$="The Secret Passage."
2420 LET 1(25)=0: LET up=2500
  
```

```

2430 RETURN
2450 LET i$="The Store Room. There
  is a large safe in the corner.
  There seems to be a passage
  leading downwards as well as
  to the door to the east."
2470 LET do=2400: LET ea=2350
2480 RETURN
2500 LET i$="The Billiard Room.
  Several cues are leaning against
  the floor. A large red ball
  the size of a football is lying
  up against the biggest snooker
  table you have ever seen. There
  is a scoreboard on the wall. The
  door leads east."
2520 LET ea=2000
2530 RETURN
2550 LET i$="The Television Room.
  The 45" t.v. set is on. The
  programme is 'Blue Peter' and
  a Simon Groomes has forgotten
  the script as usual. He appears
  to be showing how to make your
  own secret passage out of
  your curtains and sticky-back
  plastic."
2570 LET ea=2300
2580 RETURN
2600 LET i$="You are on the first
  tee of a huge golf course. A
  sign stuck in the ground says
  'Hole 1, 7345 yds, Par 3'. So
  one way off to the north you
  can see a flag. The castle is
  to the south."
2620 LET no=2650: LET so=1950
2630 RETURN
2650 LET i$="You are now half
  way down the fairway. The flag
  blows gently in the breeze, but
  is still some way off."
2670 LET no=2700: LET so=2600
2680 RETURN
2700 LET i$="You are now on the
  green. The flag towers above
  you, and the hole is at least
  6 feet across. There is a bunker
  to the east, and a stream to the
  north."
2720 LET ea=2750: LET so=2650: LET
  no=3150
2730 RETURN
2750 LET i$="You are now in the
  bunker. This would be a tricky
  shot if you were really playing
  golf."
2770 LET we=2700: LET so=2650
2780 RETURN
2800 LET i$="You are in the garden
  shed. The garden is to the
  west and a dusty track climbs
  the hill to the south."
2820 LET we=1400: LET so=1350
2830 RETURN
2850 LET i$="You are standing in
  a quarry. There are huge
  slabs of stone all around."
2870 LET so=1100: LET ea=2900: LET
  up=ea
2880 RETURN
2900 LET i$="You are on a cliff
  top. Down below you can see
  
```

```

the quarry and to the south some
  trees."
2920 LET do=2850: LET so=1150
2930 RETURN
2950 LET i$="Inside the church.
  Someone is playing music on the
  organ. You are facing the main
  door to the south with a small
  side door to your left."
2970 LET so=1300: LET ea=1050
2980 RETURN
3000 IF b$="" THEN PRINT a$; "What
  at 7?" : GO TO 100
3002 IF 1(25)=0 THEN PRINT "It's
  too dark to 'a$' anything." :
  GO TO 100
3003 IF 1(5)=5 THEN PRINT "You can
  't carry any more!": GO TO 100
3005 LET found=0: FOR n=1 TO max
  : IF a$(n)=b$+ " " THEN (T
  O 7) AND 1(n)=set: THEN LET found
  =n: GO SUB 3040
3005 NEXT n
3007 IF found THEN GO TO 100
3010 FOR n=1 TO max: IF a$(n)=b
  $+ " " THEN (TO 14) AND 1
  (n)=set: THEN LET found=n: GO SUB
  3040
3012 NEXT n
3020 IF NOT found THEN PRINT "That
  is not possible!": GO TO 100
3030 GO TO 100
3040 IF found=3 AND found=5 THEN
  EN IF NOT 1(3)+1(4)+1(5) THEN PR
  INT "You can only carry one
  treasure at a time.": RETURN
3045 IF found=3 THEN PRINT "The
  hearth cries 'Master! Master! You
  hear sounds of movement nextdoor.'"
3050 PRINT "OK.": LET 1(found)=
  0: LET i=i+1: RETURN
3100 PRINT "There is a loud
  scream as you fall to your death,
  narrowly missing your house."
  : FOR n=60 TO 0 STEP -2: BEEP .0
  1:n: NEXT n: GO TO 3000
3150 PRINT "Gurgles, gurgles, gurg
  les..... You have fallen in the
  water and drowned.": FOR n=60
  TO 0 STEP -2: BEEP .01:n: NEXT n
  : GO TO 9000
3200 IF b$="" THEN PRINT "Unlock
  what?": GO TO 100
3205 IF b$="a$e" THEN GO TO 335
  0
3205 IF b$<>"door" AND b$<>"cast
  le door" THEN PRINT "It doesn't
  have a keyhole!": GO TO 100
3210 IF set<1850 THEN PRINT "There
  is no door to unlock.": GO TO
  100
3215 IF 1(23) THEN PRINT "It's a
  already unlocked, silly!": GO TO
  100
3220 IF 1(11) THEN PRINT "You do
  not have the key.": GO TO 100
3225 IF 1(14)=1 THEN PRINT "You
  can't quite manage to get the
  key into the lock.": GO TO 100
3230 IF NOT 1(17) THEN PRINT "The
  key is jamming the lock.": GO
  TO 100
  
```

(listing continued on next page)



continued from previous page)

```

3240 PRINT "Clunk !": LET 1(23)=
1: GO TO 100
3300 BEEP .01,10: INPUT "Combina
tion please": LINE a$: IF a$=""
OR LEN a$>10 THEN GO TO 3303
3305 PAUSE 50: FOR n=1 TO LEN a$
: PRINT a$(n): IF a$(n)<"0" OR
a$(n)>"9" THEN PRINT AT 20,7:"Th
at's not a number !": GO TO 3390
3307 FOR m=1 TO VAL a$(n): BEEP
.10,0: PAUSE 10: NEXT m: PAUSE 5
0: NEXT n
3310 IF a$="3725" THEN PRINT AT
20,7:"Click.": PAUSE 100: LET 1(
27)=1: GO TO 3390
3315 IF a$="4234" OR a$="7345" T
HEN PRINT AT 20,7: PAPER 2:"Boom
!!!: FOR n=60 TO 0 STEP -5: BEEP
.01,n: EORDER n/10: INPUT " ":
PRINT PAPER n/10:p$: NEXT n: INP
UT " ": FOR n=1 TO 150: NEXT n:
CLS: PRINT "The safe blows up i
n your face. This has unfortunat
ely caused you to meet your ma
ker.": GO TO 9000
3320 PRINT "IS WRONG !!!": GO T
O 3390
3350 IF set<>2450 THEN PRINT "Th
ere is no safe here.": GO TO 100
3352 CLS: BORDER 1: DRAW 255,0:
DRAW 0,175: DRAW -255,0: DRAW 0
,-175: INPUT " "
3355 PLOT 55,47: DRAW 65,0: DRAW
0,81: DRAW -65,0: DRAW 0,-81: P
LOT 120,47: DRAW 8,9: DRAW 0,81:
DRAW -65,0: DRAW -8,-81: PLOT 12
0,128: DRAW 8,8
3360 LET p$=CHR$ 21+CHR$ : FOR
n=6 TO 15: LET p$=p$+CHR$ 22+CHR
$ n+CHR$ 74: " " NEXT n
3365 PRINT AT 11,9: INK 0:CHR$ 1
40:CHR$ 140: CIRCLE INK 0:96,104
,4: CIRCLE INK 0:96,104,7
3370 PRINT PAPER 0: INK 7:p$
3375 PRINT AT 18,7:
3380, GO TO 3300
3390 PAUSE 100: BORDER 0: CLS:
INPUT " ", GO TO 20
3400 IF b$="" THEN PRINT "Examin
e what?": GO TO 100
3405 IF 1(25)=0 THEN PRINT "Ther
e's not enough light.": GO TO 100
3410 LET found=0: FOR n=1 TO max
: IF a$(n)=b$+ " " (
TO 7) AND 1(n)=set OR 1(n)=0) T
HEN LET found=1: PRINT "You see.
": d$(n)
3415 NEXT n: IF found THEN GO TO
100
3420 FOR n=1 TO 10: IF a$(n)=b$
+ " " (TO 10) AND e(n)
=set THEN LET found=1: PRINT "Ye
u see.": d$(n+10)

```

```

3425 NEXT n: IF found THEN GO TO
100
3430 FOR n=1 TO max: IF a$(n)=b
$+ " " (TO 14) AND 1
(n)=set OR 1(n)=0) THEN LET fou
nd=1: PRINT "You see.": c$(n)
3435 NEXT n: IF found THEN GO TO
100
3440 PRINT "You see nothing inte
resting.": GO TO 100
3400 LET found=0: FOR n=1 TO max
: IF 1(n)<>0 THEN NEXT n: GO TO
3440
3410 IF NOT found THEN PRINT "Yo
u don't have anything !":
LET found=1
3420 GO SUB 700
3430 NEXT n
3440 IF NOT found THEN PRINT "Yo
u don't have anything !":
3450 RETURN
3800 IF a$="" THEN PRINT "Open u
hat?": GO TO 100
3802 IF a$="safe" OR b$="safe do
or" THEN GO TO 3900
3805 IF a$<>"door" AND b$<>"cas
le door" THEN PRINT "hat would
be a great feat !": GO TO 100
3810 IF set<>1850 THEN PRINT "Th
ere is no door to open.": GO TO
100
3820 IF NOT 1(23) THEN PRINT "It
's locked !": GO TO 100
3830 PRINT "Creak ! The door swi
ngs open.": LET no=2000: GO TO 1
00
3900 IF set<>2430 THEN PRINT "Th
ere ain't no safe here, man !":
GO TO 100
3910 IF NOT 1(27) THEN PRINT "It
won't open.": GO TO 100
3920 IF 1(27)=2 THEN PRINT "It's
already open.": GO TO 100
3930 LET 1(27)=2: LET 1(15)=2450
: PRINT "You open the safe door.
": GO TO 100
4000 IF b$="" THEN PRINT a$:" wh
at?": GO TO 100
4010 LET found=0: IF b$="gloves"
THEN LET found=14
4020 IF b$="boots" THEN LET foun
d=7
4030 IF NOT found THEN PRINT "Du
n't be silly !": GO TO 100
4040 IF 1(found)=0 THEN LET i=1
: LET 1(found)=1: PRINT "OK.":
GO TO 4070
4050 IF 1(found)=set THEN LET 1(
found)=1: PRINT "OK.": GO TO 4
070
4060 PRINT "See no 'b$?": "":
GO TO 100
4070 IF set=.050 AND 1(7)+1(14)=
-2 THEN LET up=1550: GO TO 100

```

```

4080 IF set=1550 AND 1(7)+1(14)=
-2 THEN LET do=1600: GO TO 100
4090 GO TO 100
4100 IF b$="" THEN PRINT a$:" wh
at?": GO TO 100
4110 LET found=0: IF b$="gloves"
THEN LET found=4
4120 IF b$="boots" THEN LET foun
d=7
4130 IF NOT found THEN PRINT "Ar
e you nuts?": GO TO 100
4140 IF set=1600 OR set=1550 THE
N GO TO 3100
4150 IF 1(found)=1 THEN LET 1(f
ound)=set: PRINT "OK.":
4160 IF NOT found THEN GO TO 499
4170 IF up=1550 THEN LET up=0
4180 IF do=1600 THEN LET do=0
4190 GO TO 100
4200 IF b$="" THEN PRINT "Oil wh
at?": GO TO 100
4210 IF b$<>"key" AND b$<>"rusty
key" THEN PRINT "Why?": GO TO
100
4215 IF 1(11) THEN PRINT "You do
not have the key !": GO TO 100
4220 IF set<>100 THEN PRINT "I
can see no lubricants.": GO TO 1
00
4230 PRINT "OK.": LET 1(17)=1:
LET a$(11)="shiny key": LET d$(1
1)="a nice, gleaming portice k
ey.":
4235 FOR n=1 TO 4: LET c(11,n)=5
: NEXT n
4240 GO TO 100
4300 IF b$<>" " AND b$<>"sand" AN
D b$<>"in sand" THEN PRINT "You
must be joking !": GO TO 100
4310 IF 1(16) THEN PRINT "You ha
ve to digg implement.": GO TO
100
4320 IF set<>2750 THEN PRINT "Th
ere is nothing to dig.": GO TO 1
00
4325 IF 1(9)<>9999 THEN PRINT "Y
ou are too hungry to dig !": GO
TO 100
4330 PRINT "Scrape...scrape... A h
ole appears in the sand.": LET 1
(14)=set: GO TO 100
4400 IF b$="" THEN PRINT "Tie wh
at?": GO TO 100
4410 IF b$<>"rope to cow" THEN P
RINT "This is not possible !": G
O TO 100
4420 IF set<>1030 THEN PRINT "Wh
at cow?": GO TO 100
4435 IF 1(6) THEN PRINT "You ha
ve no rope !":
4440 LET 1(20)=1: PRINT "Holo !!
The cow is now tied by the nec
k.": GO TO 100
4500 IF b$="" THEN PRINT a$:" wh

```

```

at?": GO TO 100
4505 LET found=0: FOR n=1 TO max
: IF a$(n)=b$+ " " (
TO 14) AND 1
(n)=0 THEN PRINT "OK.": LET fou
nd=1: LET 1(n)=set: LET i=i-1
4515 NEXT n
4520 IF NOT found THEN PRINT "Yo
u don't have 'b$?": " "
4530 GO TO 100
4540 IF b$="" THEN PRINT a$:" wh
at?": GO TO 100
4550 IF b$<>"door" AND b$<>"cupb
oard door" THEN PRINT "I don't t
hink that would be a good idea
": GO TO 100
4560 IF set=1850 OR set=1000 OR
set=1050 OR set=1400 THEN PRINT
"The door is too strong.": GO TO
100
4570 IF set<>2100 THEN PRINT "Yo
u see no door here.": GO TO 100
4580 IF 1(13) THEN PRINT "You've
nothing to smash it with!": GO
TO 100
4595 IF NOT 1(23) THEN PRINT "Yo
u'll need some refreshment !": G
O TO 100
4600 LET 1(24)=1: LET ea=2200
4605 PRINT "Crunch !! The remai
ns of the cupboard door fall a
way to the side.":
4610 GO TO 100
4620 IF b$="" THEN PRINT a$:" wh
at?": GO TO 100
4630 IF b$<>"match" THEN PRINT "
Be reasonable !": GO TO 100
4640 IF 1(12) THEN PRINT "What r
atch?": GO TO 100
4650 IF 1(25)=1 THEN PRINT "That
was a waste !": GO TO 100
4660 LET 1(25)=2: PRINT "That's
better !": GO TO 100
4670 LET 1(20)=2: LET e(4)=9999:
LET 1(2)=set: RETURN
4680 LET 1(33)=e(4): LET 1(34)=e
t: LET 1(35)=i
4690 SAVE "Jack" DATA 1()
4700 GO TO 100
4710 PRINT "Please wait.": GO S
UB 7000
4720 PRINT "Start tape.":
4730 LOAD "Jack" DATA 1(): LET e
(4)=1(33): LET set=1(34): LET i=
1(35)
4740 IF 1(17) THEN FOR n=1 TO 4:
LET c(11,n)=5: NEXT n: LET a$(1
1)="shiny key": LET d$(11)="a

```

(continued from page 100)

have a graphic representation which appears after Look and Inventory commands. Associated with each of these objects are three levels of description, for example: "bag", "money bag" and "a cloth bag full of gold coins". The first two forms are those that can be used in commands like Get Bag or Get Money Bag. The third is the response given by the program to the Examine command.

Some special commands are also implemented. These include: Save, Load, Inventory, Recap and Quit.

First type in listing 1. This creates 64 user-defined graphic characters which are used in the graphic representation of the portable objects. When this runs without an error message, save the resulting code either to tape by typing

GO TO 9990

or to Microdrive cartridge by typing

GO TO 9995

Now type in the main program, listing 2. What you do now depends on whether you are using a Microdrive or tape. With a Microdrive simply type

GO TO 9995

having inserted the cartridge with the UDG code already on it. With tape it is now necessary to re-load the UDG code saved by listing 1. Do this by typing

GO TO 9990

This will load the code and then Save/Verify

Table 1. Variables:

1(n)	Array of flags and object locations.	h\$	Current help message
m\$(n)	Short descriptions of objects.	up,do,no,so,ea,we	Pointers to surrounding locations.
os(n)	Standard descriptions of objects.	i,a,b\$	No. of objects carried.
ds(n)	Verbose descriptions of objects.	max	Input line, command and parameter.
es(n)	Fixed objects that can be examined.	found,sp	Maximum number of portable objects.
e(n)	Location of fixed objects.	n,m	Assorted flags.
set	Current location.	keys s\$	General for/next control variables.
is	Current location		Currah MicroSpeech variables.

Table 2. Program breakdown

10 — Initialisation	4300 — Dig
20 — Main loop	4400 — Tie
500 — Command Decoder	4500 — Drop
600 — Input routine	5000 — Break/Smash
700 — Prints graphical representation of object n	5400 — Light/Strike
1000 — Location subroutines	5600 — Save
3000 — Get/Take	5800 — Load
3200 — Unlock	6000 — Eat
3400 — Examine	6200 — Drink
3600 — Inventory	6400 — Sleep
3800 — Oper	6600 — Caught by Giant
4000 — Wear	6700 — Chop
4100 — Remove	7000 — Main Initialisation
4200 — Oil/Lubricate	8000 — Titles
	9000 — Game Over
	9990 — Tape/Microdrive Program save

both the Basic program and the code automatically.

If this task seems rather onerous then tape and Microdrive copies are available at £4.95

and £8.95 respectively from: Col:n Carruthers, 22 Drylaw House Gardens, Edinburgh EH4 2UE. In addition, maps can be obtained from the same address at only £1.



```

nice, gleaming mortice key."
5640 GO TO 20
6000 IF b5="" THEN PRINT "Eat wh
at 7:1 GO TO 100
6010 IF b6<>"food" THEN PRINT "T
hat would not be very nice !": G
O TO 100
6020 IF 1/9<>set AND 1/9<>30 TH
EN PRINT "There is no food.": G
O TO 100
6030 PRINT "There are sounds of
munching as you eat the food.":
IF 1/9=0 THEN LET i=i+1
6035 LET i/9=9999
6040 GO TO 100
6200 IF b5="" THEN PRINT a5: wh
at 7:1 GO TO 100
6202 IF 1/25=0 THEN PRINT "You
can see nothing to": a5: GO TO 1
00
6205 IF b5="water" THEN GO TO 63
00
6210 IF b5<>"wine" AND b5<>"bott
le of wine" THEN PRINT "that's i
mpossible !": GO TO 100
6220 IF 1/110<>set AND 1/110<>0
THEN PRINT "There is no wine.":
GO TO 100
6230 LET i/25=1: PRINT "You dri
nk some wine.": GO TO 100
6200 IF set<>1450 AND set<>2700
THEN PRINT "This is a very dry a
rea. In fact it is so dry there i
s no water to drink.": GO TO 10
0
6310 PRINT "Due to a lack of poi
llution controls in this are
a, the water which you have just
drank was highly toxic. This h
as meant that you are now an
Ex-Jack."
6320 FOR n=60 TO 1 STEP -1: BEEP
.01,n: NEXT n: GO TO 9000
6400 IF 1/18 THEN LET 1/18=0:
LET 1/17=1: CLD: PRINT AT 11,1
5;"ZZZZZZZZ !": GO SUB 3200: PA
USE 200: BORDER 0: GO TO 20
6410 CLS: PRINT AT 0,10;"ZZZZZ
ZZZZZ !": FOR n=1 TO 400: NEXT
n
6420 GO TO 20
6400 FOR n=60 TO 0 STEP -1: BEEP
.01,n: NEXT n
6410 PRINT "Due to your slow re
actions the GIANT has caught you
and bitten your head off. This
has caused your bodily function
s to cease.": GO TO 9000
6700 IF b5="" THEN PRINT "Up n
hat 7:1 GO TO 100
6710 IF b5<>"beanstalk" THEN PRI
NT "That would be a waste of tim
e.": GO TO 100
6720 IF 1/1 THEN PRINT "You do

```

```

not have the axe !": GO TO 100
6730 IF set<>1050 OR NOT 1/19: T
HEN PRINT "What beanstalk 7:1 GO
TO 100
6740 GO TO 9000
7000 RESTORE 7400
7005 LET a5=""
7010 DIM i(35): DIM d5(max,14)
7020 DIM e5(10,10): DIM d5(26,46)
7030 DIM a5(max,7): DIM e5(10)
7035 DIM c5(max,4)
7037 FOR n=1 TO max: FOR m=1 TO
4: READ c5(n,m): NEXT m: NEXT n
7040 FOR n=1 TO max: READ i(n),o
5(n),a5(n),d5(n): NEXT n
7050 FOR n=1 TO 10: READ e5(n),a5
(n),d5(n+16): NEXT n
7060 RETURN
7400 DATA 5,6,6,6,6
7405 DATA 6,3,4,4
7410 DATA 4,4,4,4,4
7415 DATA 4,4,4,4
7420 DATA 7,7,7,7
7425 DATA 6,6,6,6,6
7430 DATA 7,7,7,7
7435 DATA 5,3,3,3
7440 DATA 6,4,4,6,6
7445 DATA 4,4,4,4
7450 DATA 3,3,3,3
7455 DATA 5,6,5,6
7460 DATA 5,5,6,5
7465 DATA 6,6,6,6
7470 DATA 6,6,6,6
7475 DATA 6,6,5,5
7500 DATA 2000,"axe","axe","a
xe with a wooden handle"
7501 DATA 9999,"magic beans","be
ans","some multi-coloured magi
c beans"
7502 DATA 2350,"golden harp","ha
rp","a magic golden harp"
7503 DATA 9999,"money bag","bag"
,"a cloth bag full of gold coi
ns"
7504 DATA 2200,"magic goose","go
ose","a magic goose that lays
golden eggs"
7505 DATA 1300,"coil of rope","r
ope","a coil of brown rope"
7506 DATA 1000,"climbing boots",
"boots","a pair of Doc Martin's
!!"
7507 DATA 2050,"library book","b
ook","an old book with parchme
nt pages"
7508 DATA 2100,"some food","food"
,"an apple and a banana"
7509 DATA 2100,"bottle of wine",
"wine","une bouteille de Borde
aux Blanc 1967"
7510 DATA 2950,"rusty key","key"
,"an old rusty key"
7511 DATA 2750,"box of matches",

```

```

'matches'," a box of Swan Vesta
s"
7512 DATA 2400,"sledge hammer",
"hammer","a rather fine stanley
sledge hammer"
7513 DATA 1200,"leather gloves",
"gloves","a pair of leather gl
oves"
7514 DATA 9999,"old parchment",
"parchment","that it says 'tric
ky shot'"
7515 DATA 2850,"spade","spade",
"a spade with a metal handle"
7520 DATA 2450,"safe","a safe
with a combination lock"
7521 DATA 2500,"scoreboard","a
scoreboard with score 37 25 0
n 44"
7522 DATA 2050,"phone","a GP3
phone number 4234"
7523 DATA 1050,"cow","a pretty
black and white cow"
7524 DATA 1450,"waterfall","a
waterfall with pretty "a
inbow"
7525 DATA 1100,"oil","a pool o
f Castrol GTX"
7526 DATA 2450,"safe","a safe
with a combination lock"
7527 DATA 1050,"beanstalk","a
huge green plant climbing "i
gh"
7528 DATA 1950,"door","a HUGE
wooden door with mortice
lock"
7529 DATA 2350,"television","a
Decca 45" goggle-box"
7530 DATA 2350,"sign","a sign
saying EMERGENCY EXIT"
8000 CLS: RANDOMIZE: GO SUB 82
00: PRINT AT 5,15;"JACK" AT 7,15
:"and the" AT 9,15;"BEANSTALK" AT
11,15;1934 RAS+CC"
8015 GO SUB 7000
8020 PRINT 10: " Press any key
to continue": PAUSE 0
8030 CLS: DRAW 250,0: DRAW 0,17
5: DRAW -255,0: DRAW 0,-175
8040 PRINT OVER 1: " JACK a
nd the BEANSTALK "
8050 PRINT OVER 1: " 1. The ma
gic goose."
8060 PRINT OVER 1: " 2. The golden
harp."
8070 PRINT OVER 1: " 3. The bag of gold co
ins."
8080 PRINT OVER 1: " Good Luck !"
8090 PRINT OVER 1: " Press any ke
y to start": PAUSE 0: BORDER 0:
INPUT " "
8095 FOR n=0 TO -10 STEP -1: BEE
P 0.05,n: NEXT n
8100 RETURN

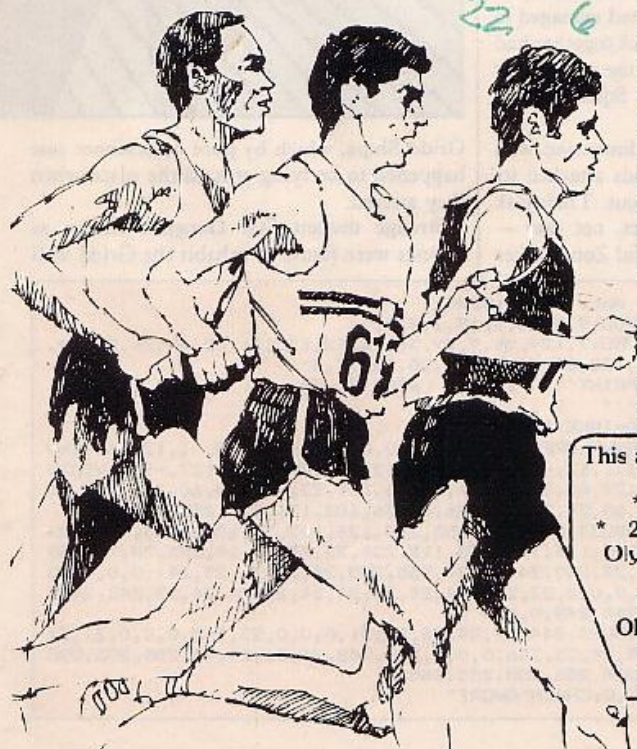
```

```

8200 BORDER 1: INPUT " "
8210 PRINT AT 20,0: PAPER 4:
8212 PLOT 0,0: DRAW 255,0: DRAW
0,175: DRAW -255,0: DRAW 0,-175
8215 LET n=70
8220 FOR n=15 TO 160 STEP 2
8225 LET rnd=RND
8230 IF rnd<(rnd+.5)-(rnd+.5)+4
<0)
8232 IF rnd>.95 THEN IF n>15 THE
N DRAW INK 4:20=n/16,3-RND*5
8233 IF rnd>.95 THEN PLOT INK 4:
n,n: DRAW INK 4:-20=n/16,3-RND*5
8235 IF .LNKEY#CHR$ 13 THEN BEEP
.1,C: RETURN
8240 PLOT INK 4:n,n: DRAW INK 4:
(175-n)/2,0
8245 BEEP .0025,n/6
8250 NEXT n
8260 RETURN
9010 FOR n=3 TO 5: IF 1/n<1550
THEN LET score=score+1
9020 NEXT n
9025 IF score=0 THEN PRINT "You
have failed miserably. Due to y
ou not being able to get one piec
e of treasure back, your moth
er is sure to starve.": GO TO 90
60
9030 IF score=1 THEN PRINT "You
have not done too well. Only one
of the treasures will not last
very long. Especially with infl
ation at 300%": GO TO 9060
9040 IF score=2 THEN PRINT "Two
out of three ain't bad. Mum won'
t starve, but she won't be all
that rich either.": GO TO 9060
9050 IF score=3 THEN PRINT "Long
ratulations. You've managed to c
ollect all the treasures. You
live happily ever after."
9060 BEEP 0.01,10: INPUT "Anothe
r game ?": LINE a
9065 IF a="" THEN LET a="--"
9070 IF a="(1)=="Y" OR a="(1)=="Y" T
HEN GO TO 0
9080 STOP
9990 REM Tape
9991 CLEAR 59999: PRINT "Load":
LOAD "CODE": SAVE "Jack" LINE 9
999
9992 SAVE "Jack.udg" CODE 60000,5
12
9993 PRINT "Verify": VERIFY "":
VERIFY "CODE": STOP
9995 REM MICRODRIVE
9996 CLEAR: ERASE "a": "Jack":
SAVE "a": "Jack" LINE 9996
9997 VERIFY "a": "Jack": STOP
9998 CLEAR 59999: LOAD "a": "J
ack.udg" CODE: RUN
9999 CLEAR 59999: LOAD "CODE":
RUN

```

# OLYMPICS 84



## 48k ZX Spectrum Commodore 64

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



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 or 0935 813528

**Storm Software**

Winchester House  
Sherborne, Dorset  
DT9 4DL



# GRIDD WORZ

TIME ONCE MORE for your fingers to hit the keyboard as Simon Phipps, author of the recently released Jet Power Jack from Program Power, presents a space megaspectacular from his warped imagination. The game is a Basic and machine code original designed to tax both your brain — have you ever tried debugging assembler code? — and reflexes. Well, here we go . . .

In the year 21867 man made a mistake. Not a very great one, not as big as deciding some several million years before to consider crawling out of the sea, but never the less it was for all intents and purposes a mistake. Some may have called it a great advance in the developments of psynetics; the obscure branch of Vruggian metaphysics discovered by the equally obscure Earth scientist Professor Thruggon Botch, but still most called it a mistake.

The science of Psynetic Transportation — or PT for short — was carefully studied by Professor Botch for many years and its true potential only realised after many experiments involving the passage of objects such as paper clips and biro's into a strange dimension now named by most recognised physicists and loonies as the Meta Zone. The dimension exists in parallel with our own and is in fact responsible for many so called everyday occurrences.

Up until Professor Botch's discovery of the Meta Zone and the subsequent proof of its existence, anyone who had put forward ideas about parallel dimensionism was branded as suffering from severe parancia or just generally laughed at.

The Professor's revelations at the discovery of the Meta Zone all related to a simple fact that everyone knows — when anything as

small and important as that last paper clip is needed it always goes missing. He successfully broke the dimension barrier by carefully leaving a paper clip lying around and accurately monitored its position until it actually vanished.

By pure coincidence the moment that the paper clip ceased to exist as far as this Universe is concerned was exactly the same moment at which the Professor was looking for the aforementioned paper clip to hold his progress reports together.

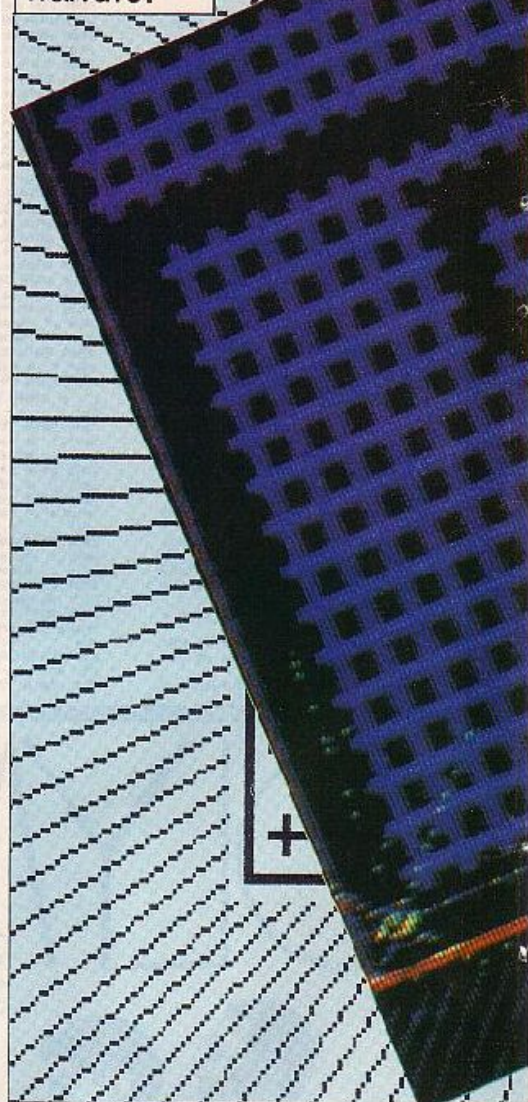
Breaching the transdimensional barrier between our world and the Meta Zone in fact caused absolute havoc. Instead of simply enabling the return of all those missing biro's and paper clips a gaping hole was produced in the dimension wall which began to suck up vast quantities of matter from our Universe.

It was quite a few minutes before some bright spark had an idea that would stop the chaos caused by the dimension warp. THREE Shredded Wheat were thrown in the general direction of the hole and immediately the havoc stopped. Of course even though the hole was well and truly plugged a few important things such as two-thirds of our Universe were at the other side of the Zone . . . whoops!

Inside the Meta Zone things were not at all hunky dory. What few people had managed to pull most of their molecules back together had decided to get out and so the amazingly trendily titled Zonetraacker Squads were formed.

Finding a weakness in the dimension wall known as the Gridd, the squads attacked its structure in an effort to break out. Their task was, as with most video games, not easy — even with the aid of the powerful Zonetraacker

Simon Phipps and his BBC micro take on more than even three Shredded Wheat can handle.



Gridd Ships, which by pure coincidence just happened to be lying around the place when they arrived.

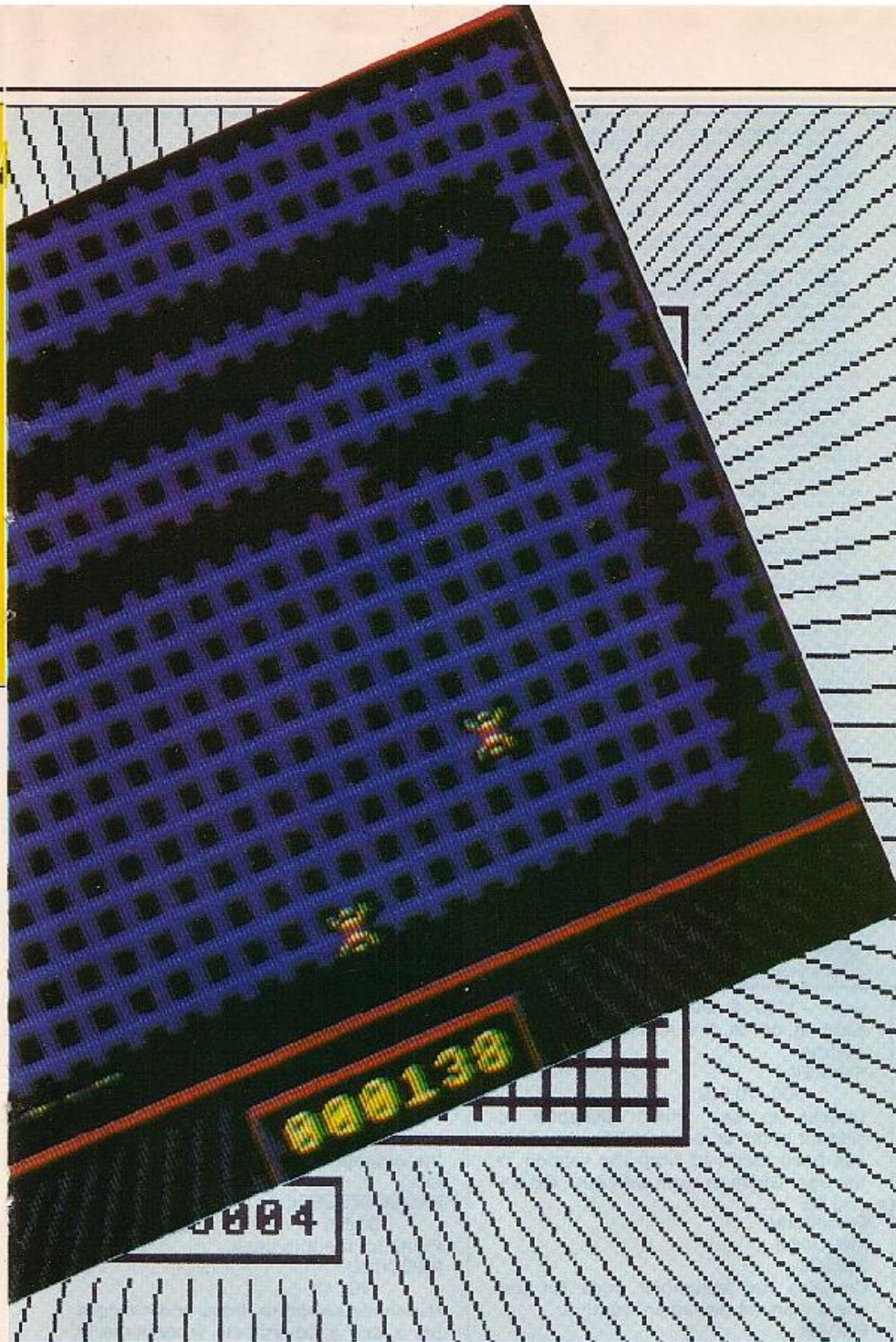
Strange mutant Star Googlies known as Drones were found to inhabit the Gridd wall

## Listing 1.

```
10REM          GRIDD WORZ
20REM          By
30REM          Simon Phipps
40*FX9,250
50*FX10,250
60MODE1:VDU19,2,4;0;19,3,6;0;BCOLO,3;FORT=0T0100:P
LDT67,RND(1280),RND(1023):NEXT:BCOLO,2
70FORT=0T01280STEP64:MOVE1280,1023:DRAWT,0:MOVE0,0:
DRAWT,1023
80MOVE1280,T:DRAWT,T*1024/1280:MOVE0,T:DRAWT,T*1024
/1280:NEXT
90VDU29,640;512;
100BCOLO,1;R=10;R1=10:T=0:REPEAT
110MCVER*CCST,R*SINT:FORT1=T TO 2*PI+T*2 STEP PI/2:D
RAWR*CCST1,R*SINT1:NEXT
120R=R+R1;R1=R1+1.2:T=T+PI/10:UNTILR>1000
130VDU26:COLCUR3:PRINTTAB(10,30)"By Simon Phipps 198
4"
140VDU5:FORT=1T03:MOVE480+T*4,512+T*4:BCOLO,T:PRINT
```

```
Gridd Worz":NEXT:VDJ4
150VDU19,3,14;0;19,1,9;0;
160VDU17,129,28,9,27,30,18,12,17,131,23,10,26,29,19,
12,17,128,28,11,25,28,20,12,17,3
170PRINT"" Z .... Left"" X .... Right"" * ..
.. Up"" ? .... Down"
180A=INKEY10000
190ENVELOPE2,4,0,0,0,0,0,250,-10,-10,-1,126,60;ENV
ELOPE1,1,12,-5,15,1,1,60,127,0,127,127,-127,-127:VDU23
,224,129,66,36,24,24,36,66,129,23,225,24,60,126,255,25
5,126,60,24,23,232,36,60,36,102,126,255,255,165
200VDU23,234,165,255,255,126,102,36,60,36,23,233,224
,112,255,114,114,255,112,224,23,231,7,14,255,78,78,255
,14,7,23,240,24,24,24,255,255,24,24,24,23,241,0,0,0,25
5,255,0,0,0,23,242,24,24,24,24,24,24,24,24,23,243,24,2
4,24,248,248,0,0,0
210VDU23,244,24,24,24,31,31,0,0,0,23,245,0,0,0,31,31
,24,24,24,23,246,0,0,0,248,248,24,24,24,23,255,255,255
,255,255,255,255,255,255
220CLS:CHAIN"GWORZ"
```





and more such nasties appeared as the Zonetracker Squads disrupted sections of the Gridd and hence progressed to the higher energy Gridd levels. The Drones were highly advanced Meta beings whose sole purpose apart from being a general annoyance to everyone was to repair and eliminate any impurities on the Gridd which meant both short circuits and the Zonetrackers themselves.

The idea of the game is to pilot your Zonetracker across the Gridd wall destroying the individual Gridd sections. After approximately 75 percent of the Gridd has been destroyed the network explodes allowing passage to the next Gridd level.

Can you save the humans at the other side of the Zone from a fate worse than missing the next issue...? Start typing now!

Control keys for the Zonetracker are:

Z — Left  
X — Right

? — Down  
\* — Up

Type in listing 1 and save it on cassette and then enter listing 2 and saving that under the title of "GWORZ".

*The variable and procedure listing for listing 2 — Gridd VlorZ.*

#### Integers

A%

30,250,330,520

General dogs-body variable, used in Inkey statements and FNPeek (x%,y%).

AX%

290,300,350,710

Value of the memory address at which the x co-ordinate values of the drones' positions are stored from.

AY%

290,300,350,710

Value of the memory address at which the y co-ordinate values of the drones' positions are stored from.

B%

330

Seems to have slipped into the program by mistake — spot the untidy programmer.

CO%

160,170,200,290,300,470,480

Number of Gridd sections left to be destroyed by the Zonetracker before the Gridd destructs.

CODE%

360,530

Value of the memory address from which the machine code is assembled into.

D%

710,750,780

Dogs-body variable used in PROC RND CHAR(C%) and PROC RND.

F%

710

Simply used in PROC RND to select the value of the x co-ordinate increments or the chosen drone's x co-ordinate value.

H%

120,130,330

The value of the character representing the drones. This is constantly being altered to give the pulsing effect of the drones.

HI%

10,240,250

Value of the high score.

J%

1000,1010

Variable used to generate the explosion of the Zonetracker.

K%

420,430,1000,1010

Variable used in the same way as J% to generate the explosion and also as the new value of the y-increment on the Zonetracker's co-ordinates depending upon the keys pressed in FRCCSnake.

K %

40,170,210,480

Variable used to check if the Zonetracker has collided with anything.

L%

420,440

Variable used to determine the x-increment of the Zonetracker's x co-ordinate depending upon the keys pressed in PROC Snake.

LI%

40,210

The number of lives left.

M%

830,840

Used in FN BIN (a\$) to determine the value returned by the functions.

P%

530

Program counter — where the machine code is being assembled into.

R%

830

For-To-Next loop variable in FN BIN (a\$) which checks down the string passed to the procedure character by character.

S%

710,780

Dogs' body variable used in PROC RND and PROC RND Char (c%).

SC%

750,780

String used in PROC RND Char (c%) to store the string returned by FN BIN (a\$).

HIS

10,30,250,910,920,960,970,980

Name of the current highest scores.

a\$

700,330,840

General dogs' body string variable used in PROCedures and functions.

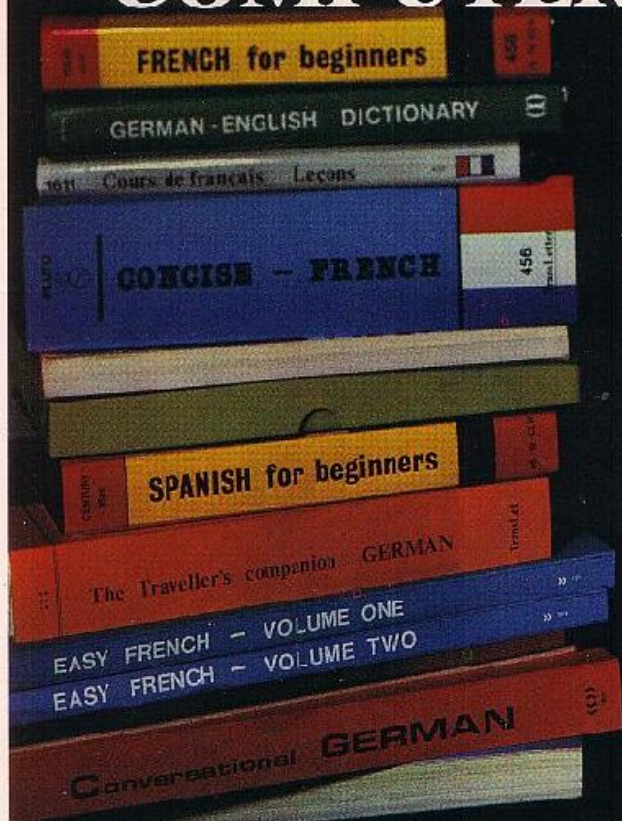
(continued on next page)







# COMPUTER LANGUAGES...



Imagine a ferret in a hardware shop

Not something you'd forget. That's how the Linkword System helps you remember that the Spanish for "hardware shop" is "ferreteria".

You'll remember that the French for "fish" is "poisson" by imagining poisoning your pet fish.

Using Linkword you'll learn over 350 words in only 10 hours, that's a quarter of the time it would normally take. Enough for holidays, business trips abroad or help with homework. Start from scratch, and it's amazing how quickly you learn a basic grammar and vocabulary.

Linkword courses in French, German and Spanish are now available from Silversoft for the 48K Spectrum home computer, and there are more to come soon.

They're the biggest thing in languages since the Tower of Babel.

To Silversoft Ltd, London House, 271/273 King St, London W6 9LZ. Tel: 01-748 4125

Please send me ☐ French ☐ German ☐ Spanish Linkword courses at £12.95 each plus 50p P&P.

I enclose a cheque/PO for £\_\_\_\_\_ payable to Silversoft Ltd, or please debit my Access card

No \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

**SILVER  
SOFT**

Silversoft Ltd, London House, 271/273 King St, London W6 9LZ



# THE CHALLENGE IS WITHIN YOUR GRASP



Compatible  
with  
Atari  
Commodore  
Spectrum

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

**NEW**

## PRO 1000

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

## PRO 3000

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

**NEW**

## PRO 5000

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

### KEMPSTON JOYSTICK INTERFACE FOR THE ZX SPECTRUM

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

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



### CONVERSION TAPE I

Converts: Horace Goes Sking, 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, And-o-ids, Horace And the Spiders, Space Raiders, Winged Avenger, Muncher

ALL 54.95 each

SPECTRUM  
JOYSTICK  
INTERFACE  
£11.50

PRO 5000  
£13.50

PRO 3000  
£12.75

PRO 1000  
£10.99

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: 826076 KEMPMI G



**VIC**

Arnie  
Blomberg  
with a high-  
resolution  
drawing routine.

**DRAW**

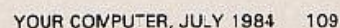
# DRAW

**Ellipse** from centre, two radii and angle of inclination.

The small text is three by five pixels and is stored as complete words in the machine-code

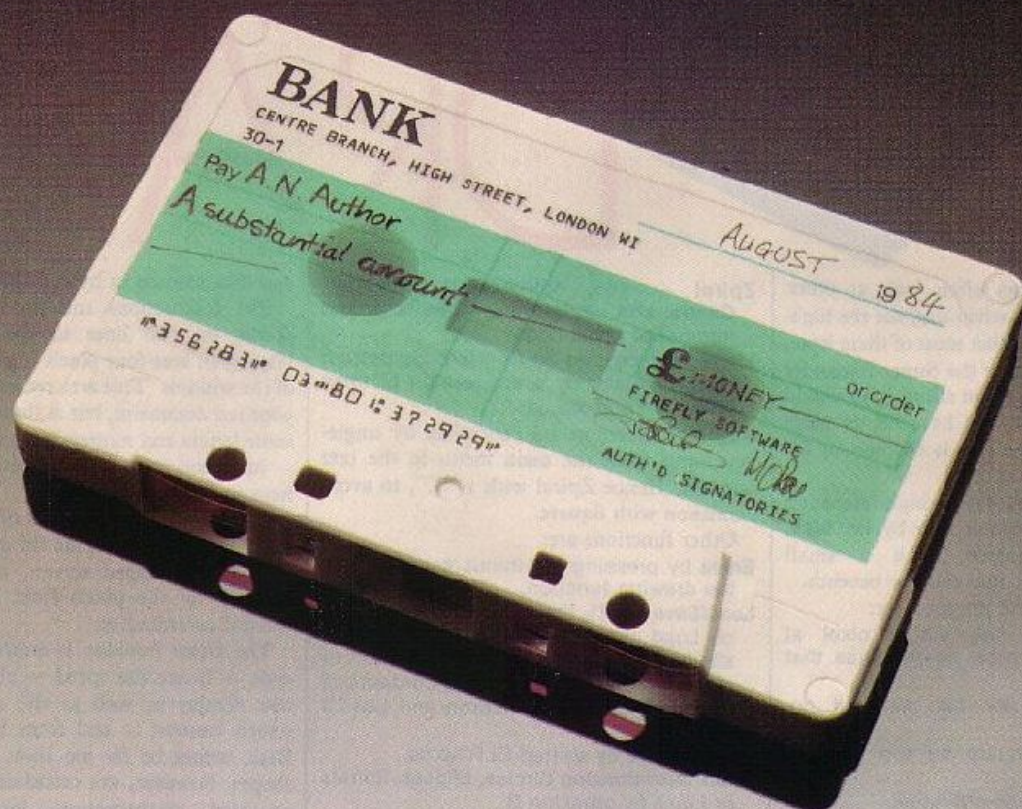
The Draw function is entirely in machine code — hence the speed — also most of the text display as well as the transfer of the screen content to and from RAM memory. Basic would be far too slow. The spherical shapes, however, are calculated in Basic, by standard mathematical formulae, using machine-code Draw between frequent points on the circumference.

(continued on page 111)





# HOW TO TURN YOUR SOFTWARE INTO HARD CASH.



Turning a great idea into a profitable idea isn't easy.

It needs skill, patience and sheer hard work. But to be really profitable, it also needs the backing of a large, respected company.

At British Telecom we are now looking for writers of games and educational programs to help us launch a new and exciting range of software.

If we like your idea we'll send you a cheque straightaway as an advance on royalties.

Then we'll package your program, advertise it and distribute it with the care and attention you'd expect from one of Britain's biggest companies.

So if you'd like to turn your software into hard cash, simply send your program, on cassette or disk, to

**FIREFLY**  
SOFTWARE



British Telecom,  
Wellington House, Upper St. Martin's Lane, London WC2H 9DL.



(continued from page 109)

If you are interested in dis-assembling the machine code, here is a brief summary of the routines:

- 8192-8238 — clears text window.
- 8240-8394 — prints various parts of text in text window.
- 8400-8529 — Sets up bit-mapped screen.
- 8530-8605 — Plots pixel positions on screen.
- 8606-8659 — More text printing.
- 8660-8932 — Calculating Draw function.
- 9368-9351 — Transfer screen to RAM and vice versa.

The gaps in between and up to 9727 are filled by character store for words and numerals, and more text printing. The variables P9 and PS, which are used in all drawing inputs, are pointers to character store and their positions in the text window.

The numeric-input routine is in Basic lines 1600 to 1640. It has a built-in protection so that you cannot input more than three digits, or a number larger than the screen dimensions. Press Return after each number input.

Here is how to enter the listings: start with listing 1, the machine-code data loader. Note

the Rems in lines 100 and 240 must be kept until the program has been typed in full. They allow you to run the program and test that the data is correct.

The checksum on each line verifies the accuracy of the data on that line, but not any missing or out-of-sequence lines — so check this carefully yourself to avoid frustrating crashes or other faults in the program. Ignore the fact that the screen tells you that the data is stored in memory at this stage — the Rems have prevented this.

When you have finished typing and checking it, remove the two Rems and save the loader program on tape. This should be saved as the first item on another tape. It will cause the start of the main high-resolution program to be loaded from byte 9728, instead of 4608, as the bit-mapped screen and machine codes use 5.5 of RAM. The Basic Move incorporates an automatic Load/Run for the next program.

Finally we come to listing 3 — the main hi-res draw program. Type it very carefully, especially all Poke and Sys entries. You cannot run it at all at this stage. When finished, save it immediately after the Basic Move.

Now load and run the programs in the following sequence:

1. Basic Move program, but press the Run/Stop key as soon as the word Load appears on the screen, as we do not want the main hi-res program yet.
2. The machine-code data loader.
3. The main hi-res draw program. This has a built-in routine at line 50000, which will save the machine-code data in a shorter format. To do so merely type RUN50000 and save it on tape after the main program. Then all the parts of the program will load and run in one sequence.

Now, with any luck, you should have a clear screen, with the main menu in the text window. If there are any mistakes in the main program, garbage will appear in the text window. To see what the error is type

GOTO5

and press Return without clearing the screen. It will return to normal text mode, and the error message can be read in the lower half. Clear the screen now, before changing any part of the program.

If the program crashes — that is, everything stops working — or if it stops with Ready on a clear screen, re-check the Poke and Sys

(continued on next page)

#### Listing 1.

```
10 REM ** MACHINE CODE AND DATA LOADER
20 REM** KEEP REM'S IN LINES 100 & 240 W
   WHILE TESTING FOR CORRECT COPY OF DATA
   IN LIST.
100 REM IF PEEK(44)<38 THEN PRINT "RUN B
   BASIC MOVE PROGRAM FIRST - THEN RELOAD" : E
   ND
150 PRINT "PLEASE WAIT !! "
200 FOR I=0 TO 95 : LC=8192+I*16 : CT=0
210 FOR J=0 TO 15 : READ A : CT=CT+A
240 REM POKE LC+J,A
250 NEXT
270 READ A : IF A<0 THEN PRINT "ERROR IN LI
   NE" : GOTO END
290 NEXT
300 PRINT "THE MACHINE CODE IS IN
   NOW STORED IN MEMORY - LOAD THE HI-RES
   PROG." : GOTO END
3192 DATA 169,11,133,253,76,12,32,234,
169,16,133,253,169,240,133,254, 2287
8208 DATA 169,0,133,251,169,31,133,252,
169,0,100,0,145,251,200,196, 2259
822 DATA 253,200,249,24,169,16,101,251,
133,251,197,254,238,234,98,234, 2878
8240 DATA 169,15,133,254,208,42,32,152,
32,32,89,32,169,55,133,254, 1800
8256 DATA 169,75,133,249,169,8,208,28,
169,15,208,2,169,40,133,254, 2825
8272 DATA 139,30,133,249,169,43,208,10,
169,75,133,254,169,8,133,249, 2296
8208 DATA 139,0,173,251,169,35,133,250,
169,5,133,253,169,31,133,252, 2285
9304 DATA 135,249,141,127,32,165,250,141,
128,32,162,0,160,8,169,75, 2016
9320 DATA 35,145,251,232,228,254,208,1,
96,200,196,253,208,240,24,169, 2740
9336 DATA 15,181,251,133,251,76,124,32,
69,104,133,249,169,92,133,251, 2384
9352 DATA 159,11,133,253,169,72,133,254,
69,36,133,252,169,29,76,110, 2116
9368 DATA 32,169,72,133,249,169,224,133,
251,169,16,133,253,169,32,76, 2206
9384 DATA 136,32,169,30,133,254,169,275,
76,54,32,168,168,164,162,76, 216
3400 DATA 139,8,168,170,57,0,30,232,24,
85,10,201,215,144,245,208, 2074
3416 DATA 152,201,10,208,235,142,2,9,30,
232,142,221,30,232,142,222,30, 2452
3432 DATA 232,142,239,30,232,142,240,30,
60,0,139,240,153,224,30,208, 2463
3448 DATA 24,185,1,201,255,208,245,165,6,
62,0,157,8,150,232,224, 2139
3464 DATA 220,208,248,162,1,142,220,150,
42,223,150,142,241,50,169,2, 2570
3480 DATA 152,8,157,224,50,232,224,16,
200,249,169,16,133,252,169,0, 2368
3496 DATA 133,251,160,0,69,0,145,251,
200,208,251,230,252,65,252,20, 2808
3512 DATA 30,208,241,162,4,142,271,156,
42,222,158,142,239,50,142,240, 2585
3528 DATA 130,36,127,191,223,238,247,251,
253,254,128,64,32,16,8,4, 2263
3544 DATA 2,1,165,254,70,175,164,96,
65,253,201,159,144,96, 2858
3560 DATA 139,16,133,252,165,254,4,248,
133,251,162,15,24,0,251,144, 2363
3576 DATA 2,230,252,202,208,240,24,101,
253,144,2,230,252,137,251,195, 2053
3592 DATA 254,41,7,173,168,0,172,251,29,
90,33,145,251,96,169,70, 1943
9608 DATA 133,254,169,0,133,249,133,251,
```

```
169,36,76,102,32,169,15,32, 1953
3624 DATA 160,33,169,35,33,254,133,249,
169,40,208,234,163,25,133,234, 2406
3640 DATA 169,724,173,249,169,6,208,222,
169,15,133,254,169,183,133,249, 2691
3656 DATA 159,50,208,230,169,0,162,12,
49,86,202,208,251,165,248,197, 2604
3672 DATA 7,76,17,56,65,242,279,248,
33,89,169,198,76,245,33,223, 2552
3688 DATA 17,33,89,169,230,141,23,34,
65,250,197,249,176,2,56,135, 2336
3704 DATA 19,229,250,133,93,169,198,76,
6,34,229,249,133,93,169,230, 2556
3720 DATA 141,22,34,75,26,34,199,230,234,
234,165,93,197,89,234,234, 2241
3736 DATA 144,27,133,87,133,94,165,89,
33,95,160,247,162,249,173,23, 2114
3752 DATA 34,141,220,34,173,22,34,141,
222,34,76,85,34,133,85,165, 1643
3768 DATA 89,133,67,133,94,169,249,162,
247,123,23,34,141,222,34,173, 2154
3784 DATA 22,34,141,220,34,140,221,34,
42,223,34,165,94,197,95,208, 2004
3800 DATA 23,169,255,133,90,133,91,132,
92,76,174,34,169,4,133,253, 1965
3816 DATA 159,252,133,254,169,60,70,18,
32,234,234,165,95,160,24,0, 2091
3832 DATA 50,30,91,39,92,10,144,18,133,
96,169,255,229,94,101,96, 1694
3848 DATA 30,90,208,0,230,91,208,2,230,
92,137,94,144,12,223,94, 2157
3864 DATA 230,90,208,230,91,208,2,230,
92,136,208,210,234,230,87, 2492
3880 DATA 169,0,133,94,133,95,169,28,
234,234,133,96,165,247,133,254, 2417
3896 DATA 165,249,133,253,32,99,33,24,
165,94,101,30,133,94,165,95, 1924
3912 DATA 181,91,133,35,165,90,101,92,
133,96,144,2,180,249,230,247, 2173
3928 DATA 198,87,208,216,96,169,6,133,
251,169,240,208,6,169,88,133, 2339
3944 DATA 251,169,214,133,249,169,10,133,
254,169,36,76,102,32,0, 1997
3960 DATA 195,170,202,138,132,165,160,
122,164,164,132,128,128,128,236, 2623
3976 DATA 170,172,170,202,74,170,234,174,
170,0,0,0,0,75,170, 1781
3992 DATA 159,170,74,18,170,34,170,147,
56,32,48,32,184,232,130,200, 1842
3008 DATA 136,236,179,170,179,160,163,
184,32,76,160,184,236,42,76,136, 2445
9024 DATA 232,177,170,179,170,170,32,160,
160,160,184,236,74,76,74,74, 2129
9040 DATA 146,171,185,170,170,72,8,200,
60,70,0,0,0,0,228, 1597
9056 DATA 138,234,42,230,164,170,174,170,
105,206,166,204,160,174,0, 2348
9072 DATA 0,0,138,139,138,138,234,93,
81,217,00,53,102,8,152, 1733
9088 DATA 54,152,78,108,140,168,78,151,
218,170,146,146,183,54,182,84, 2092
9104 DATA 7,4,10,14,0,10,150,213,181,
143,150,24,21,20,21,71, 1090
9120 DATA 153,65,213,85,89,83,84,82,81,
54,132,136,138,138,228,73, 1655
9136 DATA 170,234,170,172,0,32,32,64,
228,138,230,42,234,170,168, 2096
9152 DATA 72,60,70,4,10,10,4,192,
60,192,160,160,130,218,170, 1846
9168 DATA 130,130,230,132,220,35,228,74,
```

```
172,236,170,170,230,129,194,128, 2641
9184 DATA 226,228,74,78,74,74,206,158,
204,136,142,4,10,10,10,4, 1648
9200 DATA 160,160,192,160,160,195,170,
206,170,170,136,216,138,136,136,78, 2646
9216 DATA 204,170,204,138,138,230,136,
206,130,220,224,120,224,32,224, 2940
2940
9232 DATA 168,284,68,174,68,170,138,170,
63,204,170,202,170,172,12,16, 2276
9248 DATA 21,14,2,10,17,8,132,138,
112,138,234,168,160,64, 1261
9264 DATA 64,64,73,173,171,169,73,0,0,0,
0,0,228,74,78,74, 1241
9280 DATA 74,78,168,204,138,142,0,0,136,
149,49,149,20,0,201,149, 2064
9296 DATA 221,85,212,0,174,200,172,174,
152,85,212,35,80,0,80,0, 2629
9312 DATA 88,81,152,0,173,169,72,23,216,
149,217,149,213,0,173,20, 2131
9328 DATA 165,168,172,155,82,219,74,91,0,
64,64,75,128,128,169,55, 1853
9344 DATA 153,754,169,170,76,94,32,169,
12,133,251,169,12,133,254,169, 2230
9360 DATA 37,133,230,169,4,70,160,32,169,
0,133,251,133,253,169,162, 2076
9376 DATA 17,251,145,253,200,268,249,
230,252,230,254,202,208,242,96, 3211
9392 DATA 172,162,228,166,174,172,162,
164,168,78,0,0,0,233,173,235, 2285
9408 DATA 169,163,36,84,68,84,55,112,73,
96,72,112,195,170,208,170, 1867
9424 DATA 170,192,78,84,78,224,196,170,
206,170,170,192,46,64,142,224, 2385
9440 DATA 175,136,233,42,235,168,160,56,
32,185,134,130,80,130,199,34, 2312
9456 DATA 85,85,34,0,60,0,60,0,172,
154,64,164,78,0,0, 1151
9472 DATA 156,170,202,132,165,160,172,
184,192,128,128,128,201, 49,85,285, 2597
9488 DATA 75,93,213,156,80,152,92,236,
74,78,74,146,171,186,170, 2677
9504 DATA 70,220,72,204,170,172,202,
72,168,231,165,126,120,0,0, 2084
9520 DATA 167,130,139,106,26,162,34,155,
56,32,48,184,232,136,200,230, 1993
9536 DATA 170,177,163,112,6,96,112,
236,74,140,232,177,170,179,170, 2451
9552 DATA 32,160,160,184,138,139,138,234,
93,81,216,93,128,0,128, 2052
9568 DATA 150,65,82,60,231,73,170,172,
170,73,174,168,172,168,78,164, 2226
9584 DATA 170,234,170,164,172,164,228,
164,174,14,10,10,10,12,4, 1714
9600 DATA 4,14,12,2,4,8,14,14,2,12,14,
8,10,14, 132
9616 DATA 2,14,8,14,2,14,4,8,14,10,14,
14,2,4,8, 134
9632 DATA 10,14,10,14,10,14,10,14,2,3,
14,10,14,10, 178
9648 DATA 10,14,12,4,4,12,2,4,14,12,4,
2,14,8,10, 140
9664 DATA 2,14,12,2,14,8,14,10,14,14,
2,4,3,10,4, 143
9680 DATA 10,14,10,14,2,0,87,84,38,39,
0,112,64,48,112, 648
9696 DATA 32,108,34,169,0,170,157,204,29,
157,220,29,232,224,4,208, 1577
9712 DATA 45,159,29,141,152,33,169,90,
141,53,33,36,0,0,0,0, 1451
```



(continued from previous page)

numbers, or the machine-code data lines.

Unfortunately the Vic-20 pixel is much wider than it is high, so that if we want symmetrical squares and triangles, and circles, which are not elongated the horizontal co-ordinates have to be adjusted. This is done in line 40

DEFFNR(B) = B\*.58

That is, the horizontal numbers are reduced by multiplying their value by .58. You can change the value here yourself to suit your own television screen. Try =B\*1 to see what a normal Vic circle and square would look like.

Although the hi-res screen is 176 true pixels wide, the adjustment factor also means that you have to input a higher number to reach the right-hand edge — in fact 175/.58 (=301) for this particular adjustment factor. You can check what the maximum is by finding the highest number you can input as a horizontal co-ordinate.

There is a check to prevent drawing outside of the screen area, and this can result in triangles and squares having one or more sides missing, if any part of them lies beyond the edge. Spherical shapes also lose parts that lie

outside of the screen. The machine-code routine lets you Draw, Square and Triangle in all directions.

A limited possibility of changing the colour of the drawn pixel can be found by changing line 70 —

Poke8456,(any number from 0 to 7)

In the same line is also the screen/border colour:

POKE 36879,25

Try

POKE 36879,225

for the reverse negative effect.

Change the variables in line 1220 — the lines routine for different patterns. Sometimes you get illegal quantity error here — type Goto5 — but no harm is done.

With no more than 3K expansion you can leave out lines 1000-1090 which operate picture storage in RAM. If you hope to

upgrade later, type them in as the program checks if you have enough memory for storage.

With 24K you can store four pictures by making this change:

1042 IF Q<10:Q>4 etc

The prompt will still read 1-2 = unless you want to redesign it to 1-4 in character store 9568-9572.

If you have a 1520 printer and would like a hard copy of your drawings, add the lines in listing 4 to the main program, and key f8 from the prime menu to activate the printer.

Finally, if you prefer not to type the program yourself, send a cheque or PO for £2.50 to me for a copy on tape, with some drawings including outline maps of the British Isles, and the World. Specify if you want the 1520 addition. 134 Aldebury Road, Maidenhead, Berkshire SL6 7HE.

### Listing 2.

```
10 REM ** TO MOVE START OF BASIC TO PAGE
38 (9728), WITH LOAD/RUN
20 POKE198,1:POKE631,131
40 POKE44,38:POKE38*256,0:NEW
```

### Listing 3.

```
1 GOTO10
2 REM ** NEEDS 8K OR MORE EXPANSION RA
M
5 REM ** IF PROG STOPCODE ERROR,TYPE 'G
OTOS' (BLIND) TO READ ERROR MESSAGE
7 POKE36889,240:POKE36867,46:END
10 IFPEEK(44)<33THENPRINT "RUN BASIC
MOVE FIRST"END
20 IFPEEK(8200)=169ANDPEEK(8200)=169 THE
N30
25 PRINT "LOADING MACHINE CODE DAT
A":LOAD"1,1
30 POKE36868,243:POKE648,30:POKE36865
,150:PRINT "*****"
35 POKE52,64:POKE56,64:CLR
40 DEFFNR(B)=B*.58 REM ** TO COMPENSATE
FOR WIDE VIC PIXEL
50 DIMBNC(3),TQ(1):BNC(0)=16:BNC(1)=1:BNC(
2)=16:BNC(3)=1:TQ(0)=175:FNR(1):TQ(1)=159
60 POKE36867,23:POKE36868,252
70 POKE36875,25:POKE8456,6:REMXCHANGE U
ALUES HERE FOR NEW COLOURS
100 SYS8400:SYS8200
120 SYS8344:SYS8303
130 SYS8,92:SYS8245
135 GETX:IFX="":THEN135
140 SYS8,92:IFX="":THEN200
145 IFASC(X4)=147THEN.00
150 IFASC(X4)=133THEN.00
155 IFX="P":THEN200
160 IFX="D":THEN300
165 IFX="S":THEN300
170 IFX="C":THEN400
175 IFX="T":THEN305
180 IFX="E":THEN500
185 IFX="Z":THEN600
190 IFX="L":THEN1220
195 GOTO130
199 SYS9351:GOSUB1755:GOTO130
200 POKE249,0:GOTO195
210 NI=1:PS=7584:P9=3580:GOSUB1600:X=FNR
(Q):IFMFTHEN130
215 PS=9264:P9=9570:GOSUB1600:Y=0:IFMFT
HEN130
220 POKE254,X:POKE253,Y:SYS8500
230 POKE249,0:GOTO195
240 SQ=X:POKE249,96:CS=12:GOTO310
250 SQ=X:POKE249,75:CS=24:GOTO310
260 SQ=X:POKE249,15:CS=36
310 SYS8240:PS=7584:P9=9588:NI=1:GOSUB1
600:Y=FNR(Q):IFMFTHEN130
315 PS=8248:P9=9465:GOSUB1600:Y3=0:IFMFT
HEN130
320 PS=9392:PS=7992:GOSUB1600:X4=FNR(Q):
IFMFTHEN130
325 PS=9392:PS=8054:GOSUB1600:Y4=0:IFMFT
HEN130
340 X1=X3:Y1=Y3
345 FORK=1TOSQ:GOSUB935
350 TX=(X4-X3)/FNR(1):TY=Y4-Y3
370 X3=X4:Y3=Y4:ONSQDOT390,375,372
372 X4=X4-FNR(TY):Y4=Y4+TX:GOTO390
375 IFX1=1TOSQ
377 TL=SQR(TX*TX+TY*TY):TW=SQR(TL*TL+TL*2)
+TY:Y4=Y4+TX*(X1/TL+Y1/TW)
380 X4=X1-FNR(TY/TL+X1/TW):FNR(TX/2):GOTO
490
385 X4=X1:Y4=Y1
390 NEXTK:POKE249,CS:GOTO199
```

```
420 POKE245,30:SYS8240:SYS8260
425 NI=1:P9=9583:PS=7942:GOSUB1600:H1=F
NR(Q):IFMFTHEN130
430 P9=9578:PS=8022:GOSUB1600:V1=0:IFMFT
HEN130
435 PS=8102:PS=9420:GOSUB1600:RA=0:IFMFT
HEN130
440 NI=S/RP:A=2*X
445 FOR:8TOSTEPIN
450 X4=FNR(RA*SI*IN(1))+H1:Y4=RA*CS(1)+V1
455 IFPEEK(197)=35THENI=A:NEXT:GOTO490
455 IFI=0THENX3=X4:Y3=Y4:X1=X4:Y1=Y4
460 GOSUB935
470 Y3=Y4:X3=X4:NEXT:Y4=Y1:X4=X1:GOSUB94
0
490 POKE245,48:GOTO199
500 POKE245,45:SYS8240
510 SYS8264:P9=9583:PS=6040:NI=1:GOSUB1
600:IF=FNR(Q):IFMFTHEN130
515 P9=9578:PS=8112:GOSUB1600:V1=0:IFMFT
HEN130
520 SYS8933:PS=7942:GOSUB1604:R1=0:IFMFT
HEN130
530 SYS8941:PS=8022:GOSUB1604:R2=0:IFMFT
HEN130
540 SYS8484:PS=8127:GOSUB1604:AN=0:X4=1:RA
:IFMFTHEN130
545 REM** CLIPSE CALCULATION STARTS HERE
550 A=2*X:Y1=0:CS(AN):IN=3/R1:
IFR2<1THENIN=3/R2
560 FORI=8TOSTEPIN
565 X2=R1*CS(1):Y2=R2*SI*IN(1)
570 X4=X1+X2*RA:Y4=Y1+Y2*RA:Y1=Y4:Y2=Y4
+Y1
575 IFI=0THENX3=X4:Y3=Y4:X1=X4:Y1=Y4
580 IFPEEK(197)=35THENI=A:NEXT:GOTO590
585 GOSUB935:X3=X4:Y3=Y4:NEXT:X4=X1:Y4=Y
1:GOSUB940
590 POKE245,68:GOTO199
600 POKE249,68:SYS8240:SYS8264
605 P9=9583:PS=8040:NI=1:GOSUB1600:H1=F
NR(Q):IFMFTHEN130
610 P9=9578:PS=8112:GOSUB1600:V1=0:IFMFT
HEN130
615 SYS8636:PS=7980:GOSUB1604:RA=0:Q=2)/C
:IFMFTHEN130
620 IFQ<0ORQ>100THENGOSUB1730:GOTO1615
625 PS=8054:P9=9065:GOSUB1590:PS=8070:PS
=8395:GOSUB1600:RU=0:IFMFTHEN130
630 S=1:RA=A*2*X:FORJ=8TORC:IFIN=6/CTJ+1
+X2
635 FORI=8TOSTEPIN:STEP IN:K=1:J=X*2
640 X4=FNR(H1+RA*CS(1)):Y4=Y1-RA*CS(1)
+Y2
645 IFI=0THENX3=X4:Y3=Y4:X1=X4:Y1=Y4
650 IFPEEK(197)=35THENI=A:NEXT:J=RU-1:GOTO
690
655 GOSUB935:W=X4:Y3=Y1
660 NEXT:NEXTI:POKE249,72:GOTO199
700 POKE8600,61:POKE8601,82
710 P9=9696:PS=7627:GOSUB1590:P9=969:PS
=7843:GOSUB1590:GOTO130
800 SYS9342
810 GETZ:IFZ="":THEN610
815 IFZ="N":THEN130
820 IFZ="S"ANDZ<>"L":THEN812
830 IFPEEK(644)=65THENGOSUB1600:[FA="R":
THEN840
840 IFZ="S"THENSYS8506:GOSUB600:GOTO890
850 IFZ="L":THENSYS8502:GOSUB611:GOSUB900
860 POKE781,0:POKE782,13:POKE780,3:SYS8
593:GOTO130
```

```
890 POKE780,0:POKE781,192:POKE782,29:POK
E78,0:POKE1,16:SYS85+96:GOTO130
900 IFPEEK(137)=35THEN130
905 IFPEEK(32143)AND2:THEN900
910 PS=79+2:P9=9573:GOSUB1590:GOSUB650:R
ETURN
930 IFX4<135ORX4>176ORY4<135ORY4>176ORX3
<135ORY3<135ORX4<135ORY4<135ORX3<135
940 IFX3=X4ANDY3=Y4:THENRETURN
945 POKE247,X3:POKE248,X4:POKE249,Y3:POK
E250,Y4:SYS8000:RETURN:NEXT:RA=0:DRAW:RU
TINE
950 REM M/C SAVE-LOAD SETUP
955 POKE780,1:POKE781,1:POKE732,255:SYS8
5465:POKE780,0:SYS85465:RETURN
1000 SYS8,92:SYS8386
1020 GETA:IFA="":THEN1020
1025 IFA="S":THEN1020:IFA="R":THEN1320
1030 RETURN
1040 P9=9568:PS=7942:NI=0:GOSUB1600:IFM
FTHEN130
1042 IFQ<10ORQ>2THENGOSUB1730:GOTO1040
1045 Q=68+14*(Q-1)
1050 IFZ="S":THENPOKE252,15:POKE254,Q:SY
S9368:GOTO130
1060 POKE252,0:POKE254,15:SYS8368
1090 GOTO130
1200 REM LINE PATTERNS—ALTER THE VARIA
BLESIN LINE 1220 FOR NEW PATTERNS
1210 REM ** MI= MIDDLE- ED= EDGES- S= S
TART-A= FINISH
1220 MI=1:S=ED=0.5:A=250:S=0:IN=MI:IF ED
MI THEN IN=ED
1230 MI=S:ED=0:FORJ=5 TO A STEP IN:X3=0:X4
=87:Y3=E+Y4=M:GOSUB940
1240 X3=0:Y4=173:Y3=M:Y4=E:GOSUB940:E=E
+ED:M=M+MI
1250 IFPEEK(197)=35ORPEEK(197)=36THENI=A
1260 NEXT:POKE243,84:SYS9361:SYS9368:GOT
O130
1590 FORI=8TOM4:POKEPS+I,PEEK(P9+I):NEXT:
RETURN
1595 POKEPS+17,120:POKEPS+19,120:RETURN
1600 GOSUB1590:GOSUB1555
1604 NI=NI+1:CD=INI/2-INT(INI/2):X2
1605 X5="":CT=0:IF=0
1610 GETA:IFA="":THEN1610
1612 MF=0:IFA="Y":THENMF=1:RETURN
1615 IFASC(A)=13ANDX<>"":THEN(NI):Q=N
TURN
1620 IFA="O":ORA="R":THEN1610
1625 X5=X4+A:Q=JAL(X5):GOSUB1700:CT=CT+
1
1630 IFQ>0ODORLEN(X4)>3THENGOSUB1730:
GOTO1605
1640 GOTO1610
1700 A=VAL(C4):P2=PS+32+16*(CT+1)
1710 P9=9593:X5=FORI=8TOM4:POKEP2+I,PEEK
(P9+I):XBNCT:POKEP2+I:NEXT:RETURN
1730 FORJ=8TOM4:P2=PS+32+J*16:FORK=8TOM4:P
OKEP2+K,0:NEXTK:J:RETURN
1755 SYS8586:FORI=8TONI:N5=MID$(STR$(NI)
1),2):N5=LEN(C4):PS=7986+X32
1770 FORJ=8TONI:A=VAL(MID$(N5,J-1,1)):P
S=PS+INT(J/2)*16:P9=86+4*(A+1):FORK=8TOM
1780 POKEPS+K,PEEK(P9+K):XBNCT:POKEP2+K
K):NEXTK:J:RETURN
50000 REM ** SAVE MACHINE CODE:ROUTINE F
ROM 9192 TO 9227
50010 GOSUB950:POKE780,0:POKE781,0:POKE7
82,38:POKE780,0:POKE1,32:SYS85496
```



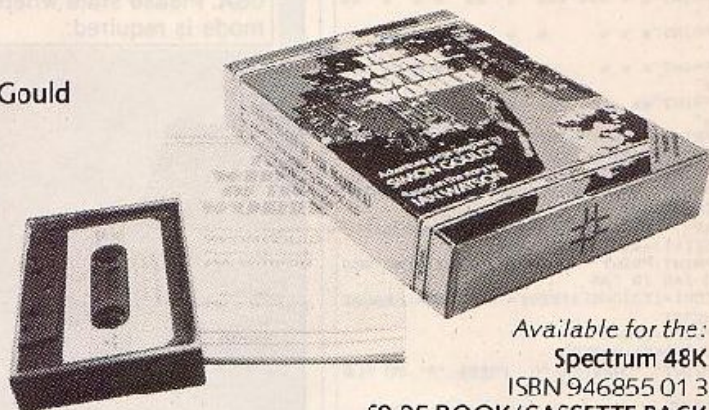
# Are you ready to step beyond the arcade?

## THE WIDTH OF THE WORLD

**Illustrated adventure game program by Simon Gould  
with the SF story by Ian Watson**

The world was expanding . . . people were disappearing . . . Ian Watson's dramatic story leaves a riddle that only you can solve.

You are Alan Roxbury, husband of the 'late' Sarah Roxbury who vanished ten years ago. All that time you have been waiting for the world to widen again. That time has now come. You must discover an exit point, find Sarah and bring her home . . .



Available for the:

**Spectrum 48K**

ISBN 946855 01 3

**£9.95 BOOK/CASSETTE PACK**

## IN THE BEGINNING

**Program by  
Humphrey Walwyn**

Starting life as a humble molecule in the Pre-Cambrian age, you progress through this exciting ten-level game to the Dawn of Early Man – if you are clever enough. Create the ideal 'fish', play a new kind of 'Snap', judge climates for your gradually evolving creature. An original combination of puzzles, arcade action and computerized board games.

Available for the: **Commodore 64**  
ISBN 946855 03 5



**£6.95 CASSETTE**

## BEYOND THE ARCADE

**Adventures and Wargames on  
your Computer**

**Nicholas Palmer**

Tired of zapping aliens?  
Bored by avoiding blobs?

You're ready for more advanced computer games, ready to step *Beyond the Arcade*. This is a critical guide to the growing world of adventure games, wargames, games of strategy, games to play at home and games to play by mail.

Covers games available for all the most popular home computers.



ISBN 946855 03 X

**£6.95 BOOK**

**Published by Mosaic Publishing Ltd**



Marketed by John Wiley & Sons Limited

Available from your bookseller/computer dealer

Or order from: John Wiley & Sons, Dept PM, Baffins Lane, Chichester, Sussex PO19 1UD

Please send: The Width of the World **Spectrum 48K** £9.95 ☐ Beyond the Arcade *pb book* £6.95 ☐  
In the Beginning **Commodore 64** £5.95 ☐ More information on Mosaic titles ☐  
To: (name & address) .....

Payment enclosed ..... (postage and packing free) or please charge to my

Credit Card No: ..... American Express/Diners Club/Barclaycard/Access/.

Expiry date ..... Please allow 14 days for delivery



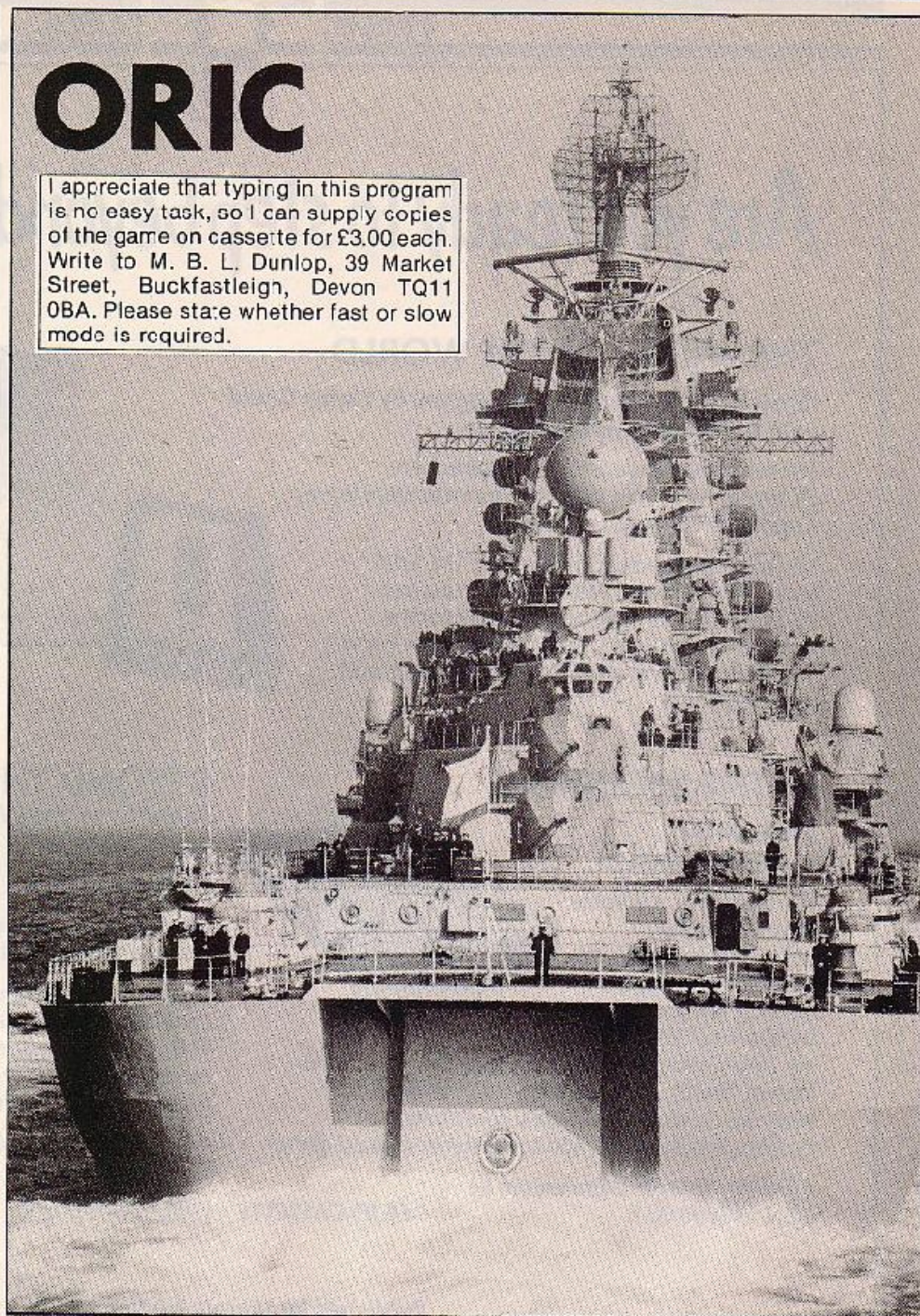
```

0 REM FOR 2 READ HASH CHARACTER
50 JOK=6400,DEEK(60):CLDAD"DEETROYER2":
DOKE60,DEEK(6400):CLEAR
55 DOKE618,10,POKE620,20:DOKE621,47960
60 CSUB900
70 DOKE646,0:DOKE6408,0:DOKE640A,0
70 PAR20:INX2:CLS
95 PRINT "ERR: 24100 PRESS 'R' TO PLAY

```

[illegible]

I appreciate that typing in this program is no easy task, so I can supply copies of the game on cassette for £3.00 each. Write to M. B. L. Dunlop, 39 Market Street, Buckfastleigh, Devon TQ11 0BA. Please state whether fast or slow mode is required.



THIS GAME RUNS on a 48K Or.c-1 and involves attempting to torpedo as many ships as possible before a depth charge finally homes in on the last of a supply of five submarines. There are four different types of enemy each scoring a certain amount of points when hit. Each type also moves at its own speed. Once 15 ships have been destroyed, then providing the player has not been killed in the process, a new attack wave will start together with an increase in difficulty.

The submarine sits on the second to bottom line of the screen and is moved left using cursor left, right using cursor down and a torpedo can be fired using the space-bar.

To enter the program, first type in the Basic program in listing 1. This plays no part in the actual running of the game but merely defines the graphics characters — 36 all together — loads the machine-code, resets the high score, and continually switches between the title

screen and the instructions calling the machine code after the start key has been pressed.

After this has been entered, save with:  
CSAVE"DESTROYER" AUTO

Next the machine-code must be entered so type New and enter the machine-code loader, listing 2.

The machine-code in listing 3 can now be typed in a byte at a time. Note the hex numbers do not need to be prefixed by a hash character. To break out of the current mode of operation on the loader, simply enter S.

As there is approximately  $2\frac{1}{2}$ K of machine-code to type in it will require a lot of time and patience, so should you want to save the code so far entered, use

```
CSAVE"MC",A# A000,E# AA53,AUTO
```

The game is now complete and will run automatically on

## CLOAD "DESTROYER"



# DESTROYER

Miles Dunlop takes to sea in an attempt to sink the fleet.

## Listing 3.

```

A000 : 60 A9 01 20 ED A1 A9 00
A008 : A2 05 9D 00 04 CA 10 FA
A010 : A7 01 3D 0C 94 A7 00 8D
A018 : 17 04 A7 0F 8D 0D 04 A9
A020 : 05 8D 0F 04 A7 00 8D 0E
A028 : 04 20 15 A1 A9 00 A2 03
A030 : A0 00 20 3D A1 A9 01 A2
A038 : 12 A0 00 20 3D A1 A9 02
A040 : A2 1B A0 00 20 3D A1 A2
A04C : 01 A0 00 A7 07 20 A2 A2
A050 : C8 00 1A D0 78 A2 00 A0
A058 : 01 A9 16 20 A2 A2 08 D0
A060 : 0E D0 F8 A2 00 A0 0B A9
A068 : 14 20 A2 A2 08 D0 1C D0
A07C : F8 A2 00 A0 00 A9 10 20
A07E : A2 A2 8A A2 10 1A 20
A08C : A2 A2 08 A7 07 20 A2 A2
A08E : A2 06 A0 08 A9 10 20 3D
A09C : A1 A2 08 A0 37 20 3D A1
A09E : A2 10 A0 04 20 3D A1 A2
A0A0 : 17 A0 02 20 3D A1 2A A0
A0A8 : 07 20 3D A1 A2 1D 00 05
A0B0 : 20 3D A1 A2 0C 00 39 A9
A0B8 : 03 20 3D A1 A2 0F 3A 18
A0C0 : 69 30 8D 07 20 A2 00 A0
A0C8 : 05 B9 06 04 18 59 30 7D
A0D0 : A0 B9 E8 88 0E 06 00 1A
A0D8 : 20 D1 A2 AD 0C 04 18 59
A0E0 : 30 8D 03 BD AD 17 04 18
A0E8 : 69 30 8D 02 BD A9 12 3D
A0F0 : 13 04 A2 12 A0 1A A9 34
A0F8 : 20 3D A1 A9 00 8D 14 04
A100 : A9 00 8D 12 04 A9 EE 3D
A108 : 10 04 8D 11 04 A9 00 3D
A110 : 18 04 04 17 A3 A9 80 95
A118 : 40 A9 B8 85 41 A0 00 A9
A120 : 20 91 40 18 A5 40 69 01
A128 : 85 40 A5 41 69 00 85 41
A130 : A5 41 C9 BF D0 E9 A5 40
A138 : C9 E0 D0 E9 60 85 3F 86
A140 : 3E 48 8A 48 98 48 8F 86
A148 : A5 3F C9 10 D0 E8 4C D1
A150 : A1 C6 3F 30 08 E8 4C D1
A158 : A1 D0 FA F0 F4 E8 BD 77
A160 : A1 F0 E0 86 3D 46 3E 20
A168 : A2 A2 E6 3E A6 3D 4C 5D
A170 : A1 A8 A8 68 A4 68 60 00
A178 : 53 49 4F 52 45 00 53 55
A180 : 42 53 00 48 49 47 48 00
A188 : 10 41 54 54 41 43 49 20
A190 : 57 41 54 45 20 20 20 20
A198 : 20 16 00 58 5C 5D 00 02
A1A0 : 5F 60 61 00 03 E2 63 00
A1A8 : 06 64 65 00 05 66 67 68
A1B0 : 00 02 69 6A 6B 00 03 6C
A1B8 : 6D 00 06 6E 6F 00 05 70
A1C0 : 71 72 00 01 73 73 73 00
A1C8 : 01 73 73 00 01 75 75 75
A1D0 : 00 A9 74 A6 3E 20 A2 A2
A1D8 : E8 A9 77 20 A2 A2 C8 A9
A1E0 : 79 20 A2 A2 CA A9 78 20
A1E8 : A2 A2 4C 71 A1 85 3F 48
A1F0 : 98 48 8A 46 A9 05 A2 00
A1F8 : A0 01 20 86 A2 A9 01 8D
A200 : E1 02 A9 00 8D E2 02 8D
A208 : E4 02 8D E3 02 8D E8 02
A210 : A9 02 8D E3 02 A9 04 8D
A218 : E5 02 A9 64 8D E7 02 20
A220 : 21 F4 20 6D A2 E5 3F F0
A228 : 03 A2 00 4C 30 A2 A2 18
A230 : BD EF A2 F0 29 8D E5 02
A238 : A9 04 8D E3 02 A9 01 8D
A240 : E1 02 20 7E A2 20 6D A2
A248 : E8 BD EF A2 A0 00 85 3F
A250 : C3 D0 EF C8 D0 FD C6 3F
A258 : D0 F6 E8 4C 30 A2 A9 01
A260 : A2 00 A0 01 20 86 A2 8D
A268 : A4 68 A8 68 60 A9 00 8D
A270 : E2 02 8D E4 02 8D E6 02
A278 : A9 08 8D E7 02 60 8A 48
A280 : 20 24 F4 40 A0 00 8D E1
A288 : 02 48 98 48 A4 48 E1 F1
A290 : 02 8C E5 02 A9 00 8D F1
A298 : 02 20 1E F4 68 A4 68 A8
A2A0 : 66 60 85 36 86 37 84 38
A2A8 : 9E 48 A9 80 85 39 A9 B8
A2B0 : 76 3A A4 37 C6 38 30 10
A2B8 : 18 A5 39 69 28 85 39 A5
A2C0 : 3A 69 00 85 34 02 B4 A2
A2C8 : A5 3E 91 39 68 A8 A5 36
A2D0 : 60 4E 9E 48 8A 48 A2 00

```

## Listing 2.

```

0 REM FOR & READ HASH CHARACTER
10 REM ** MACHINE CODE LOADER **
20 CLS
30 PRINT "OPTIONS:-"
40 PRINT "1 - ENTER CODE"
50 PRINT "2 - EXAMINE MEMORY"
60 PRINT "3 - QUIT"
70 INPUT A
80 IF A=1 OR A=2 THEN 70
90 ON A GOTO 100,200,300
100 INPUT "ADDRESS:" AD$
110 AD=VAL("&" + AD$)
120 PRINTAD$ : ""
130 INPUT BT$:IFBT$="S" THEN 30
140 BT=VAL("&" + BT$)
150 FOR I=0 TO 255
160 AD=AD+1
170 AD$=HEX$(AD),2)
180 GOTO 120
200 INPUT "ADDRESS:" AD$
210 AD=VAL("&" + AD$)
220 FOR J=0 TO 255
230 BT=PEEK(AD+J)
240 BT$=HEX$(BT),2)
250 IFBT$="S" THENBT$="00"
260 IFLEN(BT$)=1 THENBT$="0" + BT$
270 PRINTBT$ : ""
280 NEXT J
290 PRINT
295 GETA$:IFA$="S" THEN30ELSEA$=AD+8:AD$=
M:D$+HEX$(AD),2):GOTO215
300 END

```

```

A2D8 : 00 05 BD 00 04 18 69 30
A2E0 : 99 85 BE E8 88 E0 06 D0
A2E8 : F1 68 AA 68 A8 68 00 01
A2F0 : 64 02 32 04 4B 08 46 09
A2F8 : 96 08 28 06 28 04 28 03
A300 : 35 01 71 01 19 00 00 01
A308 : 29 0C 23 03 23 0A 23 05
A310 : 23 06 23 06 64 00 00 20
A318 : 0A 05 2C 04 A3 20 D8 A7
A320 : 20 AF A6 2C 55 A7 AD 08
A328 : 02 C9 A9 D0 01 6C EA A2
A330 : 00 04 A0 0C C8 D0 FD CA
A338 : D0 FA 3E AD 10 04 E9 01
A340 : D0 10 04 AD 11 04 F9 00
A348 : 8D 11 04 AD 18 04 C9 0F
A350 : D0 C5 CE 0E 04 D0 0A EE
A358 : 0D 04 AE 04 C9 14 90
A360 : 08 A7 03 0E 04 CA 00
A368 : FA A9 0C 20 ED A1 AD 0C
A370 : 04 18 69 01 C9 0A F0 06
A378 : 8D 0C 04 4C 8C A2 AD 17
A380 : 04 18 69 01 8E 17 04 A9
A388 : 00 8D 0C 04 AL 18 04 C9
A390 : D0 F0 03 CE 18 04 A9 05
A398 : 20 A9 A6 20 A9 A6 4C 29
A3A0 : A0 85 3F 9E 48 A1 10 04
A3A8 : 85 3D AD 11 04 85 3E AC
A3B0 : 76 02 C6 3E B1 3C C5 3F
A3B8 : 00 05 4E 78 75 0C 20 C8
A3C0 : A8 A9 01 6C AE 12 04 D0
A3C8 : 00 60 A5 00 85 40 A0 00
A3D0 : B9 33 AA 85 41 B9 54 AA
A3D8 : 85 42 85 55 AA 85 43 B9
A3E0 : 56 AA 85 44 B9 57 AA 85
A3E8 : 45 20 1F A4 A5 40 CD 12
A3F0 : 04 F0 2B A5 46 DC 1E A5
A3F8 : 41 99 5E AA A5 42 99 54
A400 : AA A5 43 99 55 AA A5 44
A408 : 99 56 AA A5 45 99 57 AA
A410 : C8 C5 CE C8 CB E0 A0 A5
A418 : 04 CD 12 04 D0 E2 60 AD
A420 : 10 04 38 E5 43 8C FB 18
A428 : 65 43 F1 01 60 78 48 A9
A430 : 00 85 44 44 A4 45 A5
A438 : 42 20 1C A6 A5 42 D0 15
A440 : E8 E0 25 FC 25 A5 41 20
A448 : 3D A1 20 EA A4 86 44 20
A450 : A4 A6 68 A0 60 CA E0 01
A458 : F0 10 A5 41 20 3E A1 20
A460 : EA A6 86 44 20 A4 A4 68
A468 : A8 60 A5 40 85 47 88 A8
A470 : 48 98 AA C8 C8 C8 C8 C8
A478 : A9 05 85 48 B9 53 AA 9D
A480 : 53 AA E6 C8 C6 48 D0 F4
A488 : FA 47 A5 47 D0 12 04 00
A490 : E7 A9 01 85 46 A9 01 A2
A498 : 00 A0 01 20 86 A2 68 A8
A4A0 : CE 12 04 6C A5 41 C9 05
A4A8 : F0 84 C9 06 F0 2B C9 07
A4B0 : F0 1A C9 0E F0 C0 C9 09
A4B8 : F0 2E C9 0A F0 18 C9 0B
A4C0 : F0 0A A5 05 A2 0C A0 A5
A4C8 : 20 8D A6 60 A9 00 A2 96
A4D0 : A0 00 20 8E A6 60 A9 01
A4D8 : A2 20 A0 0C 2C 8E A6 60
A4E0 : A9 02 A2 8C 0A 20 8D
A4E8 : A6 60 9E 4E 8A 4E AD 0E
A4F0 : 04 38 E9 05 20 A1 A3 C9
A4F8 : 01 F0 05 6E A4 68 A8 60
A500 : C8 A9 5C 20 A2 A2 4C
A508 : F3 A4 AD 12 04 C9 07 F0
A510 : 04 A0 0E 04 20 A1 A5 C5
A518 : 01 F0 0C 60 AD 10 04 1E
A520 : 10 04 F0 8D 85 39 A4 E6
A528 : 20 A1 A3 C9 01 D0 0E 4C
A530 : E3 A5 A9 C8 20 A1 A5 C5
A538 : 01 D0 03 4C F2 A5 A5 A4
A540 : 20 A1 A3 C9 01 D0 03 4C
A548 : F9 A5 A9 82 20 A1 A3 C5
A550 : 01 D0 03 4C 00 A6 A5 64
A558 : 20 A1 A3 C9 C1 D0 03 4C
A560 : 07 A5 A9 46 20 A1 A3 C9
A568 : 01 D0 03 4C CE 7A A9 2B
A570 : 20 A1 A3 C9 01 D0 03 4C
A578 : 15 A6 A9 C5 A2 C2 48 AC
A580 : 10 04 B9 00 C0 16 6D 69
A588 : 02 4A 4A 4A 4A 18 67
A590 : 0C A8 68 20 3D A1 85 40
A598 : 86 41 64 42 A5 50 8D 10
A600 : 04 A0 00 AD 12 04 85 43
A608 : C6 43 30 C8 C8 C8 C8 C8
A610 : C8 4C A8 A5 EE 12 04 A5
A618 : 40 99 53 AA A5 41 99 56
A620 : AA A5 42 99 57 AA A6 40
A628 : ED 1E A5 99 55 AA E0 09
A630 : 30 06 A9 00 99 54 AA 60
A638 : A9 01 99 54 AA 60 00 00
A640 : 00 00 00 01 C2 01 09 01
A648 : 02 01 03 A9 C2 24 4C 7E
A650 : 7E A5 A9 0B A2 24 4C 7E
A658 : A5 A9 0A A2 24 4C 7E A5
A660 : 39 09 A2 24 4C 7E A5 A9
A668 : 08 A2 02 4C 7E A5 A9 07
A670 : A2 02 4C 7E A5 A9 06 A2
A678 : 02 4C 7E A5 65 3F 86 3E
A680 : 48 8A 48 98 48 A2 C0 C6
A688 : 3F 80 08 E8 BD 4D A6 D0
A690 : FA 70 74 E8 BD 4D A6 F0
A698 : DF 3A 3D A6 3F 70 47 A2
A700 : E6 3E A6 3D 4C 33 A6 68
A708 : 48 58 AA 68 60 00 07 00
A710 : 37 00 07 00 07 00 20 20
A718 : 20 00 20 20 20 20 20 20
A720 : 20 20 20 20 20 20 20 20
A728 : 20 20 20 20 20 20 20 20
A730 : 20 20 20 20 20 20 20 20
A738 : 20 20 20 20 20 20 20 20
A740 : 20 20 20 20 20 20 20 20
A748 : 20 20 20 20 20 20 20 20
A750 : 20 20 20 20 20 20 20 20
A758 : 20 20 20 20 20 20 20 20
A760 : 20 20 20 20 20 20 20 20
A768 : 20 20 20 20 20 20 20 20
A770 : 20 20 20 20 20 20 20 20
A778 : 20 20 20 20 20 20 20 20
A780 : 20 20 20 20 20 20 20 20
A788 : 20 20 20 20 20 20 20 20
A790 : 20 20 20 20 20 20 20 20
A798 : 20 20 20 20 20 20 20 20
A800 : 20 20 20 20 20 20 20 20
A808 : 20 20 20 20 20 20 20 20
A810 : 20 20 20 20 20 20 20 20
A818 : 20 20 20 20 20 20 20 20
A820 : 20 20 20 20 20 20 20 20
A828 : 20 20 20 20 20 20 20 20
A830 : 20 20 20 20 20 20 20 20
A838 : 20 20 20 20 20 20 20 20
A840 : 20 20 20 20 20 20 20 20
A848 : 20 20 20 20 20 20 20 20
A850 : 20 20 20 20 20 20 20 20
A858 : 20 20 20 20 20 20 20 20
A860 : 20 20 20 20 20 20 20 20
A868 : 20 20 20 20 20 20 20 20
A870 : 20 20 20 20 20 20 20 20
A878 : 20 20 20 20 20 20 20 20
A880 : 20 20 20 20 20 20 20 20
A888 : 20 20 20 20 20 20 20 20
A890 : 20 20 20 20 20 20 20 20
A898 : 20 20 20 20 20 20 20 20
A900 : 20 20 20 20 20 20 20 20
A908 : 20 20 20 20 20 20 20 20
A910 : 20 20 20 20 20 20 20 20
A918 : 20 20 20 20 20 20 20 20
A920 : 20 20 20 20 20 20 20 20
A928 : 20 20 20 20 20 20 20 20
A930 : 20 20 20 20 20 20 20 20
A938 : 20 20 20 20 20 20 20 20
A940 : 20 20 20 20 20 20 20 20
A948 : 20 20 20 20 20 20 20 20
A950 : 20 20 20 20 20 20 20 20
A958 : 20 20 20 20 20 20 20 20
A960 : 20 20 20 20 20 20 20 20
A968 : 20 20 20 20 20 20 20 20
A970 : 20 20 20 20 20 20 20 20
A978 : 20 20 20 20 20 20 20 20
A980 : 20 20 20 20 20 20 20 20
A988 : 20 20 20 20 20 20 20 20
A990 : 20 20 20 20 20 20 20 20
A998 : 20 20 20 20 20 20 20 20
AA00 : 20 20 20 20 20 20 20 20
AA08 : 20 20 20 20 20 20 20 20
AA10 : 20 20 20 20 20 20 20 20
AA18 : 20 20 20 20 20 20 20 20
AA20 : 20 20 20 20 20 20 20 20
AA28 : 20 20 20 20 20 20 20 20
AA30 : 20 20 20 20 20 20 20 20
AA38 : 20 20 20 20 20 20 20 20
AA40 : 20 20 20 20 20 20 20 20
AA48 : 20 20 20 20 20 20 20 20
AA50 : 20 20 20 20 20 20 20 20
AA58 : 20 20 20 20 20 20 20 20
AA60 : 20 20 20 20 20 20 20 20
AA68 : 20 20 20 20 20 20 20 20
AA70 : 20 20 20 20 20 20 20 20
AA78 : 20 20 20 20 20 20 20 20
AA80 : 20 20 20 20 20 20 20 20
AA88 : 20 20 20 20 20 20 20 20
AA90 : 20 20 20 20 20 20 20 20
AA98 : 20 20 20 20 20 20 20 20
AB00 : 20 20 20 20 20 20 20 20
AB08 : 20 20 20 20 20 20 20 20
AB10 : 20 20 20 20 20 20 20 20
AB18 : 20 20 20 20 20 20 20 20
AB20 : 20 20 20 20 20 20 20 20
AB28 : 20 20 20 20 20 20 20 20
AB30 : 20 20 20 20 20 20 20 20
AB38 : 20 20 20 20 20 20 20 20
AB40 : 20 20 20 20 20 20 20 20
AB48 : 20 20 20 20 20 20 20 20
AB50 : 20 20 20 20 20 20 20 20
AB58 : 20 20 20 20 20 20 20 20
AB60 : 20 20 20 20 20 20 20 20
AB68 : 20 20 20 20 20 20 20 20
AB70 : 20 20 20 20 20 20 20 20
AB78 : 20 20 20 20 20 20 20 20
AB80 : 20 20 20 20 20 20 20 20
AB88 : 20 20 20 20 20 20 20 20
AB90 : 20 20 20 20 20 20 20 20
AB98 : 20 20 20 20 20 20 20 20
AC00 : 20 20 20 20 20 20 20 20
AC08 : 20 20 20 20 20 20 20 20
AC10 : 20 20 20 20 20 20 20 20
AC18 : 20 20 20 20 20 20 20 20
AC20 : 20 20 20 20 20 20 20 20
AC28 : 20 20 20 20 20 20 20 20
AC30 : 20 20 20 20 20 20 20 20
AC38 : 20 20 20 20 20 20 20 20
AC40 : 20 20 20 20 20 20 20 20
AC48 : 20 20 20 20 20 20 20 20
AC50 : 20 20 20 20 20 20 20 20
AC58 : 20 20 20 20 20 20 20 20
AC60 : 20 20 20 20 20 20 20 20
AC68 : 20 20 20 20 20 20 20 20
AC70 : 20 20 20 20 20 20 20 20
AC78 : 20 20 20 20 20 20 20 20
AC80 : 20 20 20 20 20 20 20 20
AC88 : 20 20 20 20 20 20 20 20
AC90 : 20 20 20 20 20 20 20 20
AC98 : 20 20 20 20 20 20 20 20
AD00 : 20 20 20 20 20 20 20 20
AD08 : 20 20 20 20 20 20 20 20
AD10 : 20 20 20 20 20 20 20 20
AD18 : 20 20 20 20 20 20 20 20
AD20 : 20 20 20 20 20 20 20 20
AD28 : 20 20 20 20 20 20 20 20
AD30 : 20 20 20 20 20 20 20 20
AD38 : 20 20 20 20 20 20 20 20
AD40 : 20 20 20 20 20 20 20 20
AD48 : 20 20 20 20 20 20 20 20
AD50 : 20 20 20 20 20 20 20 20
AD58 : 20 20 20 20 20 20 20 20
AD60 : 20 20 20 20 20 20 20 20
AD68 : 20 20 20 20 20 20 20 20
AD70 : 20 20 20 20 20 20 20 20
AD78 : 20 20 20 20 20 20 20 20
AD80 : 20 20 20 20 20 20 20 20
AD88 : 20 20 20 20 20 20 20 20
AD90 : 20 20 20 20 20 20 20 20
AD98 : 20 20 20 20 20 20 20 20
AE00 : 20 20 20 20 20 20 20 20
AE08 : 20 20 20 20 20 20 20 20
AE10 : 20 20 20 20 20 20 20 20
AE18 : 20 20 20 20 20 20 20 20
AE20 : 20 20 20 20 20 20 20 20
AE28 : 20 20 20 20 20 20 20 20
AE30 : 20 20 20 20 20 20 20 20
AE38 : 20 20 20 20 20 20 20 20
AE40 : 20 20 20 20 20 20 20 20
AE48 : 20 20 20 20 20 20 20 20
AE50 : 20 20 20 20 20 20 20 20
AE58 : 20 20 20 20 20 20 20 20
AE60 : 20 20 20 20 20 20 20 20
AE68 : 20 20 20 20 20 20 20 20
AE70 : 20 20 20 20 20 20 20 20
AE78 : 20 20 20 20 20 20 20 20
AE80 : 20 20 20 20 20 20 20 20
AE88 : 20 20 20 20 20 20 20 20
AE90 : 20 20 20 20 20 20 20 20
AE98 : 20 20 20 20 20 20 20 20
AF00 : 20 20 20 20 20 20 20 20
AF08 : 20 20 20 20 20 20 20 20
AF10 : 20 20 20 20 20 20 20 20
AF18 : 20 20 20 20 20 20 20 20
AF20 : 20 20 20 20 20 20 20 20
AF28 : 20 20 20 20 20 20 20 20
AF30 : 20 20 20 20 20 20 20 20
AF38 : 20 20 20 20 20 20 20 20
AF40 : 20 20 20 20 20 20 20 20
AF48 : 20 20 20 20 20 20 20 20
AF50 : 20 20 20 20 20 20 20 20
AF58 : 20 20 20 20 20 20 20 20
AF60 : 20 20 20 20 20 20 20 20
AF68 : 20 20 20 20 20 20 20 20
AF70 : 20 20 20 20 20 20 20 20
AF78 : 20 20 20 20 20 20 20 20
AF80 : 20 20 20 20 20 20 20 20
AF88 : 20 20 20 20 20 20 20 20
AF90 : 20 20 20 20 20 20 20 20
AF98 : 20 20 20 20 20 20 20 20

```

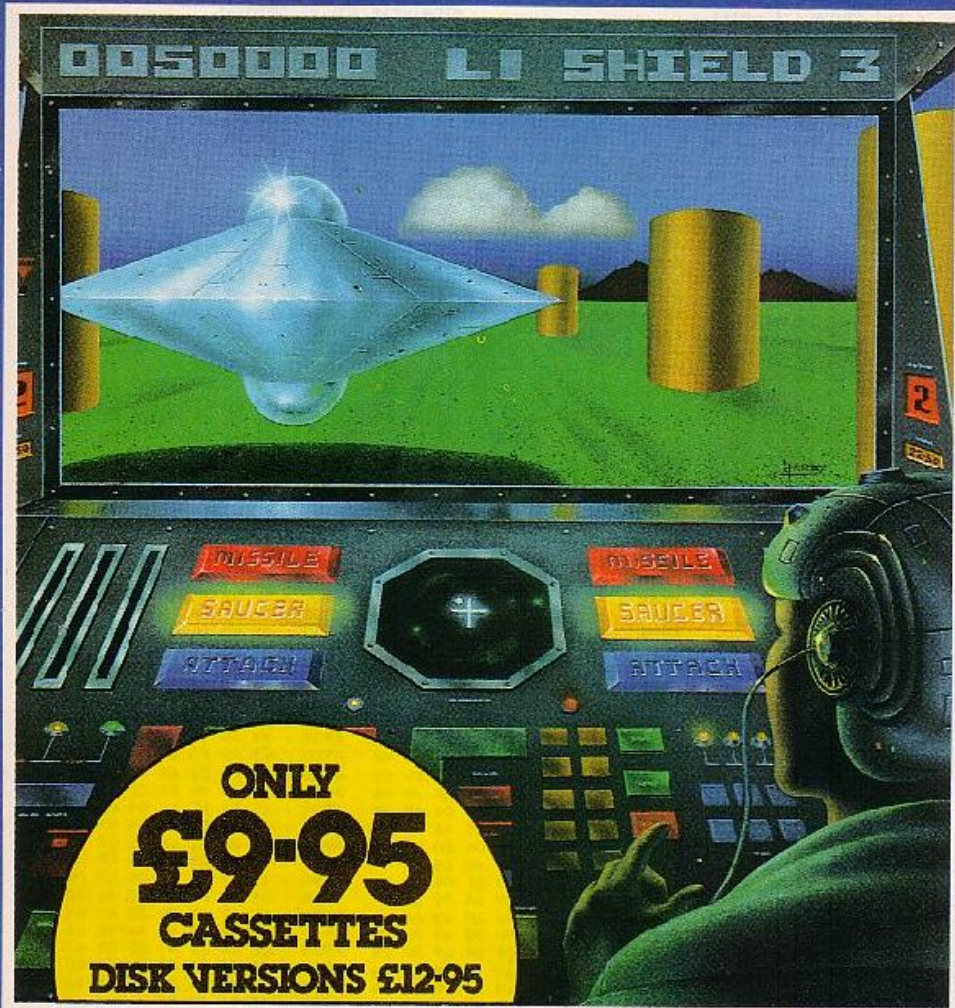


**AN FABULOUS  
3D GRAPHICS**

You're alone on a distant planet, designed to train the greatest warriors in the universe. For the first time in millions of years, YOU have activated the combat grid. Can you survive?

# ENCOUNTER!

## It begins here!



### INSTRUCTIONS FOR SURVIVAL

In a galaxy, far, far away, your starship is in orbit around a strange new world. You set off in a Seeker-Probe to take a closer look at the planet's surface. Mysterious obelisks litter the planet, clouds hover menacingly across the desolate plain, when suddenly your monitoring systems tell you you're under attack. The Encounter has begun!

An alien saucer flashes onto your view screen. Your ATTACK indicator flashes and a bolt of raw energy smashes into your protective screen. Your screen can only absorb four hits of this intensity. You must fight back!

"The graphics are outstanding...it's 3D impression is superb. The Game itself is first class."

**WHICH MICRO?** Brilliant!

"Encounter is a game that will have Arcade game lovers riveted to their screens for hours on end..." **PERSONAL SOFTWARE (USA).**

"The graphics and sound in this 3 dimensional simulation are stunning" **ANALOG.**

- Superb 3D Scrolling Game
- For Commodore 64 and all ATARI Computers

PUBLISHED BY

# NOVAGEN



Distributed by HI-TECH DISTRIBUTION LTD 213 Broad Street, Birmingham B15 1AY Tel: 021-632 6749



LAST MONTH I showed you how to define characters for the sprites routine and this month I will show you how to use them in your own Basic programs. But first a few explanatory notes on topics mentioned last month.

To achieve animation a sequence of slightly different characters needs to be displayed. To define these sorts of characters I would advise first defining a Basic character and Saving it uncompiled and then reloading it — more than once if necessary — so that each stage of the animation may be defined simultaneously, swapping between characters to simulate the animation. Then when all the characters are ready they may be Saved one after the other.

The string of addresses which you enter at the end of a sprite's attributes go to make up the sprite's normal and termination sequences of animation. The characters at the given addresses are displayed in order, repeatedly. To obtain an effect like a pendulum swinging then, although only three distinct characters are required — the pendulum to the right, to the left and at the centre — the characters must be displayed in the order centre, right, centre, left. Thus four frames of animation are required here and the character addresses must be entered in this order. This method applies to many types of animation so please note it carefully or you will end up with jerky animation.

### Sprite magnification

When using the magnification facility note that as the sprite grows or shrinks its centre remains stationary or moves with the speed defined for the character.

Hit colours — I explained the easiest way to use these last month but if you understand how colours of pixels are stored in bytes by Mode 2 then let me say that each byte altered by printing a character is "Anded" with the hit colour byte for that sprite and if the result is not zero a hit is registered.

Printing — When you have the sprites routine in memory then by loading the code produced by CHARPRT. To print a sprite character in memory onto the screen xLOAD the sprites routine and "PRT CODE". This latter Loads into \$C00 to \$C1F so the first fouruser definable characters are unusable. To print a character at \$1300 in memory at \$20 along the X axis and \$80 down the Y axis use the following in Mode 2:

&74 = &13008020

#### Listing 2.

```
10MODE7
20PRINTTAB(11,2);" "
30PRINTTAB(10,3);CHR$141;"Sprites Game One"
40PRINTTAB(10,4);CHR$141;"Sprites Game One"
50PRINTTAB(11,5);" "
60PRINT""As you sit poised at your photon mega bl
aster you can just see the menacing undulations of yo
ur foe approaching and your mind reels at the enorm
ity of your task...etc."
70PRINTTAB(11,15);"Z-LEFT X-RIGHT"
80PRINTTAB(6,17);"SHIFT-THRUST RETURN-FIRE"
90PRINTTAB(8,19);"SPACE BAR - HYPERSPACE"
100VDU28,11,24,28,21
110*LOAD
120*LOAD
130CHAIN""
```

#### CALL &LC00

The character should now appear and to remove it use the same commands. Note that you can print onto the screen at any time while sprites are in motion and they will move without corrupting the background.

After you have defined and Saved the code of the sprites using the sprites' generation program you may use this code by first setting PAGE to &2000, typing New and then \*LOADing the code. To start the sprites first go into Mode 2 and then use the following lines of Basic:

?&8D=0: ?&8F=0: ?&D3E= no. of

sprites: ?&D3F=0: ?&8E=1  
?&FE6E= &1F: ?&FE6D= &E0:  
?&FE6E= &E0  
?&FE6B=(?&FE6B) AND &BF  
?&FE68=0: ?&FE69=30  
?&208=&4F: ?&207=&12

To stop the sprites use

?&FE9E=(?&FE6E) AND 127

To make the sprites move more slowly put a larger value in &8E — 1 is fast and 256 is slow. Location &D3F contains the number of dead sprites and is updated each time a sprite dies, that is, finishes its termination sequence and disappears.

To see at any time if a sprite number N is dead use

?(&D40+(4\*N))

which will return a value greater than 128 if the sprite is dead.

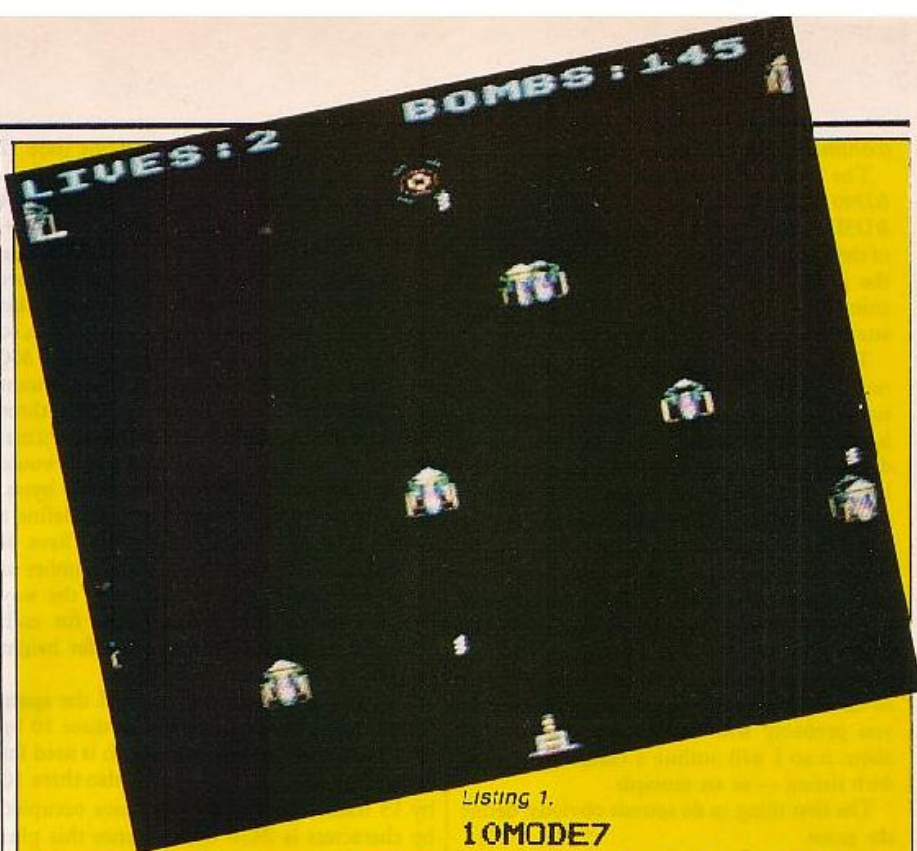
Page &D is used by the routine and for every sprite there are four bytes which hold data about where the sprite's attributes are.

The first byte of the four holds the length of the sprite's attributes. Also 128 is added to this number if the sprite is dead.

The second and third bytes hold the address of the sprite's attributes — low byte followed by high byte.

The fourth byte of the four contains the number of the frame currently being displayed — initially this contains.

(continued on next page)



#### Listing 1.

10MODE7

20PAGE=&2000:CHAIN""

Bobby Rao explains the game using his sprites routine which was promised last month.

# BBC SPRITES



(continued from previous page)

The first of these groups of four bytes is at &D40 because the memory from &D00 to &D3D is used to hold a copy of the attributes of the sprite the routine is working on. This is the limiting factor in how many frames of animation one sprite can have, that is, its attributes must fit into &D00 to &D3D.

To alter any of the sprites' attributes you must first find out where in memory they are stored. The "next free address" stated after loading in character data for the sprite defining is where sprites' attributes start. The length of this data for a particular sprite is given by 20 plus twice the number of frames of animation used in normal movement and in the termination sequence. So for a sprite with four normal frames and three termination frames the total length of its data is  $20 + 2 \times (4 + 3) = 34$ .

Although this is all you really need to know to be able to write a game using the sprites you probably still have no idea how to go about it so I will outline a Galaxians-type — with listing — as an example.

The first thing to do sounds obvious: define the game.

My game will consist of several levels of various types of aliens each type moving in a different manner and each member of a level moving independently of each other. The player will be represented by a ship at the bottom of the screen which may fire single bullets upwards, move left or right and thrust upwards, being pulled down again by an unknown force.

With the sprites routine in position and Page set to &2000 there is 4K for a Basic program and 3¼K for sprites characters and attributes. I thought that at least four frames of animation would be required for good effects so with a three frame explosion the attributes for a sprite would be 34 bytes long. Also I thought that seven aliens would be adequate for each sheet and this together with the player's ship, its bomb and three bombs

for the aliens means that at any one time 12 sprites may be active.

Thus, as the attributes for a bomb are 24 bytes long the attributes can take up  $(7 \times 34) + (1 \times 34) + (3 \times 24) + (1 \times 24) = 368$  bytes. However if on one of the levels the aliens have more than three frames of animation this number will increase by 14 per extra frame, so be on the safe side we may assume that 400 bytes are needed for sprites' attributes. I want eight levels of aliens and if each has three characters of 10 by 15 pixels for its normal frames of animation these characters would occupy  $8 \times 3 \times (10 \times 15 / 2 + 2) = 1968$  bytes. This figure arises because when you define a character of 10 by 15 pixels and Save it compiled, it only takes up half the number of bytes you would expect because of the way Mode 2 stores pixel colours. Also for each character you must add two bytes for height and width.

To this figure we must also add the space taken up by the ship, which is of three 10 by 15 frames, and the explosion which is used for both aliens and the ship; this is also three 10 by 15 frames. Thus the total space occupied by characters is 2430 bytes. Hence this plus the room taken up by sprites' attributes gives about 2800 bytes used leaving about 500 bytes free for more frames in certain levels or some larger characters.

Now we have defined our game we can concentrate on the fun part: defining the characters. You can do what you like here and if you feel particularly artistic try to make the levels have more than four frames of animation. However, there are a few things to note: try to fit the characters for each level into about 300 bytes per level and do not forget to leave room for your ship and an explosion — three frames.

The explosion will be the same for all the aliens on all levels and also for your ship so try to make all these characters about the same size because it looks odd when a tall, thin alien has a square explosion half its height. When

defining a bomb a simple 6 by 2 block is sufficient and if you are lazy you can use the same character for both the aliens' and your ship's bombs. The bombs will have no explosion and will disappear on hitting something.

Also define your bomb using only flashing colours because we will later define aliens so that they only crash into flashing colours — just passing through the other colours. Do not use flashing colours for any other characters. After you have defined and Saved — compiled — the characters you need set Page to &2000, type New and Load in the Basic part of the sprites defining program listed last month. Run this program and Load in all your character data.

I advise you to make a list of the characters you Load in and their corresponding addresses in memory as told to you by the program. I include part of the list I made so you can see how it is used in the game listing given later.

FILENAME	ADDRESSES OF SUCCESSIVE FRAMES (IN DECIMAL)
Rocket	4864,4941,5018
Skull	5095,5172,5248
Wobler	5326,5403,5480
— 6 more alien types	
Explosion	6788,6865,6942
Ship	7019,7096,7173
Alien missile	7250
Ship's bomb	7258
Next free address is	7266

When you have finished you will be told the next free address after the character data in decimal. Convert this number to hex (as detailed on pages 410 and 411 of the User Guide) — let us call it WXYZ — and use it in the following command:

xSAVE"chardata" 1300 WXYZ

This will Save the character data all in one go for use with the actual game program. We do not need to use the rest of the sprites defining program because many of its

(continued on page 120)

### Listing 3.

```
10ENVELOPE1,129,-20,-15,-10,10,10,10,125,0,0,-126,1
26,126
20MODE2
30COLOUR3:PRINTTAB(2,30);"Space bar to play"
40REPEAT:6=GET:UNTIL6=32
50MODE2:COLOUR6:PRINTTAB(0,0)"LIVES:";TAB(10,0)"BCM
BS:"
60DATA0,0,0,0,4,3,150,0,1,1,1,1,0,0,1,1,152,195,0,0
,4864,4941,5018,4941,5768,6865,6942
70DATA40,0,240,0,4,3,150,0,1,1,1,1,0,10,0,0,255,140
,0,0,7019,7096,7173,7096,6788,6865,6942
80DATA0,0,237,-6,1,1,150,0,1,1,1,1,0,15,0,0,255,129
,0,0,7258,7258
90DATA0,0,0,6,1,1,150,0,1,1,1,1,0,15,0,0,0,129,0,0,
7250,7250
100DATA100
110STX=7363:BX=STX:DX=0
120ALNX=7:ALNBX=3:FLTX=8
130FRMX=4:TFRMX=3:TDIRX=72
140FRMX=4:STFRMX=3:STDIRX=12
150ATLX=20+2*FRMX+2*TFRMX
160SATLX=20+2*SFRMX+2*STFRMX
170MATLX=20+2*1+2*1
180SHPX=STX+ALNX+ATLX:SHPDX=&D40+ALNX*4
190BMBX=SHPX+SATLX:BMBDX=SHPDX+4
200MISX=BMBX+MATLX:MISDX=BMBDX+4
210FORMX=1:TOALNX:PROCINIT(0):NEXT
220PROCINIT(1):PROCINIT(2)
230FORMX=0:TOALNBX:PROCINIT(3):NEXT
240?&D3E=DX
250BX=4:EX=150:LX=0:HX=0
260PROCRESET
270PROCSTART
```

```
280PRINTTAB(15,0);EX
290FORAX=0 TOGX
300PRINTTAB(6,0);GX-AX
310REPEAT:1F?(SHPX+17)<128 SOUND&10,-15,5,3:GOTO370
320IFINKEY(-98)?(SHPX+1)=-1 ELSEIFINKEY(-67)?(SHPX
+1)=1
330IFINKEY(-1) AND?(SHPX+2)>30?(SHPX+3)=-3 ELSE?(SH
PX+3)=1
340IFINKEY(-74) AND?BMBDX>128 AND?(SHPX+2)>20?BMBX=
?SHPX+2?(BMBX+2)=?(SHPX+2)-10?(BMBX+3)=-6?(BMBX+17)
=129?(BMBX+6)=150?&D3F=?&D3F-1?BMBDX-MATLX:EX=EX-1:
PRINTTAB(15,0);EX;" "
350IFINKEY(-99)?SHPX=RND(79)?(SHPX+2)=100+RND(140)
360PROCBOOMB(RND(3)-1,RND(7)-1)
370UNTIL(?&D3F=7 AND?(SHPX-17)>127:OR?SHPDX>128:ORE
X<1
380IFEX<1 GOTO420
390IF?&D3F=7 AND?SHPDX<128 PROCRESET:?&D3F=0:GOTO310
400?(SHPX+6)=150?(SHPX+17)=128+STDIRX?SHPDX=ATLX:?
&D3F=?&D3F-1
410NEXTAX
420PROCFIN
430GOTO30
440DEFPROCBOOMB(AX,DX)
450IF?(STX+17+BX*ATLX)<128 OR?(MISDX+AX*4)<128 ENDPR
OC
460?(MISX+AX*MATLX)-?(STX+BX*ATLX)+2?(MISX+2*AX*MAT
LX)=?(STX+2+EX*ATLX)+15
470?(MISX+3+AX*MATLX)=6
480?(MISX+AX*MATLX+17)=129?(MISX+AX*MATLX+6)=150?(
MISDX+AX*4)=MATLX
490?&D3F=?&D3F-1
500ENDPROC
510DEFPROCRESET
```

(listing 3 continued on page 120)



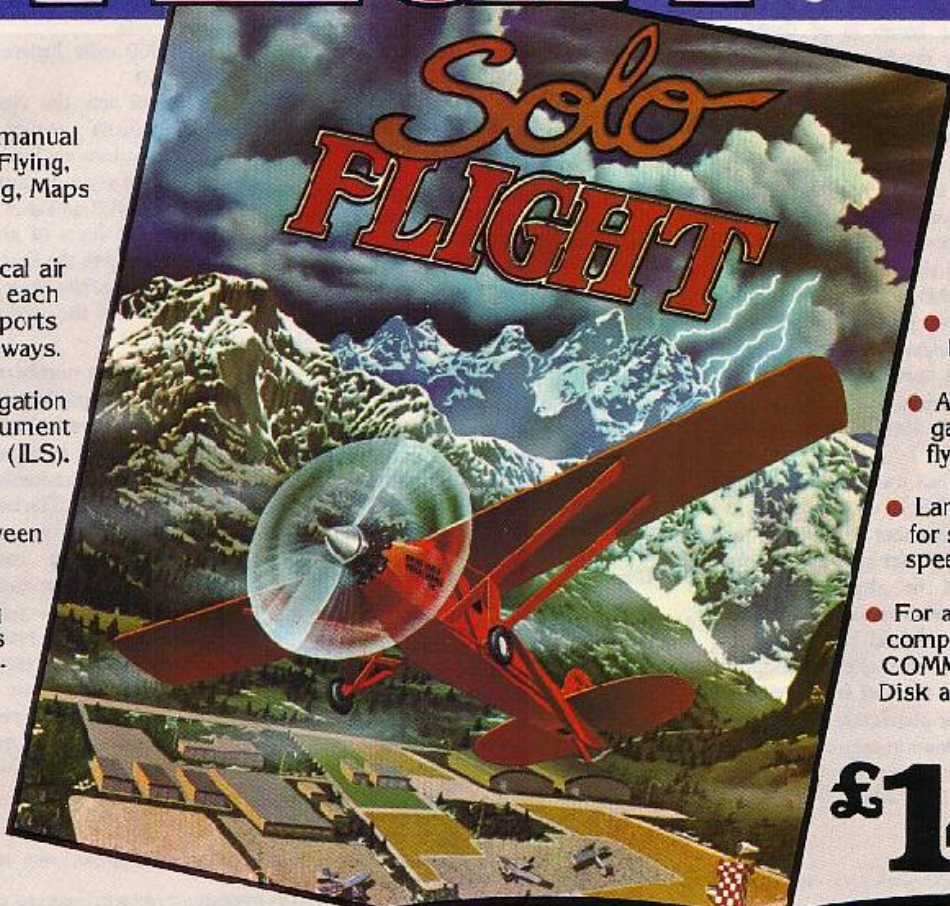
# At last... A REAL FLIGHT SIMULATOR!

## Solo FLIGHT

ATARI

commodore

- 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:



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



(continued from page 118)

functions will be duplicated and used repeatedly in the game program so do not enter Data lines as the program asks.

Now type in and Save one after the other listings 1 and 2. These Load the character data, the sprites routine and the game program. Make a copy of the character data and the sprites routine — listed last month — after listings 1 and 2.

You must type it in as it is printed and will have to adjust it to fit your graphics which are, of course, different from mine.

Here are a few points to note about the data lines — 60 to 100.

All the sprites are normal size. Note that the aliens can crash into flashing colours only, so as long as only your bomb is of flashing colours they will only crash on hitting that. Your ship stops on hitting any edge of the screen. Also your ship will explode on hitting any colour — so the program cannot let you go faster than your bomb or you may hit it. Your ship always starts off at 40 along the X axis and 237 down the Y axis. Your bomb has an upward speed of six pixels per frame and does not move sideways — these are not changed by the program. Also this sprite will terminate on hitting an edge or on hitting any colour.

The aliens' missiles move down at six pixels per frame and do not move sideways. They also terminate on hitting any edge or on hitting any colour. Line 100 is just to tell the program data ends here.

Type in these lines but make the following changes: the fifth number in each line should be changed to the number of frames of animation you have for that sprite type, the sixth number should be changed to the number of frames of termination animation, the eighteenth number should be changed to 123 plus how long you want the termination sequence to go on and the last few numbers which are addresses for characters making up the sprite and its termination sequence should

be changed to suit your graphics. For the aliens' line insert addresses for the first type of alien — these will be altered by the program to suit each level. Lines 110 to 200 are used to set up system variables which are listed below.

table border="0">
ST%	This the start of the sprites' attributes
FLT%	The number of fleets (levels) of aliens
ALN%	How many aliens there are per fleet
ALNB%	The max. number of alien bombs on the screen simultaneously
FRM%	The no. of frames of animation of the aliens (must be same as n line 60 data statement)
TFRM%	The number of frames of animation of the aliens (must be same as in line 60 data statement)
TDUR%	Length of aliens' termination sequence
SFRM%	Number of frames of animation for your ship (must be same as n line 70)
STFRM%	Number of frames of termination sequence for ship (must be same as in line 70)
ATL%	This is the length of the attributes for each alien sprite.
SATL%	The length of attributes for the ship. This is also calculated as above
MATL%	The length of attributes for the ship's bomb and for the aliens' missiles. This is not calculated and assumes a sprite with only one frame of animation that disappears on hitting something
SHP%	The address of the ship's attributes.
SHPD%	The address of the ship's data in PAGE &D
BM3%	The address of the ship's bomb's attributes
BM3D%	The address of the ship's bomb's data in PAGE &D
MIS%	The address of the first sprite that is an alien bomb

MDS% The address of the first sprite that is an alien bomb's data in PAGE &D

All the last five variables are calculated and change with other relevant variables. Lines 210 to 230 call PROCINIT repeatedly so I will now explain this procedure. Lines 850 to 920 are PROCINIT. This is a procedure which will you must have in any program you write with sprites as it stores the sprites attributes and data in &D page in the correct place.

Line 250 sets some more variables:

G% is the number of goes you have (lives)

E% is the number of bombs you start with

L% is the level you are on

H% is how many times you have completed all the levels.

Line 260 calls Procrset which is at lines 510 to 610.

Procrset sets the characters which make up the aliens' sprites, sets their speeds and their actions on hitting a screen edge for each level of alien. It obtains this information from lines 1.00 onwards. These Data lines — one for each level of aliens with line 1100 corresponding to the first level — contain first the addresses of the characters which make up that alien in the order you want them displayed.

The next two numbers control the sprites' speed in the X and Y axes respectively. If the speeds are entered then each alien has that speed but if 128 is added to the speed then each alien has a randomly chosen speed up to the speed entered. The next number is bounce control — see last month's article. The last two numbers are random displacement controls and say how much random speed the sprites should have — see last month's article. All the parameters reset by Procrset and Proclevel should be reset each time you wish to reincarnate or initiate a sprite.

Line 260 then calls Procstart — lines 930 to 1000 — and this initiates the interrupts

(listing 3 continued from page 118)

```

520LOCALN%
530?&D3F=0
540FORN%=0 TOALN%-1
550?(STX+N%*ATL%)=RND(10)+N%*10:?(STX+2+N%*ATL%)=RND
(100)
560?(STX+6+N%*ATL%)=150
570?(STX+17+N%*ATL%)=128+TDUR%
580NEXT
590PROCLEVEL
600FORN%=0 TOALN%-1:?(&D40+N%*4)=ATL%:?(&D43+N%*4)=1
: NEXT
610ENDPROC
620DEFPROCLEVEL
630LOCALA%,B%,N%,H%
640FORN%=0 TOALN%-1
650RESTORE(1100+L%*10)
660FORM%=0 TOFRM%-1:READA%
670?(STX+20+M%*2+N%*ATL%)=A% MOD256:?(STX+21+M%*2+N%
*ATL%)=A% DIV256
680NEXT
690READA%,B%
700REPEAT
710?(STX+1+N%*ATL%)=FNDISP(A%)
720?(STX+3+N%*ATL%)=FNDISP(B%)
730UNTIL?(STX+1+N%*ATL%)<>0 OR?(STX+3+N%*ATL%)<>0
740READA%:?(STX+13+N%*ATL%)=A%
750READA%,B%
760?(STX+14+N%*ATL%)=A%:?(STX+15+N%*ATL%)=B%
770NEXT
780L%=L%+1:IFL%=FLT%:L%=0:H%=H%+1
790E%=E%-H%*20:IFE%<70:E%=70
800ENDPROC
810DEFFNDISP(P%)
820P%=P%+2*H%
830IFP%<128=P%
840P%=P%-128:=FND(P%)-P%/2
850DEFPROCINIT(C%)
860LOCALN%,B%
870RESTORE(60+C%*10):?(&D41+D%*4)=S% MOD256:?(&D42+D%
*4)=S% DIV256:B%=S%
880FORN%=0 TO19:READA%:?(SX+N%)=A%:NEXT:S%=S%+N%
890READA%:IF A%<256 GOTO910
900?S%=A% MOD256:S%?1=A% DIV256:S%=S%+2:GOTO890
910?(&D40+D%*4)=S%-B%:?(&D43+D%*4)=1:D%=D%+1
920ENDPROC
930DEFPROCSTART
940?&BA=1:?&BD=1:?&BF=0:?&BE=1
950?&D3E=ALN%+1:ALND%:=?&DMD%-120+MATL%:FORN%=0 TOA
LNB%-1:?(MISD%+N%*4)=128+MATL%:NEXT
960?&FE6E=&1F:?&FE6D=&E0:?&FE6E=&E0
970?&FE6B=(?&FE6B:AND&EF
980?&FE6B=0:?&FE69=30
990?&206=&4F:?&207=&12
1000ENDPROC
1010DEFPROCFIN
1020?&FE6E=?&FE6E AND127:*FX15,1
1030CLS
1040IFEX<1 COLOUR6:PRINTTAB(4,5);"Out of bombs!"
1050COLOUR8
1060PRINTTAB(5,14);"Game Over"
1070COLOUR5
1080PRINTTAB(3,20);"Level ";L%+H%*FLT%:" reached"
1090ENDPROC
1100DATA4864,4941,5018,4941,134,134,0,0,0
1110DATA5095,5172,5249,5172,134,134,5,0,0
1120DATA5326,5403,5480,5403,130,140,5,0,0
1130DATA5615,5557,5673,5557,134,131,0,0,0
1140DATA5812,5735,5889,5735,136,136,5,0,0
1150DATA6038,5961,6115,5961,138,138,4,0,0
1160DATA6192,6269,6346,6423,132,132,5,0,0
1170DATA6500,5572,6644,6716,138,138,0,3,3

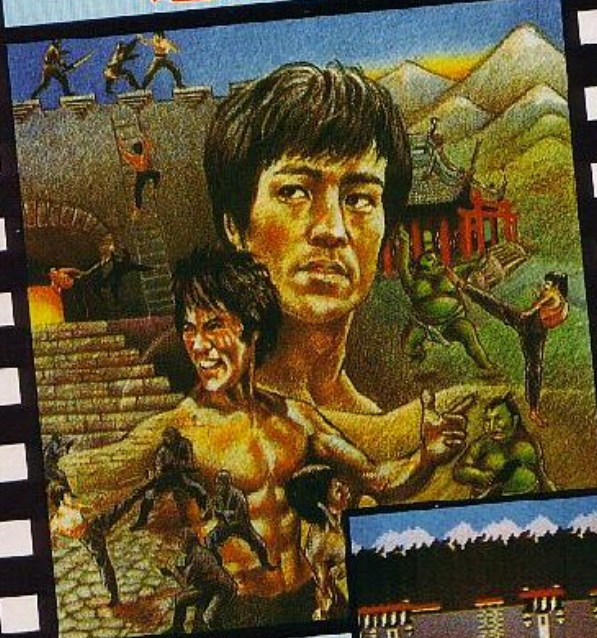
```



# Just Arrived!

## TWO OF YOUR ALL-TIME CINEMA & T.V. FAVOURITES

### THE LEGENDARY BRUCE LEE



Your chance to relive the deadly skills and awesome power of the legendary Bruce Lee.

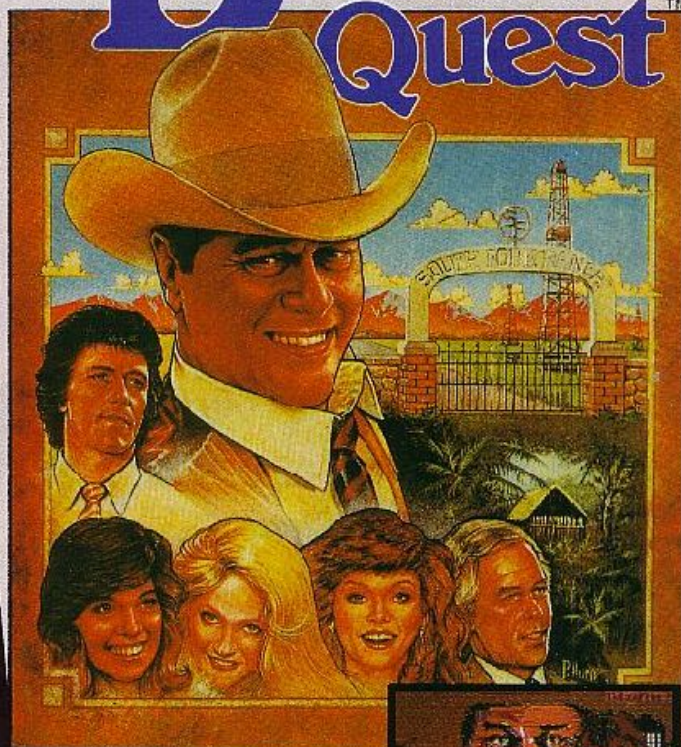
- Twenty secret chambers.
- Dazzling graphics and animation.
- Unique multiple player options.



Disk and  
Cassette  
**£14.95**

Danger, Intrigue, Suspense! You'll need all your wits and skill when you take on the ruthless J.R. and face the many hidden enemies in the search for oil that is...

### The DALLAS Quest



- A unique graphic adventure.
- Choose your level of difficulty.
- Scores of colourful scenes.



Disk  
only **£14.95**

Two more quality  
products from  
Datasoft Software.

**Datasoft**

THE ULTIMATE IN AMERICAN  
SOFTWARE FOR YOU ON U.S. GOLD  
U.S. Gold is stocked by all leading computer  
stores.

DEALERS! For information on how to become a U.S.  
Gold Stockist write to: CentreSoft Ltd., Unit 24,  
Tipton Trading Estate, Bloomfield Road, Tipton,  
West Midlands DY4 9AH. Telephone: 021-520 7591.  
Overseas enquiries welcome.

# U.S. GOLD

## All American Software



# 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 x 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; RS232 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.

\*CPM 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.

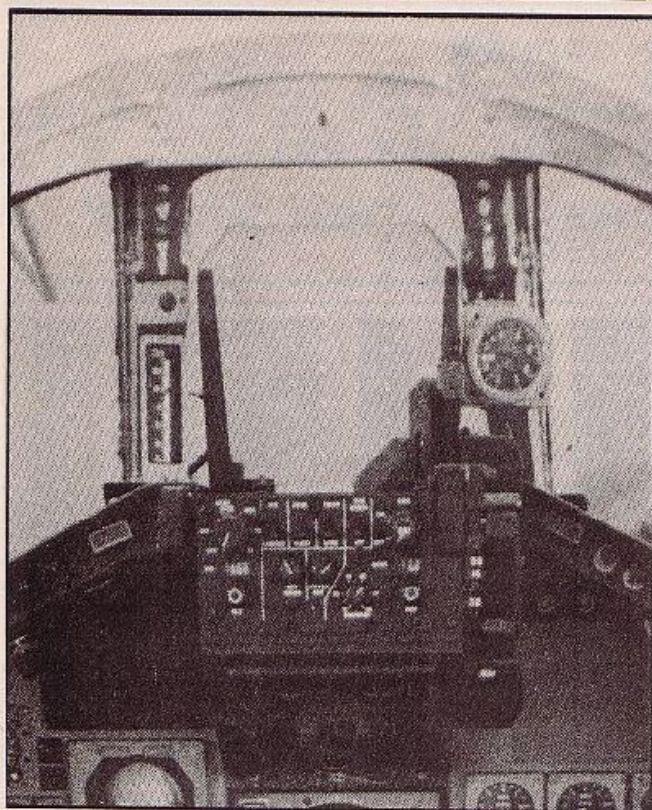
Name: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. No.: \_\_\_\_\_ STD Code: \_\_\_\_\_

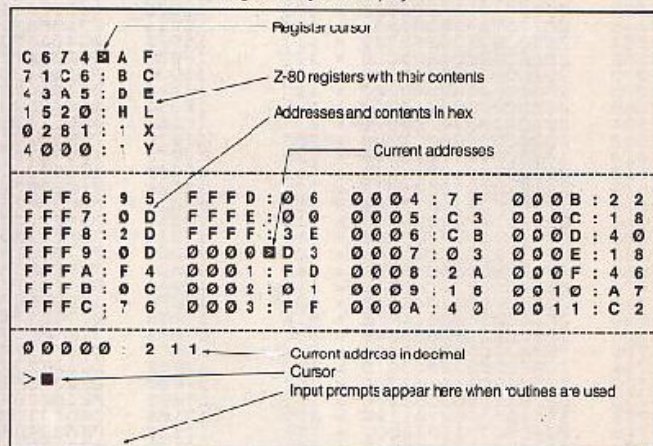
YC 784





# HEAD-UP DISPLAY

Figure 1: Layout of display



ZX PANEL is a program for the 16K ZX-81 providing a front panel display similar to those found on Research Machines and Memotech computers. It provides a means of easily entering and debugging machine code programs.

ZX Panel is initially stored in a Rem statement for the purpose of saving it, but relocates itself above RAMtop upon loading. The Rem statement is of length 1099 bytes; this can be entered in the following way; enter

```
1 REM @@100 CHR$ @@
```

Edit this line, changing the line number to 2, and adding an extra five characters after the Rem. Edit line two eight times to create lines 3 to 10 all of the same length. Then type in the following statements directly, do not attempt to list the program automatically by pressing new line, as this will crash the computer.

```
POKE 16511,77
POKE 16512,4
POKE 16514,118
POKE 16515,118
POKE 16510,0
```

Then enter program 1, the hex loader. Run this program and enter the hex codes — program 2 — in the normal fashion. When the last code has been entered the hex loader will stop. Now delete the hex loader, and enter program 3. Type RUN, and the program will be saved on cassette. When the save is completed press E and ZX Panel will locate above RAMtop, which will be set to 28672, and execute New. . . Now enter

```
RAND USR 29126
```

and the display should appear as in figure 1. If the computer crashes at this point, or any other during the testing, reset the computer and reload the program from tape. When the message appears on the screen after loading, press Break and enter program 4, the hex checker. Run the program and check the code displayed against those in program 2. If any

## Program 1.

```
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+60
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
```

discrepancies are found, correct them with a direct Poke statement.

If all is well so far, we will now explore the program. The hex address near the centre of the screen indicated by the Sinclair program cursor is called the current address. Code can be entered at the current address by merely typing in one, or a string of up to 15 two-digit hex numbers. The panel provides eight routines, which are accessed by typing full-stop followed by the number of the routine required, followed by Newline. Various parameters are then requested for that routine. The routines are as follows:

**ROUTINE 0:** This is a routine to change the current address. To change the current address to an address where we can enter code enter ".0 Newline", and in response to the prompt "START?" Enter 7436, followed by Newline. All inputs are in hex, so only key presses from full-stop to F will be acknowledged, though Rubout can be used as normal. Newline will increment the current address by 1, cursor up (shifted 7) will decrement the current address by 1. Enter a short program at this address, e.g.,

```
3E0106FFFD710FDC9 Newline
```

**ROUTINE 1:** This moves a block of code. There are three parameters to be entered, Start and Finish are the first and last addresses of the block to be moved, To is the address the block will be moved to. To test this routine enter ".1 Newline" and enter 7436,743D and 7437 respectively in response to the prompts. The program you entered should now have moved forward 1 byte. To move it back again enter 7437,743E and 7436 in response to Start, Finish and To. Code can also be moved larger distances, e.g. from Rem to above RAMtop.

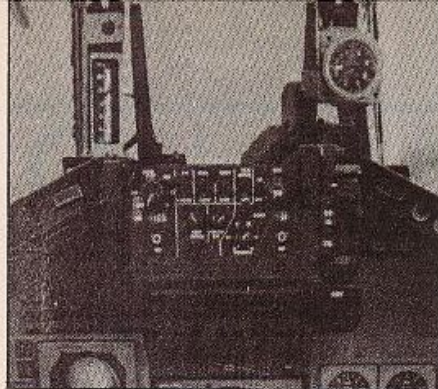
**ROUTINE 2:** This runs a machine code subroutine. The registers AF, BC, DE, HL, IX and IY take the values indicated in the top left corner of the display before starting the subroutine — these can be altered (see Routine 7) and on returning from the subroutine, the values of the registers as they were at the end will be displayed.

When the subroutine has finished, a key must be pressed to return to the panel display. To run the program we entered, enter ".2 Newline", and 7436 in response to the prompt. The screen will clear and a series of blocks will be displayed, press any key to return to the panel display. Breakpoints may also be set using Routine 4.

**ROUTINE 3:** This fills a block of memory with a constant. There are three parameters, Start and Finish are the first and last addresses of the block to be filled, With defines the constant. The constant is an 8-bit — 2 digit — hex number, though it must be entered as four digits, e.g. to fill a block from 7438 to 7440 with FF, enter 7438, 7440 and 00FF in response to Start, Finish and To.

**ROUTINE 4:** This sets a breakpoint at the address specified. When your machine code subroutine reaches a breakpoint, it will jump back to the panel display, showing the values of the Z-80 registers at that point in your sub-





```

10 SAVE "PANEL"
15 PRINT "ZX-PANEL LOADED..."
//TAB 0;"PRESS ""E"" TO CONTINUE
//TAB 0;"RAND USR 29126 TO ENT
ER PANEL"
20 IF INKEY#="" THEN GOTO 20
25 RAND USR 16516

```

165514	7573210740110070	=	313	165520	2A38702020022E05	=	341	172550	0505010015004570	=	318
165515	0110000000000000	=	314	165521	22387000D1871000	=	934	172551	0101000000000000	=	1017
165516	0000000000000000	=	315	165522	7100000000000000	=	247	172552	022E70E10002713F	=	1138
165517	0000000000000000	=	316	165523	11E8001900000000	=	368	172553	022E70E111167001	=	561
165518	0000000000000000	=	317	165524	2310F800200F0000	=	339	172554	0500000037200532F	=	888
165519	0000000000000000	=	318	165525	0C40011500019E00	=	433	172555	7009111B7000100000	=	478
165520	0000000000000000	=	319	165526	06237E7E70000410	=	591	172556	000372ED53317000	=	1196
165521	0000000000000000	=	320	165527	7010003600000F0E	=	821	172557	00E772ED53207003	=	1221
165522	0000000000000000	=	321	165528	3612000000000000	=	989	172558	007100E77200F572	=	1431
165523	0000000000000000	=	322	165529	2540020000000000	=	776	172559	1125700102000000	=	569
165524	0000000000000000	=	323	165530	4051112000000000	=	654	172560	7000000000000000	=	903
165525	0000000000000000	=	324	165531	7EE1000010000000	=	1322	172561	152A317000000000	=	711
165526	0000000000000000	=	325	165532	1717171717472370	=	536	172562	ED52E50C12000F7001	=	1191
165527	0000000000000000	=	326	165533	1030000000000000	=	1033	172563	03ED000000000000	=	1019
165528	0000000000000000	=	327	165534	7100700000000000	=	1033	172564	70ED582F70000000	=	1147
165529	0000000000000000	=	328	165535	0000000000000000	=	1033	172565	01E1030000000000	=	969
165530	0000000000000000	=	329	165536	72FE772000000000	=	527	172566	7000000000000000	=	1293
165531	0000000000000000	=	330	165537	7E7E122000000000	=	954	172567	E772ED5360000000	=	1123
165532	0000000000000000	=	331	165538	7070201000000000	=	1033	172568	E772ED5360000000	=	1123
165533	0000000000000000	=	332	165539	71FE133000000000	=	1016	172569	3A2E000000000000	=	1190
165534	0000000000000000	=	333	165540	0877207000000000	=	1131	172570	03067100E7720000	=	1500
165535	0000000000000000	=	334	165541	1800000000000000	=	733	172571	7211217000104000	=	486
165536	0000000000000000	=	335	165542	8070000000000000	=	1033	172572	0372700000000000	=	707
165537	0000000000000000	=	336	165543	712A207023220070	=	536	172573	222F70ED56317000	=	919
165538	0000000000000000	=	337	165544	0300072A00010154	=	731	172574	520A007118001100	=	902
165539	0000000000000000	=	338	165545	0210000000000000	=	741	172575	7001000000000000	=	974
165540	0000000000000000	=	339	165546	0000000000000000	=	919	172576	5330000000000000	=	904
165541	0000000000000000	=	340	165547	FE18200000000000	=	866	172577	0300000000000000	=	907
165542	0000000000000000	=	341	165548	0AD2770000000000	=	1134	172578	2185730103000000	=	747
165543	0000000000000000	=	342	165549	FE30000000000000	=	1022	172579	0300710300000000	=	1201
165544	0000000000000000	=	343	165550	0020000000000000	=	457	172580	71ED563370010300	=	906
165545	0000000000000000	=	344	165551	197E7E7000000000	=	934	172581	0103000000000000	=	907
165546	0000000000000000	=	345	165552	FE30000000000000	=	1213	172582	00E7720000000000	=	908
165547	0000000000000000	=	346	165553	FE13A00000000000	=	772	172583	7000000000000000	=	943
165548	0000000000000000	=	347	165554	00387E5000000000	=	1048	172584	7000000000000000	=	943
165549	0000000000000000	=	348	165555	3222207000000000	=	866	172585	7000000000000000	=	943
165550	0000000000000000	=	349	165556	00CACC0711000000	=	1294	172586	7000000000000000	=	943
165551	0000000000000000	=	350	165557	7157200000000000	=	1033	172587	7000000000000000	=	943
165552	0000000000000000	=	351	165558	0610112000000000	=	866	172588	7000000000000000	=	943
165553	0000000000000000	=	352	165559	02A0720000000000	=	839	172589	7000000000000000	=	943
165554	0000000000000000	=	353	165560	0373000000000000	=	866	172590	7000000000000000	=	943
165555	0000000000000000	=	354	165561	0173000000000000	=	866	172591	7000000000000000	=	943
165556	0000000000000000	=	355	165562	0F71007100710071	=	1280	172592	7000000000000000	=	943
165557	0000000000000000	=	356	165563	0505000000000000	=	1439	172593	7000000000000000	=	943
165558	0000000000000000	=	357					172594	7000000000000000	=	943
165559	0000000000000000	=	358					172595	7000000000000000	=	943
165560	0000000000000000	=	359					172596	7000000000000000	=	943
165561	0000000000000000	=	360					172597	7000000000000000	=	943
165562	0000000000000000	=	361					172598	7000000000000000	=	943
165563	0000000000000000	=	362					172599	7000000000000000	=	943
165564	0000000000000000	=	363					172600	7000000000000000	=	943
165565	0000000000000000	=	364					172601	7000000000000000	=	943
165566	0000000000000000	=	365					172602	7000000000000000	=	943
165567	0000000000000000	=	366					172603	7000000000000000	=	943
165568	0000000000000000	=	367					172604	7000000000000000	=	943
165569	0000000000000000	=	368					172605	7000000000000000	=	943
165570	0000000000000000	=	369					172606	7000000000000000	=	943
165571	0000000000000000	=	370					172607	7000000000000000	=	943
165572	0000000000000000	=	371					172608	7000000000000000	=	943
165573	0000000000000000	=	372					172609	7000000000000000	=	943
165574	0000000000000000	=	373					172610	7000000000000000	=	943

routine. When the breakpoint is reached, the memory at that point is replaced to its original contents, so if the breakpoint is required again it will have to be set again.

**ROUTINE 5:** This displays a block of memory from the address specified by Start, but displays the contents of the memory as characters corresponding to the value of the address. Enter the routine by ".5 Newline", and in response to Start, type 0100 newline. This displays a part of the ZX-81 ROM where the data for the keywords is stored. To advance the display press Z, to go backwards press I. To return to the normal panel display type H. Only those characters with codes 0-63 and their inverses are displayed, others are shown as spaces.

**ROUTINE 6:** This quits the panel display, and returns to Basic. To re-enter the panel type

RAND USR 29126

**ROUTINE 7:** This allows you to change the values of the Z-80 registers AF, BC, DE, HL, IX and IY as shown in the top left corner of the display. This can be useful if you wish to give a particular register a value before jumping to a machine code subroutine with ".2". The register cursor, as shown in figure 1 indicates which register is to be changed. It is

When you have selected the register to be altered, enter ".7 Newline", and you will be prompted for the value you wish the register to take. This value will not take effect until

you run a machine code subroutine using ".2". Do not attempt to alter the values of IX and IY unless you know what you are doing, as you could crash the computer.

These are the only routines implemented at present, though there is the facility for at least eight more that you may wish to implement yourself. A jump table is located at 72A1 hex from which the program is vectored to each of the routines. The vector of the first unused routine, that is ".8" is located at 72B3. The start address of your routine would be stored low byte at 72B3 and high byte at 72B4. The start address for ".9" would be stored at 72B5 and so on, up to ".F" which would be stored at 72C1 hex.

If you wish to input parameters for your routine there are subroutines within the program which will help you. To input a start address call 72E7, on return the value input will be in the DE register, and also stored at 702F/7030 hex.

To input a finish address call 72F5, on return the value input will be in the DE register and also stored at 7031/7032 hex. To input a parameter with a different prompt message, store your message in the memory at a convenient point, load the DE register with the start address of the message, load the BC register with the length of the message, then call 72C3.

This subroutine will display the prompt, input the value, and return with the value input in the DE register. Only four-digit hex

numbers can be input in this way. End your routine with a jump either to 71C6 if the screen has been cleared, or to 71CC otherwise. Some routines that come to mind are search and replace routines, a dis-assembler, or some Basic utilities.

A general breakdown of the program is (all addresses in hex):

- 7000-702B: Data for messages.
- 702C-7044: System variables.
- 7045-705E: Print at B register (y coord), C register (x coord).
- 705F-706F: Print value of B register hex.
- 7070-707D: Print value of HL followed by colon.
- 707E-70B1: Print four columns of hex addresses/contents.
- 70B2-70F9: Routines for printing in decimal.
- 70FA-715A: Routines to store, load and print registers.
- 715B-716D: Move register cursor.
- 716E-7181: Print two dotted lines across screen.
- 7182-719E: Clear bottom six lines of screen.
- 719F-71B7: Wait for key press, return value in A reg.
- 71B8-71C5: Decode a hex number on screen, value in A reg.
- 71C6-728A: Accept key presses, check and evaluate inputs.
- 728B-72A0: Jump to selected routine.
- 72A1-72C2: Jump table.
- 72C3-7302: Input routines already discussed.
- 7303-7435: Routines 0 to 7.



# VISION STORE South London's Largest Specialist Micro Computer Centres Offer

## INTEREST FREE CREDIT on Micro Computers and Peripherals

In addition to offering computers and peripherals at low, low prices, Vision Store now offer Interest Free Credit i.e. paying over 6 or 9 months with no interest charge. To take advantage of our Interest Free Credit Scheme come to one of our stores where our friendly staff will help you complete the form. Then subject to status, after paying the deposit, you can take the goods away with you. It's as simple as that!

### COMPUTERS

#### COMMODORE

Price | Deposit | Payments

**CBM 64 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



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  
**£799.95**  
Interest Free  
Deposit £205.59 + 6 monthly  
payments of £99.00



VIC 20 PACKAGE inc. VIC 20 C2N Cassette Joystick 5 Game Cassette Game Cartridge Usual Price £167.95	£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/ platter	£199.90	£19.90	6x£30.00
1027 Letter quality printer	£299.90	£35.90	6x£44.00

Interest Free Credit available to Mail  
Order Customers. Phone or write for  
details.

### APPLE IIc and Machintosh Business Computers now available on INTEREST FREE TERMS

#### BBC

Price | Deposit | Payments

**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£76.00
CUMANA 40/80TR 2x400K CD900	£579.95	£99.95	6x£80.00

#### Microviter Cub RGB

Colour Monitor  
**£229.95**  
Interest Free  
Deposit £44.95 + 6 monthly  
payments of £30.00



SANYO 14" RGB Monitor Sta TORCH 280 Disk Pack Inc C/PM Programs Perfect Speller Perfect Writer Perfect Filer	£249.95	£33.95	6x£36.00
	£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 GPI00A	£199.95	£19.95	6x£30.00
SEIKOSHA GPI00VC	£199.95	£19.95	6x£30.00
SEIKOSHA GP250VC	£259.95	£37.95	6x£37.00
SEIKOSHA GP700A	£419.95	£47.95	6x£62.00
SHINWA CP00	£279.95	£39.95	6x£40.00
STAR DPS15	£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 TP1**  
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 HR 5	£455.95	£53.95	6x£67.00

**Memotech MTX500 32K**  
Interest Free Deposit £34.95 +  
6 monthly payments of £40.00

**Memotech MTX512 64K**  
Interest Free Deposit £44.95 +  
6 monthly payments of £45.00

### New Additions - Just In

#### Sanyo MBC 555

16 bit business computer  
128K RAM  
Twin 160K Disk Drives  
Detachable Keyboard  
With the following FREE Software: -  
MS-DOS - operating system  
Wordstar - Word Processor  
Calcstar - Spreadsheet  
Infostar - Database  
Spellstar - Spelling Checker  
**Worth £1,400 FREE**  
**£1,150 inc VAT**  
Interest Free Deposit £340 + 9 monthly  
payments of £90.00  
(please note Monitor is extra)

### 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 Commodore Vic-20 inc. 4 Games Cartridges (worth £39.96)	£199.95
Oric Atmos 48K In Stock Now	£159.95
Brother HR5 Printer	£159.95

Also we are main Apple agents

### SOFTWARE

Don't forget -  
We are London's largest stockist of Micro Computer  
Software. Over 1,000 programmes in stock for games,  
educational and business. Continuous 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

## 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



SINCLAIR  
ORIC, COMMODORE  
ACORN, MEMOTECH, ETC

# MICRO-X

We export Microcomputers  
and Peripherals to all Countries  
Any make. Any Quantities  
**BIG DISCOUNTS**

send for comprehensive price list:  
**MICRO-X LTD (Dept 166)**  
765-767 HARROW ROAD, LONDON NW10 5NY  
TELEPHONE 01-968 6622 TELEX 915866 MICROX G.

## COMPUTER LINK

CONNECTORS ICC			IDC SHROUDED HEADERS WITH EJECTING LOCKING ARMS			IDC D CONNECTORS		
	Cart. Edge	2 Row Socket		Straight	Right Angle		Male	Female
10-way	£1.20	£0.85	£0.80	10 way	85	9-way	£2.70	£3.20
14-way	—	—	£0.90	14 way	£1.00	15-way	£3.20	£3.70
16-way	£1.60	£1.20	£1.00	16 way	£1.25	25-way	£3.80	£4.45
20-way	£1.50	£1.35	£1.20	20 way	£1.40	37-way	£5.90	£6.80
26-way	£2.40	£1.60	£1.45	26 way	£1.70	IDC 25 WAY D CONN		
34-way	£3.70	£1.95	£1.60	34 way	£2.00	Jumper Lead Ribbon Cable (RS232) Assembly		
40-way	£3.40	£2.00	£1.85	40 way	£2.16	19" long Single End Male	£4.65	
50-way	£3.85	£2.25	£2.00	50 way	£2.30	19" long S End female	£5.10	
60-way	£4.80	£2.60	£2.25	60 way	£2.45	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			D CONNECTORS			DIL PLUG (Headers) IDC		
36-way	(Centronics)	£5.20	Solder Bucket	Male	Female	Pine	£0.90	
			5-way	.75	£1.00	16	£1.00	
			15-way	.95	£1.50	24	£1.40	
			25-way	£1.50	£1.90	40	£2.15	
			37-way	£2.40	£3.25			
			HOODS .95					
RIBBON CABLE (Printer & F)			BBC OF SPECTRUM JOYSTICK INTERFACES			IDC JUMPERS 36" SINGLE ENDED		
	Grey	Rainbow				Ways	2 Row Socket	Card Edge
9-way	.13	.24				1C	£1.30	£1.95
10-way	.15	.28				14	£1.70	—
14-way	.18	.32				16	£1.90	£2.45
15-way	.20	.36				2C	£2.20	£2.95
16-way	.22	.40				2E	£2.35	£2.85
20-way	.30	.50				34	£3.40	£4.35
24-way	.38	.60				4C	£4.50	£5.65
25-way	.40	.65				5C	£5.25	£6.50
26-way	.45	.70				6C	£5.25	£6.20
34-way	.50	.80						
37-way	.55	.85						
50-way	.70	.90						
50-way	.75	1.25						
60-way	£1.10	£1.40						
64-way	£1.15	£1.60						
COMPUTER LEADS			EDGE CONNECTORS			DIL PLUG HEADERS		
BBC PRINTER LEAD	1 METRE =	£10.40	2x23-way (ZX81)	£1.85		Single ended leads:	16 Pin	24 Pin
Dual disk drive 1m	£10.25		2x28-way (Spectrum)	£2.10		Length	£1.35	£2.30
Single disk drive 1m	£7.25		2x8-way VIC20/64	£1.20		Double ended leads:	16 Pin	24 Pin
ORACON PRINTER LEADS	1 METRE =	£10.40	DOUBLE SOLED PLUG BOARDS			8"	£1.60	£2.00
36-way Amphenol to 36-way Amphenol 1m	£15.20		ZX81 23-way	£1.25		12"	£1.90	£2.10
7 pin DIN Plug to 2x3.5mm 1x2.5mm Jack Plugs	£2.25		Spectrum 28-way	£1.50		24"	£2.00	£2.25
5 Pin DIN Plug to 2x3.5mm 1x2.5mm Jack Plugs	£2.20					36"	£2.25	£2.45
6 Pin DIN Plug to 6 Pin DIN Plug 11 3/4"	£1.95							
2x3.5mm Jack Plugs to 2x3.5mm Jack Plugs	£1.25							
7 Pin DIN Plug to 5 Pin DIN Plug 11 3/4"	£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 12 1/2"	£2.25							
5 Pin DIN Plug to 5 Pin DIN Plug 11 3/4"	£1.95							
Phone Plug to Cassette Tapes	£5.50							

NOW  
3RD  
GREAT  
YEAR!

# HIRE

**SPECTRUM**  
ZX81 and  
COMMODORE 64  
TAPES

**HUGE RANGE!**

ADVENTURE  
GAMES  
ARCADE and  
SIMULATION GAMES  
BUSINESS  
and PRACTICAL  
PROGRAMS  
UTILITIES  
M/C COMPILERS  
EDUCATIONAL  
FROM OVER  
60 TOP SUPPLIERS

**FREE**

ILLUSTRATED  
QUARTERLY  
MAGAZINE WITH  
TIPS, NEWS,  
REVIEWS  
DISCOUNT OFFERS

**LIFE  
MEMBERSHIP  
£5.00  
TAPE HIRE FROM  
50P  
INCLUDING VAT**

**OVER  
3,000  
DELIGHTED MEMBERS!**

**SPECIAL OFFER!  
YOUR FIRST TWO  
TAPES FREE**

IF YOU USE THIS COUPON!  
or send £1 for magazine & details;  
From: ALEC FRY ARPS, FRSA and  
ERNA FRY, QA

**THE  
ORIGINAL  
SOFTWARE  
LIBRARY!**

■ The first true software library to be set up in the world—and still the largest ■ Unrivalled tape stock, as you'd expect from our head start ■ Run by a 16-bit computer (2 million bytes of program and data on disk!) with the help of six less able but more friendly mere humans ■ Often imitated (sometimes almost to the letter—flattery indeed!) but never equalled ■ Friendly, helpful service—at the end of a phone if needed ■ Free membership of our Discount Club: pounds off peripherals and up to the short tapes ■ Any loading problems (rare!) automatically credited ■ Shop now open (next to Post Office) for rent and discount sales of tapes and peripherals ■ Branches throughout the world ■ No complicated schemes, no commitment to quantity—rent what and when you like ■ Printed, illustrated magazine "Computerchat" packs in more than any mere typed newsletter ■ Keenest-ever rates ■ ACCESS holders can join by telephone on 0730 692732 ■ NO RIVAL can offer all this....

To: SOFTWARE LIBRARY, Farnham Road, Wes: Liss, Hants GU33 6JU.  
NAME.....Mach ne.....  
ADDRESS.....

**Special offer from this issue: LIFE MEMBERSHIP £5**  
(normally £9.50). Overseas (Europe only) £10, or join local branch in W. Germany, France, Holland, Belgium, Scandinavia, South Africa, Ireland—send Int. Reply Coupon and we'll forward your enquiry.





# CBM-64

THE COMMODORE 64 with its extensive sound and graphics facilities has many features seldom found on other computers. Unfortunately it has an outdated and totally inadequate resident Basic, and as a result the programmer has to lock up complicated Peeks and Pokes to make use of the sound, sprites and other features. Not only does it take a long time to write a program in this manner, but also making a mistake in the Poke statement can cause the computer to crash irretrievably.

To remedy this problem, I have written in machine code a set of routines to do all the necessary Pokes for you. The routines are accessed using the Sys statements followed by the routine's name and its parameters.

To enter the program, first type in program 1 and save it at the beginning of a cassette. Then type in program 2, and run it. There will probably be numerous data entry errors, so there is a checksum for every line. If you get an error, correct the appropriate line and rerun the program. If all the data is correct, you will be asked to position the cassette. At this point make sure that the tape is positioned just after program 1, then press a key. The data will then be saved. It is a good idea to save program 2 elsewhere as a back-up.

To use the new commands, rewind the tape to the beginning and press Shift and Run/Stop. The computer will take care of itself from then on.

The following commands should now be available:

**VOLUME** — sets the overall volume.  
Format: SYS49664, "VOL" volume 0-15.

**ENVELOPE** — sets the attack rate, decay rate, sustain level and release rate.  
Format: SYS49664, "ENV" voice 1-3, attack 0-15, decay 0-15, sustain 0-15, release 0-15.

**SILENCE** — clears the SID chip, turns everything off. This routine should be used before and after using sound.  
Format: SYS49664, "SIL".

**PULSE** — sets the width of the pulse wave.  
Format: SYS49664, "PUL" voice 1-3, width 0-4095.

**WAVE** — sets a waveform for a particular voice.  
Format: SYS49664, "WAV" voice 1-3, waveform 0-3 where 0 = triangle, 1 = saw-tooth, 2 = pulse, 3 = noise.

**VOICE** — turns on, or off, a particular voice and sets its pitch.  
Format: SYS49664, "VOI" voice 1-3, pitch 0-96 where 0 = off.

**SOUND** — turns on a voice at a particular pitch for a set duration, then turns it off again.  
Format: SYS49664, "SOU" voice 1-3, pitch 0-96 where 0 is off and duration 0-32767 — 100 is about one second.

**POINTER** — sets sprite pointer.  
Format: SYS49664, "POI" sprite 0-7, location 0-6383. If you have changed the video bank, add the starting location of that bank on to the second parameter for the correct location. Also, the pointer is

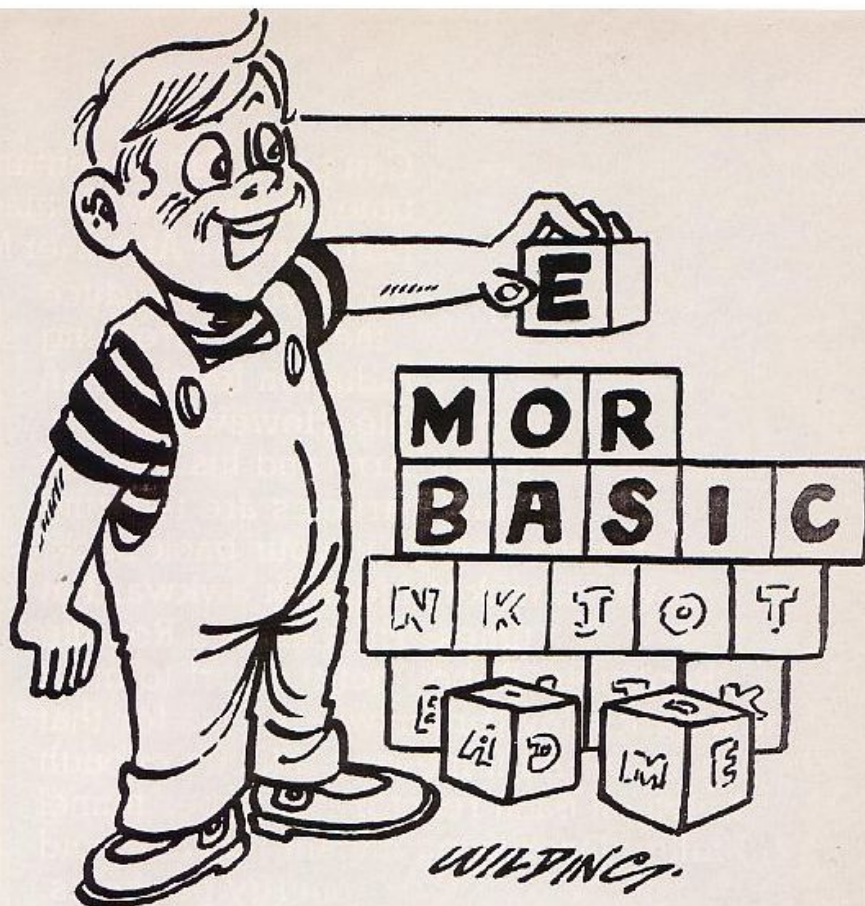
set to the last multiple of 64 if the location required is not divisible by 64.

**ENABLE** — turns a sprite on or off.  
Format: SYS49664, "ENA" sprite 0-7, on/off 0/1 0 = off, 1 = on.

**SPRITE** — positions a sprite at x,y coordinates.  
Format: SYS49664, "SPR" sprite 0-7, x 0-511, y 0-255. Note that some coordinates are off the screen and will not be visible.

**Sprite COLOUR** — sets a sprite's colour.  
Format: SYS49664, "SCO" sprite 0-7, colour 0-15 — multicolour off/on 0/1. This last

(continued on page 129)

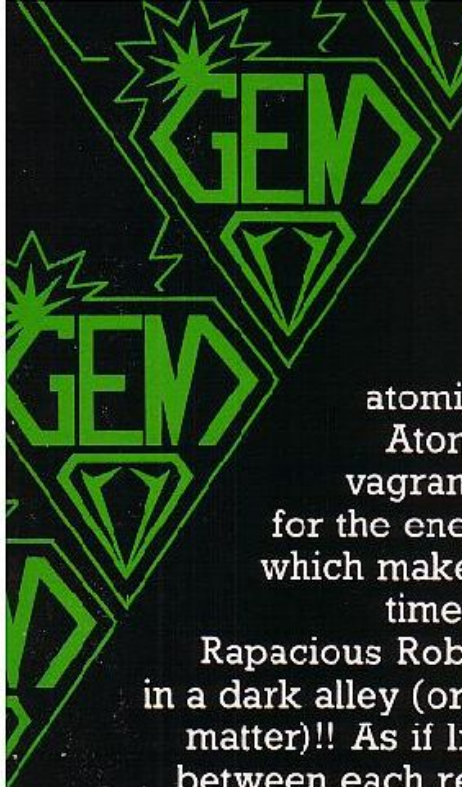


## EXTENDED BASIC

### Listing 1

```
5 REM PROGRAM 1
10 IFFL=0 THEN FL=1: LOAD "EXTENSION 64", 1, 1
20 PRINT "***** CBM 64 BASIC V2 + NEW COMMANDS *****"
30 FB=FREE(0)-65536*(FREE(0)<0)+205
40 PRINT TAB(7); FB "BASIC BYTES FREE"
50 POKE 785, 0: POKE 785, 194
60 NEW
```



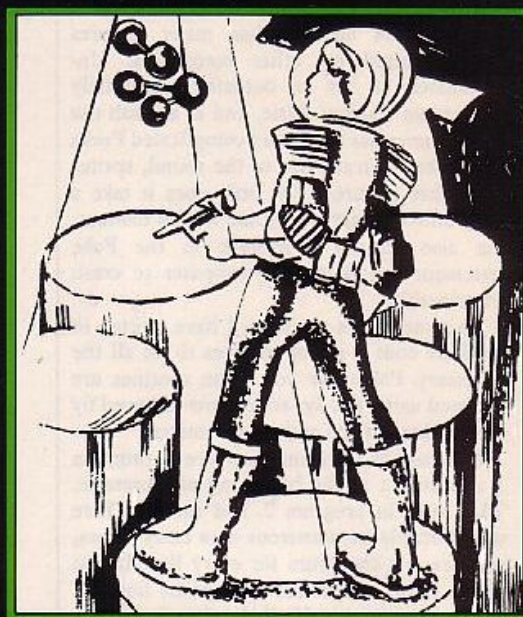


Can poor Dan decontaminate the atomic fuel rods in time? In this new 3D machine code game, you control Dan Dan The Atomiser Man, jumping him from disc to disc, trying to reduce

the ever increasing radiation levels in an atomic pile. However, Up 'n'

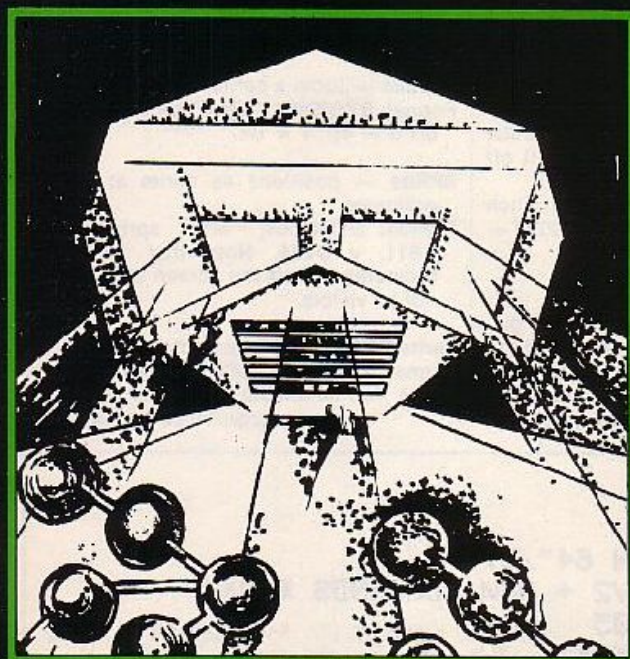
Atom 'Arry and his gang of vagrant particles are thirsting for the energy in your back pack, which makes life a bit awkward at times. Then there's Ron the

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

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

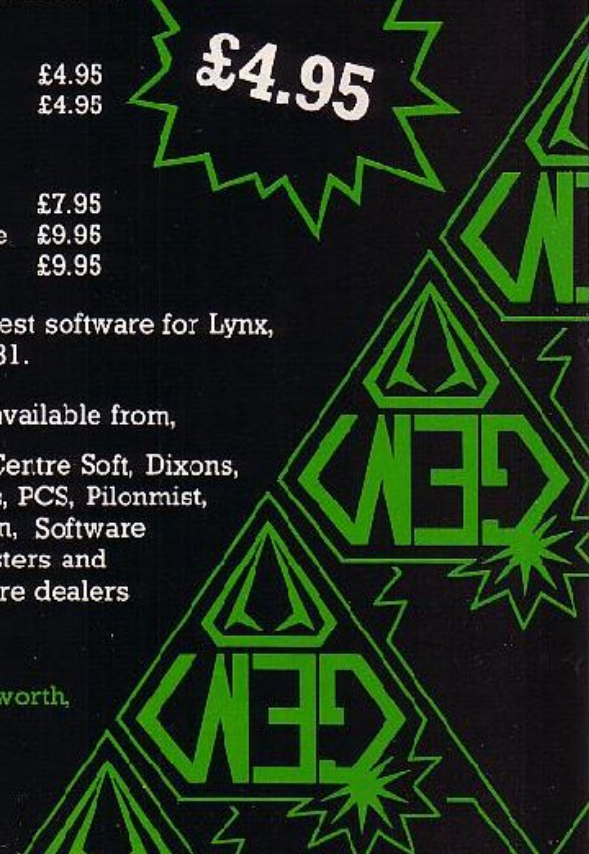
Selected titles available from,

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

**£4.95**



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





```

5 YS=49654
10 INPUT"*****INSTRUCTIONS**";AF:IFLEFT$(A$,1)=""Y"THEN9000
20 GOSUB5000
500 IFT1$(?"000020"THEN60SUB4900
505 P=P+4*(USR(0),"JOY",0,3)-4*(USR(0),"JOY",0,2)
510 P=P+4*(PEEK(197)=12)-4*(PEEK(137)=36)
515 P=P+4*(P>335)-4*(P<0)
520 SYSYS;"SPR",1,P,229
530 IF(USR(0),"CCL",0,0);THENGOSUB4000
540 Y=Y+DY:X=X+DX
550 IFY<56THEN6300
560 IFX>323THENDX=-DX:SYSYS;"SOU",1,70,1:X=323
570 IFX<24THENDX=-DX:SYSYS;"SOU",1,70,1:X=24
580 SYSYS;"SPR",0,X,Y
585 IFY>225THEN6000
590 IF(USR(0),"CCL",0,0);THENGOSUB4000
600 IF(USR(0),"CCL",0,1);THENGOSUB4500
610 GOTO500

```

(continued from page 127)

parameter is optional but if it is included, 0 turns multicoulour off for that sprite and 1 turns it on.

**Size** — expands or contracts a sprite.

Format: SYS49664, "SIZ" sprite 0-7, expand  
in x direction where 0 = no, 1 = yes;  
expand in y direction where 0 = no, 1 =  
yes.

**PRIority** — tells computer whether to put a

sprite above or below text.

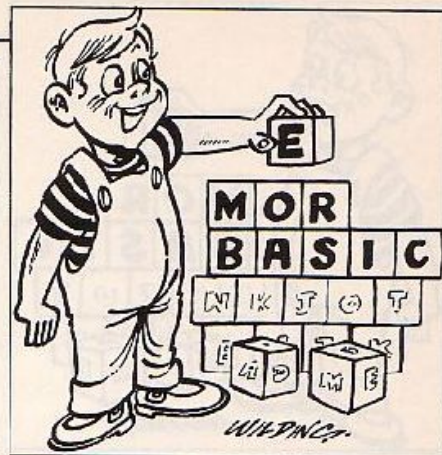
Format: SYS49664, 'PRI' sprite 0-7,

below/above 0/1 where 0 = below, 1 = above

**Sprite Multicolours** — sets sprite multi-

colours 1 and 2  
Format: SYS49664, "SMU" multicolour 1  
0-15, multicolour 2 0-15

**Left SScroll** — scroll whole or part of screen



one character to left.

Format: SYS49664, "L5C" top line to scroll 0-24, bottom line to scroll 0-24. The second parameter must be greater than the first.

**Right SScroll** scroll whole or part of screen  
one character to right

Format: SYS49664, "RSC" top line to scroll 0-24, bottom line to scroll 0-24. The second parameter must be greater than the first.

(continued on next page)

[illegible]

READY.





(continued from previous page)

**BORder** — sets border colour.  
Format: SYS49664, "BOR" colour 0-15

**BACKground** — sets background colour.  
Format: SYS49664, "BAC" colour 0-15.

**BLank** — turns screen on or off. The screen should be turned off before using the 1515 printer to prevent a crash, and might also be blanked before a lengthy calculation as running speed is slightly increased when the screen is blanked.  
Format: SYS49664, "BLA" off/on 0/1 where 0 = turn screen off, 1 = turn screen on.

**SCReen** — sets width and length of screen.

Format: SYS49664, "SCR" columns 38/40 rows 24/25.

**POStion** — sets the x and y scrolling registers. It can be used to move the whole screen up to one character in any direction.

Format: SYS49664, "POS" x position 0-7 — normally 0 — y position 0-7 — normally 3.

**CURSet** — sets cursor position.

Format: SYS49664, "CUR" x 0-39, y 0-24.0  
There are also two functions available. The value in brackets after USR is a dummy argument and does not affect the functions.

**JOYstick** — reads joystick values.

Format: USR(0), "JOY" port 0/1 where 0 = port 2, 1 = port 1 — switch 0-4 where 0 = up, 1 = down, 2 = left, 3 = right, 4 = fire. The function returns a 0 if the switch is open and a 1 if the switch is closed.

**COLLision** — detects sprite/sprite or sprite/data 0/1 (sprite = 0, data = 1). The function returns one if the second argument is 0 and the sprite has collided with another sprite since the function was last used. It will also return one if the second argument is one and the sprite has collided with text since the function was last used. Otherwise it will return a zero.

The keywords do not have to be kept to the minimum of three characters. Any number of characters can be enclosed in the quotes as long as the first three letters are those given. Also, the numeric parameters should be enclosed in brackets if they include any calculations. If they consist of just a number or a variable no brackets are needed.

## Demonstration

I have written a demonstration game — program 3 which uses the new commands. Look in the listing if you are unsure about how to use any of them.

To add your own commands, first load the existing new vocabulary as normal. Next, load program 2. Now use your assembler or monitor to enter the routine, which should start at the location held in FS\$, line 80. The following subroutines should be useful:

SC252 gets an integer from the Basic text and puts it in \$A7 and \$A8, with the least significant byte in the accumulator.

SC267 checks that the number in the accumulator is greater than or equal to the number in the X register and less than or equal to that in the Y register. If it is not, the subroutine produces an illegal quantity message.

SC4EC puts the number in the accumulator, which must be 0 or 1, in bit X of the location held in \$FD and \$FE.

SC7E4: puts bit X of the location held in \$FD and \$FE into the accumulator.

## Saved

When you have done this, change line 80 so that FS\$ contains the next free byte after your last routine. Add the first three letters of the new command's name, followed by its start address in hexadecimal, to the Data before line 290. There is room for a total of 64 new commands. Finally, type in direct mode:

FS\$ = "(start of free memory, in hex)":  
GOSUB 3000. GOTO 5040.

The data will now be saved.

### Demonstration Game continued from previous page

```

599 END
4000 DX=DX+((X-P-14)/14)*(ABS(DY)/2):DY=-ABS(DY)
4010 S=SGN(SOU*2/50+1)
4020 RETURN
4500 X1=INT((X-24)/8):SYSYS,"CUR"X1,INT((Y-50)/8)
4510 AS="XXXXXXXXXXXX"
4513 IFX1>37THENAS="XXXXXXXX"
4518 PRINTAS
4520 IFDY<0THENDY=-DY
4530 Z=USR(0):"COL"0,1
4540 SC=SC+1:SYSYS,"CUR"29,0:PRINT"SCORE:"SC:SYSYS,"SOU"2/50+1
4550 RETURN
4900 T:="000000":IFABS(DY)>5THENRETURN
4910 D=SGN(DY)*(ABS(DY)+1)
4920 SYSYS,"CUR"10,0:PRINT"DIFFICULTY:"ABS(DY)-:
4930 SYSYS,"BOR"(ABS(DY))
4940 RETURN
5000 REM SETUP
5010 FORN=0TO126:READA:POKE832+N,A:NEXT
5020 SYSYS,"POI"0,832:SYSYS,"POI"1,896
5030 SYSYS,"SMU"5,7
5040 SYSYS,"SCOL"0,0:SYSYS,"SCOL"1,14,1
5045 SYSYS,"SIZ"0,0,0:SYSYS,"SIZ"1,1,0
5050 SYSYS,"SPR"0,511,0:SYSYS,"SPR"1,0,0
5060 SYSYS,"ENA"0,1:SYSYS,"ENA"1,1
5070 SYSYS,"BOR"2:SYSYS,"BAC"0
5075 PRINT"XXXXXXXXX":FORN=1TO10:POKE646,N+1
5080 IFN/2=INT(N/2)THENPRINT" ";GOTO5087
5085 PRINT" ";
5087 NEXT PRINT
5090 SYSYS,"VOL"10
5100 SYSYS,"ENV"1,0,15,13,9:SYSYS,"WAVE"1,0
5105 SYSYS,"ENV"2,0,15,13,9:SYSYS,"WAVE"2,0
5110 Y=200:DY=-2:X=124:DX=RND(1)*4-2:P=200
5120 SYSYS,"ENA"0,1
5130 IF(USR(0),"COL"0,0)OR(USR(0),"COL"0,1)THEN5130
5140 PRINT"LIVES: 3 DIFFICULTY: 1":L=3
5150 T:="000000"
5999 RETURN
6000 SYSYS,"NAV"1,1:SYSYS,"SOU"1,20,100
6010 SYSYS,"NAV"1,0
6020 L=L-1:IFL=0THEN5100
6025 SYSYS,"SPR"0,0,0:SYSYS,"SCOL"0,(5+L)
6030 PRINT"LIVES:"L:T:="000000"
6040 Y=200:DY=-2:X=124:DX=RND(1)*4-2:P=200
6042 IF(USR(0),"COL"0,0)OR(USR(0),"COL"0,1)THEN6042
6045 GOSUB4920
6050 GOTO5000
6100 FORN=40TO365STEP-1:SYSYS,"SOL"2,N,10:SYSYS,"BOR"(N-35):NEXT
6105 SYSYS,"BOR"6
6110 PRINT"PRESS SPACE OR FIRE....."
6130 IF(USR(0),"JOY"0,4=0)ANDPEEK(197)<060THEN5130
6150 PRINT"CLR:FS=49664:GOTO20"
6500 FORN=36TO48:SYSYS,"SOU"2,N,10:SYSYS,"BOR"(N-36):NEXT
6510 SYSYS,"BOR"6
6520 SC=SC+10*L:SYSYS,"CUR"29,0:PRINT"SCORE:"SC
6530 GOTO6110
8000 DATA0,240,0,7,255,0,31,255,192,60,255,224
8010 DATA60,255,224,121,255,240,121,255,240,15,255,240
8020 DATA243,255,240,243,255,240,243,255,240,243,255,240
8030 DATA243,255,240,115,255,240,121,255,240,121,255,240
8040 DATA60,255,224,60,255,224,31,255,192,7,255,0,0,240,0,0
8050 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
8060 DATA60,0,0,255,0,3,255,192,15,0,240,12,0,48
8070 DATA63,195,252,48,195,12,0,255,0,0,60,0
8080 DATA42,170,163,42,170,160,4,0,16,21,0,84,21,0,84,4,0,16
9000 SYSYS,"BOR"6:SYSYS,"BAC"6
9010 PRINT"J:TAB(16)"BREAKOUT"
9020 PRINTTAB(16)
9030 PRINT"XKNOCK THE BRICKS OUT OF THE WALL BY"
9040 PRINT"BOUNCING THE BALL OFF YOUR BAT USING"
9045 PRINT"X-LEFT, M-RIGHT OR JOYSTICK IN PORT 2."
9050 PRINT"EVERY 20 SECONDS THE BALL SPEEDS UP"
9060 PRINT"AND BECOMES MORE DIFFICULT TO CONTROL."
9070 PRINT"THE GAME ENDS IF THE BALL HITS THE"
9080 PRINT"GROUND 3 TIMES OR REACHES THE TOP OF"
9090 PRINT"THE SCREEN. IF THE LATTER HAPPENS YOU"
9100 PRINT"GET A BONUS WHICH VARIES DEPENDING ON"
9110 PRINT"THE NUMBER OF LIVES YOU HAVE LEFT."
9120 PRINT"PRESS SPACE OR FIRE TO BEGIN....."
9130 GOTO6130
9999 RETURN

```



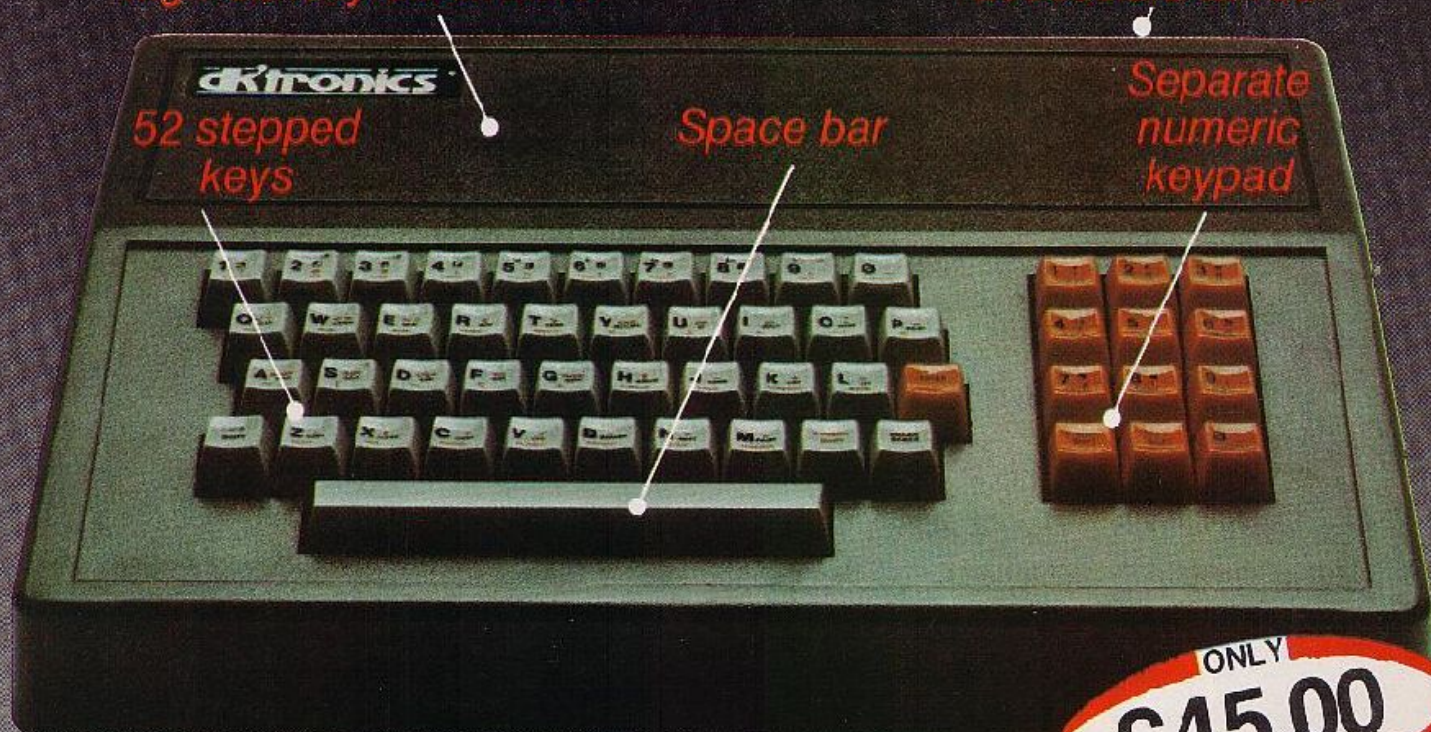
# THE FINAL TOUCH

**W**e've just added the final touch to our professional keyboard. This new Microdrive compatible keyboard offers more key functions than any other in its price range. And the stepped keys and space bar make it even easier to use. Our keyboard, constructed from high density black ABS, will take your Spectrum into the professional league. It has 52 "stepped" keys plus space bar. A separate numeric key pad consisting of 12 red keys including a single entry 'delete' plus single entry 'decimal point', facilitate fast

numeric data entry. The 15" x 9" x 3" case will accommodate your Spectrum and other addons like interface 1, power supply etc. and forms an attractive self-contained unit. All connections, power, Mic, Ear, T.V., network RS232 and expansion port are accessible at the rear. A few minutes, a screwdriver and the simple instructions supplied are all you need to fit your Spectrum. All **dktronics** products are covered by a comprehensive guarantee.

*Constructed from  
high density black ABS*

*All connections  
accessible at rear*



ONLY  
**£45.00**

**No Price  
Increases!**

**And it's  
Available  
NOW!**

Please rush me the following

..... Microdrive compatible  
keyboard(s) ..... £45.00  
Please add post and packing ..... £1.25  
I enclose cheque/PO/Cash for Total £ .....  
or debit my Access/Barclaycard No. ....  
[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]  
Signature \_\_\_\_\_ Name \_\_\_\_\_  
Address \_\_\_\_\_

## dktronics

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

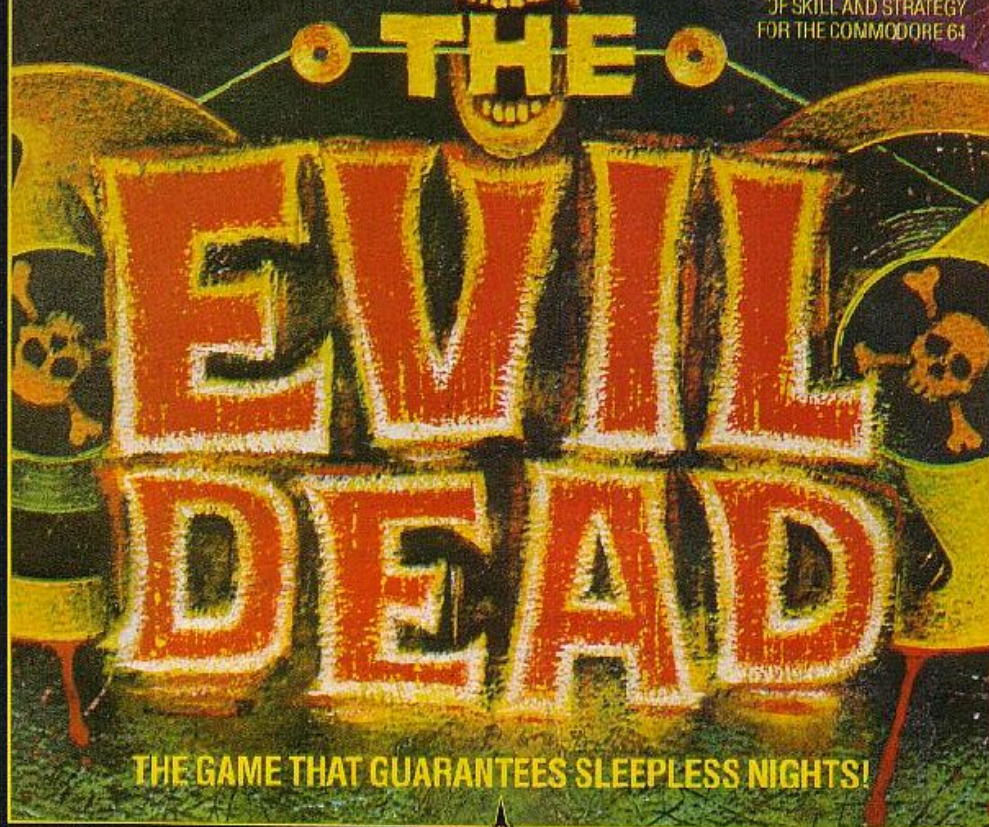
**The Spectrum Connection**



# WHO WILL JOIN THE EVIL DEAD NEXT?

FROM BRITAIN'S MOST  
POPULAR HORROR FILM  
COMES A MOST  
EXCITING COMPUTER GAME

A FAST MOVING GAME  
OF SKILL AND STRATEGY  
FOR THE COMMODORE 64



THE GAME THAT GUARANTEES SLEEPLESS NIGHTS!

AVAILABLE FROM  
ALL GOOD COMPUTER  
GAMES STOCKISTS INCLUDING  
THE VIDEO PALACE  
100 OXFORD STREET, LONDON W1

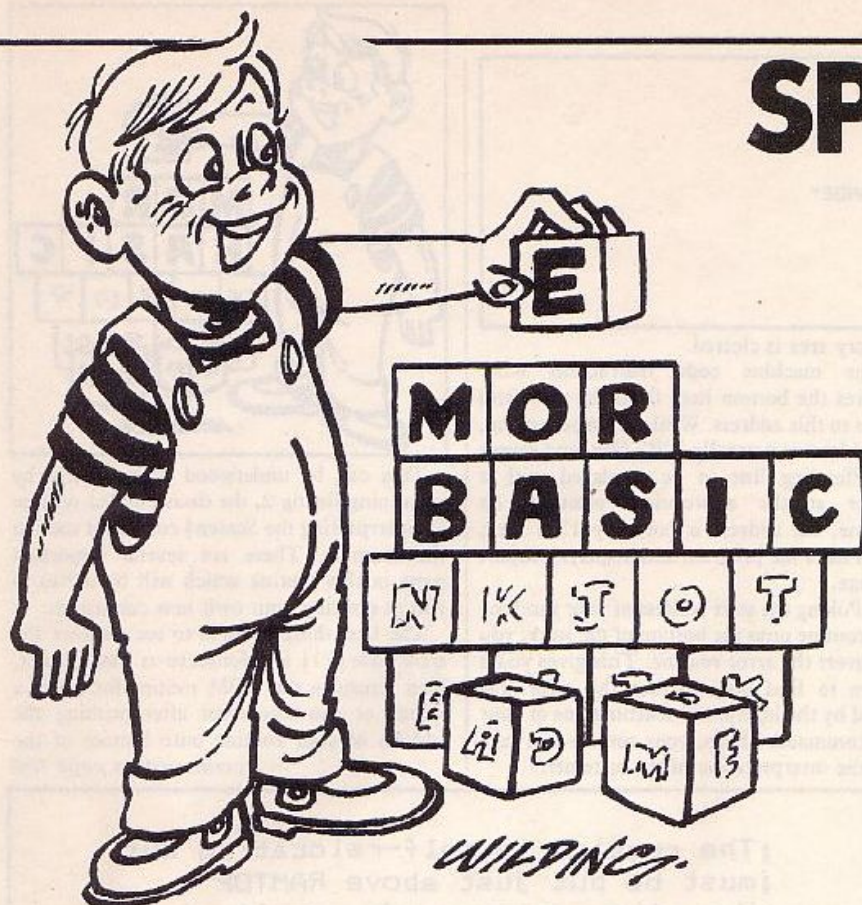


PALACE  
software

275 PINTONVILLE ROAD, LONDON N1 9RL

DISTRIBUTED BY  
PALACE VIRGIN GOLD  
69 FLEMPTON ROAD,  
LONDON E10 7NL  
TELEPHONE: 01-539 5566





## EXTENDED BASIC

Listing 1.

```

1 REM ** SCREEN$ as command *
2 REM (C) Robert Newman : 1984
3 REM
4 CLEAR 32400+32700*(PEEK 23733=255)
5 LET start=1:PEEK 23730+256*PEEK 23731
6 RESTORE : LET sum=0
7 FOR j=start TO start+157
8 READ n: POKE j,n
9 LET sum=sum+n
10 NEXT j
11 IF sum<>16918 THEN PRINT "Checksum error": STOP
12 REM
13 DATA 58,58,92,254,11,40,35,253,203,1,126,32,8,42,178,92,35,2
29,195,183,18,205,3,19
14 DATA 253,54,0,255,42,89,92,205,167,17,42,178,92,35,229,195,1
80,18,42,93,92,43,126,254
15 DATA 170,32,212,253,54,0,255,253,54,33,0,205,122,28,253,203,
0,126,40,195,254,13,40,8
16 DATA 253,54,0,11,254,58,32,183,253,54,0,255,253,203,1,126,32
,12,42,178,92,35,229,33
17 DATA 183,18,225,195,118,27,42,141,92,34,143,92,205,148,30,25
4,8,40,5,87,55,205,53,34
18 DATA 205,148,30,254,8,40,5,87,167,205,53,34,205,173,28,58,14
1,92,33,0,88,17,1,8E
19 DATA 1,255,2,119,237,176,42,178,92,35,229,195,118,27
20 LET errsp=PEEK 23613+256*PEEK 23614
21 POKE errsp,start-256*INT (start/256): POKE errsp+1,INT (star
t/256)
22 REM *****
23 REM * RUN lines 1 - 21

```

Listing continued on next page.

USING INTERFACE 1, it is possible to extend the Spectrum's Basic interpreter and add your own commands — see, for example, the article by Kathleen Peel in February's *Your Computer*. I have discovered another method of doing this which does not use Interface 1, and will work whether or not it is fitted. It can be used on any Spectrum, either 16K or 48K.

The ability to add your own commands can be very useful. It allows you to produce customised versions of Basic for particular applications. For example, you could add extra graphics commands to assist in writing arcade games, or add toolkit routines to help while debugging programs.

Any new command which you decide to use must fail the normal syntax checking in ROM. Two ways of doing this are particularly suitable for this method. The easiest is to use one of the keyword tokens RND to STOP as your command. Listing 1, for example, demonstrates SCREEN\$ used in this way. Note that this does not affect the normal use of the token — for example SCREEN\$ as a function.

The other method is to invent new words such as \*Renum and \*Trade which would need to be typed letter by letter. The "\*", or another shifted character, is required to get out of K cursor mode. Just like any other command, your new one could then be followed by a number of parameters — for example \*Renum 100,10 might renumber from line 100 in steps of 10.

The program in listing 1 sets up and demonstrates the use of a new command SCREEN\$ which can be used to change the paper and ink colours of the whole screen without erasing its contents. The new command has the syntax:

SCREEN\$ paper colour, ink colour(eg. SCREEN\$ 5,1)

Listing 1 can be used on both 16K and 48K computers. First type in lines 1 to 21. These lines set up the machine code routine which recognises, checks syntax, and interprets the new command.

The machine-code loader includes a checksum, but even so it is best to Save these lines before you try a Run, because if you have made a mistake in the Data statements the computer might crash. If everything seems OK when you Run these lines, you can test the new command by typing:

SCREEN\$ 5,1

as a direct command which should change the screen colours to cyan paper and blue ink. If this works you can now delete lines 1 to 19 before entering the rest of the program. You must leave lines 20 and 21 however, otherwise the new command will not be recognised when you Run the program.

The method for adding new commands is to intercept the error routine which is used by the interpreter when an incorrect command is found. The address of the error routine is the bottom item on the machine stack, and it is pointed to by system variable ERR-SP — address 23513/4. The occurrence of an error (during either syntax-checking or runtime)

(continued on next page)



(Listing 1 continued from previous page)

```

24 REM before typing rest of program
30 REM
40 CLE : LIST 23:SCREEN# 5,1
50 FOR j=1 TO 3
60 PRINT ""PRESS A KEY FOR COLOUR CHANGE"
70 NEXT j
80 FOR j=2 TO 7
90 PAUSE 0
100SCREEN# j,0
110 NEXT j

```

causes the following actions from the ROM:

☐ The address reached by the interpreter — system variable CH ADD — is copied to the error pointer — X PTR.

☐ The error code is put into ERR NR. The error code is one less than the report code which is printed after a runtime error. For example, the error code is 255 for report 0 (OK), and is 11 for report C — Nonsense in Basic. An unrecognised command would have an error code of 11 during both syntax checking and runtime.

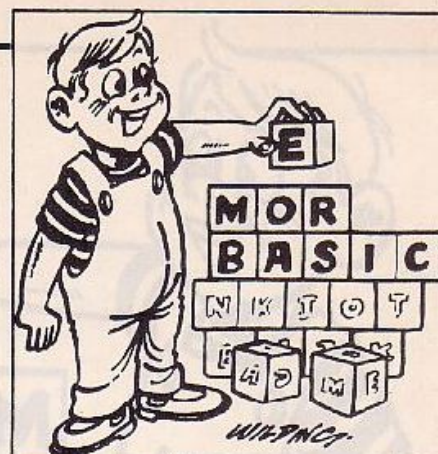
☐ The stack pointer is loaded from ERR SP, and so it points to the bottom item on the machine stack.

☐ The floating-point calculator stack and

memory area is cleared.

☐ The machine code instruction RET removes the bottom item from the stack and jumps to this address. While syntax-checking, this address is normally 12B7 Hex, and causes the offering line to be displayed with a marker at the appropriate position. At runtime, the address is normally 1303 Hex, which halts the program and displays a report message.

By Poking the start address of your machine code routine onto the bottom of the stack, you can divert the error routine. This gives you a chance to find out whether the error was caused by the interpreter reaching one of your new commands. If so, your routine can take over the interpretation of the statement.



This can be understood more clearly by examining listing 2, the disassembled routine for interpreting the SCREEN\$ command used in the example. There are several important parts in this routine which will be useful to you in creating your own new commands.

The first thing to do is to see whether the error code is 11 for Nonsense in Basic. If not, then return to the ROM routine for either a syntax or run-time error after pushing the address of your routine onto bottom of the

(continued on page 136)

Listing 2.

	ORG	RAMTOP+1	; The routine is self-relocating but
			; must be put just above RAMTOP
START	LD	A, (23610)	; Was the error code = 11 for
	CP	11	; "Nonsense in BASIC"?
	JR	Z, NONSENSE	
ERROR	BIT	7, (1Y+1)	; Bit 7 of FLAGS is set at runtime
	JR	NZ, RUNERROR	
SYNTAXERR	LD	HL, (23730)	; Syntax error. START = RAMTOP + 1.
	INC	HL	; START is put onto bottom of stack
	PUSH	HL	; ready for next error.
	JP	12B7H	; Back to ROM at this address.
RUNERROR	CALL	1303H	; Runtime error - produce report.
	LD	(1Y+0), 255	; Clear error number
	LD	HL, (23641)	; Remove floating point forms from
	CALL	11A7H	; line in editing area before
	LD	HL, (23730)	; doing a syntax check
	INC	HL	; Put START on bottom of stack
	PUSH	HL	
	JP	12B4H	; Return to ROM
NONSENSE	LD	HL, (23645)	; CH ADD is the address reached by
	DEC	HL	; interpreter. Obtain character
	LD	A, (HL)	; which caused the error.
	CP	170	; Was it SCREEN\$ ?
	JR	NZ, ERROR	; Error if not.
	LD	(1Y+0), 255	; Reset ERR NR and X PTR, and then
	LD	(1Y+38), 0	; check for two
	CALL	1C7AH	; numbers separated by comma. If not
	BIT	7, (1Y+0)	; found, ERR NR will indicate an
	JR	Z, ERROR	; error. CH ADD has been advanced
	CP	13	; and A contains the next character
	JR	Z, DK	; which must be ENTER or a colon
	LD	(1Y+0), 11	; else give "Nonsense in BASIC"
	CP	58	; error.
	JR	NZ, ERROR	
OK	LD	(1Y+0), 255	; Syntax is OK, so reset ERR NR
	BIT	7, (1Y+1)	; If runtime the command can now be
	JR	NZ, DO-IT	; obeyed

(continued on page 136)



# RIVER RESCUE

**YOU'RE THEIR ONLY HOPE...**

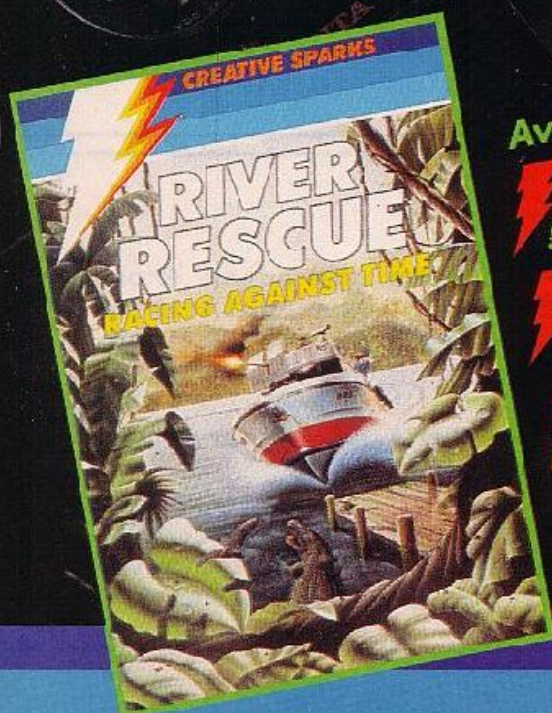
... And you don't have to read pages of instructions to get started. It's a fast playable game that's extremely challenging and far from being a pushover.

A team of important scientists have become trapped in a dangerous jungle and their only way out is via the river...

You are the owner of a high power river boat and it's your job to rescue them.

Navigating one of the wildest, most dangerous rivers in the world, you must steer your craft up the winding river, avoiding hazardous islands, crocodiles and floating logs, in your attempt to save lives.

This fast action, high energy game combines a smooth scrolling screen with superb sound and graphics ensuring hours of enjoyment.



Available on  
**COMMODORE 64**  
CASSETTE  
**£7.95**

**SPECTRUM 48K**  
CASSETTE  
**£6.95**

**VIC 20**  
CARTRIDGE  
**£9.95**

**ATARI**  
CASSETTE  
**£8.95**



**CREATIVE  
SPARKS**  
STRIKES AGAIN



(continued from page 134)

stack — it will be addressed by ERR SP ready for the next error.

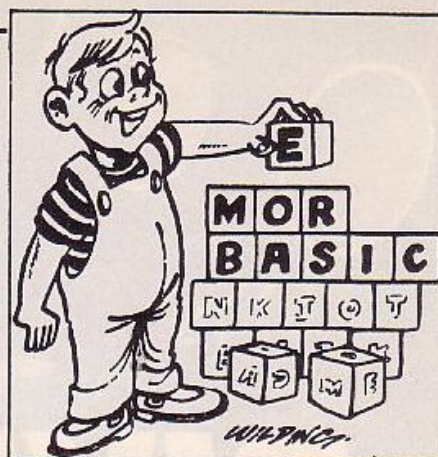
If the error code was 11, then the error may have been caused by your new command. At this stage, system variable CH ADD points to the character in the line after the one which caused the error. If you command uses one of the tokens RND to Step — e.g., Screen\$ — then it is easy to test for the appropriate code. If you choose new keywords which are typed letter by letter, such as \*Renum, then each character should be individually tested, and CH ADD advanced along the line as you do so by using RST 18H and RST 20H — see table 1. If your new command did not cause the

error, then a return to the ROM can be made.

After identifying the command, your routine must make sure that it is followed by the correct number of expressions, and during runtime they must be evaluated. The easiest way to do this is to use the line-scanning routines in ROM — see table 1.

Before calling these, CH ADD must point to the first character of the expression, and afterwards it will point to the character following the expression. At run-time, the value of the expression is put onto the calculator stack.

The final syntax check which must be made is to ensure that the last character of the



(Listing 2 continued from page 134)

	LD HL,(23730)	;else the addresses START and
	INC HL	;12B7H are put onto stack and a
	PUSH HL	;return to the ROM is made.
	LD HL,12B7H	
	PUSH HL	
	JP 1B76H	
DO-IT	LD HL,(23693)	;Execution. First permanent colours
	LD (23695),HL	;are copied to temporary colours.
	CALL 1E94H	;The INK colour is unstacked
	CP 8	;If it was 8, the ink is left
	JR Z,PAPER	;unchanged, else the ROM routine
	LD D,A	;is used to change ATTR T ink
	SCF	
	CALL 2235H	
PAPER	CALL 1E94H	;Paper colour is unstacked, and
	CP 8	;if it was not 8, the ROM routine
	JR Z,OUT	;is used again
	LD D,A	
	AND A	
	CALL 2235H	
OUT	CALL 1CADH	;Temp colours are made permanent.
	LD A,(23693)	;LDIR instruction is used to make
	LD HL,5800H	;the attributes colours the same
	LD DE,5801H	;as ATTR P.
	LD BC,2FFH	
	LD (HL),A	
	LDIR	
	LD HL,(23730)	;START is put onto the bottom of
	INC HL	;the stack ready for the next
	PUSH HL	;error, and a return to the ROM
	JP 1B76H	;is made.

Table 1.

ADDRESS (Hex)

ACTION

- |      |  |
|------|--|
| 18   | RST 18H loads the accumulator with the character from the program addressed by CH ADD. Non printable characters (e.g colour codes) are ignored and CH ADD advanced until a valid character is found. |
| 20   | RST 20H. CH ADD is incremented and the next character from the program put into the accumulator.   |
| 1C82 | A numeric expression is evaluated and its value put on the calculator stack if runtime. CH ADD should point to the first character of the expression before  |

(continued on page 139)



For Commodore 64

1 and 2 player's/joystick needed

Turbo cassette

New from HesWare

# Your Tuba-tootin' mad musical chase!

## HesWare action play

FOR you: power-toots on your tuba, an invisibility escape-button and 4 lives. AGAINST you: six mad instruments from the Cymbomb to the Pianha, all trying to trap you in a maze of musical notes. BEFORE you: points to score, 4 starting levels, 21 different play-patterns of ever increasing difficulty. POWER PLAY: great graphics and musical sounds.



HesWare

## Rootin' Tootin'

By Bryce C. Nesbitt



Joystick Required

Turbotape™ for Commodore 64

Turbotape for Commodore 64  
Hard Cassette

## HesWare Turbotape

All the speed of a disk-drive, but not the cost. This program will load at—amazingly—in under a minute.

### For your copy of 'Rootin Tootin'

(Cat. No. HSEE153). Available from all good computer software stockists.

Send me (tick as required)

☐ My local stockist's address

☐ Your full list of games

☐ \_\_\_\_\_ copy/ies of this game

at £9.95 each    £    :    p

+ single P&P sum    :    30p

Total to send    £    :    p

### Method of payment

By cheque or PO (no cash) made payable to **TECS**



☐ By Access or

☐ Barclaycard

Enter card no.    Sign below:

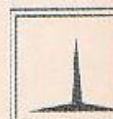
Credit card sales: UK buyers only.  
Response within 21 days.

To: Thorn EMI Computer Software Distributors, 296 Farnborough Road, Farnborough, Hants., GU14 7NF.  
Phone: (0252) 518364.

Name \_\_\_\_\_

Address \_\_\_\_\_

AYC1



THORN EMI  
Computer  
Software  
Distributors

COMPUTER SOFTWARE DISTRIBUTORS FOR: CREATIVE SPARKS / HESWARE / IUS / MAINSTREET / TOTL / DATAMASTER / HUMAN ED



(continued from page 136)

statement is Enter or a colon. CH ADD should point to this character, otherwise the Basic interpreter will be upset when you return. If syntax-checking, the return car. now be made after resetting the stack.

At runtime the command can now be executed. The start address of your routine is replaced on the bottom of the stack, and a jump back to the ROM made.

Any number of new commands can be added to the interpreter using this method. Each one will need its own syntax-checking and runtime routine. If you want to try this for yourself, the example in listing 2 will give you an idea of what is involved.

After writing your machine code routine, it can then be loaded into memory. The best place to put it is above RAMtop, using the Clear command to reserve some space for it. Before your new command(s) will be recognised, you must Poke the start address for the machine-code routine onto the bottom of the stack as in lines 20 and 21 of listing 1.

Similar Pokes must be included at the beginning of any program which uses your extended Basic. Although your routine should replace its start address onto the stack each time it is called, the Run command has the effect of clearing the stack and returning the normal error address. The Pokes are needed in the program to overcome this.

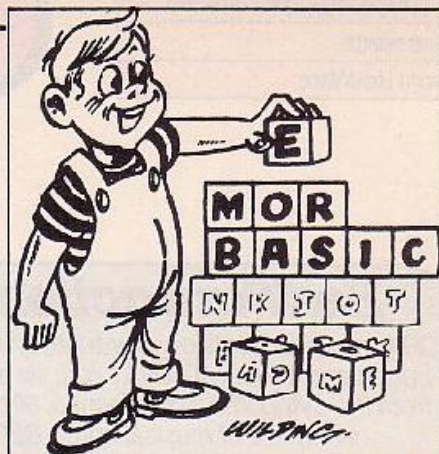


Table 1 continued from page 136.

calling this routine, and afterwards it points to the next character after the expression. If the expression was numeric, bit 6 of system variable FLAGS is set (reset for a string).

- |      |   |
|------|---|
| 1C7A | Evaluate two numeric expressions, separated by a comma and put values onto calculator stack if runtime. CH ADD and FLAGS as for 1C82. |
| 1E94 | Take number off calculator stack and put into the accumulator. The number must be positive and less than 256.                         |
| 1E99 | Take number off calculator stack and put into BC. The number must be positive and less than 65536.                                    |

## SIMPLY THE BEST

## SPECTRUM USERS!

Remove  
5 screws

Separate  
Spectrum

Remove tails

Screw Spectrum  
to base

Insert keyboard  
tails

Screw keyboard  
to base

Secure  
Housing  
Facia

SCREWDRIVER

+

5 MINUTES

SAGA 11

EMPEROR



The ZX Spectrum is the best Homecomputer for Software, both educational and games. The main flaw, is of course, the keyboard. This classic keyboard housing is designed to accommodate the Spectrum personal computer.

A professional full size 'Qwerty' keyboard has been designed, with full travel keys & a full size space bar. Special functions are strategically placed for rapid programming & ease of use. Designed today for users of tomorrow, you can play the fastest games with the greatest of ease. It's easy to assemble too—you need 1 screwdriver & 5 minutes—Simple! Available in white.

**67 KEYS!**  
AVAILABLE  
EX STOCK

If you are not entirely satisfied with any of our products please return and we will refund your money and postage. All prices include VAT.

ONLY  
£54.45

**SAGA SYSTEMS LTD**

WOODHAM RD, WOKING, SURREY TEL 69527

### TRY OUR NEW SOUND BOOST FOR THE SPECTRUM

Sound volume adjustable from a whisper to a roar providing sound and vision for added realism. No memory used, pushes the sound out through the T.V. No soldering required, just 3 easy push on connections.

**£9.50 P & P FREE**

PLEASE RUSH ME WITHOUT DELAY

I ENCLOSE CHEQUE/PO PAYABLE TO SAGA SYSTEMS LTD FOR £\_\_\_\_\_. PLEASE ADD £1.5 P & P PER KEYBOARD P & P **FREE** FOR BEEP BOOST

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_ POSTCODE \_\_\_\_\_



For Commodore 64  
Solo play/joystick optional  
Turbo-cassette  
New from HesWare

# Battle through to the Balrog!

## HesWare 'role-play' action

FOR you in this fantasy adventure: 3 wizard and warrior characters you name, arm and activate. AGAINST you: 40 kinds of murderous monsters, dark corridors, secret and one-way doors and the riddle of the Balrog. BEFORE you: either failure within minutes of play or hours gaining gold and power through 5 levels of dungeons, 3 levels of difficulty. PLAY POWER: 3D graphics and super sound.



HesWare

## Maze Master

By Michael Cranford

Maze Master is a 3-D fantasy adventure through the dark corridors of BALROG's dungeon. Your expedition must protect the liege lord and his domain from the vicious BALROG and his band of blackguards. You and your party have to be clever and courageous to overcome BALROG's treachery.

Joystick optional.



Turbotape for Commodore 64

## HesWare Turbotape

All the speed of a disk-drive, but not the cost. This program will load at—amazingly—in under a minute.

### For your copy of 'Maze Master'

(Cat. No. HSEE 123). Available from all good computer software stockists.

Send me (tick as required)

- ☐ My local stockist's address  
☐ Your full list of games  
☐ \_\_\_\_\_ copy/ies of this game

at £9.95 each    £    :    p

+ single P&P sum    :    30p

Total to send    £    :    p

### Method of payment

By cheque or PO (no cash) made payable to **TECS**



- ☐ By Access or  
☐ Barclaycard

Enter card no.    Sign below:

Credit card sales: UK buyers only.  
Response within 21 days.

To: Thorn EMI Computer Software Distributors, 296 Farnborough Road, Farnborough, Hants. GU14 7NF. Phone: (0252) 518364.

Name \_\_\_\_\_

Address \_\_\_\_\_

AYC2



THORN EMI  
Computer  
Software  
Distributors

COMPUTER SOFTWARE DISTRIBUTORS FOR: CREATIVE SPARKS / HESWARE / IUS / MAINSTREET / TOTL / DATAMASTER / HUMAN EDG



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)

## PRICES THAT'LL KNOCK YOU OFF YOUR FEET!



### COMPUTERS

Apricot 256K 630K DD + MON	£1450.00
Apricot 256K 10 + MON	£2279
Commodore 64	£ 152.18
Commodore VIC20 Starter Pack	£ 108.69
Commodore SX 64 (Portable)	£ 609.00
Kaypro 2	£1199.00
Kaypro 10MB	£2099.00
Oric Atmos 48K	£ 145.00
Sanyo MBC550 1 x 160K Disk drive	£ 699.00
Sanyo MBC555 2 x 160K Disk drive	£ 899.00
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

### PERIPHERALS

Sanyo 2112 Green Screen	£ 65.00
Sanyo 3117 Col Hi Res	£ 279.00
Commodore 1541 Disk Drive	£ 156.52
Commodore C2N Cassette	£ 35.00
Keyboards, cables, interfaces, tractor feeds, sheet feeds, disks, software, up grades, listing paper, ribbons, daisy wheels available for most products.	

- \* Superb stock of computers and peripherals
- \* Wholesale prices!
- \* Export facilities arranged
- \* Express delivery
- \* Guarantees available
- \* Dial-a-Quote: 01-947 8562

### DAISY WHEEL PRINTERS

Brother HR1	£ 449.00
Brother HR15	£ 329.00
Brother HR5	£ 145.00
Daisy Step 2000 (20CPS)	£ 246.00
Diablo 520	£ 675.00
Diablo 530	£1320.00
Juki 6100	£ 335.00
Qume 11/40	£1190.00
Qume 9/45	£1590.00
Qume Letter Pro 20	£ 599.00
Ricoh FP1330	£ 899.00
Ricoh FP1630	£1239.00
Uchida 18cps	£ 319.00

### DOT MATRIX

Aradex DP 9000	£ 799.00
Canon PW 1080A (NLQ)	£ 275.00
Commodore MTS 801	£ 175.00
Commodore 1526 Printer	£ 250.00
Epson RX8QT	£ 195.00
Epson RX80 F/T	£ 225.00
Epson FX80	£ 325.00
Epson RX100 F/T III	£ 345.00
Epson FX100 F/T	£ 425.00
Mannesmann Tally MT80	£ 200.00
Mannesmann Tally MT160	£ 399.00
OKI Microline 80A	£ 199.00
OKI Microline 84	£ 635.00
OKI Microline 2350	£1449.00
Radix 10 (NLQ)	£ 449.00
Seikosha GP103A	£ 179.00
Shiwa CP30 F/T	£ 185.00
Star Gemini 10X	£ 209.00
Star Gemini 15X	£ 309.00
Star Delta 15	£ 425.00

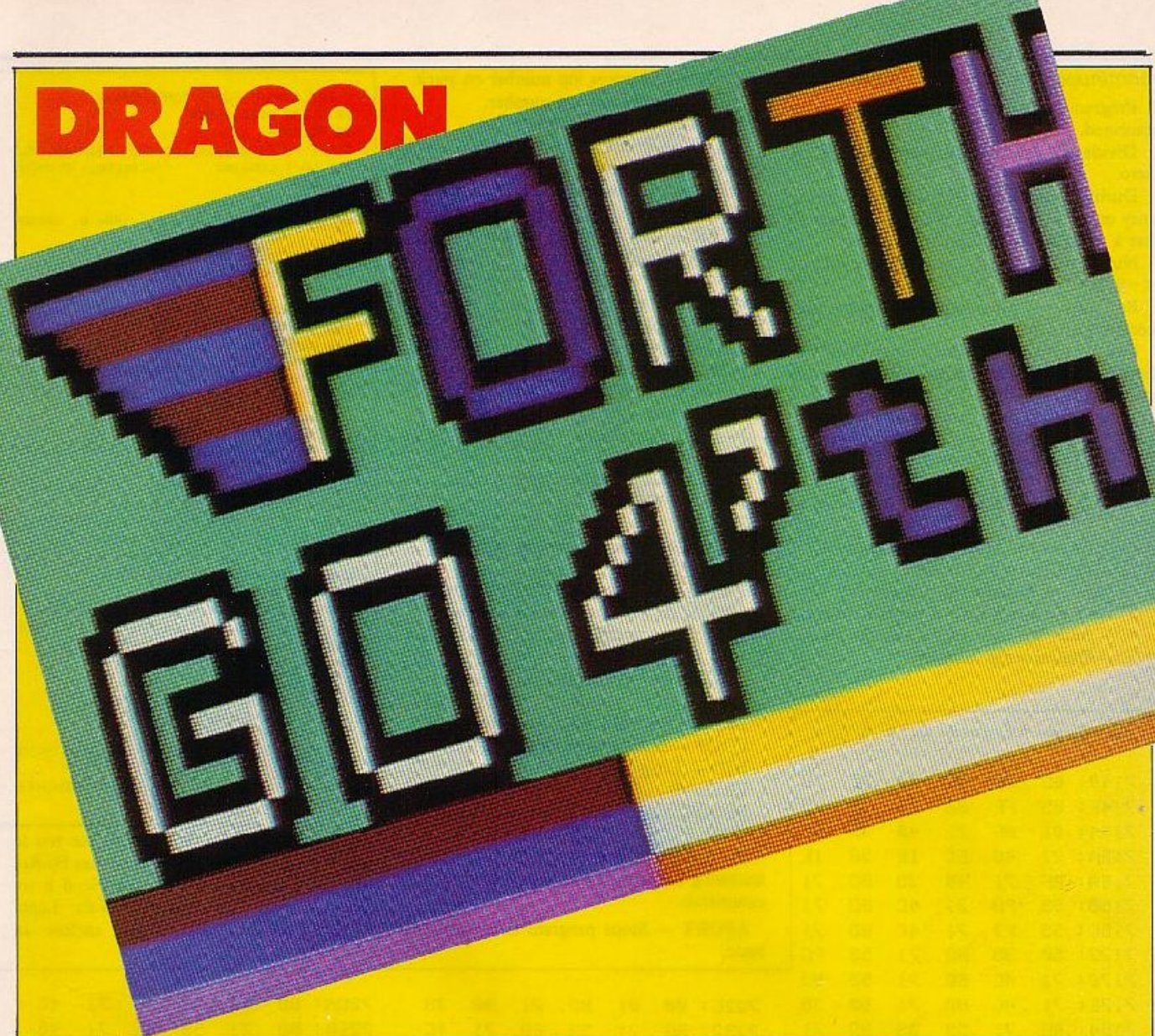
All prices excluding V.A.T.



Spa House, 11-17 Worple Road, Wembley, London SW19 4JS Tel: 01-947 8562 Telex: WOWICO 8955888



# DRAGON



THIS PROGRAM IS Dragon Forth for the Dragon 32/64. As many people have read articles in back issues of *Your Computer* I will not explain the fundamentals of the language although I will explain my implementations of the words. Although the compiler is slow, once compiled programs will run up to 50 times as fast as Basic.

Typing it in is quite a task but if you have time you will be well rewarded. First you type

in the Basic program then save it and autorun i.e., Goto 1210 — line 1240, if included in your programs, will make it autorun.

Next you type in the machine code or assembly code if you have DASM. Once this is done and checksum matches then save it after the Basic compiler. If you leave a big space between the Basic and machine code then that would be safer. To save the machine code use

CSAVEM'F WORDS',29000,30100,34010

The compiler and Forth is well error checked so it is just about impossible to crash it unless you use USR or Exec.

Some of the following errors may occur during execution:

Loops Not Nested — Do Loop; Repeat Until; Begin While loops not nested or Exit without Do-Loop.

*continued on next page*

```
10 CS=0
20 FOR A=&H7148 TO &H758B
30 IF LEN(A$)=0 THEN READ A$
40 POKE A,VAL("&H"-LEFT$(A$,2)):A$=RIGHT$(A$,LEN(A$)-2)
50 CS=CS+PEEK(A)
60 NEXT
70 IF CS<>116842 THEN PRINT"CHECKSUM ERROR..":END
80 PRINT"DATA OK. PREPARE TAPE THEN PRESS A KEY."
90 AUDIOCN:MOTORON
100 IF INKEY$="" THEN 100
110 CSAVEM'F WORDS',&H7148,&H758B,34010
120 PRINT"REWIND TAPE TO CHECK"
```

```
130 PRINT"THEN PRESS A KEY"
140 AUDIOCN:MOTORON
150 IF INKEY$="" THEN 150
160 SKIPP'F WORDS"
170 PRINT"SAVED OK."
180 REM *****
**
190 REM *HEXADECIMAL DATA CAN BE ENTERED
*
200 REM *AS 170 DATA EE,00,EE,00,39 ETC
*
210 REM *OR 170 DATA EE00EE0039 ETC
*
220 REM *****
**
```



continued from previous page

Program Aborted — Abort has been executed.

Divide By Zero — Attempt to divide by zero.

During compilation the following errors may occur — Undefined Word — Attempt to use a word that is not in the dictionary.

Number Too Big — Number >65535 or <-32767.

Bad Line — A programme line has been incorrectly entered.

Bad Variable — Variables other than A-Z have been used. The following is the system commands:

is >32767 then is is printed as a negative.

CLEAR — Clears all stacks.

\*VLIST — List dictionary,

\*LIST — List out source definitions,

\*SAVE — Save all words and definitions to tape,

\*LOAD — Load back into computer.

\*DEL — Clear source buffer

\*RESET — Restarts the program.

These are explanations of the core words:

+ — Adds top two numbers on the stack.

- — Subtracts top numbers.

Hex dump of core word M/C .

```

7148: 6D 60 6F 54 26 00
714E: 05 FF 0E 71 48 ED
7154: 81 BF 71 48 39 BE
715A: 71 48 EC 1E 30 1E
7160: BF 71 48 39 3D 71
7166: 59 FD 71 4C 3D 71
716C: 59 F3 71 4C 3D 71
7172: 50 39 BD 71 59 FD
7178: 71 4C BD 71 59 B3
717E: 71 4C BD 71 50 39
7184: BD 71 59 39 3D 71
718A: 59 BD 71 50 3D 71
7190: 50 39 BD 71 59 FD
7196: 71 4C BD 71 59 1F
719C: 01 CC 00 00 F3 71
71A2: 4C 30 1F 26 F9 BD
71A8: 71 50 39 BD 71 59
71AE: 1F 98 BD B5 4A 39
71B4: BD 71 59 FD 71 4C
71BA: 48 24 15 FC 71 4C
71C0: 34 02 86 2D 3D B5
71C6: 4A 35 02 FC 71 4C
71CC: 83 7F FF FD 71 4C
71D2: FC 71 4C 8D 95 7A
71D8: 39 8E 6D 60 3F 71
71DE: 48 8E 6F 54 3F 71
71E4: 4A 39 BD 71 59 1F
71EA: 02 BD 71 59 1E 02
71F0: BD 71 50 1F 20 BD
71F6: 71 50 39 BD 71 59
71FC: FD 71 4C BD 71 59
7202: FD 71 4E BD 71 50
7208: FC 71 4C BD 71 50
720E: FC 71 4E BD 71 50
7214: 39 BD 71 59 FD 71
721A: 4C BD 71 59 10 B3
7220: 71 4C 27 07 CC 00
7226: 00 BD 71 50 39 CC

```

DROP — Removes top number on stack.

DUP — Duplicates top number.

\* — Multiply top numbers.

EM.T — Prints character whose ASCII value is on the stack.

Prints top number on stack. If the number

SWAP — Swaps top two numbers on stack.

OVER — Duplicates the second number.

= — As basic test leaves 1 if true and 0 if false.

<,> All as =.

AND — Logical And.

OR — Logical Or.

EOR — Logical Exclusive Or.

? — Single byte Peek.

@ — Double byte Peek.

? — Single byte Poke.

?+ — Double byte Poke.

EXEC — Calls machine-code routine.

PRINT/PRINTOFF — Turns on/off printer.

USR — As Exec but returns value in D — Register.

KEY — Gets a keypress. 0 if no key pressed.

GET — As key but waits for a press.

\$ — Prints a string of letters I.E. 'HELLO' \$.

/ — Divides top numbers on stack.

DO .. LOOP — As FOR .. NEXT loop.

EXIT — Premature exit from DO LOOP.

LOOP — As loop but with step.

IND — Loop counter.

REPEAT .. UNTIL — as in beeb basic.

BEGIN .. WHILE — As REPEAT UNTIL.

IF — Tests flag on stack. If true it does following commands else jumps forward two commands.

ABORT — Stops program and returns to basic.

```

722C: 00 01 B3 71 50 39
7232: BD 71 59 FD 71 4C
7238: BD 71 59 10 B3 71
723E: 4C 27 07 CC 00 01
7244: BD 71 50 39 CC 00
724A: 40 BD 71 50 39 BD
7250: 71 59 FD 71 4C BD
7256: 71 59 10 B3 71 4C
725C: 2D 07 CC 00 00 BD
7262: 71 50 39 CC 00 01
7268: 3D 71 50 39 BD 71
726E: 59 FD 71 4C BD 71
7274: 59 10 B3 71 4C 2E
727A: 07 CC 00 00 BD 71
7280: 50 39 CC 00 01 3D
7286: 71 50 39 BD 71 59
728C: FD 71 4C BD 71 59
7292: 34 71 4C F4 71 4D
7298: 3D 71 50 39 BD 71
729E: 59 FD 71 4C BD 71
72A4: 59 BA 71 4C FA 71
72AA: 40 BU 71 50 39 3D
72B0: 71 59 FD 71 4C 3D
72B6: 71 59 B8 71 4C F8
72BC: 71 4D BD 71 50 39
72C2: BD 71 59 1F 01 86
72C8: 00 E6 84 BD 71 50
72CE: 39 BD 71 59 1F 01
72D4: EC 84 BD 71 50 39

```

```

1 REM ***THE FORTH COMPILER***
10 CLEAR 2000,16999
20 PCLEAR4
30 IF PEEK(29500)<>129 THEN PRINT00,"PLE
ASE WAIT LOADING..." :SCREEN0,1:CLCADM"
F WORDS"
40 CLS
50 PRINT"DRAGON FORTH (C) 1984 B. WATSON
"
60 PRINT
70 AD=12000:A1=AD
80 EN=AC
90 UA=2E800
100 GOSUB 1070
110 ED=C:SP=1
120 DIM S$(20)
130 IF ED THEN RETURN
140 IF NOT ED THEN LINE INPUT">";L$
150 Z2=0
160 IF L$="" THEN 140
170 IF LEFT$(L$,1)="#" AND DE#0 THEN GOT
O 320
180 IF DE OR LEFT$(L$,1)="#" THEN S$(SP)
=L$:S1=SP:SP=SP+1:Z2=1:A1=AD
190 IF SP>20 THEN PRINT"SOURCE BUFFERS F
ULL. DO YOU WISHTO CLEAR THEM ";:INPUT Q
$:IF Q$="Y" THEN SP=1:S1=SP:FOR E=1 TO 2
A:S$(A1)="":INEXT (SP=2:S$(1)=L$:
200 IF SP>20 THEN 130
210 IF LEFT$(L$,1)="#" AND RIGHT$(L$,1)<
">:" THEN E=2:SP=51:S$(SP)="":GOTO 1140
220 IF L$="#" THEN Z2=2:SP=S1:S$(SP)=""
GOTO 1140
230 IF LEFT$(L$,1)="#" THEN 280
240 IF RIGHT$(L$,1)="#" THEN 320
250 IF DE THEN 360
260 AD=EN:GOSUB 470
270 POKE AD,S7:EXEC EN:AD=EN:A1=FD:GOTO
130
280 PD=1:GOSUB 910:WE=RIGHT$(L$,LEN(L$)-
1)

```

If the program is a bit daunting for you to type in I will supply a copy which has Hi-Res text and a few examples for £4. Send it to: Brian Watson, 33 Moredun Vale Loan, Edinburgh EH17 7RJ. Please enclose an SAE.

```

72DA: BD 71 59 FD 71 4C
72E0: BD 71 59 BE 71 4C
72E6: ED 84 39 BD 71 59
72EC: FD 71 4C BD 71 59
72F2: BE 71 4C E7 84 39
72F8: BD 71 59 1F 01 6E
72FE: 84 BE 80 0F BF 01
7304: 68 86 7E B7 01 67
730A: 39 BE 39 39 BF 01
7310: 67 39 BD 71 59 1F
7316: 01 AD 84 BD 71 50
731C: 39 BD 80 06 1F 89
7322: 4F BD 71 50 39 BD
7328: 80 06 81 00 27 F9
732E: 1F 89 4F BD 71 50
7334: 39 BD 71 59 1F 01
733A: A6 84 81 00 27 08
7340: BD B5 4A 30 01 7E
7346: 73 3F 39 BD 71 59
734C: FD 71 4C 10 83 00
7352: 00 27 1F BD 71 59
7358: 8E 00 00 30 01 B3
735E: 71 4C 10 B3 71 4C
7364: 2E F5 10 B3 71 4C
736A: 26 02 30 01 1F 10
7370: BD 71 50 39 8C 74
7376: A5 BD 30 E5 7E 84
737C: DA 1F 41 EC 84 10
7382: BE 71 4A ED 24 BD

```



```

290 DE=1:NC=NC+1:D*(NO)=W*(A(NC)=AD
300 IF LEN(D*(NO))<10 THEN D*(NO)=D*(NO)
+ " " :GOTO 300
310 L*=RIGHT$(L$,LEN(L$)-PO+1):GOTO 240
320 IF LEN(L$)>1 THEN L*=LEFT$(L$,LEN(
L$)-1):GOSUB 470
330 POKE AD,57:AD=AD+1:EN=AD
340 DE=0
350 GOTO 130
360 GOSUB 470:GOTO 130
370 L*=RIGHT$(L$,LEN(L$)-1)
380 IF L*="LIST" THEN 450
390 IF L*="DEL" THEN SP=1:S*(1)="":GOTO
130
400 IF L*="SAVE" THEN CSAVEN "FWORDS",17
000,EN,17000:OPEN "O",#-1,"FWORDS":PRINT#
-1,EN:PRINT# -1,NO:FOR J=1 TO NO:PRINT#-1
,D*(J),A(J):NEXT J:PRINT#-1,SP:FOR J=1 T
O SP:PRINT#-1,S*(J):NEXT J:CLOSE #-1:GOTO
130
410 IF L*="LOAD" THEN PRINT"SEARCHING":C
LOADM "FWORDS":PRINT"LOADING":OPEN "O",#-
1,"FWORDS":INPUT #-1,EN:INPUT #-1,NO:FOR
J=1 TO NO:INPUT #-1,D*(J),A(J):NEXT J:J
NPUT #-1,SP:FOR J=1 TO SP:INPUT #-1,S*(J
):NEXT J:CLOSE #-1:AD=EN+1:AD=51:SP=GOTO
130
420 IF L*="ULIST" THEN FOR I=1 TO NO:PR
INTD*(I):POKE 31365,0+15*(ABS(I)-2*(I
/2)):NEXT I:PRINT"ENTRIES ":(2
8000-AD):BYTES LEFT :GOTO 130
430 IF L*="RESET" THEN RUN
440 GOTO 130
450 FOR B=1 TO SP-1:PRINTS*(B):NEXT
460 GOTO 130
470 A1=AD:W$=""
480 IF LEFT$(L$,1)="/" THEN RETURN
490 PO=1:LA=0
500 IF LA THEN RETURN
510 GOSUB 310
520 IF LEFT$(W$,1)="/" AND LEFT$(L$,1)
<="/" OR LEFT$(W$,1)="/" AND MID$(L$,2,1
1)<>" " THEN 610
530 IF MID$(W$,2,1)="/" THEN 680
540 IF MID$(W$,2,1)="/" THEN 740
550 IF LEFT$(W$,1)="/" THEN 800
560 IF LEFT$(W$,1)=CHR$(34) THEN 840
570 IF LEN (W$)<10 THEN W$=W$+" " :GOTO 5

```

```

70
580 FOR I=1 TO NO:IF LEFT$(W$,10)<>D*(I)
THEN NEXT I:IF=1:GOTO 1140
590 POKE AD,&HBD:AD=AD+1:D=A(I):GOSUB10
20
600 GOTO 500
610 DD=VAL (W$):IF DD<0 THEN DD=65536+DD
620 IF DD>65535 THEN E=3:GOTO 1140
630 IF DD<0 THEN E=2:GOTO 1140
640 POKE AD,&HCC
650 AD=AD+1:GOSUB 1020
660 GOSUB 1050
670 GOTO 500
680 J=ASC(W$)-65
690 IF U<0 OR V>25 THEN E=7:GOTO 1140
700 POKE AD,&HFC:AD=AD+1
710 DD=VA+U*2:GOSUB 1020
720 GOSUB 1050
730 GOTO 500
740 J=ASC(W$)-65
750 IF U<0 OR V>25 THEN E=7:GOTO 1140
760 GOSUB 1080
770 POKE AD,&HFD:AD=AD+1
780 DD=VA+U*2:GOSUB 1020
790 GOTO 500
800 W$=RIGHT$(W$,LEN(W$)-1)
810 IF LEFT$(W$,1)="/" THEN 500
820 POKE AD,VALC"&H"+LEFT$(W$,2):AD=AD+
1
830 W$=RIGHT$(W$,LEN(W$)-2):GOTO 810
840 POKE AD,&HCC:AD=AD+1:CD=AD+7:GOSUB 1
020:GOSUB 1050
850 POKE AJ,&H20:1=2
860 W$=W$+CHR$(34)
870 W$=RIGHT$(W$,LEN(W$)-1):IF LEFT$(W$,
1)=CHR$(34) THEN 890
880 POKE AD+1,ASC(W$):I=I+1:GOTO 870
890 POKE AD+1,0:POKE AD+1,I-1:AC=AD+1+1
900 GOTO 500
910 W$=""
920 LA=0
930 IF MID$(L$,PO,1)="/" THEN PC=PO+1:50
TO 530
940 IF MID$(L$,PJ,1)=CHR$(34) THEN PO=PO
+1:GOTO 990
950 FOR Z=PO TO LEN (L$):IF MID$(L$,Z,1)
<>" " THEN W$=W$+MID$(L$,Z,1):NEXT Z:Z=2-
1:LA=1

```

```

960 IF LEN(W$)<10 THEN W$=W$+" " :GOTO 96
0
970 PO=Z
980 RETURN
990 FOR Z=PO TO LEN(L$):IF MID$(L$,Z,1)<
>CHR$(34) THEN NEXT Z:Z=Z-1:LA=1
1000 IF Z=LEN(L$) THEN LA=1
1010 W$=CHR$(34)+MID$(L$,PO,Z-PO):PO=Z+1
:RETURN
1020 POKE AD,INT(DD/256)
1030 POKE AD+1,DD-(256*PEEK(AD))
1040 AD=AD+2:RETURN
1050 POKE AD,&HED:AD=AD+1:DD=&H7150:GOSU
B 1320:RETURN
1060 POKEAD,&HBD:AD=AD+1:DD=&H7159:GOSUB
1020:RETURN
1070 Z=30000:DIM D(82):DIM A(82):READ N
O:FOR I=1 TO NO:READ D*(I):A(I)=PEEK(2)*
256+PEEK(2+1):Z=Z+2
1080 IF I=FN(D*(I))<10 THEN D*(I)=D*(I)+
" " :GOTO 1080
1090 NEXT
1100 RETURN
1110 DATA 41
1120 DATA "+","-",DROP,DLP,"*",EMIT,".",
"CLEAR",SWAP,OVER,"=", "<>","<",">","AND"
,"OR","EOR","?",@,!,+,%, "EXEC","PRINTON",
"PRINTOFF","USR",KEY,GET
1130 DATA "*","/",00,LOOP,EXIT,+LOOP,NO
,REPEAT,UNTIL,BEGIN,WHILE,"IF","THEN",AB
ORT
1140 IF E=1 THEN PRINT"UNDEFINED WORD"
1150 IF E=2 THEN PRINT"BAD VARIABLE"
1160 IF E=2 THEN PRINT"BAD LINE"
1170 IF E=3 THEN PRINT"NUMBER TOO BIG"
1180 AD=HJ
1190 DE=0
1200 GOTO 130
1210 PCLEAR1:FOR A=0 TO 511:POKE 1024+A,
PEEK(1536+A):NEXT
1220 POKE 2300,PEEK(25):POKE2301,PEEK(26
):POKE2302,PEEK(27):POKE 2303,PEEK(28)
1230 POKE 1024,PEEK(1025)
1240 CSAVEN"FOR"150,PEEK(27)*256+PEEK
(28),0
1250 POKE 25,PEEK(2300):POKE26,PEEK(2301
):POKE27,PEEK(2302):POKE28,PEEK(2303)
1260 RUN

```

```

7388: 71 59 ED 94 BD 71
738E: 59 ED 22 86 01 A7
7394: 26 31 27 10 BF 71
739A: 4A 39 10 3E 71 4A
73A0: 31 39 A6 26 81 01
73A6: 26 58 EC 94 AE 22
73AC: BF 71 4E 10 B3 71
73B2: 4E 27 46 C3 00 01
73B8: ED A4 AE 24 32 67
73BE: 6E 84 10 3E 71 4A
73C4: 31 39 A6 26 81 01
73CA: 26 34 EC 94 ED 22
73D0: 39 10 BE 71 4A 31
73D6: 39 A6 26 81 01 26
73DC: 23 EC A4 AE 22 BF
73E2: 71 4E 10 33 71 4E
73E8: 24 11 FD 71 4E BD
73EE: 71 59 F3 71 4E ED
73F4: A4 AE 24 32 62 6E
73FA: 84 10 BF 71 4A 39
7400: 8E 74 B6 3D 90 E5
7406: 7E 84 DA BE 71 4A
740C: EC 19 BD 71 50 39
7412: 1F 41 EC 84 BE 71
7418: 4A E0 84 86 02 A7
741E: 02 30 03 BF 71 4A
7424: 39 BC 71 4A A6 1F
742A: 81 02 26 D2 BD 71
7430: 59 10 83 00 01 27

```

```

7436: 0B BE 71 4A EC 1D
743C: 1F 01 32 62 6E 84
7442: BE 71 4A 30 1D BF
7448: 71 4A 39 1F 41 EC
744E: 84 BE 71 4A ED 84
7454: 86 03 A7 02 30 03
745A: BF 71 4A 39 BE 71
7460: 4A A6 1F 81 03 26
7466: 99 8D 71 59 1A 83
746C: 00 01 27 D2 BE 71
7472: 4A EC 1D 1F 01 32
7478: 62 6E 84 3D 71 59
747E: 10 83 00 30 27 01
7484: 39 1F 41 EC 84 C3
748A: 00 06 ED 84 39 39
7490: 8E 0D 00 3F 71 48
7496: 8E 6F 54 3F 71 4A
749C: 8E 74 C9 3D 90 E5
74A2: 7E 84 DA 0D 44 49
74A8: 55 43 44 45 20 42
74AE: 53 20 5A 45 52 4F
74B4: 0D 00 0D 4C 4F 4F
74BA: 52 53 20 4E 4F 54
74C0: 20 4E 45 53 54 45
74C6: 44 0D 00 5D 50 52
74CC: 4F 47 52 41 4D 20
74D2: 41 42 4F 52 54 45
74D8: 44 0D 00 20 FF 00
74DE: FF 00 FF 30 FD 00

```

```

74E4: 89 00 7D 00 FD 00
74EA: FD 00 FD 00 FD 00
74F0: FD 00 F9 00 F1 00
74F6: FD 00 FD 00 FD 00
74FC: F9 00 F9 01 60 00
7502: 7F 00 2F 00 35 00
7508: EE 00 CC 00 EE 00
750E: EA 00 3F 00 77 10
7514: 7F 00 64 00 EE 00
751A: EA 20 EA 20 EA 01
7520: 3F 00 65 10 26 01
7526: 24 00 EE 00 EA 00
752C: EC 00 EA 00 71 64
7532: 71 74 71 84 71 88
7538: 71 92 71 AB 71 B4
753E: 71 D9 71 E6 71 F9
7544: 72 15 72 32 72 4F
754A: 72 6C 72 89 72 SC
7550: 72 AF 72 C2 72 CF
7556: 72 DA 72 E9 72 F8
755C: 72 FF 73 0B 73 12
7562: 73 1D 73 27 73 35
7568: 73 43 73 7D 73 SC
756E: 73 C0 73 D1 74 09
7574: 74 12 74 25 74 4B
757A: 74 5E 74 7B 74 8F
7580: 74 90 74 20 74 14
7586: FF 30 FF 01 FF 10
116847

```





# EMPIRES

**When a Galactic war breaks out,  
there is only one winner —  
make sure it's you!**

Empires is a game of the type which has not been seen before. It is a fully player interactive strategy game for up to six players and an umpire. The basic set contains three players. Expansion set one contains three more. Each player controls a unique race struggling to take over the galaxy. Mining companies, space fleets and sound strategy all contribute to the success of your race; but beware the other players will be trying to tear your empire apart. The skill required to organise your empire as it grows is enormous. To assist you galactic maps and data cards are provided. Soon further expansion sets will be available to give you an advantage over the other players. Move information is transferred via cassette to the umpire who analyses it with his program and returns the new data to the players. Messages can be sent to other players in the same way.

**THIS IS A NEW CONCEPT IN STRATEGY  
GAME PLAYING.**

48K SPECTRUM

**CONTENTS:** THREE PLAYER CASSETTES, ONE UMPIRE CASSETTE,  
4 GALACTIC MAPS, 81 DATA CARDS, 1 FULL SET OF RULES, 3 PLAYER INSTRUCTIONS

Price £19.95.

Please send me ..... copy/copies of Empires Basic Set

Total cheque/P.O. enclosed .....  
Cheques payable to Imperial Software.

Send order to:  
IMPERIAL SOFTWARE  
IMPERIAL HOUSE  
153 CHURCHILL ROAD  
PARKSTONE  
POOLE  
DORSET  
TEL: 0202-723060

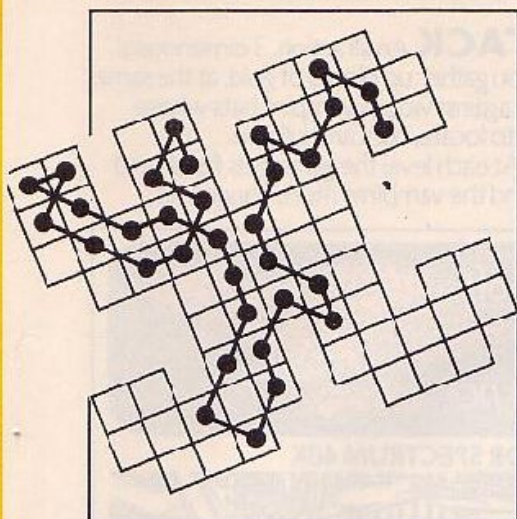
Name .....

Address .....

..... Age .....

NOW AVAILABLE AT BOOTS AND OTHER GOOD COMPUTER STORES





FANS OF DOUGLAS Adam's book and TV series, the *Hitchhiker's Guide to the Galaxy*, will know it starred a computer named Deep Thought. In answer to the Ultimate Question about the Meaning of Life, the Universe and Everything Deep Thought came up with the number 42. This also happens to be the solution to May's Coleco Adam Competition.

42 is the maximum number of shapes you can touch on in sequence taking 41 steps to do so. There are two routes through the puzzle grid which give this figure. One is shown here. The other is almost the same except for a variation over two steps.

Well over 1,000 people entered the competition. Quite a few of them put their computers to the task of finding the solution.

# COLECO ADAM

## Competition

### RESULTS

A look at the times their programs took to run through all variations throws an interesting light on the relative speeds of different machines and languages.

On the ZX-81 one program took three days before it found the answer. A more efficient version on the same machine cut the time down to 10 hours while on the BBC micro the job took six hours.

Several Spectrum owners used the popular Hisoft compiler to write programs in Pascal which checked all the routes in around two hours.

Pride of place, however, must go to the two entrants — one from Poland — who wrote their programs in machine code. These made swift work of the problem, coming up with the answer in just over two minutes.

In view of the number of correct answers — 130 of them — we awarded the prize on the basis of the tie-breaker. Competitors were asked to complete the sentence, "With arcade

fun and word processing in one . . ."

It seemed in short supply this month and most people were content simply to carry on the rhyme. The best in this line were A. Taylor's "an Adam I'd treasure for both business and pleasure" and P. Holdsworth's "amusement's respected whilst words are perfected".

Alan Whitfield, however — of 43 Cambridge Avenue, Marton, Middlesbrough, Cleveland — found inspiration in the Garden of Eden. His was judged to be the winning entry: "an Adam would have enlightened Eve more than an Apple". On the same theme A. Wood suggested "if Eden had Adam would Eve even consider the Apple".

Other entries deserving of a mention were P. King's "Adam plays when work is done" and from D. Sinfield who expressed his feelings about Coleco's cabbage Patch dolls with "nice computer — shame about the doll".

# 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 is superb value.

Order it using the coupon adding £2.30 p&p (£5 for Europe, £10 outside) or if you want more information, tick that box instead. Either way, it will put you one step ahead of the competition.

Please send me Multi-Forth 83 for BBC Micro £40 + VAT. Deluxe System inc. Disc £80 + VAT. Cheques to Skywave Software Readers' A/C (or enter Visa No.)		
Name _____		Please send me more information: <input type="checkbox"/> Multi-Forth 83 <input type="checkbox"/> ZX81-Forth ROM <input type="checkbox"/> Spectrum Forth-I/O Cartridge
Address _____		
Post code _____		
SUBJECT: AVAILABILITY FOR I/O DOWNWARDS Send to Skywave Software, 75 Curzon Road, Bournemouth, BH1 4PW Dorset, England. Tel: (0202) 302335		



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 ...

CheetahSoft

Soft we're not



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.



# 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".

## CBM-64 BUGS?

□ I have recently acquired a Commodore 64, and have two queries about it. The first is that when the cursor-right key is used and then followed by cursor-up in quick succession, a spade — shifted A — is left at the point of change. The second is that when the operation FRE is used, I get a number in the region of -26,000. I have found that if this number is added to 64,000 then a number in the correct region is gained, although my old Vic-20 directly printed up the number of bytes free. Are these bugs in my computer?

A W Duncan,

Baras Park, Cramlington.

ONE IS A BUG, and one is just a fact of Commodore 64 life. The spade is due to a bug — common to all Commodore 64s — either in the Basic or the operating system. It seems that FRE on this computer can return either the number of bytes left, or a negative number. It depends on the circumstances in which the command is used. That is, on what the computer has been doing immediately prior to you using FRE. If the number is positive, then that is the number you use. If it is negative, add this number to 79,360 — 64 times 1240 — to obtain the answer you want.

## 6502 INFO

□ Would you kindly advise of any publications dealing with 6502 assembly language, and machine code, which could be used in conjunction with the BBC model B for the purpose of writing programs in these languages?

B V Dukinfield,  
Poynton, Cheshire.

PERHAPS THE best general guide to 6502 is Rodney Zaks' *Programming the 6502*, Sybex. BBC-specific books you might find helpful are: *Beginner's Guide to Assembly Language Programming on the BBC Micro* — Ross Symons; *Discovering BBC Machine Code* — Stephenson; *Assembly Language Programming for the BBC* — Iar Birnbaum; *6502 Assembly Language Programming* — Levertmal; *Assembly Language Programming for the BBC Micro* — John Ferguson and Tony Shaw.

## STRING POSITIONS

□ I have a 48K Spectrum and want to work out anagrams on my computer. Please could you tell me how I can simulate Mid\$, Left\$ and Right\$ using the Def FN function, as these are in the

program I wish to use, but are not on the Spectrum keyboard.

Cuy Westgate,  
Shaftesbury, Dorset.

MID\$, LEFT\$ and RIGHT\$ are the Microsoft Basic means of obtaining parts of strings. Nearly all computers with Basic use these. The Sinclair computers are the exception. You cannot use DEF FN to simulate these, and I am sure that you would not want to do so, even if you could. All you need to do is understand what the Microsoft commands do, and then you can easily substitute the Sinclair string-handling commands for these. MID\$ is used to extract a portion of a string. MID\$(A\$,3,2) takes two characters from the string A\$, starting at the third character. The Sinclair equivalent is A\$(3 TO 5). LEFT\$ also takes bits of a string, but starts at the left-hand end. This means that LEFT\$(A\$,2) would take the first two characters of A\$. A\$(TO 2) is the Sinclair equivalent. RIGHT\$ does the opposite of LEFT\$, stripping characters from the right-hand end of the string. Therefore, RIGHT\$(A\$,2) in Microsoft Basic is A\$(LEN(A\$) - 2 TO).

## SAVE PROBLEM

□ I have been quite proud of my ZX-81, but now I have a Sinclair 16K RAMpack I have problems. With the RAMpack fitted, I find that Saved programs do not Load. Listening to the sound track, I can hear a humming interference on top of the usual noise pattern. Since my tape-recorder is a good one, and the problem does not occur without the RAM pack, I am pretty sure it is the pack which is causing the problem. If so, is there anything I can do about it?

Stephen Boyles,  
Woking.

IT SOUNDS AS if you have just bought your RAM pack. If this is so, take it back to the place you bought it from, explain the problem, and get a new one. If you have had the pack for some time, and this solution is not realistic, I suggest you borrow a RAMpack from a friend, and see if the same problem occurs. If it does, it sounds as if the problem is the computer. If not, it is your RAM pack which is faulty. In this case, I suggest you replace it.

## PERIPHERALS

□ I own a Sinclair Spectrum and would like to add a modem, disc drive and a printer/plotter capable of using standard stationery. Is this a practical proposition, or would I be better off using another manufacturer's

computer as the base of such a system?

Paul Seward,  
Kilkhampton, Cornwall.

I GUESS IT would be possible, but you would have a pretty ugly mess of interfaces and the like. I would forget the idea of starting with a Spectrum. The set-up will never be as satisfactory as it would be if you started off with another machine. The BBC model B may well be worth considering for this.

## VIC ASSEMBLER

□ I am a Vic-20 owner and wish to delve into machine code. Could you, therefore, advise me as to the best way to go about this? I realise I need an assembler, yet how do I use it? Is that all I need? Which is the best and most reasonable assembler to buy?

A Jones,  
Northwood, Merseyside.

THE FIRST STEP is to buy a good book on learning machine code on your Vic-20. Some books actually include an assembler. Commodore sells a cartridge called Vic-Mon for programming in assembly language.

## BEST DISC DRIVE

□ I am planning to buy a BBC model B with disc drives, and while waiting for my savings to reach the necessary amount, I am trying to find out what is the best to buy. Buying the computer itself is not so much of a problem, but when it comes to the drives, I really cannot see the forest for the trees, and would therefore be very pleased if you could give me some advice. I am looking for at least 200K — 400K would be better still — compatibility with Acornsoft disc-based software, maximum reliability and a price-tag not exceeding the £375 mark, including cables, etc. What should I buy? If it is not possible to answer my question specifically, could you then perhaps tell me what to look for?

Joachim Fleury,  
Amsteraam.

YOU HAVE IN fact, already gone some way to answering your own question. The advice I tend to give when asked "which . . . should I buy", be it a Pac-man implementation or a computer, is for the prospective purchaser to make a list of (a) the "must have" requirements, which usually includes the price, and particular features which are vital; and (b) the "would be nice to have" requirements. Then I suggest working through *Your Computer* magazine advertisements for a start to make a shortlist of products which meet the "must have" requirements. From this, it is usually fairly simple to find one product which also supports the "would be nice to have" list. Joining one or more machine-specific users' clubs — such as Laserbug or Beebug, in your case — is also a good

way to learn, at least, which products to avoid. User club publications tend to be more scathing in their treatment of unsatisfactory products than magazines aimed at a wider audience.

## INPUT INIGMA

□ Michael Maloney writes from Islington in north London: I was interested to see J H Weaver's letter — *Response Frame*, *Your Computer*, January — as I have had the same problem with the Input statement using the Microsoft Basic Compiler. The MBasic Interpreter will return a null string if RETURN is entered in response to the input prompt, but the compiled version prints "Redo from start" and forces re-entry on the next line. This error cannot be trapped by the ON ERROR GOTO statement and makes the INPUT statement useless for serious applications.

One way round this is to use the CP/M BDOS call for string input and I have enclosed a short 8080 routine that does this. It can be assembled with the Macro-80 assembler and incorporated in the system library — BASLIB.REL — as follows:  
MRO IN,IN = IN  
LIB NEWLIB = BASLIB,IN,E  
PIP BASLIB.REL = NEWLIB.REL

Any program using it can then be compiled and linked normally.

```
0005      bdos equ
000A      bdosfn equ

0000      in:
0000' E5      push h
0001' 13      inx d
0002' E3      xchg
0003' 5E      mov e,m
0004' 23      inx h
0005' 56      mov d,m
0006' E1      pop h
0007' E5      push h
0008' 7E      mov a,m
0009' 12      stax d
000A' C5      push d

000B' CE CA      mvi c,todosfn
000D' CD 0005      call bdos

0010' D1      pop d
0011' 13      inx d
0012' 1A      ldax d
0013' E1      pop h
0014' 77      mov m,a

0015' C9      ret
```

## VIC-20 UDGS

□ I own a Vic-20 and have written a few games for it. Since the graphics from the keyboard are not particularly exciting, I would like to know how user-defined graphics are accessed and used.

Mark Deaville,  
Milton, Stoke-on-Trent.

I AM AFRAID I cannot answer that question in a few lines. It would take an article that would run to several pages in this magazine. Creating user-defined graphics is covered in detail in the book *Beyond Simple Basic — Delving Deeper into your Vic-20* by Philip Campbell. The *Vic-20 User Guide* also covers the subject.



# 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 every month for 12 months

A. I enclose cheque/P.O. to the value of £11.50 (UK) / \$18.50 (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,  
Perry Mount Road, HAYWARDS HEATH, Sussex,  
RH16 3DQ



# 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.

## Traffic Control

Nick Hockaday,  
Shepherd's Bush,  
London.



THIS PROGRAM FOR the 48K Spectrum puts

you in charge of traffic in a busy city centre. It presents you with an aerial view of a number of city blocks; traffic is shown moving in all directions. Your job is to ensure a steady flow of traffic by controlling the lights at the intersections. Jams are quick to build up so you will have your work cut out. Full instructions are given in the program.

### Listing 1

```
2 REM "b"
4 PAPER 0: BORDER 0:CLS
6 PAUSE 50:FOR n=1 TO 5:PRINT AT n,3: PAPER 2: BRIGHT 1:"
: NEXT n
8 PAUSE 150:FOR n=8 TO 12:PRINT AT n,5: PAPER 4: BRIGHT 1:"
: NEXT n
10 PAUSE 150:CLS
12 PAUSE 5:FOR n=15 TO 19:PRINT AT n,5: PAPER 4: BRIGHT 1:"
: NEXT n
14 PAUSE 20:DECP .3,10:PAUSE 10: BEEP .4,-10
16 PRINT AT 15,13: PAPER 5:"TRAFFIC CONTROL"
18 PAUSE 60:PRINT AT 17,13: PAPER 5:" Nick Hockaday "
20 PAUSE 40:PRINT AT 17,13: PAPER 5:" NOW PRESS ENTER "
22 IF "INKEY$<>"" THEN GO TO 22
24 IF "INKEY$=" THEN GO TO 24
100 PAPER 5: BORDER 5:CLS
102 PRINT AT 0,9:"TRAFFIC CONTROL"
104 PRINT AT 1,3:"You are the controller of a"
106 PRINT "city's traffic: light"
108 PRINT AT 3,3:"By pressing a key from 1 to 0"
110 PRINT "you can change the traffic flow"
112 PRINT "at the respective intersection."
114 PRINT AT 6,3:"But take care, although cars"
116 PRINT "may sometimes enter the car park"
118 PRINT "there are always cars trying to"
120 PRINT "leave the car park."
122 PRINT AT 10,3:"Your job is to ensure that"
124 PRINT "the maximum no. of cars are able"
126 PRINT "to use the streets without a jam"
128 PRINT "developing. Right it turns are"
130 PRINT "banned throughout the city. If"
132 PRINT "a car at an intersection has a"
134 PRINT "go signal but is unable to move"
136 PRINT "forward or to the left, then this"
138 PRINT "constitutes a jam."
140 PRINT "flash and the game is over."
142 PRINT AT 21,9:"PRESS ENTER"
144 IF INKEY$<>"" THEN GO TO 144
146 IF INKEY$="" THEN GO TO 146
148 CLS:PRINT AT 0,3:"There are 5 levels of play."
150 PRINT AT 2,3:"Level 1 is the easiest,going"
152 PRINT "up to level 5,which is the most"
154 PRINT "difficult level."
156 PRINT AT 6,3:"You will see 3 indicators on"
158 PRINT "the screen."
160 PRINT AT 8,3:"The level you are playing on"
162 PRINT "is at the top."
164 PRINT AT 10,3:"The number of cars currently"
166 PRINT "on the streets is indicated next"
168 PRINT "to: TAB 3: PAPER 6: BRIGHT 1:"C"
170 PRINT AT 13,3:"The maximum no. of cars that"
172 PRINT "you have had under your control"
174 PRINT "is shown at: TAB 12: PAPER 6: BRIGHT 1:"H"
176 PRINT AT 16,3:"The higher "
```

```
:TAB 14: PAPER 6: BRIGHT 1:"M"
178 PRINT AT 16,14:"is,at the end of"
180 PRINT "the game,the higher your TRAFFIC"
182 PRINT "CONTROL ability is."
184 PRINT AT 20,3:"Now press 1, 2,3,4 or 5 to pick"
186 PRINT "the level you wish to play on."
188 IF INKEY$<>"" THEN GO TO 188
190 IF INKEY$="" THEN GO TO 190
192 LET I=INKEY$: IF I<>"1" AND I<>"2" AND I<>"3" AND I<>"4" AND I<>"5" THEN GO TO 188
200 PAPER 4: BORDER 7:CLS:LE T a=0: LET m=0: LET l=VAL I$: LET c$=""
202 IF 1=I THEN LET p=25
204 IF 1=2 THEN LET p=20
206 IF 1=3 THEN LET p=15
208 IF 1=4 THEN LET p=10
210 IF 1=5 THEN LET p=5
212 POKE 60000,0: POKE 60001,0: POKE 60002,0: POKE 60003,0: POKE 60004,0: POKE 60005,1
214 FOR n=60658 TO 60694 STEP 4
216 LET x=(PEEK n)/2
218 IF x=IN" x THEN POKE n,2*x+1
220 NEXT n
222 RANDOMIZE USR 50025
224 PRINT AT 0,7: PAPER 6:"CAR PARK":PRINT AT 0,21: PAPER 6:"LEVEL"
226 PRINT AT 1,23: PAPER 6:1
228 PRINT AT 2,2: PAPER 6: BRIGHT 1:"1":PRINT AT 2,10: PAPER 6: BRIGHT 1:"2":PRINT AT 2,18: PAPER 6: BRIGHT 1:"3":PRINT AT 2,26: PAPER 6: BRIGHT 1:"4"
230 PRINT AT 7,14: PAPER 6: BRIGHT 1:"M":PRINT AT 15: PAPER 5: BRIGHT 1:"C":PRINT AT 16,26: PAPER 5: BRIGHT 1:"H"
232 PRINT AT 9,2: PAPER 6: BRIGHT 1:"S":PRINT AT 9,8: PAPER 6: BRIGHT 1:"F":PRINT AT 9,18: PAPER 6: BRIGHT 1:"6":PRINT AT 9,26: PAPER 6: BRIGHT 1:"7"
234 PRINT AT 12,8: PAPER 6:"FLY OVER"
236 PRINT AT 16,2: PAPER 6: BRIGHT 1:"B":PRINT AT 16,18: PAPER 6: BRIGHT 1:"9":PRINT AT 16,26: PAPER 6: BRIGHT 1:"0"
238 PRINT AT 17,9: INK 7: Nick:PRINT AT 18,9: INK 7:"Hockaday":PRINT AT 19,9: INK 7:"day":PRINT AT 20,11: INK 7:"1984"
300 IF INKEY$<>"" THEN LET a=1
302 LET x=USR 60189
304 IF PEEK 60004=0 THEN GO TO 350
306 POKE x,248: BEEP .75,7: BEEP .25,8: BEEP .5,7: BEEP .5,3: BEEP .5,3: BEEP .5,2: BEEP 1,0
308 PRINT AT 7,14: PAPER 6: BRIGHT 1: FLASH 1:"M"
310 PRINT AT 9,6: PAPER 6:"GAME OVER":PRINT AT 10,6: PAPER 7:"":PRINT AT 11,6: PAPER 7:"FOR NEW GAME: PRINT A T 12,6: PAPER 7:"PRESS 2"
312 IF INKEY$<>"" THEN GO TO 312
314 IF INKEY$="" THEN GO TO 314
316 LET I=INKEY$: IF I<>"2" THEN GO TO 312
318 GO TO 100
330 IF a=1 THEN BEEP .05,m/2: L ET a=0
352 FOR n=1 TO p: NEXT n
354 RANDOMIZE USR 60464
356 GO SUB 500
400 FOR n=1 TO p: NEXT n
402 RANDOMIZE USR 60538
404 GO SUB 500
450 FOR n=1 TO p: NEXT n
452 GO TO 300
600 LET c=PEEK 60000+256*PEEK 6
```

```
0001:
002 LET m=PEEK 60002+256*PEEK 60003
004 LET c$=STR$ c: LET m$=STR$ m
006 IF LEN c$<3 THEN LET c$=""
008 IF LEN m$<3 THEN LET m$=""
010 PRINT AT 7,10: PAPER 5:m$:PRINT AT 7,23: PAPER 5:c$
012 RETURN
00001: 152 4 152 4 1 32 1
00002: 35 67 98 44 2 35 98 97
00003: 64 1 2 98 35 97 1 64
00004: 0 221 33 241 236 221 126 0
00005: 254 0 40 81 221 110 2 221
00006: 102 3 35 35 221 126 1 230
00007: 192 129 205 87 242 225 1 30
00008: 0 9 229 205 87 242 225 1
00009: 35 0 9 229 205 87 242 225
00010: 1 30 0 9 229 205 87 242
00011: 225 1 97 0 167 237 66 229
00012: 1 33 0 9 54 40 35 54
00013: 40 1 31 0 9 54 40 35
00014: 54 40 225 205 231 241 1 4
00015: 0 22 9 24 168 221 110 1
00016: 221 102 2 221 126 3 205 87
00017: 4 0 221 9 221 126
00018: 1 254 0 40 19 221 110 0
00019: 221 102 1 221 126 4 205 87
00020: 242 1 5 0 221 9 24 230
00021: 221 35 221 35 221 126 1 254
00022: 0 209 221 110 0 221 102 1
00023: 221 26 6 206 87 242 1 7
00024: 0 22 9 24 221 221 33 241
00025: 236 221 126 0 254 0 40 56
00026: 78 4 92 221 190 0 40 7
00027: 1 4 0 221 9 24 234 221
00028: 110 2 221 102 3 221 126 1
00029: 230 1 254 0 40 14 221 126
00030: 1 230 192 205 36 242 221 205
00031: 1 134 24 12 221 126 1 230
00032: 192 205 234 241 221 203 1 198
00033: 221 33 241 236 221 26 0 234
00034: 0 200 0 0 221 110 2 221
00035: 0 22 3 17 6 0 221 126 1
00036: 221 1 254 0 40 3 17 0
00037: 0 221 227 221 33 102 234 221
00038: 25 221 126 0 50 114 234 221
00039: 126 5 50 117 234 58 120 92
00040: 103 71 40 14 221 126 1 50
00041: 115 234 221 126 2 50 116 234
00042: 24 12 221 126 1 50 116 234
00043: 221 126 2 50 115 234 58 120
00044: 92 203 71 40 14 221 126 4
00045: 50 118 234 221 126 5 50 119
00046: 234 24 12 221 126 4 50 119
00047: 234 221 126 5 50 118 234 221
00048: 33 114 234 221 126 0 254 0
00049: 40 60 221 94 0 22 0 227
00050: 25 63 77 124 254 0 32 38
00051: 225 229 221 94 1 22 0 25
00052: 126 254 40 40 7 54 40 62
00053: 45 2 24 18 225 229 221 94
00054: 2 22 0 25 126 254 40 40
00055: 23 54 40 62 45 2 225 1
00056: 3 0 221 9 24 18 221 225
00057: 4 0 221 9 195 100 235
00058: 225 225 13 100 234 54 1 201
00059: 221 33 25 237 221 110 1 221
00060: 42 2 126 254 40 32 9 54
00061: 40 2 96 234 43 34 76 234
00062: 4 0 221 9 221 126 1
00063: 254 0 200 0 221 110 0 221
00064: 102 1 126 254 40 32 13 229
00065: 221 110 2 221 162 3 126 254
00066: 40 32 8 225 1 5 0 221
00067: 0 94 218 54 40 225 54 45
00068: 24 282 221 33 157 241 221 126
00069: 1 254 0 40 66 221 110 0
00070: 221 102 1 221 78 2 221 70
00071: 3 21 94 4 221 86 5 124
00072: 234 40 32 34 58 120 92 203
00073: 71 40 5 10 254 40 32 16
00074: 24 24 40 40 8 54 45 213
00075: 225 54 40 24 11 10 254 40
00076: 4 5 54 45 197 225 54 0
00077: 1 7 0 221 9 24 183 221
00078: 110 2 221 162 3 126 254 40
00079: 40 25 54 40 42 76 234 35
00080: 34 96 234 237 75 98 234 167
00081: 237 66 250 238 234 42 96 234
00082: 34 234 234 33 100 234 54 0
00083: 201 48 129 26 90 49 1 66
00084: 38 50 0 74 88 31 1 82
00085: 38 52 1 90 88 33 65 34
00086: 39 54 65 50 89 55 65 58
00087: 39 56 129 2 90 57 128 18
00088: 90 0 43 88 0 44 88 76
```

```
60704: 88 0 75 88 43 88 0 203
60712: 88 171 88 0 19 90 50 90
60720: 128 70 90 69 90 128 234 89
60728: 235 89 64 15 90 47 90 128
60736: 104 90 72 90 128 105 88 106
60744: 88 0 142 88 141 83 0 134
60752: 88 133 88 0 13 88 114 88
60760: 0 36 88 68 88 0 32 88
60768: 84 88 0 60 88 92 88 0
60776: 97 88 98 88 0 195 88 163
60784: 88 0 150 88 145 88 0 121
60792: 88 122 88 0 156 88 157 88
60800: 0 219 88 187 88 0 211 88
60808: 179 88 0 4 89 36 39 44
60816: 20 89 52 89 64 28 89 60
60824: 89 64 63 89 66 89 64 81
60832: 89 82 89 64 89 89 90 89
60840: 64 102 89 101 89 54 118 89
60848: 117 85 64 126 89 125 89 44
60856: 143 85 131 89 64 179 89 147
60864: 89 64 187 89 155 89 64 226
60872: 89 4 90 64 244 89 20 90
60880: 64 252 89 28 90 64 33 90
60888: 34 90 128 86 90 85 90 128
60896: 97 90 50 90 128 94 90 93
60904: 90 128 131 90 99 90 128 147
60912: 90 112 90 128 155 90 123 90
60920: 128 235 88 203 88 0 48 90
60928: 49 90 128 71 90 70 90 128
60936: 233 89 234 89 64 239 89 15
60944: 90 64 136 90 64 179 89 147
60952: 89 105 88 0 143 88 142 88
60960: 0 135 88 134 88 0 112 88
60968: 113 88 0 4 06 36 38 8
60976: 20 88 52 88 0 28 88 60
60984: 88 0 96 88 97 88 0 227
60992: 88 195 88 0 151 88 150 88
61000: 0 120 88 121 88 0 155 88
61008: 158 88 0 251 88 219 88 0
61016: 243 88 251 88 0 228 88 4
61024: 89 0 244 88 20 89 0 252
61032: 88 28 89 64 89 85 89
61040: 44 90 85 81 89 44 79 89
61048: 80 89 64 88 89 89 89 64
61056: 103 85 102 89 64 104 89 103
61064: 89 64 119 89 118 89 64 127
61072: 89 126 89 64 195 89 163 89
61080: 64 211 89 179 89 64 219 89
61088: 187 85 64 196 89 228 89 44
61096: 212 85 244 89 64 220 89 252
61104: 89 64 32 90 33 90 128 238
61112: 89 252 89 64 337 89 238 89
61120: 64 87 90 86 90 128 56 90
61128: 57 90 128 78 89 79 85 44
61136: 105 85 104 89 64 95 80 94
61144: 90 126 168 90 136 90 128 169
61152: 90 168 90 128 163 90 131 90
61160: 128 236 89 237 89 64 179 90
61168: 147 90 128 187 90 135 90 128
61176: 170 90 169 90 128 164 90 4
61184: 88 126 180 90 20 88 128 11
61192: 89 238 88 64 188 90 28 88
61200: 128 3 88 63 90 0 232 89
61208: 233 85 64 19 88 179 50 0
61216: 171 90 170 90 128 77 88 187
61224: 90 0 128 88 134 88 0 121
61232: 86 96 88 0 77 89 78 89
61240: 64 104 89 105 89 64 204 89
61248: 236 88 64 75 89 64 89 64
61256: 96 89 127 89 64 76 89 77
61264: 89 64 107 89 106 89 64 171
61272: 89 11 89 64 8 90 232 89
61280: 128 64 90 95 90 128 43 90
61288: 32 90 128 172 90 171 90 128
61296: 172 90 204 87 64 40 0 0
61304: 90 126 35 88 3 88 0 51
61312: 88 19 88 0 59 88 27 88
61320: 0 75 89 76 89 64 108 89
61328: 167 89 64 129 88 128 88 0
61336: 103 88 104 88 0 136 88 135
61344: 88 0 111 88 112 88 0 144
61352: 88 143 88 0 119 88 120 88
61360: 0 152 88 151 88 0 124 88
61368: 127 88 0 203 89 171 89 64
61376: 173 90 172 90 128 55 90 56
61384: 90 128 88 90 87 90 128 132
61392: 90 164 90 128 12 89 172 89
61400: 64 102 88 103 88 0 110 88
61408: 111 88 0 118 88 119 88 0
61416: 137 88 136 88 0 145 88 144
61424: 88 0 153 88 152 88 0 74
61432: 85 75 89 64 109 89 108 89
61440: 64 174 90 173 90 178 148 90
61448: 150 90 128 155 90 188 90 128
61456: 33 90 40 90 128 87 89 88
61464: 85 64 120 89 119 89 44 27
61472: 85 251 88 64 220 88 252 88
61480: 0 94 89 93 89 64 3 89
61488: 227 88 64 196 88 228 88 0
61496: 15 89 243 88 54 212 88 244
61504: 88 0 175 90 174 90 128 227
61512: 85 195 89 64 164 89 196 97
61520: 64 243 89 211 89 64 143 90
```

(continued on next page)



(continued from previous page)

```
61520: 175 90 128 180 89 212 89 64
61536: 251 89 219 89 54 188 89 220
61544: 84 64 67 88 32 88 0 236
61552: 88 12 89 0 111 90 143 90
61560: 128 83 88 51 89 0 91 88
61568: 59 88 0 38 90 39 90 128
61576: 97 89 56 89 64 130 88 129
61584: 88 0 128 88 128 88 0 86
61592: 89 87 89 64 73 89 74 89
61600: 64 110 89 109 89 64 121 89
61608: 120 89 64 65 90 64 90 128
61616: 101 88 102 88 0 72 87 73
61624: 89 64 111 89 110 89 64 164
61632: 88 196 88 0 109 88 110 88
```

```
61640: 0 79 90 111 90 120 71 89
61648: 72 89 64 112 89 111 89 64
61656: 138 88 137 88 0 204 88 236
61664: 88 0 146 88 145 88 0 117
61672: 88 118 88 0 180 88 212 88
61680: 0 80 90 79 90 128 154 88
61688: 153 88 0 54 90 55 90 128
61696: 89 90 88 90 128 70 89 7
61704: 89 64 115 89 112 89 64 180
61712: 88 250 88 0 172 88 204 88
61720: 0 35 89 2 88 64 132 89
61728: 164 89 64 98 89 97 89 64
61736: 81 90 80 90 128 51 89 19
61744: 89 64 148 89 180 89 64 85
61752: 89 84 89 64 114 89 115 89
61760: 64 55 89 27 89 64 93 89
61768: 94 85 64 156 89 188 89 64
```

```
61776: 122 07 121 07 44 62 90 63
61784: 90 128 39 89 70 89 64 1
61792: 90 127 39 128 100 90 132 90
61800: 128 66 90 48 90 128 37 90
61808: 90 90 128 116 90 148 90 128
61816: 19 90 213 89 128 82 90 81
61824: 90 128 53 90 54 90 128 124
61832: 90 56 90 128 27 90 251 89
61840: 128 90 70 89 90 128 61 90
61848: 42 90 128 0 72 90 71
61856: 90 40 90 128 47 90 48 90
61864: 79 90 128 255 89 203 89 236
61872: 89 64 0 44 88 254 123
61880: 40 4 254 64 40 5 17 0
61888: 24 6 17 0 17 24 3
61896: 17 0 10 167 237 82 201 54
61904: 0 35 54 0 36 54 60 36
```

```
61912: 54 80 36 34 80 36 54 80
61920: 36 54 0 36 54 0 201 1
61928: 33 0 9 205 182 241 229 62
61936: 7 54 0 36 61 32 250 84
61944: 255 225 35 229 62 7 54 0
61952: 36 61 32 250 54 255 225 11
61960: 11 9 229 54 255 36 62 7
61968: 54 0 36 61 32 250 225 35
61976: 54 255 36 62 7 54 0 36
61984: 41 32 250 201 1 33 0 7
61992: 205 182 241 229 62 8 54 1
62000: 36 61 32 250 225 35 229 62
62008: 8 54 128 36 61 32 250 225
62016: 11 11 9 229 54 255 36 62 7
62024: 36 61 32 250 225 35 62 8
62032: 54 128 36 61 32 250 201 54
62040: 45 205 182 241 205 207 241 201
```

## Stuntman

BBC

S. Bradshaw

STUNTMAN IS A GAME where you become a stuntman and you have to jump over cars on a motorbike.

Your motorbike starts off in the top left corner of the screen and you control its speed across and down the screen. There

are six levels on each screen with a jump with varying numbers of cars on each. It does not matter if you jump too far over the cars, unless there is a tunnel after a jump. After the jumps with tunnels you must land just after the cars in order to go straight through the tunnel.

You start with three motorbikes and lose one every time you crash, and the game ends when you have none left. You score five points for every jump and a bonus for finishing each screen. There is also an

extra bonus for of a hundred points for finishing five screens.

The program takes up about 3.4K but it uses Mode 1 which uses 20K. The program was written for the model B but it could easily be converted to run on Model A in Mode 4. The instructions procedure is unimportant and could be missed out or changed. To omit the procedure delete lines 60, 540 and 550, change line 520 and change line 530 to

REPEAT UNTIL INKEY (-99):CLS

```
1 REM * STUNTMAN *
2 REM * By S. Bradshaw *
10 MODE1
20 VDU23,230,12,60,120,254,50,239,181,231,23,231,0,
0,0,0,0,0,48,48,23,232,60,114,127,245,119,240,160,224
30 VDU23,233,0,3,7,15,31,63,127,255,23,234,7,3,8,31
51,63,48,48,23,233,224,16,16,248,204,252,12,12
40 VDU23,236,0,0,0,170,255,255,129,66,23,237,36,24,
36,66,129,255,255,170,23,238,48,49,254,50,47,173,119,8
8
50 VDU23,8202;0;0;0;
60 PROCINST
70 CLS:VDU19,2,2;0;19,3,6;0;5
80 SCX=0:HSCX=100:HSCF="WILD WILLY":LX=1:MX=3:HX=0:
DIMRX(6)
90 PROCSET
100 GCOL3,3:MOVEX,32:PRINTB#
110 REPEAT:PROCTUNE:TIME=0:REPEAT
120 BX=50-TIME DIV:50
130 IFBX<0 BX=0
140 PROCM
150 PROCSC
160 UNTILMX=0
170 PROCEND
180 VDU5:PROCSET
190 UNTILFALSE
200 DEFPROC
210 GCOL3,3:MOVEX,Y:PRINTB#
220 PX=POINT(X+16,Y-36)
230 IFINKEY(-74)ANDSX<58ANDPX>0 SX=SX+1
240 IFINKEY(-1)ANDSX>0ANDPX>0 SX=SX-1
250 XX=X+SX DIV2:IFXX>1280 YX=Y-160:XX=-32:SCX=SCX+
5
260 CX=((YX-32) DIV:60)+1
270 IFXX>RX(CX)-32)ANDXX<RX(CX)ANDPX>0 YX=Y+32:XX=
XX+CX:CY=1
280 IFJY=1ANDSX>47 PROCCRASH
290 IFJY=1 BX=BX+1:YX=Y+(SX/5):B#=#J#
300 IFBX>5 BX=0:JY=0
310 IFPY=2 PROCCRASH
320 SOUND1,0,SX+3,0:SJOUND,0,-10-SX/10,3,2
330 IFYX<0 CLS:SCX=SCX+GX:LX=LX+1:PROCSET:TIME=0
340 IFPY=0 YX=Y-4ELSEB#=#F#
350 IFBX>47 B#=#C#
360 GCOL3,3:MOVEX,Y:PRINTB#
370 ENDPROC
380 DEFPROC
390 VDU4:PRINTTAB(4,2);SCX;TAB(13,2);LX;TAB(20,2);GX;
";TAB(28,2);SX;";TAB(36,2);MX;";TAB(44,2);VX;
400 ENDPROC
410 DEFPROC
420 GCOL3,3:MOVEX,Y:PRINTCHR#238
430 SOUND0,-15,5,10
440 FORDEL=0TO80:NEXTDEL:MOVEX,Y:PRINTCHR#238
450 HX=HX+1:PROCSET:TIME=0:MX=MX-1
460 ENDPROC
470 DEFPROCEND:VDU4:CLS
480 #FX15,0
490 IFSCX>HSCX HSCX=SCX:PRINTTAB(3,5);"You beat the
high score.":TAB(3,7);"What is your name?":INPUTHSCF:C
LS
500 PRINTTAB(5,4);"HIGH SCORE="HSCX;TAB(5,5);"HIGHSC
ORE="HSCF
510 PRINTTAB(5,7);"YOUR SCORE WAS ";SCX
520 PRINTTAB(4,12);"PRESS SPACE TO START AGAIN OR I
FOR
INSTRUCTIONS"
530 REPEAT UNTIL INKEY (-99) OR INKEY (-38)
540 IFINKEY (-38):PROCINST
```

```
550 IFINKEY(-99):CLS
560 VDU5:GCOL3,3:MOVEX,Y:PRINTCHR#230
570 SCX=0:LX=1:MX=3:HX=0:ENDPROC
580 DEFPROCINST:CLS
590 COLOUR1
600 PRINTTAB(12,3);"S T U N T M A N":TAB(11,4);STRIN
B#(17,"~")
610 COLOUR2
620 PRINTTAB(2,7);"You have recently gained employe
nt as a stuntman and your first task in this new job
is to jump cars on a motorbike."
630 PRINTTAB(2,10);"This game represents your job wh
ere you control the bike to jump the cars. The bike
starts off in the top left corner and you control
its speed across and down the screen."
640 PRINTTAB(2,16);"To accelerate use RETURN and to
brake use SHIFT. You can accelerate to 58mph but you
can not hit a ramp travelling faster than 47mph. When
you finish the screen you get a bonus which gradual
y decreases during the"
650 PRINTTAB(21,21);"game. After some jumps there
will be a tunnel which you must go through. There are
five different sets of ramps to jump and you get a
bonus for finishing them all."
660 PRINTTAB(2,28);"Press space to start.":REPEAT UN
TIL INKEY(-99)
670 CLS:ENDPROC
680 DEFPROCSET
690 HX=HX+1:IFHX>5 HX=1:SCX=SCX-100:PROCTUNE
700 VDU4:PRINTTAB(3,1);"SCORE LEVEL BONUS SPEE
D";CHR#230:VDU5
710 XX=32:YX=832:BX=0:JY=0:B#=#F#:#CHR#230
720 J#=#CHR#232+CHR#8-CHR#11+CHR#231
730 B#=#F#:T#=#CHR#237-CHR#237+CHR#8+CHR#6+CHR#11+CHR#
236+CHR#236
740 IFHX=1:RESTORE850 ELSEIFHX=2:RESTORE860 ELSEIFHX=3
:RESTORE870 ELSEIFHX=4:RESTORE880 ELSEIFHX=5:RESTORE890
750 GCOL0,1:FORAX=0TO80:NEXTAX
760 CX=(AX DIV:160)+1
770 READDX,EX,FX
780 RX(CX)=EX-32
790 MOVERX(CX),AX+32:PRINTCHR#233
800 GCOL0,2:MOVEX,AX+32:PRINTSTRING$(DX,CHR#234+CHR
#235)
810 IFFX=1 MOVEEX+(DX*64)+200,AX+32:PRINTT#
820 GCOL0,1
830 MOVEO,AX:DRAW1280,AX:MOVEO,AX-4:DRAW1280,AX-4:N
XT
840 ENDPROC
850 DATA7,70,0,4,400,1,4,150,0,3,500,1,2,700,0,1,300
,0
860 DATA4,200,0,2,100,1,4,600,1,3,300,1,3,800,0,4,55
0,1
870 DATA1,100,1,3,600,1,5,300,0,2,300,1,4,100,1,3,80
0,1
880 DATA1,900,1,5,200,0,2,100,1,3,700,1,1,200,1,3,90
0,1
890 DATA4,200,1,3,900,0,5,100,1,2,400,1,4,100,0,1,95
0,1
900 DEFPROCEND:RESTORE950
910 FORSO=1TO22:READA,B
920 SOUND1,-15,A,B
930 SOUND1,0,0,B:NEXT
940 ENDPROC
950 DATA20,1,20,2,40,1,60,1,40,1,60,1,40,1,30,1,30,2
,50,1,70,4,80,1,60,1,40,1,80,1,60,1,40,1,60,1,80,1,100
,2,30,1,100,6
```



## 3D-Effect

Chris Cattanach,  
Weiwyn,  
Hertfordshire.

VIC-20

THIS PROGRAM WAS written on an expanded Vic-20 — 16K — and features the spinning outline of a 2 inch cube, depicted in outline as a wire skeleton, so all the edges are seen simultaneously.

Written in machine code, the program rapidly projects successive images of the cube in 3D on the screen, giving the illusion of movement. The speed of rotation may be slowed down, or increased with the aid of the function buttons F1 and F7.

As regular users of an expanded Vic-20 will know, the presence of the extra 16K brings about a rearrangement of the various memory locations, including that of the screen. Before this program can be Run, it is necessary to set

aside an area where one can store the machine code, without fear of it being overrun with Basic. This is done by running the short program entitled "Re-arrange Vic-memory" every time the computer is first switched on. This moves the start of Basic to 8192, and reserves the section from 4096 to 7679 for machine code.

As described in the Commodore Programmers' Reference book, the screen address has now been moved to 7680. This program should be saved for future use, before being Run. After being Run, it is automatically erased from memory, having done its job.

When the Basic program is first Run, the lines 2000-2015 Poke the Data values into the area reserved for machine code. Data values in Lines 20-28; 29-35; 36-44 and 45-52 contain information essential for drawing the various shapes of the cube. Data values in Lines 1000 to 1005 are concerned with the machine code control program.

The program is directed to the machine-code program by the various SYS values in Lis: 4001. Once the Control part of the machine-code program has been invoked, this loads the various line values into the accumulator and Stores them in the relevant positions. Lines 4005-4012 control the speed of rotation.

It is very important to Save the program, before RUNNING it, in case errors have been introduced and it crashes. Nothing is more frustrating than to spend some time typing in a lot of values and then losing the lot.

For those not interested in machine code, the Basic program supplied will set up all the parameters and the program will Run without trouble. For machine code enthusiasts, further information is supplied by the "Disassembler Analysis of Rotation Control" print out. The Control part of the machine-code program which lies between 6000-6090 decimal (1770-17D2 Hex) has been analysed by a disassembler program.

### RE-ARRANGE VIC-MEMORY

```
2 REM "RE-ARRANGE VIC-MEMORY"
10 POKE640,30:POKE36866,150:POKE641,0
:POKE642,32:POKE36869,24E
40 POKE43,1:POKE44,32
50 POKE8192,0
60 PRINT"J":NEW
```

### ROTATION BY MACHINE CODE (VIC-20)

```
REARRANGE ROTATION BY MACHINE CODE - 3D EFFECT"
2 REM BY C.J.CATTANACH
3 PRINT"PRESS ANY BUTTON - WAIT 4 SECS"
4 GET# : IF#=" " THEN#
20 DATA141,163,30,141,167,30,141,186,30,141,190,30,141,61,31,141,65,31,141,84,31
,141
21 DATA88,31,96,141,212,30,141,211,30,141,64,31,96
22 DATA141,142,30,141,39,31,141,40,31,141,143,30,141,187,30,141,188,30,141,144,3
0
23 DATA141,141,30,96,141,19,31,141,23,31,141,189,30,141,209,30,141,85,31,141,41,
31
24 DATA141,1,31,141,89,31,141,231,30,141,45,31,141,213,30,141,63,31,141,235,30
25 DATA141,67,31,141,253,30,96
26 DATA141,232,30,141,210,30,141,42,31,141,250,30,141,166,30,141,254,30,141,162,
30
27 DATA141,16,31,141,206,30,141,20,31,141,228,30,141,30,31,141,184,30,96
28 DATA141,127,31,141,108,31,141,109,31,141,110,31,96
29 REM FIG 2
30 DATA141,44,31,141,163,30,141,232,30,141,252,30,141,121,30,141,17,31,141,21,3
0
31 DATA141,65,31,141,142,30,141,86,31,141,190,30,56
32 DATA141,23,31,141,254,30,141,42,31,141,213,30,141,1,31,141,64,31,141,235,30,1
41,20,31
33 DATA141,191,30,96,141,250,30,141,209,30,141,187,30,141,143,30,141,229,30,141,
16,31
34 DATA141,184,30,141,206,30,141,165,30,96,141,122,30,141,145,30,141,168,30,141,
185,30
35 DATA141,208,30,141,231,30,141,255,30,141,22,31,141,39,31,141,62,31,141,85,31,
56
36 REM FIG 3
37 DATA141,164,30,141,168,30,141,165,30,141,185,30,141,62,31,141,66,31,141,83,31
38 DATA141,67,31,96,141,207,30,141,63,31,141,208,30,141,209,30,141,210,30,141,10
5,31
39 DATA141,106,31,141,107,31,141,106,31,96,141,146,30,141,42,31,141,44,31,141,14
3,30
40 DATA141,144,30,141,145,30,96,141,23,31,141,165,30,141,43,31,141,187,30,141,45
,31
41 DATA141,169,30,141,191,30,141,65,31,141,211,30,141,213,30,141,233,30,141,235,
30
42 DATA141,255,30,141,1,31,96
43 DATA141,18,31,141,228,30,141,250,30,141,38,31,141,82,31,141,40,31,141,86,31
44 DATA141,252,30,141,230,30,141,206,30,141,16,31,141,60,31,96
45 REM FIG 4
46 DATA141,62,31,141,63,31,141,64,31,141,65,31,141,164,30,141,165,30,141,166,30
47 DATA141,167,30,96,141,234,30,141,0,31,141,66,31,141,88,31,141,22,31,141,44,31
48 DATA141,190,30,141,212,30,96
49 DATA141,229,30,141,39,31,141,83,31,141,207,30,141,61,31,141,251,30,141,185,30
50 DATA141,17,31,96
51 DATA141,208,30,141,209,30,141,210,30,141,211,30,141,186,31,141,107,31
52 DATA141,108,31,141,109,31,96
1000 DATA169,77,32,30,16,169,99,32,25,16,169,120,32,35,16,169,101,32,60,16
1001 DATA169,103,32,106,16,169,99,32,146,16,96
1002 DATA169,78,32,159,16,169,101,32,193,16,169,103,32,221,16,169,77,32,249,16,9
6
1003 DATA169,78,32,27,17,169,99,32,52,17,169,120,32,80,17,169,101,32,99,17,169,1
03,32
1004 DATA142,17,96
1005 DATA169,100,32,179,17,169,101,32,204,17,169,103,32,229,17,169,99,32,254,17,
96
2000 FORL=4096TO4633
2001 READ:POKEL,A
2002 NEXT L
2010 FORL=6000TO5093
2011 READ:POKEL,A
2012 NEXT L
2016 PRINT"IF F1 FASTER: F2 SLOWER. PRESS ANY BUTTON"
2017 GET# : IF#=" " THEN#2017
4000 M=100:POKE36879,0:PRINT"J"
4001 SYS6000:GOSUB4005:SYS6031:GOSUB4005:SYS6052:GOSUB4005:SYS6073:GOSUB4005:GOT
O4001
4005 FOR=1TO1:NEW
4006 GET# : IF#=" " THENM=M-10
4009 IF#=" " THENM=M+10
4010 IFM<0 THENM=20
4012 PRINT"J":RETURN
4020 STOP
```

## Listing speed

S.A. Sassoon,  
Long Stratton,  
Norfolk.

CBM-64

THE COMMODORE 64 lists at such a fast speed that it is impossible to read each line as it scrolls onto the screen, even while the Ctrl key is held down. This routine enables the function keys to control the listing speed.

Once the program has been run, holding down the f1 key while a program is being listed halts the display, enabling the lines to be examined. Holding down the f3 key during listing causes the display to be slowed down — characters being printed on the screen one at a time.

(continued on next page)



(continued from previous page)

This is extremely useful for checking complicated Basic lines such as data statements. As an extra bonus, it will also reveal any Basic lines that have been hidden with delete characters.

The speed of the slow listing depends on the value Poked in line 30. This can be altered if required — values of 230 to 255 give best results.

This extension to the Basic list routine is written in machine code which is Poked into memory from the data statements. This means that after running it can be newed and the listing controls remain effective on any further programs which are entered or loaded.

```
10 REM PRESS F1 TO PAUSE LISTING, PRESS
   F3 TO SLOW LISTING SPEED
20 :
30 POKE 251,248 :REM SPEED OF LISTING
   (230-255 GIVE BEST RESULTS)
40 FOR D=0 TO 22 :READ MCODE :POKE 49152
   +D,MCODE :NEXT
50 POKE 774,0 :POKE 775,192 :REM ALTER
   LIST VECTOR TO EXECUTE NEW CODE
60 DATA 72,165,197,201,4,240,250,201,5
70 DATA 208,8,165,251,133,162,165,162,48
   ,252,104,76,26,167
```

## Screen Editor

R.G. Strange,  
Loughborough,  
Leicestershire.

**DRAGON**

THIS PROGRAM EQUIPS the Dragon with a screen editor, a valuable programming aid with many uses including modification of the program line sequence and line concatenation.

The machine code is relocatable and uses the character-input RAM hook at address \$6A.

Type in the program and save it in case of a crash, then run it. Line 80 provides a checksum which should detect most errors in the data. When all is correct, the Exec statement in line 90 sets up the RAM hook. Once the program is debugged, you can add a New command to line 90 so that the program clears itself.

The editor is installed now but it is not active, and the Dragon behaves just like normal, though you cannot use the right-arrow in your programs. To invoke the editor, press the right-arrow key, whereupon the cursor should stop blinking. Using the arrow keys, the cursor can be positioned anywhere on the screen. Note that the keyboard auto-repeats if a key is held down.

Once the cursor has been placed over the first of a set of characters to be copied, pressing the Clear key will run the cursor along the line, copying the characters as if they had been typed. Characters may be inserted by moving the cursor off the line, typing the new characters and moving back onto the line.

The up-arrow character may be obtained using shift up-arrow. To delete a character once it has been copied, type shift left-arrow. Once the new line is complete, it can be entered by typing Return as usual. This also exits from the editor.

```
0 CLS7:MOTOR ON
20 PRINT@36,"DRAGON 32 SCREEN EDITOR";
30 PRINT@129,"RIGHT ARROW INVOKES EDITOR ";
40 PRINT@193,"'^' IS NOW ACCESSED BY SHIFT ^";
50 PRINT@257,"USE SHIFT "CHR$(95)" TO DELETE
;
60 CLEAR200,32595
70 FOR A=32596 TO 32767:READ D#:D=VAL("&H"+D#):CS=CS+D
:POKEA,D:NEXT
80 IF CS<>15975 THEN PRINT@321,"ERROR IN PROGRAM":END
ELSE PRINT@353,"SCREEN EDITOR IS INSTALLED ";:PRINT
@448,"";
90 EXEC 32596:SOUND200,1
100 DATA30,8C,B,8F,1,6B,86,7E,B7,1,6A,F,FF,39,D,6F,26,
FB,D,FF,26,6,81,9,26,F3,3,FF,32,62,34,34,F,70,8D
110 DATA50,BD,80,6,26,4,F,FE,20,F7,8E,1,51,C6,FF,E7,80
,8C,1,5A,26,F9,8E,20,0,30,1F,26,FC,C,FE,D6,FE,C4,FE
120 DATA27,4,C1,6,25,DB,12,12,8D,24,81,9,27,2F,81,8,27
,2D,81,5E,27,21,81,A,27,20,81,C,27,31,81,5F,27,41,81
130 DATA15,27,3B,81,D,26,2,F,FF,35,B4,7E,8B,E6,84,C8,4
0,E7,84,39,30,8B,C0,30,8B,1F,30,2,30,1F,8C,4,0,25,7
140 DATA8C,5,FF,22,2,9F,8B,20,8B,A6,84,81,20,24,4,8B,6
0,35,B4,81,60,25,2,80,40,35,B4,86,9,4A,35,B4
```

## Back-up

D N Venamore,  
Burgess Hill,  
Sussex.

**ZX-81**

THIS COPIER for the 16K ZX-81 will duplicate any program up to 15K long including those which cannot be Saved by the normal routine.

The program is a modified version of the ZX-81 Load and Save routines and comprises 128 bytes of machine code and a supporting "no-frills" Basic program. It fits into 1K with a little to spare.

The program to be copied is loaded above RAMtop, from where it can be saved as required.

Before typing in anything,  
POKE 16389,72

and New. This sets RAMtop to 18432, which allows sufficient space to enter and edit the program, but is low enough to collapse the Display File. If this is not done the expanded Display File will be saved with your completed program, making it too long to

Load into the 1K finally allocated for it.

Load or type in your favourite hex loader and create a Line 1 Rem statement with 128 characters of your choice.

If your hex loader starts at Line 10,

POKE 16419,10

If not create a dummy Line 10 — 10 Rem will do — and then

POKE 16419,10

Load the machine code — listing 1 — into the Rem statement and check it. Note that the first two bytes of machine code prevent the rest of the machine code listing in the Rem statement.

When the machine code is loaded in,

POKE 16510,10

The Rem statement should now be Line 0. This cannot be accidentally deleted.

Now delete all lines excepting Line 0 and 10, and enter the remainder of the program — listing 2 — overwriting the previous line 10.

Save the program a couple of times before proceeding.

The program in the computer cannot be Run in its present state because RAMtop is too high.

It is necessary then to clear the program from memory, reset RAMtop to 17408 and reload the program.

I prefer to set RAMtop using the short program in listing 3.

I keep this on tape in front of the Copy program with approx. 10 secs of tape running between them.

Whichever you prefer, enter New. Set RAMtop using the RAMtop program or

POKE 16389,68

Now reload Copy and run it.

The first prompt asks for the name of the program to be copied. Note that the name is not used to find the named program on the tape.

After entering the name and Newline, the next prompt appears, "Start Tape the New Line".

Audibly monitor the program to be copied and locate the start of the 5 second silent period which precedes the program proper. Stop the tape there. Then with the recorder set for Load, start the tape and press Newline immediately.

When the program is Loaded, the prompt



# SOFTWARE FILE

"Loaded-Start Blank Tape then Newline to Save" appears. Place a clean tape in the recorder set for Save, run tape and press Newline.

When the program has Saved, the option to take further copies is presented. The Break key may be used to abort both Load and Save routines.

After Break, Run will return you to the Load routine. Goto 180 will return you to the Save routine.

## LIST 1 HEX DUMP

```
16514: 76 76 21 00 44 0E 01 3E
16522: 7F DB FE D3 FF 1F D0 17
16530: 17 38 02 18 F2 1E 94 06
16538: 1A 1D DB FE 17 CB 7B 7B
16546: 38 F5 10 F5 20 04 FE 56
16554: 30 D0 3F C6 11 30 D8 71
16562: CD B7 40 18 D0 23 EB 2A
16570: 00 00 01 00 00 09 37 ED
16578: 52 EB D0 E1 C9 11 CB 12
16586: CD 46 0F 30 27 10 FE 1B
16594: 7A B3 20 F4 21 00 44 CD
16602: E1 40 CD B7 40 18 F8 5E
16610: 37 CB 13 C6 9F E6 05 C6
16618: 04 4F D3 FF 06 23 10 FE
16626: CD 46 0F D0 06 1E 10 FE
16634: 0D 20 EF A7 10 FD 18 E1
```

## LIST 2 "COPY"

```
00 REM -128 CHARACTERS-
10 PRINT "ENTER NAME OF PROG."
20 PRINT
30 INPUT A$
40 LET X=17419+LEN A$
50 POKE X+1,69
60 LET Y=X-16404
70 RAND X
80 POKE 16570,PEEK 16434
90 POKE 16571,PEEK 16435
100 RAND Y
110 POKE 16573,PEEK 16434
120 POKE 16574,PEEK 16435
130 PRINT "START TAPE THEN N/L"
140 INPUT D$
150 CLS
```

```
160 FAST
170 RAND USR 16516
180 PRINT "LOADED",,"START BLANK
K TAPE THEN N/L TO "SAVE"
190 INPUT D$
200 RAND USR 16560
210 CLS
220 PRINT "DONE:-ANOTHER COPY ?"
230 INPUT D$
240 IF D$="Y" THEN GOTO 180
250 SLOW
```

## LIST 3 "RAMTOP"

```
5 REM "RAMTOP"
10 RAND 17400
20 POKE 16388,PEEK 16434
30 POKE 16389,PEEK 16435
40 PRINT "RAMTOP NOW SET TO ";
PEEK 16388+256*PEEK 16389
50 PRINT AT 2,0;"
60 FOR N=1 TO 8
70 NEXT N
80 PRINT AT 2,0;"STOP TAPE"
90 FOR N=1 TO 8
100 NEXT N
110 PRINT AT 4,0;"PRESS ANY KEY
TO CONTINUE",,"THEN LOAD ""COPY""
120 IF INKEY$="" THEN GOTO 50
130 NEW
140 SAVE "RAMTOP"
150 GOTO 10
```

## Learning Tree

D.J. West

**SPECTRUM**

WRITTEN IN Basic for the 16K, Learning Tree asks you, the user, questions about an object you are thinking of, which you answer True or False by pressing T or F until it guesses the correct object or a false one.

It starts by asking you to input the names of

two objects and a difference between them from which it forms the questions it will ask. This is the first branch of a tree of knowledge which builds up as you teach the computer the names of new objects and their differences.

By calling the Menu you can Save and Load trees of files which you have created, or start a new one.

When running the program Caps Lock is On, i.e., the cursor should flash C.

Program structure is as follows:

Line	Function
0-90	Initialise.
100	1st branch.
200-300	Plain loop, question and answer.
900	Enter unknown object.
1000	Modify tree routine.
2000	Word-wrap routine.
2500	Load tree.
3000	Save tree.
4000	Menu.

```
8 REM *****
9 REM *
10 REM * LEARNING TREE *
11 REM *
12 REM * BY DJ WEST 4/84 *
13 REM *
14 REM *****
15 REM
20 DEF FN P(X)=PEEK X+256*PEEK
(X+1)
30 POKE 23693,71: BORDER 0: PO
KE 23609,9
40 CLEAR 29999: LET PN=30002
90 BEEP .1,22
100 INPUT "ENTER THE NAMES OF T
WO OBJECTS" "EB." "A CAT" AND "
A DOG" " "1ST OBJECT ? ";T$ "2ND
OBJECT ? ";F$
110 GO SUB 1000
120 BEEP .4,20: PRINT " "THINK
OF ANOTHER OBJECT AND PRESS
A KEY" INK 6: "I PRESS 'M' FOR
MENU J"
125 LET PR=30002
130 PAUSE 0: IF INKEY$="M" THEN
GO TO 4000
140 IF INKEY$="" THEN GO TO 130
150 BEEP .1,20
200 POKE 23692,255: LET F$=""
205 IF NOT FN P(PR) THEN LET X=
2: LET F$="IS ": GO TO 220
210 LET X=4
220 LET W=PR+X: LET F$=F$+"IT "
230 IF PEEK W THEN LET F$=F$+CH
```

```
R$ (PEEK W): LET W=W+1: GO TO 23
0
240 BEEP .1,24: LET F$=F$+" ? [
T/F]"
245 GO SUB 2000
250 IF INKEY$="T" THEN BEEP .1,
36: PRINT INK 3: "> TRUE" : LET
C=0: GO TO 280
260 IF INKEY$="F" THEN BEEP .1,
12: PRINT INK 4: "> FALSE" : LET
C=2: GO TO 280
270 GO TO 250
280 IF X=2 AND C THEN LET F$=F$
(7 TO LEN F$-8): GO SUB 900: GO
TO 120
285 IF X=2 THEN GO TO 120
290 LET LP=PR+C
300 LET PR=FN P(LP)
310 GO TO 200
900 BEEP .1,0: INPUT "I GIVE IN
" "WHAT ARE YOU THINKING OF ?"
T$
910 POKE LP,PN-256*INT (PN/256)
: POKE LP+1,INT (PN/256)
1000 BEEP .1,12: INPUT "ENTER A
DIFFERENCE BETWEEN" (T$) " AND "
(F$) "> ";(T$) " "; LINE D$
1100 LET LP=FN
1110 FOR F=1 TO LEN D$: POKE PN+
F+3,CODE D$(F): NEXT F
1120 LET PN=PN+F+4: POKE PN-1,0
1150 POKE LP,PN-256*INT (PN/256)
: POKE LP+1,INT (PN/256)
1200 POKE PN,0: POKE PN+1,0
```

```
1210 FOR F=1 TO LEN T$: POKE PN+
F+1,CODE T$(F): NEXT F
1220 LET PN=PN+F+2: POKE PN-1,0
1230 IF LP<>30002 THEN POKE LP+2
,PR-256*INT (PR/256): POKE LP+3,
INT (PR/256): RETURN
1250 POKE LP+2,PN-256*INT (PN/25
6): POKE LP+3,INT (PN/256)
1300 POKE PN,0: POKE PN+1,0
1310 FOR F=1 TO LEN F$: POKE PN+
F+1,CODE F$(F): NEXT F
1320 LET PN=PN+F+2: POKE PN-1,0
1390 RETURN
2000 LET D$=F$
2010 IF LEN D$=32 THEN PRINT D$
: RETURN
2020 LET T$=D$(33 TO )
2030 LET D$=D$( TO 32)
2040 IF D$(LEN D$)<>" " THEN LET
T$=D$(LEN D$)-T$: LET D$=D$( TO
LEN D$-1): GO TO 2040
2050 PRINT D$
2060 LET D$=T$: GO TO 2010
2500 BEEP .4,44: CLS : PRINT "LO
ADING FILE FROM TAPE: ""PLAYBAC
K TAPE NOW"" ON ERROR ENTER [C]O
NTINUE"" AND REPEAT"
2520 LOAD ""CODE
2530 LET PN=FN P(30000)
2540 GO TO 4000
3000 BEEP .3,33: CLS : PRINT "SA
VING FILE ON TAPE:"
3010 INPUT "WHAT NAME DO YOU WAN
```

(continued on next page)



(continued from previous page)

```
T TO GIVE THE FILE ?" F$
3015 IF NOT LEN F$ THEN GO TO 30
10
3020 POKE 30000,PN-256*INT (PN/2
56): POKE 30001,INT (PN/256)
3040 SAVE F$CODE 30000,PN-30000
3060 BEEP .4,44: PRINT "PLAYBACK
K TAPE NOW" "ON ERROR ENTER [C]
NTINUE""TO RETURN TO 'MENU' AND
REPEAT""SAVE-OPTION"
3070 VERIFY ""CODE 30000,PN-3000
0
3080 GO TO 4000
```

```
4000 BEEP .1,40: CLS : PRINT INK
6," MENU "" "" [1] LOAD FILE FRO
M TAPE"" [2] SAVE FILE ONTO TA
PE"" [3] START NEW FILE"" [4] R
ETURN TO PRESENT FILE"
4005 PRINT INK 6""PICK A NUMBER
"
4010 IF INKEY$="1" THEN GO TO 25
00
4020 IF INKEY$="2" THEN GO TO 30
00
4030 IF INKEY$="3" THEN RUN
4040 IF INKEY$="4" THEN CLS : GO
TO 120
4050 GO TO 4010
```

## Airbrush

Robert Graves,  
Hanwell,  
London.



AIRBRUSH IS NOT another sketchpad

routine. The problem with those is that they lay colour too thickly and too uniformly in neat straight lines — leaving the finished artwork looking just like it's been drawn on a computer. Airbrush, however, allows colour to be built up on an area, laid randomly in a fine spray of

colour. The size of the area over which you spray can vary from a single pixel's width — giving a performance similar to the sketchpad program on the Welcome tape — right up to approximately half the screen.

The results are much more realistic than usual, as shading is now possible, the colours achieve an un-computerish "texture" — though higher resolution graphics would achieve this even better — and, with care, even a certain amount of colour mixing is possible.

Unfortunately, this version doesn't allow for pictures being saved or stored for later use, and it can only be used with a joystick. The procedure "j-scan" could easily be modified to work with the cursor keys, though, and any occurrence of "Adval(o)" throughout the program replaced with a line looking for, say, the Return key.

```
10MODE7
20PROCCTITLES
30MODE2
40*KEY10 OLD:M RUN:M
500N ERROR GOTO 640
60VDL23;8202;0;0;0;
70X=640:Y=512:VDU19,8,0,0,0,0,19,15,7,0,0,0
80PROCpalette
90PROCairbrush
100DEFPROCjscan (SP)
110LR=ADVAL(1):UD=ADVAL(2)
120IF LR<70 AND X>0 THEN X=X-SP
130IF LR>65400 AND X<1280 THEN X=X+SP
140IF UD<70 AND Y>71 THEN Y=Y-SP
150IF UD>65400 AND Y<1024 THEN Y=Y+SP
160ENDPROC
170DEFPROCkscan
180IF INKEY(-33) THEN PROCpalette
190IF INKEY(-1) AND INKEY(-120) THEN CLS:PROCpalette
200IF INKEY(-133) THEN RUN
210ENDPROC
220DEFPROCairbrush
230PROCbrushcs
240GCOLOR,COL:PLOT69,X+(RND(SZ*2)-SZ),Y+(RND(SZ*2)-SZ)
250PROCjscan(4):PROCkscan
260IF ADVAL(0)=257 OR ADVAL(0)=513 THEN PROCbrushcs
270GOTO240
280DEFPROCpalette
290FORN=16 TO 1136 STEP 160
300GCOLOR,7
310MOVEN,8:DRAWN+128,8:DRAWN+128,64:DRAWN,64:DRAWN,8
320NEXT
330FORN=16 TO 1136 STEP 160
340GCOLOR,(N-16)/160
350MOVEN+8,12:DRAWN+124,12:DRAWN+124,60:PLOT85,N+8,1
360NEXT
370X=X:Y1=Y
380X=16
390GCOLOR,7:MOVEX,8:DRAWX+128,8:DRAWX+128,64:DRAWX,64
```

```
:DRAWX,8
400PROCjscan(160)
410GCOLOR,0:MOVEX,8:DRAWX+128,8:DRAWX+128,64:DRAWX,64
:DRAWX,8
420IF ADVAL(0)=257 OR ADVAL(0)=513 THEN GOTO440
430GOTO390
440COL=(X-16)/160
450X=X1:Y=Y1
460ENDPROC
470DEFPROCbrushcs
480SZ=0
490GCOLOR,7:MOVEX-SZ,Y-SZ:DRAWX-SZ,Y+SZ:DRAWX+SZ,Y+SZ
:DRAWX+SZ,Y-SZ:DRAWX-SZ,Y-SZ:GCOLOR,0:MOVEX-SZ,Y-SZ:DRA
WX-SZ,Y+SZ:DRAWX+SZ,Y+SZ:DRAWX+SZ,Y-SZ:DRAWX-SZ,Y-SZ
500IF INKEY(-104) AND SZ<300 THEN SZ=SZ+4
510IF INKEY(-103) AND SZ>0 THEN SZ=SZ-4
520IF INKEY(-74) THEN ENDPROC
530PROCjscan(4):PROCkscan
540GOTO490
550DEFPROCCTITLES
560PRINTTAB(13,0);CHR$(141);CHR$(131);"AIRBRUSH";TAB
(13,1);CHR$(141);CHR$(131);"AIRBRUSH"
570PRINTTAB(10,3)"by Robert Graves"
580PRINTTAB(12,5);CHR$(130)"INSTRUCTIONS";TAB(12,6)"
"
590PRINTTAB(0,8)"On pressing the space bar a palette
of eight colours will be produced across bottom of
the screen,move the flashing box over the colour you
wish to paint with,and press the joystick fire butt
on."
600PRINT"The screen cursor marks the point or are
a over which you wish to 'spray'.It can be moved arou
nd the screen using the joystick (RETURN to paint,FIRE
to stop) and enlarged or decreased by '>' and '<'.respe
ctively."
610PRINT
620PRINT"f(0)will allow you to change colour, and S
HIFTedf(9)will clear the screen."
630IF GET$<>" THEN GOTO630 ELSE ENDPROC
640IF ERR=17 THEN GOTO 80
```

## UDG \* 8

Brian Cooper,  
Lytham,  
Lancashire.



MACHINE CODE BUFFS must be on the increase. Regular readers of *Your Computer* will know that published programs become more and more sophisticated. But, while machine code makes for faster action, the beginner will find it difficult to follow how the routines work and entering pages full of numbers is not a pleasant prospect. Instead of hours typing in strings of data in read statements, this is the program to turn creation of User Defined Graphics — UDGs — from a chore into a game, with a guarantee

of perfect results. And not just single characters.

The program provides a grid which enables up to eight UDGs to be worked on together — ideal when a composite figure is needed — and continuously show the results. Unlike the single character grid on the Spectrum Horizons tape, with this program characters can be seen relative to each other as the UDG set is built up. Any single pixel can easily be changed.

Two groups of eight UDGs make a string of sixteen characters which are then copied away to a separate area of memory, to be followed by as many further sets as are ever likely to be wanted. Any one of these sets can then be called back and used at will, and all can be stored on tape.

This program incorporates a number of

features which may provide instructive examples to the new programmer. Though written in Basic and therefore easy to follow, the program is reasonably quick in operation and makes full use of the system variables relating to UDGs.

Almost every Spectrum owner will know that each character comprises an eight by eight matrix of dots or pixels. UDGs can be entered one "line" at a time as bytes from USR 'A' to USR 'R' + 7. The program works by holding the line being worked on in the form of a string, for example

BIN 101C1011

and this is constantly updated from an array which monitors the grid as the program progresses.

The numeric value of the string is continuously Poked to memory, and the



## SOFTWARE FILE

graphics set printed out with letters grouped in various useful combinations to show the effect actual size at the bottom of the screen.

All this happens quite quickly — the main subroutine is near the start of the program in lines 6020/30 to keep time to a minimum.

The complete program can easily be

incorporated in a larger program and some of the subroutines may be useful. For example, the various sets stored away are called up by the lines from 6450. This is achieved by Poking successive values into 23675/6 — UDG: see page 175 of the manual — to point to the first character of the set.

```

AT 19,0: "No(s) of blocks to be
filled a=1, b=1a2, c=1 to 3,
d=1 to 4 e=2a3,f=4:
PAUSE 0: LET e=INKEY$
Y$
6510 IF e$="a" OR e$="A" THEN LE
T f:=1:st=0 LET +ast=3+3: GO TO 5
570
6520 IF e$="b" OR e$="B" THEN LE
T f:=1:st=0 LET last=2+3: GO TO 5
570
6530 IF e$="c" OR e$="C" THEN LE
T f:=1:st=0 LET last=1+3: GO TO 5
570
6540 IF e$="e" OR e$="E" THEN LE
T f:=1:st=1+3: LET last=1+3: GO TO
5570
6550 IF e$="f" OR e$="F" THEN LE
T f:=1:st=3+3: LET last=0: GO TO 5
570
6560 IF e$="d" OR e$="D" THEN LE
T f:=1:st=0 LET last=0: GO TO 557
0
6565 GO TO 6500
6570 LET v:=f:=1: PRINT AT 19,0
:$(st,$h,$h): PRINT AT x,y,"R":
RETURN
6580 GO TO 6510
6590 REM INSTRUCTIONS
6600 CLS: PRINT "DO YOU WANT IN
STRUCTIONS? Y/N": PAUSE 0: IF I
NKEY$="Y" OR INKEY$="Y" THEN CLS
: PRINT
To use the grid which follows,
use I for Ink, P for paper
and the direction keys as
required.": GO TO 6620
6610 RETURN
6620 PRINT
"YOU can limit the number of
Characters you are working on
by pressing L
When you have made the
characters you want press F for
Finished." "Each grid makes 3
characters."
Press ENTER: PAUSE 0: CLS
6630 PRINT
"to start with you can either
work over the letters
representing the equivalent
UDGs, or make them blank by
pressing a nou"
"Press a key": PAUSE 0: IF INKEY$
="b" OR INKEY$="B" THEN CLS: P
DR n=USR "a" TO USR "p"+7: POKE
n,0: NEXT n
6640 CLS: PRINT
"YOU can build up as many sets as
you wish, each of 10 characters
a to
6650 PRINT
The sets are stored in one long
string and a routine is included
to select the one needed."
PRESS ENTER: PAUSE 0
6660 RETURN

```

[illegible]

```

INT , PAPER 5, INK 1: AT X=1: "0"
IF (R1(1,4+1))=1 THEN PRINT : I
6100 REM SAVE POSITION ON GRID
6200 LET X=X+1B=5-X+1X=7
6300 LET Y=Y+1B=3-Y+1Y=5
6400 IF (32-(2B-1)) OR Y=-(1+1F)
6500 THEN LET Y=(31-lastY)+(1-2+
6600 firstY)+firstY+(32-lastY) LE
6700 X=X+1Y=-(0+firstY)-(4-(31-last
6800 Y)=X=0 OR X=17 THEN LET X=X-
6900 Y=0+1X=17)
7000 REM GO TO 6100
7100 REM SAVE 15 DGS TO NEW AREA
7200 IF COUNT=1 THEN ET COUNT=2
7300 GO TO 6040
7400 IF COUNT=2 THEN LET COUNT=1
7500 PRINT "SAVING CHARACTER"
7600 AT Y+1G=123 FOR N=1 TO 15
7700 POKE Y+1G+(128+10)PRINT
7800 Y=Y+1NEXT N LET Y+1
7900 CLS:PRINT : IF YOU HAVE F
8000 INISHED MAKING characters th
8100 EN PRESS "Y" IF NOT, PRESS ANY
8200 OTHER ELSE, PAUSE 0.1 INKEY$
8300 IF OR INKEY$="Y" THEN GO TO 64
8400
8500 GO TO 6040
8600 REM SAVE ALL DGS TO TAPE
8700 AT Y+1G=1 "Grappists" CODE
8800 255
8900 REM GET TARGET=4311123
9000 REM SAVE POSITION
9100 REM SAVE DGS AT POSITION
9200 FOR N=100 TO target+1
9300 POKE (INT (N+1)-2-1), POKE 23
9400 (0+128+(N/2-1)INT (N/2))
9500 PRINT "SET "N-399" A B C D E F
9600 G H I J K L M N O P Q R S A B C
9700 D O R A B C I J K L I U K L V B F G
9800 H G H E F G H I N O M N O P NEXT N
9900 PRINT "H 21.0", "after number
1000 of set you want " PAUSE 0.1
1010 ET h=INKEY$: LET F=VAL h IF
1020 F=0 OR F=128+1G=400 THEN CLS
1030 GO TO 6040
1040 POKE 23676, (INT (F+400)/2-
1050 1): POKE 23675, 0+128+(F/2-INT
1060 (F/2)): CLS : 6*OP
1070 REM GET SIZE OF GRID
1080 REM GO TO 6040
1090 LET h="": PRINT AT 13.0, h

```

## Matrix Run

*Johan Berge,  
Norway.*



**SURVIVOR** IS A fast-moving matrix game. It runs on a Dragon 32/64 and is written entirely in Basic. It is actually the same game as *Matrix Run* published in *Your Computer* October 1983, written by Russ Whitehead.

I was amazed of the superior Boolean algebra in this game, and therefore I converted it to my Dragon 32. Necessary instructions are contained in the following program.

```

10 CLEAR:CLS:GCSUB 500
20 F=1:A=1488:IFK<2.5 THEN30SUBBOELSEGO SUB120
30 FOR X=0TO 300:NEXTX:FOR C=2 TO 100:A#=INKEY$:F=F+(A
$=CHR$(B))- (A$=CHR$(9)):F=F-4*(F=0)+4*(F=5)
40 A=A+(F=4)-(F=2)+32*(F=1)-32*(F=3):V=PEEK(A):POKEA,1
91
50 IFV=128THEN NEXT C:PLAY"Q3V16T9CDEFGAB":U=U+1:Z=O:K
=K+0.5:GOTO20
60 Z=C:PLAY"Q2T5V16BAGFEDC":L=L+1:IFL=3THEN210
70 GOTO20
80 CLS:FOR C=1TO U:POKE 1024+INT(RND(511)),175:NEXTC:
FORC=0TO32:POKE1024+C,239:POKE1503+C,239:NEXTC
90 FOR C=1TO15:POKE 1024+C*32,239:POKE1055+C*32,239:NE
XTC
100 FORC=2TO30STEP4-K:FORD=2TO13STEP4-K:POKE1024+INT(C
)+INT(D)*32,159:NEXTD,C
110 PRINT@11,"SURVIVOR":RETURN
120 CLS:FOR C=0TO 32:POKE 1024+C,175:POKE 1503+C,175:
NEXT C:FORC=1TO15:POKE 1024+C*32,175:POKE1055+C*32,175:
NEXT
130 FOR D=0TO10 STEP2:FORC=2+D TO 29-D:POKE 1088+C+D*3
2,223:POKE1408+C-D*32,223:NEXTC
140 FORG=2-D TO 12-D:POKE1024+2+D+8*32,223:POKE1053-D+
8*32,223:NEXTG,D:PRINT@10,"OPEN BATES":FORX=0TO300:NE
XTX
150 A$=INKEY$:F=F+(A$=CHR$(B))- (A$=CHR$(9))
160 F=F-4*(F=0)+4*(F=5):A=A+(F=4)-(F=2)+32*(F=1)-32*(F
=3):V=PEEK(A):POKE A,191
170 IFA=1071 THEN FORC=3TO12STEP4:POKEA+C*32,120:NEXT
180 IF A=1263THEN230
190 IFV=128THEN150
200 SOUND100,3,1,1,1+1:IFL<>3 THEN20
210 CLS

```

```

220 GOTO 700
230 CLS:PRINT@235,"WELL DONE!":PLAY"T20DFADFADFACEGEC
L1A"
240 PRINT@240,"NOW IT'S EVEN HARDER!":K=0:POKE &FFD7,
0:REM POKES HIGHER SPEED
241 GOTO 20
500 CLS
510 PRINT@228,"DO YOU WANT INSTRUCTIONS";
520 $%=INKEY$:IF $%="N" THEN RETURN
530 IF$%<>"Y" THEN 520
540 CLS
550 PRINTTAB(7)"S U R V I V O R"
560 PRINT
570 PRINT'THE OBJECT IN THIS GAME IS TO    RUN THE WORM
    100 CYCLES WITHOUT CRASHING."
580 PRINT'BEWARE OF THE BLUE DOTS AND THE GRID,WHICH G
ETS THINNER FOR EACHSCREEN."
590 PRINT'AFter YOU HAVE MANAGED SURVIVINGFIVE SCREENS
    YOU ARRIVE THE"
600 PRINT'LAST ONE,WHICH IS COMPLETELY    DIFFERENT."
610 PRINT'THERE YOU HAVE TO REACH THE    CENTRE OF TH
E MAZE.":PRINTTAB(10)"HIT A KEY"
620 IF INKEY$=""THEN620
630 CLS:PRINT
640 PRINT'YOU USE THE RIGHT AND LEFT ARROWKEYS."
650 PRINT'WHEN YOU PRESS THE RIGHT KEY,    THE WORM WIL
L TU'N RIGHT."
660 PRINT'A PRESS ON THE LEFT KEY WILL    TURN THE WORM
M TO LEFT.":PRINT:PRINTTAB(3)"YOU HAVE THREE LIVES."
670 PRINT:PRINT"    GOOD LUCK,YOU'LL NEED IT!":PRINT:PR
INTTAB(10)"HIT A KEY."
680 IF INKEY$=""THEN680 ELSE RETURN
700 SC=U*10+(C/20):IF SC<HS THEN GOTO730

```

(continued on next page)



(continued from previous page)

```

710 PRINT:PRINT:PRINT:PRINT:PRINT" A NEW HIGH
SCORE!"
715 HS=INT(SC)
720 PLAY"120EGEGEGCP5GEGECF5CECECEB5F5CECECE6"
730 CLS:PRINT@202,"GAME OVER";
735 FOR R=0 TO 12:PRINT@136+R,CHR$(159);:PRINT@264+R,C
HR$(159);:NEXT:FOR R=0 TO 96 STEP 32:PRINT@168+R,CHR$(
159);:PRINT@180+R,CHR$(159);:NEXT
740 PRINT@330,"SCORE";INT(SC);:PRINT@341,"HI SCORE"HS;
750 PRINT@419,"DO YOU WANT ANOTHER GAME";
760 A$=INKEY$:IF A$="Y"THEN K=0:SC=0:L=0:U=0:Z=0:GOTO
20
765 IF A$="N" THEN CLS:END
770 GOTO 760

```

## Renumber

J Bull,  
Taunton,  
Somerset.

ORIC

THIS PROGRAM IS a machine-code renumberer which was written on a 43K machine. The program will renumber any size Basic program. It has been designed to renumber the whole of a Basic program of lines not greater than 64000. However it will handle Goto, Gsub, Then and Else and On Goto/ Gsub commands.

After typing in the Basic program, which Pokes the machine code, it should be Saved as a Basic program so it can be checked later, if necessary. After Saving the Basic type Run. Now type New and CSave

CSAVE "RENUMBER", A #9A00, E #9D40  
This now Saves the code directly.

When you want to renumber a Basic program type

HIMEM #99FF

and

CLOAD"

the machine code.

Now two variables have to be set. The first

is at which line number the Basic will be renumbered and the size of increment between each line. An example of this is:

DOKE #400,(NEW STARTING LINE OF PROGRAM)

DOKE // 402,(INCREMENT)

To get the machine code going call #9AC0. As it is a machine code renumberer it is very fast and even the largest of program take a very short time to renumber.

Although I wrote the program on a 48K machine I see no reason why it should not work on a 16K machine.

```

1 REM ** RENUMBER **
2 REM ** J.BULL **
3 REM ** 29/1/84 **
4 N=#9A00
5 REPEAT
6 READD$
7 C=VAL("&"+D$):POKE,C
8 N=N+1:UNTIL D$="???"
9 DATAAD,00,04,48,AD,01,04,48,AD,02,04,48,AD,03,04,48
,A5,9A,85,46,A5,9B,85
10 DATA47,A0,00,B1,46,D0,05,CB,B1,46,F0,2B,A9,01,BD,0
,04,A7,FA,BD,01,04
11 DATAA9,01,8D,02,04,A9,00,8D,03,04,20,53,9A,6B,8D,0
3,04,6B,8D,02,04,6B
12 DATA8D,01,04,6B,8D,00,04,20,53,9A,6B,6B,6B,6B,6
,0,DE,A7,00,8D,07,04
13 DATA8D,0B,04,45,9A,85,46,A5,9B,85,47,3B,AD,00,04,E
D,02,04,8D,11,04,AD
14 DATA01,04,ED,03,04,8D,12,04,AC,00,B1,46,AA,CB,B1,4
6,AB,D0,04,E0,00,F0
15 DATA30,A5,46,CD,07,04,D0,07,A5,47,CD,0B,04,F0,22,1
B,AD,11,04,6D,02,04
16 DATA8D,11,04,AD,12,04,6D,03,04,8D,12,04,A5,46,85,4
B,A5,47,85,49,84,47
17 DATA86,46,4C,77,9A,A0,02,B1,4B,8D,07,04,AA,CB,B1,4
B,8D,0A,04,20,C6,9C
18 DATAA2,05,BD,13,04,9D,0B,04,CA,10,F7,A0,02,AD,11,0
4,91,4B,AA,CB,AD,12
19 DATA04,91,4B,20,C6,9C,A5,9A,85,46,A5,9B,85,47,A5,4
B,8D,07,04,A5,49,8D
20 DATA0B,04,A0,04,B1,46,F0,23,10,1D,C9,97,F0,0C,C9,7
B,F0,0B,C9,CB,F0,04
21 DATAC9,C9,D0,06,20,44,9B,4C,1A,9B,C9,B4,D0,03,20,1
7,9C,CB,4C,F7,9A,A0
22 DATA00,B1,46,AA,CB,B1,46,85,47,86,46,D0,C9,E0,00,D
0,C5,AD,11,04,CD,00
23 DATA04,D0,0B,AD,12,04,CD,01,04,F0,03,4C,5C,9A,60,C
B,20,2E,9D,8C,06,04
24 DATA20,9C,9C,90,04,8B,4C,16,9C,AE,0B,04,EC,19,04,D
0,F5,CA,30,0A,BD,0C
25 DATA04,D0,1A,04,D0,EA,F0,F3,3B,A2,00,AD,13,04,ED,1
9,04,BD,04,04,10,02
26 DATA2,FF,BE,05,04,18,9B,65,46,85,40,A5,47,69,00,E
5,41,1B,A5,40,6D,04
27 DATA04,35,44,A5,41,6D,05,04,85,45,A5,9C,85,42,A5,9
D,85,43,20,35,9C,A5
28 DATA46,85,4B,A5,47,85,49,F0,00,1B,B1,4B,0E,6D,04,0
4,91,4B,AA,CB,B1,4B
29 DATA0B,6D,05,04,91,4B,2B,F0,0B,2B,85,49,86,4B,4C,A
A,9A,2B,D0,F6,A9,00
30 DATA91,4B,8B,91,4E,A5,47,CD,0B,04,90,07,A5,46,CD,0
7,04,E0,13,1B,AD,07
31 DATA04,6D,04,04,8E,07,04,AD,0B,04,6D,05,04,8D,03,C
4,13,A5,9C,6D,04,04
32 DATA85,9C,A5,9D,6E,05,04,E5,9D,AC,06,04,A2,00,BD,1
4,04,91,46,CB,EB,EC
33 DATA13,04,D0,F4,BE,60,CB,E1,46,D0,02,8B,6C,C9,97,F
0,04,C9,9B,D0,F1,20
34 DATA44,7B,CB,20,2E,9D,B1,46,C9,2C,F0,F3,8E,60,93,4
B,A0,00,AD,41,C5,45
35 DATA90,20,A5,40,CE,44,90,1A,B1,40,91,44,E6,44,D0,C
2,E5,45,20,91,9C,D0
36 DATA03,6B,AB,60,E6,40,D0,EA,E6,41,D0,E6,3E,A5,12,E
5,40,AA,A5,43,E5,41
37 DATA4B,1B,8A,65,44,85,44,6B,65,45,85,45,B1,42,91,4
4,A5,44,D0,02,C6,45
38 DATAC6,44,20,91,9C,F0,CE,A5,42,D0,02,C6,43,C6,42,4
C,75,9C,A5,40,C5,42
39 DATA00,04,A5,41,C5,43,60,A2,00,B1,46,20,22,9D,B0,2
0,CB,9D,1A,04,EB,A9
40 DATA04,BD,19,04,B1,46,20,22,9D,B0,0A,CB,9D,1A,04,E
B,CE,19,04,D0,EF,8E
41 DATA19,04,8B,1B,6C,8D,05,04,8E,04,04,A2,00,8E,13,C
4,A0,00,A9,05,8D,06
42 DATA04,A9,30,9D,14,04,3B,AD,04,04,F9,37,9D,8D,04,C
4,AD,05,04,F9,3B,9D
43 DATA8D,05,04,90,05,FE,14,C4,D0,E6,AD,13,04,D0,07,E
D,14,04,C9,30,F0,04
44 DATAEB,EE,13,04,1E,AD,04,C4,79,37,9D,8D,04,04,AD,C
5,04,79,3B,9D,8D,05
45 DATA04,CB,CB,CE,06,04,D0,E7,60,C9,30,90,06,C9,3A,E
0,02,1B,60,3B,60,B1
46 DATA46,CB,C9,20,F0,F9,8B,60,10,27,EB,03,64,00,0A,0
0,01,60,???"

```

## Animator

Derek Gladding,  
Hathersage,  
Derbyshire.

DRAGON

LOW-RESOLUTION Animator is a program I have written to produce short animated sequences of graphics on the Dragon 32 micro. The frames are entered one by one using a graphic design program, saved in memory and then animated by machine code. The program is very easy to use, although designing 40 or so frames of a cartoon can take some time.

First, the frame must be drawn out on the screen. The graphics design program is

controlled by the arrow keys moving a small flashing cursor around the screen — owing to the limitations of the low resolution graphics mode, the cursor will turn the whole block it is in to white if it is moved against a coloured background, but it will return the block to its original colour when moved away. The system has three modes of operation:

PLOTTING MODE — Graphics are entered by pressing a number key from 0-8, which sets the pixel under the cursor to that colour.

FOLLOW MODE — This is accessed by pressing F and then a number key. When in follow mode, the cursor will leave a trail behind it in the colour corresponding to the number key pressed when follow mode was

accessed. To leave follow mode, press any command key apart from the arrow keys.

TEXT MODE — This is accessed by pressing T. It enables you to type in text — for captions, speech bubbles, etc. — starting at the cursor position. To leave this mode, press the down arrow. The caption had better be kept on for several frames if it is to be easily read.

To finish a frame and to save it in memory, press S. The screen will not be cleared in case the next screen is only slightly different from the last. If the screen needs clearing, press C and enter a colour. When the sequence is finished, press Enter and the computer will provide an animated display of your frames by flicking through them rapidly. If the speed is



# SOFTWARE FILE

too great, or the program does not provide enough time for your sequence, add a delay loop at line 715 to slow it down.

The program works by calling a machine code routine to copy the low-resolution screen up into higher memory. Every frame is stored in the memory above the program, and when

the Enter key is pressed to animate the sequence, the program runs through all these by calling a similar machine code routine to move it back again down to the low-resolution screen.

It would have been possible to animate the pictures even faster by simply altering the

screen start location — FFC7hex to FFD3 hex — in the SAM, but unfortunately, in the older Dragons, this doesn't seem to work above 4000 hex (16384 decimal). Anyway, this provides more than adequate speed of animation: copying memory from one place to another.

```

10 'ANIMATOR 1.1
20 'BY DEREK GLADDING
30 '(C) DEREK GLADDING 1984
40
50 PMODE 0,1:PCLEAR 1
60 CLEAR 100,&H2000
70 CLS
80 PRINT@C,"LOW RESOLUTION ANIMATED CARTOONS"
90 H=0:GOSUB 760
100 DEF FNH(N)=INT(N/256)
110 DEF FNL(N)=256*(N/256-FNH(N))
120
130 'MACHINE CODE
140
150 '      ORG $7000
160 'DOWN  LDX #$ (PAGE)
170 '      LDJ #$400
180 'LOOP1  LDA ,X+
190 '      STA ,U+
200 '      CMPI #$600
210 '      BLD LOOP1
220 '      RTS
230 'UP     LDX #$ (PAGE)
240 '      LDJ #$400
250 'LOOP2  LDA ,U+
260 '      STA ,X+
270 '      CMPI #$600
280 '      BLD LOOP2
290 '      RTS
300
310 DATA 8E,00,00,CE,04,00,A6,80,A7,C0,11,83,06,00,25,
F6,39
320 DATA 8E,00,00,CE,04,00,A6,C0,A7,80,11,83,06,00,25,
F6,39
330 FOR L=&H7F00 TO &H7F21:READ H$:POKE L,VAL("&H"+H$)
:NEXT
340 V$="^"+CHR$(8)+CHR$(9)+CHR$(10)+"123456780SCFT"+CH
R$(13)
350 PRINT:PRINT"COMMANDS:-":PRINT
360 PRINTTAB(3);"ARROW KEYS TO MOVE CURSOR"
370 PRINTTAB(3);"O-B TO SET POINT"
380 PRINTTAB(3);"S TO SAVE PICTURE"
390 PRINTTAB(3);"C TO CLEAR SCREEN"
400 PRINTTAB(3);"F TO FOLLOW POINTER"
410 PRINTTAB(3);"T TO ADD TEXT"
420 PRINTTAB(3);"ENTER TO FINISH"
430 PRINT@480,"*** PRESS SPACEBAR TO CONTINUE *";
440 POKE 1535,106
450 IF INKEY$<>" " THEN 450
460 CLSO
470 MO$="PLOTTING":MO=1:PA=0
480 PRINT@480,"PAGE":PA;" ";MO$;" MODE. ";
490 IF MO=3 THEN PRINT@BY-1024,,:GOSUB 910:MO=1:MO$="P
LOTTING"
500 BY=1024+INT(X/2)+INT(Y/2)+32:CO=PEEK(BY)
510 SET(X,Y,5):FORD=1TOS:NEXT:RESET(X,Y)
520 A$=INKEY$:IF A$="" OR INSTR(V$,A$)=0 THEN 510
530 PLAY"T4004C"
540 N=INSTR(V$,A$)
550 POKE BY,CO
560 IF N=1 THEN Y=Y-1:IF Y=-1 THEN Y=29
570 IF N=2 THEN X=X-1:IF X=-1 THEN X=63
580 IF N=3 THEN X=X+1:IF X=64 THEN X=0
590 IF N=4 THEN Y=Y+1:IF Y=30 THEN Y=0
600 IF MO=2 AND C>0 THEN SET(X,Y,C):IF N>4 THEN MO=1:M
O$="PLOTTING"
610 IF MO=2 AND C=0 THEN RESET(X,Y):IF N>4 THEN MO=1:M
O$="PLOTTING"
620 IF N>4 AND N<13 THEN SET(X,Y,N-4)
630 IF N=13 THEN RESET(X,Y)
640 IF N=14 THEN GOSUB 780:PA=PA+1:IF PA=46 THEN 700
650 IF N=15 THEN GOSUB 840
660 IF N=16 THEN MO$="FOLLOW":MO=2:GOSUB 870:IF C=-1 T
HEN 660
670 IF N=17 THEN MO$="TEXT":MO=3
680 IF N=18 THEN 700
690 GOTO 480
700 T=PA-1
710 FOR PA=0 TO T
720 GOSUB 930
730 N=XT
740 GOTO 710
750 END
760 FOR L=1024+(H*32) TO 1024+(H*32)+31:POKE L,(PEEK(L
) AND &BF):NEXT
770 RETURN
780 P=PA*512+&H2000
790 POKE &H7F12,FNH(P):POKE &H7F13,FNL(P)
800 PRINT@480,STRING$(31,128);
810 POKE 1535,128
820 EXEC &H7F11
830 RETURN
840 PRINT@480,"CLEAR SCREEN - COLOUR?";
850 GOSUB 870:IF C=-1 THEN CLS C
860 RETURN
870 A$=INKEY$:IF A$="" THEN 870
880 C=INSTR("012345678",A$)
890 C=C-1
900 RETURN
910 A$=INKEY$:IF A$="" THEN 910
920 IF A$=CHR$(10) THEN RETURN ELSE PRINTA$;:GOTO 910
930 P=&H2000+PA*512
940 POKE&H7F01,FNH(P)
950 POKE&H7F02,FNL(P)
960 EXEC&H7F00
970 RETURN

```

## Program Scanner

Don Scarrott,  
Workington,  
Cumbria.



WHEN DEBUGGING a program, you often need to know where and how a particular variable is used. It is very difficult to be sure you have identified every occurrence yourself, so I tried to write a Basic program to do the search for

me. It worked, but was dreadfully slow, taking some 10 minutes to scan a long program.

This machine-code version is much shorter, and is as fast as the normal listing. It scans the program lines, skipping Rem and Data lines, rushing past anything between quotes, jumping over the embedded numbers, converting upper to lower case, and comparing names to what you have placed in z\$. If they match, that line is printed.

The machine code is located at 63929 with a length of 291. To use it you merely set the variable name into z\$, and Randomise USR 63929. It will then list all the lines containing that variable on the screen.

To enter the machine code, first type in the hex loader from figure 1, and Run it. Figure 2 shows a column of decimal addresses on the left, and four columns of hex on the right.

Enter the first address from figure 2, and then the blocks of hex, one after the other. Each block contains its own check digit, so if it is wrong, it beeps and expects you to enter it again.

(continued on next page)

Figure 3

```

8691 REM Progan Prompter
8692 CLEAR 63928
8693 LOAD "PROGAN3" CODE
8694 INPUT "Z$ ";Z$
8695 PRINT : PRINT "Lines contain
ing ";z$
8696 RANDOMIZE USR 63929
8697 GO TO 8694
8698 SAVE "progan"
8699 SAVE "PROGAN3" CODE 63929,2
91: STOP

```



(continued from previous page)

You only have to enter one address at the beginning, but do check that the ones on the screen correspond to those in the figure, in case you miss a line. If you do miss something, run again from the last correct line.

When you want to get out of the loop, delete the first quotes and enter Stop.

When it has been entered correctly, you may like to take a backup copy by entering SAVE "PROGAN" CODE 639 29, 291. You can test it at this stage by:

"LET Z\$ = "b":RANDOMISE USR 63929:  
PAUSE 0"

However, for convenience, you can prepare a prompter tape as follows.

New, and type in the prompter program from figure 3. Put a fresh tape in the recorder and Goto 8698 to save first the Basic program and then the machine code. You may like to verify them before proceeding.

Load your target program, enter  
MERGE"  
and start the prompter tape. Stop it as soon as

the Basic part has loaded. Enter  
Goto 8692

and start the tape again. When the code has loaded, the z\$ prompt should appear. Enter the variable name of interest, and watch the lines scroll up the screen.

If you want hard copy, get out of the loop by deleting the quotes and entering Stop. Then enter:

OPEN #2,"p"  
and  
Goto 8694  
to re-enter the loop.

```

10 REM HEXLOADER
11 REM by Don Scarrott
12 CLEAR 63000
20 DIM n(5)
30 INPUT "Start address(DECIMA
L) ";a
55 PRINT "Please use upper cas
e"
60 PRINT : PRINT a;
62 FOR K=1 TO 4
64 INPUT "4 Hex digits+check "
;x$
65 IF x$="END" THEN STOP
70 IF LEN x$ <> 5 THEN BEEP
1,1: GO TO 64
80 LET s=0
90 FOR j=1 TO 5
100 LET b= CODE x$(j)-48
110 IF b>9 THEN LET b=b-7
115 IF b>15 THEN BEEP 2,1: GO
TO 64
120 IF j <> 5 THEN LET s=s+b
130 LET n(j)=b
140 NEXT j
150 LET p= INT (s/16): LET r=s-
16*p
160 IF b <> r THEN BEEP 1,1: G
O TO 64
170 POKE a,16*n(1)+n(2)
180 LET a=a+1
190 POKE a,16*n(3)+n(4)
200 LET a=a+1
202 PRINT " ";X$;
204 NEXT K
210 GO TO 60
212 ERASE "M";1;"hexloader"
214 SAVE "M";1;"hexloader"
216 VERIFY "M";1;"hexloader"
217 STOP
    
```

```

63929 11D54 FAED4 4B5D1 5CEDC
63937 43D9D FAED4 535DA 5CCDA
63945 B2287 ED4BA D9FAF ED432
63953 5D5C3 30025 CF01C 2346F
63961 78324 D4FAA 2323A 22D23
63969 FA7EE CDAE1 FA777 23106
63977 F82A3 535C9 22CCC FA7EE
63985 E6C00 C0231 234E7 2346F
63993 ED432 D0FA6 23E58 0922D
64001 CEFA3 3E001 32D8A FA32E
64009 DBFA1 3AD4E FA474 2AD2B
64017 FAD17 1AFE8 0D287 78FEC
64025 22206 103AE D8FAE A7203
64033 033C2 1802B 3E001 32D8A
64041 FA182 4E4F5 3AD82 FAFE6
64049 00790 2045B FEA5 28576
64057 FEE4F 28532 FE0EB 200E0
64065 E5216 05005 19EB3 E13E0
64073 00325 DBFA1 182B6 CDAE1
64081 FA30C F44F6 3ADB5 FAFE6
64089 00790 201D0 BEF5D CD968
64097 FAF19 20158 C5E54 0528F
64105 17CD1 96FA8 23139 1ACD4
64113 AEFA1 3008B BE283 EFE1C
64121 C1131 18968 E1C1C 18C7C
64129 E1C1C 131AF CDAE1 FA384
64137 8ACDB 9EFA0 3E0DE D72A0
64145 CEFA3 C3EDA F93A5 DBFA1
64153 3C324 DBFA1 C9E58 D5C53
64161 2ACC4 FA11B 01001 CD654
64169 18C16 D1E1D C9FE2 24280
64177 18FE6 3038E 10FE4 3A388
64185 10FEE 41380 08FE5 5B38B
64193 06FE3 7B38D 04A75 C9C67
64201 2037C C9005 00000 00000
64209 00000 00000 5A245 3A00D
64217 00000 00000 00000 00000
    
```

## Merge Command

William Fong,  
Charlton,  
London SE7.

CBM-64

ONE OF THE MAJOR drawbacks of Commodore Basic is that it has no merge command like the Spectrum. I have written a program which will compensate for that; it simulates the Merge command.

When you have typed the program out do not run it until you have a copy saved on tape. This is because the program may crash if a mistake has been entered. When all is ready Run the program and the screen should go black and "Ready" will appear. This program is situated above the RAM in which you use so it will not crash with your programs. You now may load your programs.

However, you do not use the command Load but

SYS 40705 "PROGRAM NAME IF YOU  
KNOW IT"

This is used instead of Merge because the Basic interpreter will not recognise this command.

Remember that the programs which you intend to string together must have different line numbers or lines will overlap each other. Also each separate program will be listed in blocks and not among themselves, but they still will run as one complete program.

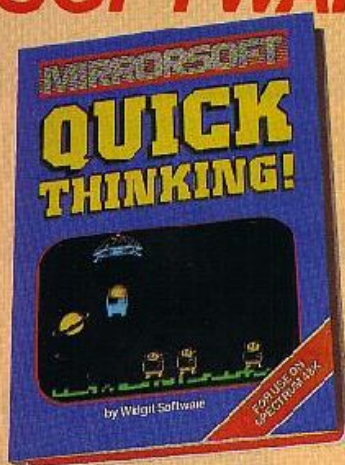
```

0 PRINT"CBM-64":POKE53281,0:POKE53280,0:REM +MERGE+: (C) WILLIAM & SIMON FONG
1 POKE55,0:POKE56,159:CLR S=40705:FORJ=STOS+78:READY:POKEJ,V:NEXT:NEW
2 DATA169,0,133,10,32,212,225,165,43,72,165,44,72,56,165,45,233,2,133,43,165
3 DATA46,233,0,133,44,169,0,133,185,166,43,164,44,169,0,32,213,255,176,14,134
4 DATA45,132,46,32,51,165,104,133,44,104,133,43,96,170,201,4,144,244,240,10
5 DATA104,133,44,104,133,43,24,108,0,3,164,186,136,240,209,208,239
    
```



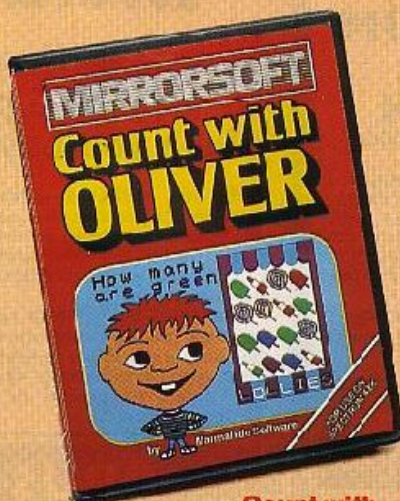
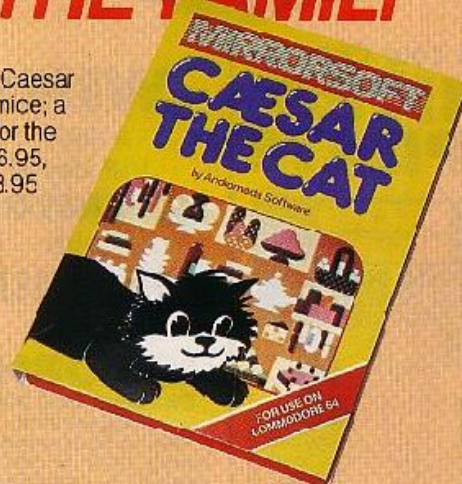
# For computer experts ...and their parents

## MIRRORSOFT SOFTWARE FOR ALL THE FAMILY



**Quick Thinking!** Mental arithmetic with a space-age flavour; for the Spectrum 48K, Electron, BBC B or Commodore 64. Price £6.95.

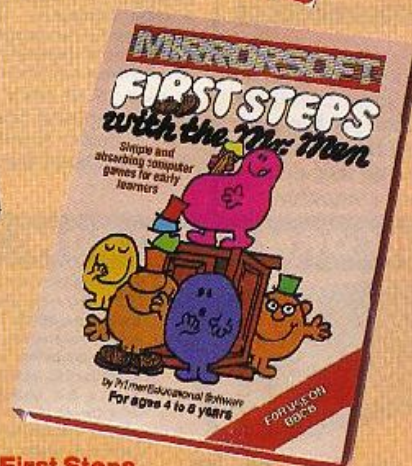
**Caesar the Cat** Help Caesar clear the lair of mice; a delightful game now for the BBC B and Spectrum 48K, £6.95, and the Commodore 64, £8.95



**Count with Oliver** Cheeky Oliver helps your child to count and add – a new program for the Spectrum 48K, BBC B or Commodore 64.



**Look Sharp!** Go down to the farm and out into space with games for sharp sighted kids – a new program for the Spectrum 48K, BBC B, Electron or Commodore 64. Price £7.95.



**First Steps with the Mr. Men** Simple games to prepare the very young for reading; for the Spectrum 48K, BBC B, Electron or Commodore 64. Price £8.95.

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

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

	Price	Spectrum 48K (01)	BBC B (03)	Electron (04)	Commodore 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 (CC02)	£6.95				
Look Sharp (LS01)	£7.95				
Count with Oliver (CO01)	£7.95				

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. \_\_\_\_\_

YCI

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: 168660 Reg. Office: Holborn Circus, London EC1.



# Spectrum

## The Latest NEWS from Spectrum

### Get Your Copy of MICRO UPDATE



Spectrum's own magazine from your local Spectrum dealer Now! All the info on the very latest in home micros and add-ons for your computer.

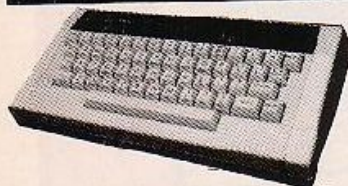
### WIN! a super VIP day at SILVERSTONE with SPECTRUM and ACORN

On August Bank Holiday  
August 27th

There's a Super competition starting NOW at SPECTRUM-arranged in conjunction with ACORN Computers, there are Two prizes for two people each of a fabulous all expenses paid day out at Silverstone Races.

Pick up an entry form from your local Spectrum dealer Now!  
**No Purchase Required**

### ACORN ELECTRON



**£199.00**

The new Computer from Acorn. Using the same powerful BBC basic as the BBC E. The Electron is the ideal machine for learning about computers as most schools use BBC BASIC. It also features a full qwerty keyboard with the ability to enter commands with one keystroke, and gives high quality graphics output to either colour T.V. or monitor. Sound can be generated through the internal speaker.

### 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 LANCMEAD Spectrum UK Ltd, Burrowfield, Welwyn Garden City, Herts or Telephone (07073) 34761

### LATEST NEWS

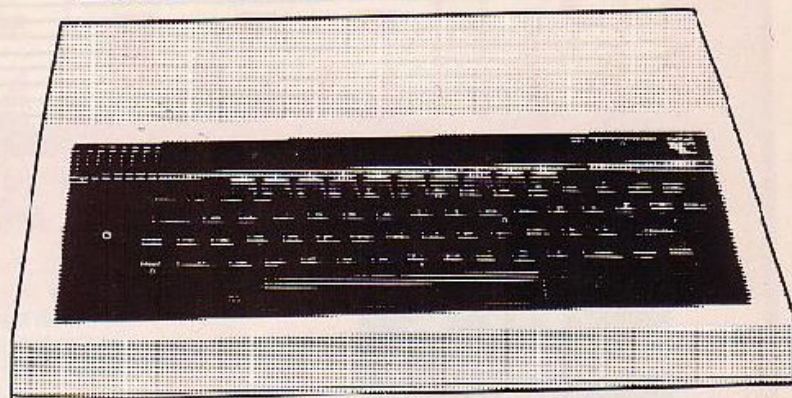
• For up-to-date news, information & offers from SPECTRUM - see PRESTEL page 600181 for details.

### UP TO £1000 INSTANT CREDIT,

**spectrum**  
CHARGE CARD

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

## BBC Model B



### Including FREE!

- Cassette Recorder and
- 5 pieces of Software

When you buy a BBC 'B' from Spectrum!

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

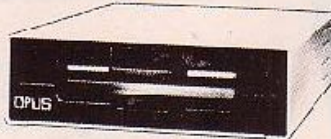
The model B features a variety of interface ports allowing easy connection not just of ordinary peripherals but also second processors or devices to give access to teletext or prestel services.

### SPECTRUM PRICE

**£399**

### OPUS DISC DRIVE

for BBC Model 'B'

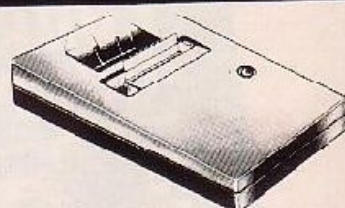


SPECTRUM LOW PRICE

**£189**

Including: Manual and Utilities Disc

### BIT PRINTER



An expensive 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 Spectrum now!

SPECTRUM  
LOW  
PRICE

**£89.95**

### ACCESSORIES for BBC

BBC Dual Disk Drive	£750.00
BBC BUGGY	£189.00
RC DIGITAL TRACER for the BBC	£55.50
GRAF PAD Graphics Tablet	£143.75
PROLINK Joystick Interface	£9.95
BIT-PRINT ZX Printer	£89.95
BBC Single Disk Drive	£265.00
BBC Disk Interface Kit (inc. fitting)	£97.00

Acorn Software Cassette-Based from	£9.95
Acorn Disk Based software	£11.50
BBC Disk-Based software from	£9.95
BBC BUGGY Spectrum Price	£189.00
BBC Disk Manual & Utilities Disc	£34.50
QUICK-SHOT JOYSTICK Especially for the BBC - Spectrum Price	£19.95





**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<sup>95</sup>** 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 & Hopbit. A fantastic deal!! and great value-for-money. But: HURRY! offer only while stocks last.

SPECTRUM PRICE

**£139<sup>99</sup>**

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: Golf, 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

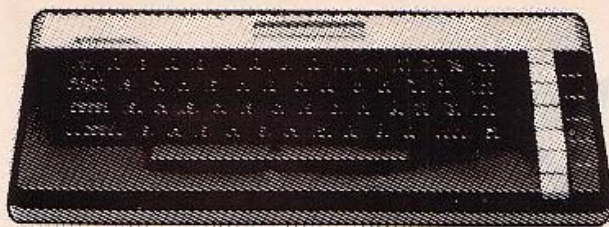
Alphacom 42 Printer with Vic 20 Interface. . . . £99.50  
Stack Light Pen . . . £28.75  
Plus 8016K RAM. . . £37.59  
Viscount 64K RAM. £59.95  
4 Slot Motherboard £24.95  
Adman Chatterbox £49.95  
Stonechip 16K switchable RAM. . . . . £34.95

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



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<sup>95</sup>**

ATARI 600XL.....£159.99

1010 CASSETTE RECORDER.....£45.99  
1030 DISK DRIVE.....£295.99  
1027 LETTER QUALITY PRINTER.....£295.99  
1020 PRINTER PLOTTER.....£199.99

TRACK BALL.....£39.99  
SOFTWARE.....£29.99  
DIE DUG.....£14.99  
LONE RAIDER.....£14.99  
And many more

## MONITORS

**Commodore Model 1701**

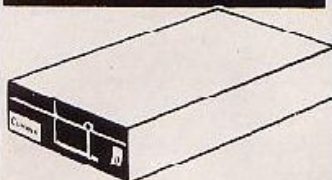
A superb Colour Monitor with sound



SPECTRUM PRICE **£230**

PHOENIX Amber.....£126.50  
FIDELITY CM14 Colour.....£199.95  
SANYO 14" Colour TV (ideal as a monitor).....£219.95  
SANYO CDD 3125NB Colour Monitor.....£185.35  
SANYO 12" Green Monitor.....£99.95

## CUMANA DISK DRIVES



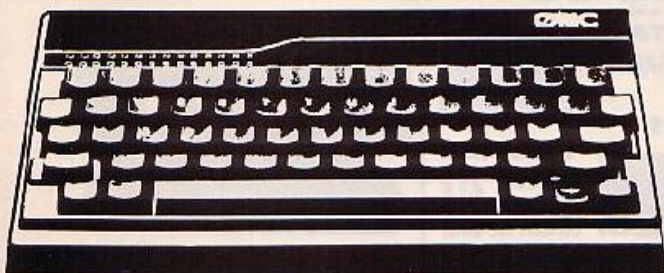
FOR BBC

CS100E.....£217.35  
CS100.....£244.95  
CS200E.....£254.15  
CS200.....£81.75

FOR DRAGON

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

## ORIC ATMOS



The ATMOS has taken a remarkable step forward in home computer technology!

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

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

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

We've a four-colour Oric printer (which accepts normal paper) at a terrific value-for-money price. Soon, a 3-inch Microdisk Drive will be available, too, to complete the system. Take a look at the superb new Oric ATMOS, at your Spectrum dealer now!

■ Lots of exciting programs available

■ Built-in centronics printer interface (no RS232 needed - just plug in your printer)

■ Full-featured keyboard with sculptured keys

■ Separate keys for cursor control

■ Built-in speaker

■ Special sound effects for game programmers

SPECTRUM PRICE

**£169<sup>99</sup>**

## Sensational PRINTER OFFERS from Spectrum

Incredible Value! from Spectrum



NEW!

## SEIKOSHA Model GPI00A MkII

SPECTRUM LOW PRICE

**£199<sup>95</sup>**

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

## Other Printer Bargains

SEIKOSHA GPI00 VC.....£199.95  
SEIKOSHA GPI00 AS.....£199.95  
SEIKOSHA GP150 X.....£249.95  
EPSON FX 80.....£495.95  
EPSON RX 80.....£314.95  
EPSON RX 80 F/T.....£366.85  
ALPHACOM 42 for VC-20, Commodore 64, Dragon, Atari, BBC with required interface.....£99.90  
ALPHACOM 3C for ZX Spectrum.....£59.95  
Bit Print 2+ for the BBC.....£89.95

## ALPHACOM



**ALPHACOM 42** For DRAGON, BBC, COMMODORE, ATARI (Interfaces extra).....Spectrum price **£79.95**  
**ALPHACOM 31** For ZX SPECTRUM.....Spectrum Price **£59.95**  
Paper Rolls for Alphacom printers  
Box of 5 Rolls.....£6.00

## STACK LIGHT RIFLE



For Commodore 64, VIC-20 & ZX Spectrum

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

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

## 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

## 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 5 1/4" DISK DRIVE with interface system and complete with all leads.

ONLY  
**£245**



### CHEETAH

**32K RAM  
Pack**

**£39.95**



### KEMPSTON

**Joystick  
Interface £15**  
(Joysticks cpt. 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™ & Micronet 800 information services ■ Instant communication with other ZX Spectrum users ■ Use the Prism VTX 5000 with a Sinclair printer - and print Prestel frames

**SPECTRUM PRICE**

**£99<sup>95</sup>**

**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  
Simple Interfacing Projects £5.95  
The Dragon & how to make the most of it £5.95  
Computing for the Hobbyist & small business £6.95  
Simple Interfacing Projects £5.95  
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 £5.95  
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 £5.95  
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 £1.95  
Hot programs to feed your Dragon £6.95  
ZX Spectrum explored £1.95  
Mastering the ZX Spectrum £1.95  
Mastering the Vic 20 £1.95  
Small business computers for the first time users £7.95



# There's a Spectrum Centre near you..

## AVON

**BATH** Software Plus, 12 York St. Tel: (0225) 61676  
**WESTON-S-MARE** K & C Computers, 32 Alfred St. Tel: (0344) 419324

## BEDFORDSHIRE

**DUNSTABLE** Informs 7-11 Broad Walk. Tel: (0582) 65515  
**LEIGHTON BUZZARD** The Computer Ctr at Millor 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) 473717  
**SLUGH** MU Gamus and Computers 245 High St. Tel: (0753) 21594

## BUCKINGHAMSHIRE

**BLETCHLEY** Rams Computer Centre, 117 Queensway. Tel: (0494) 647744  
**CHEGAM** Need 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** Pbrghr Communications, 91 Midland Rd. Tel: (0733) 41007

## CHANNEL ISLANDS

**GUERNSEY** Gluts, 3-5 The Priory, St Peter Port. Tel: (0481) 24682  
**JERSEY** Audio & Computer Centre, 7 Peter St. Tel: (0534) 74000

## CHESHIRE

**ALTRINCHAM** Mr Micro 28 High St. Tel: (061) 941 6213  
**CRUWE** Microman Unit, 128 Namwich Rd. Tel: (0707) 216314  
**ELLSMERE** PORT RFR Computers, 1 Pootown Rd. Whitby. Tel: 051 356 4150  
**MAGGLESFIELD** 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: (0511) 420 3333  
**WILMSLOW** Swift of Wilmslow, 4-5 St. Annes Parade. Tel: (0625) 526213

## CLEVELAND

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

## CORNWALL

**ST AUSTELL** A & C Computers, Tucky House, 6 Lower Aylmer Sq. Tel: (0725) 67337

## CUMBRIA

**BARROW-IN-FURNESS** Barrow Computer Centre, 24 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 10-5pm  
**WHITEHAVEN** P D Henden 15 King St. Tel: (0946) 2033

## DERBYSHIRE

**ALFRETON** Gordon Harwood 69-71 High St. Tel: (0773) 832078  
**CHESTERFIELD** The Computer Centre, 14 Stephenson Place Tel: (0424) 238802  
**DERBY** C T Electronics, at Camera Thorpe, The Spot Tel: (0332) 364456

## DEVON

**EXETER** Seven Courts (Computers) Ltd, 7 Paris Street. Tel: (0392) 211212  
**EXMOUTH** Open Channel 30 The Strand. Tel: (0393) 264408  
**PLYMOUTH** Syntax Ltd, 76 Cornwall St. Tel: (0752) 28705  
**TIVERTON** Acron Micro Computers, 37 Bampton St. Tel: (0844) 252851  
**TORQUAY** Devon Computers, 4 Torhill Rd, Castle Circus. Tel: (0803) 526303

## DORSET

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

## DURHAM

**DARLINGTON** McKenna & Brown, 102 Bordgate. Tel: (0325) 459744

## ESSEX

**BASILDON** Godfrey's 28-32 East Walk, Tel: (0206) 289379  
**BASILDON** Godfrey's Computer Centre, 5 London Main Centre London. Tel: (0268) 416747  
**CANVEY ISLAND** O'Neil Radio Ltd, 43 High St. Tel: 0268 682211  
**CHELMSFORD** Maxton Hayman Ltd, 5 Brookfield Rd. Tel: (0245) 354395  
**COLCHESTER** Colchester Computer Ctr, 16 St. Botolphs St. Tel: (0206) 47242  
**GRAYS** H. Reynolds, 79 Orsett Rd. Tel: (0375) 5948  
**ILFORD** Woolmans, 76 Ilford Lane. Tel: (01) 478 1307  
**ROMFORD** Computer Centre 72 North St. Tel: 0708 752862  
**SOUTHEND** Computer Centre 332 London Rd. Tel: (0702) 45412

## HAMPSHIRE

**BASINGSTOKE** Fisher's, 2-3 Market Place. Tel: (01262) 22079  
**PORTSMOUTH (Waterloo)** C B Microland, London Rd., Opp. Cur-up. Tel: (07014) 59911  
**SOUTHAMPTON** RJ Parker & Son Ltd, 11 West End Rd. Bitterne. Tel: (0703) 415925  
**SOUTHAMPTON** L.T.C. Ltd, 112 East St. Tel: (0703) 333958/24703  
**WINCHESTER** Winchester Camera & Computer Centre, 75 Parchment St. Tel: (0962) 53962

## HEREFORD

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

## HERTFORDSHIRE

**BOREHAMWOOD** Master Micro, 36 Shelley Rd. Tel: (019) 953 6368  
**HITCHIN** Camera Arts Micro Computer Division, 68A Hermitage Rd. Tel: (0462) 53285  
**POTTERS BAR** The Computer Shop, 197 High St. Tel: (0707) 4417  
**ST ALBANS (Herts)** Carks Computer Centre 14-16 Hallowell Hill. Tel: (0737) 52991  
**STEVENAGE** D J Computers, 11 Town Square. Tel: (0438) 65501  
**WATFORD** SRS Microsystems Ltd, 94 The Parade, High St. Tel: (0823) 26602  
**WILMINGTON** GARDEN CITY D J Computers, 40 Fretherne Rd. Tel: (0703) 26435/26444

## HUMBERSIDE

**BEVERLEY** Computing World 10 Swaby's Yard Dyer Lane. Tel: (0482) 88181  
**GRIMSBY** R C Johnson Ltd, 22 Farngate, Riverhead Centre. Tel: (0472) 42031  
**HULL** The Computer Centre, 26 Anlaby Rd. Tel: (0482) 26297

## ISLE OF MAN

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

## ISLE OF WIGHT

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

## KENT

**BECKENHAM** Supa Computers Ltd, 425 Croydon Rd. Tel: (01) 650 3569  
**BROADSTAIRS** Video Vision 19/23 Willow Court, St. Peters Park Road Tel: (0843) 63284 (No Early Closing Day)  
**BROMLEY** Computers Today 31 Market Square Tel: (01) 290 3552  
**DOVER** Kent Photos & Computers, 4 King St. Tel: (0304) 202020  
**GRAVESEND** Marshalls Computers & Cameras, 3 Windmill St. Tel: (0474) 65630  
**RAINHAM** Microway Computers Ltd, 39 High St. Medway Towns. Tel: (0664) 376702  
**SEVENOAKS** Ernest Fiddler Computers, Dorset St. Tel: (0732) 456800  
**SITTINGBOURNE** Computers Plus, 65 High St. Tel: (0795) 25677  
**TUNBRIDGE WELLS** Modate Computers Ltd, 28-30 St Johns Rd. Tel: (0892) 41555

## LANCASHIRE

**ACCINGTON** P.V. Computers, 104 Abbey St. Tel: (0254) 36521/32611  
**BLACKBURN** Tempo Computers, 9 Railway Rd. Tel: (0254) 691333  
**BURNLEY** IMU Computer Centre 39/43 Standish St. Tel: (0282) 54299  
**BURY (Lancs)** Micro-North, 7 Broad St. Tel: (061) 797 5764  
**PRESTON** Wilding's, 49 Fishergate. Tel: (0772) 556250

## LEICESTERSHIRE

**MARKET HARBOUROUGH** Harborough Home Computers, 7 Church St. Tel: (0535) 63056

## LINCOLNSHIRE

**LINCOLN** MKD Computers, 24 Newlands, Tel: (0522) 25907

## LONDON

**E1** Periwale, 85 High St. North, East Ham. Tel: (0) 472 8941  
**E17** Encl Computers Ltd., 125 High Street Walthamstow Tel: (01) 520 7763  
**E2** Pedro Computer Services Ltd, 47 Clerkenwell Road Tel: (01) 251 8635  
**E2** Devon Computer Centre, 155 Moorgate Tel: (0) 633 3339/1830  
**N14** Logic Sales, 19 Broadway, The Bourse, Southgate. Tel: (01) 882 4542  
**N20** Castlehurst Ltd., 291 High Rd. Tel: (0) 445 2260  
**NW4** Da Vinci Computer Store, 112 Brent St., Hendon Tel: (01) 202 2272  
**SE1** Vic. Odden's 6 London Bridge Walk. Tel: (01) 403 1986  
**SE9** Square Deal 373-375 Footscray Rd, New Elham Tel: (01) 859 1516  
**SE15** Castlehurs Ltd., 152 Rye Lane, Peckham. Tel: (0) 639 2255  
**SW5** CLM/Matmos 26- Earls Court Tel: (01) 373 458/6333  
**SW16** Butler Micro Shop, 310 Streatham High Rd. Tel: (01) 769 2687  
**SW19** Emcom 3, High St. Wimbledon Tel: (01) 947 7678  
**W1** Computers of Wigmore St., 87 Wigmore St. Tel: (01) 466 0373  
**W1** GK Photo & Computers, 92-94 Waidour St. Tel: (01) 437 0182  
**W1** Suiic Foto & Micro Centre, 256 Tottenham Court Rd. Tel: (01) 580 5826  
**W2** Devon, 4 Edgware Rd. Tel: (01) 724 2373  
**W7** IK Electronics, 11/13 Boston Rd, Hanwell. Tel: (01) 579 2842

## MANCHESTER GREATER

**BOLTON** Winding Ltd., 23 Dunsangate. Tel: (0204) 33512  
**MANCHESTER** Lomax Ltd., 8 Exchange St. St. Ann's Square. Tel: (061) 632 6167  
**D.D.H.M** Home & Business Computers Ltd, 54 Yorkshire St. Tel: (061) 6331808  
**RICHMOND** Home & Business Computers, 75 Yorkshire St. Tel: (0706) 344654  
**SWINTON** Mr Micro Ltd., 69 Partington Lane. Tel: (061) 728 2282  
 Late Night Friday  
**WIGAN** Winding Ltd., 11 Mesnes St. Tel: (0542) 44382

## MERSEYSIDE

**BIRKENHEAD** Fars Cameras & Hi-Fi, Cacre Hill, Rock Ferry. Tel: (051) 645 5000  
**HESWALL** Thorncroft Computer Systems, 46 Pinsky Rd. Tel: (051) 342 7516  
**HYTON** Ian Houghton 5 Fuyton Hey Rd. Tel: (051) 489 5785  
**LIVERPOOL** Beaver Road, 20-22 Whitechapel. Tel: (051) 709 9896  
**LIVERPOOL (Aintree)** Hargreaves, 31-37 Warbeck Moor. Tel: (051) 625 1782  
**SOUTHPORT** Central Computers, 575 Lord St. Tel: (0704) 31881  
**ST HELENS** Studio 55 55 Ormskirk St. Tel: (0444) 34996

## MIDDLESEX

**EDGWARE** GK Photographic & Computers 106 High St. Tel: (01) 951 1000  
**HARROW** Camera Arts, (Micro Computer Division) 42 St Ann's Rd. Tel: (01) 427 5469

**STAINES** Spelthorne Microsystems Ltd, 2 Kingston Rd. Tel: (0784) 55659/55554  
**UXTON** Andrews, Broad St. Tel: (01) 977 4716  
**UXBRIDGE** J K L Computers, 7 Windsor St. Tel: (0895) 51815

## NORFOLK

**RAKENHAM** Fastview, 12 Norwich Rd. Tel: (0328) 51319  
**NORWICH** Sound Marketing, 52 St. Benedict's 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: (0363) 72594  
**WORKSOP** Computatrafix 132 Bridge St. Tel: (0909) 472240

## NORTHERN IRELAND

**BELFAST** Arthur Hobson Ltd, 37 Great Victoria St. Tel: (0232) 246336  
**PORTADOWN** Redlows, 16 Market St, Craigavon Co. Antrim. Tel: (0762) 32265  
**LONDONDERY** Foye Computer Systems, 3 Bishop St. Tel: (0504) 238337  
**NEWRY** Newry Computer Centre, 34 Monaghan St. Tel: (0593) 36545

## NORTHUMBERLAND

**WORTH** Telerents 31 Newgate St. Tel: (0665) 512 537

## OXFORDSHIRE

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

## SCOTLAND

**ABERDEEN** North East Computers, 1-3 Ellis St., Peterhead. Tel: (0779) 79900  
**AYR** Vennas, 64 New Bridge St. Tel: (0292) 264124  
**DUMFRIES** Vennas, 71 English St. Tel: (0347) 54547  
**EDINBURGH** The Silicon Centre, 6-7 Antigua St. Tel: (031) 557 4546  
**GLASGOW** Victor Morris Ltd, 340 Argyle St. Tel: (041) 221 6958  
**HAMILTON** Tom Dickson Computers, 8-12 Cadzow St. Tel: (0698) 283193  
**KILMARNOCK** Vennas, 45 Forgate. Tel: (0563) 32175  
**STORNOWAY** Cameron's Computers The Playhouse. Tel: (0851) 3427

## SHROPSHIRE

**SHREWSBURY** Computarama, 13 Castlegate. Tel: (0743) 60528  
**TELFORD** Computer Village, 4 Hazeldine House, Telford Town Centre. Tel: (0952) 606771

## SOMERSET

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

## STAFFORDSHIRE

**STAFFORD** Computarama, 59 Fargate St. Tel: (0785) 41899  
**STOKE-ON-TRENT** Computarama, 11 Mk. Square Arcade Hanley. Tel: (0782) 268620  
**STOKE-ON-TRENT** The Microshop, 37 Station Rd. Biddulph Tel: (0782) 511555

## SUFFOLK

**BURY ST EDMUNDS** Bury Computer Centre, 11 Guildhall St. Tel: (0284) 705172

**IPSWICH** Brainwave, 24 Crown St. Tel: (0473) 50365  
**LOWESTOFT** John Wells, 44 London Rd. North Tel: (0562) 3742

## SURREY

**CAMBERLEY** Camera Arts (Micro Computer Division), 36 High St. Tel: (0276) 65848  
**CERTSEY** Certsey Computer Centre, 1 Windsor St. Tel: (09328) 64663  
**EPSOM** The Micro Workshop 12 Station Approach Tel: (0377) 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, 6 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) 22340  
**CRAWLEY** Gatwick Computer Services, E2 Boulevard Tel: (0293) 37842  
**LITTLEHAMPTON** Alan Crase Ltd, 39 High St. Tel: (09064) 5674

## WALES

**ABERDARE** Inkey Computer Services Ltd, 70 Mill St. The Square Treecynon. Tel: (0685) 86 828  
**ABERYSTWYTH** AberData at Galloways, 23 Pier St. Tel: (0970) 515522  
**CARDIFF** Rantall Cox, 18-22 High St. Tel: (0222) 31960  
**LLANDUDNO (Gwynedd)** Computer Plus Discount, 15 Chmnd St. Tel: (0492) 79943  
**NEWPORT (Gwent)** Rantall Cox, 118 Commercial St. Tel: (0633) 67378  
**PENBROKE** Rantall Cox, 19 Main St. Tel: (064) 682876  
**WREXHAM** T F Roberts, 26 King St. Tel: (0976) 36404/364527

## WARWICKSHIRE

**NUNEATON** Micro City 1A Queens Road Tel: (0203) 382045  
**RUGBY** The Fugby Micro Centre 9-11 Regent St. Tel: (0789) 1522

## WEST MIDLANDS

**BIRMINGHAM** Sherwoods, 61 Western Arcade. Tel: (021) 236 7211  
**COVENTRY** Greens, 22 Market Way. Tel: (0203) 2842  
**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) 26688

## WORCESTER

**KIDDERMINSTER** Central Computers, 20-21 Blackwell St. Tel: (0562) 746941  
**WORCESTER** David Waring Ltd, 1 Marmion House High St. Tel: (0905) 27551

## YORKSHIRE

**BRAZFORD** Erricks, Fotosonic House Rawson Square. Tel: (0274) 309266  
**DEWSBURY** Home & Business Computers, 59 Daisy Hill. Tel: (0294) 455300  
**DONCASTER** The Soft Centre 8 Queensgate Watfordale Centre Tel: (0332) 20088  
**HUDDESFIELD** Richards (Formerly Launes) 12 Queen St. Tel: (0484) 25334  
**HULL** Computer Centre 23 Anlaby Rd. Tel: (0482) 26297  
**LEEDS** Bass & Bligh 4 Lower Briggate. Tel: (0532) 454551  
**YORK** York Computer Centre, Stonegate Arcade. Tel: (0504) 641862



# GOLD

## A NEW GENERATION

### GOLDSTAR HOME REFERENCE

informative and helpful programs which teach useful, practical skills

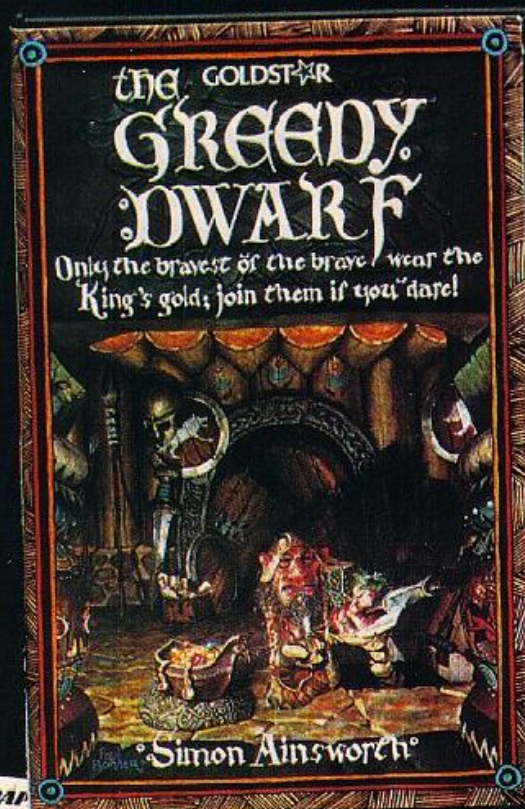
With applications to business and professional purposes as well, this is software which will turn your home computer into an invaluable learning resource.



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

SKETCH PAD  
cassette version  
BBC Model B/  
Acorn Electron

GOLDSTAR  
**SKETCH**  
Pad  
GARY ATKINSON  
Hours of drawing fun  
with the ultimate in  
electronic easels



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

Doring Kindersley Software, 1-2 Henrietta Street, London WC2E 8PS or ring 01-836 6388

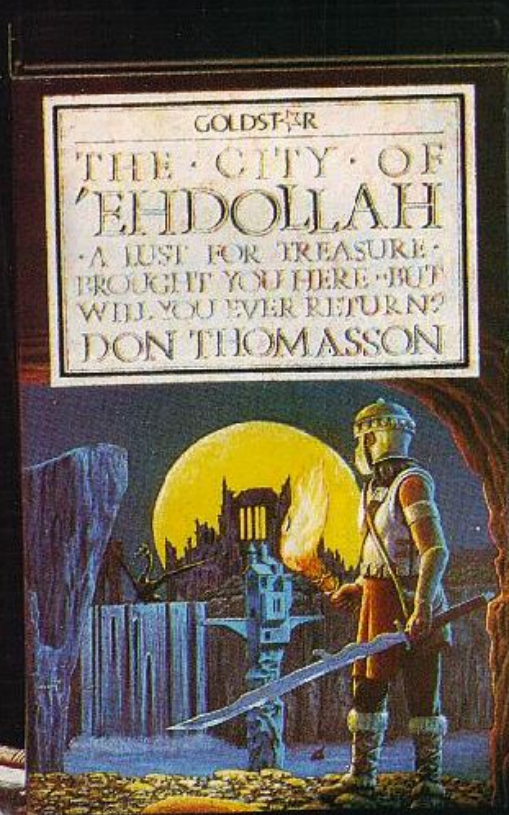
Clip the coupon for your free catalogue. Send to:  
Block Capitals Please  
Name.....  
Address.....  
Post Code.....  
YC

Full supporting documentation in each pack  
Available from your nearest computer dealer now



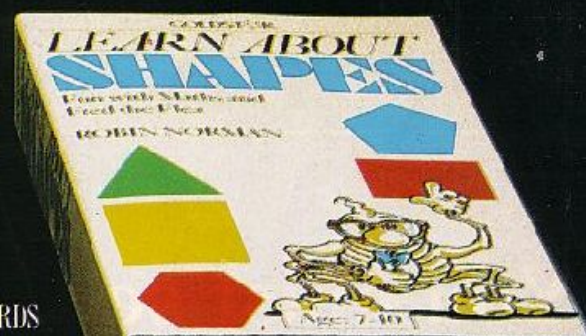
# GOLDSTAR

## OF SOFTWARE

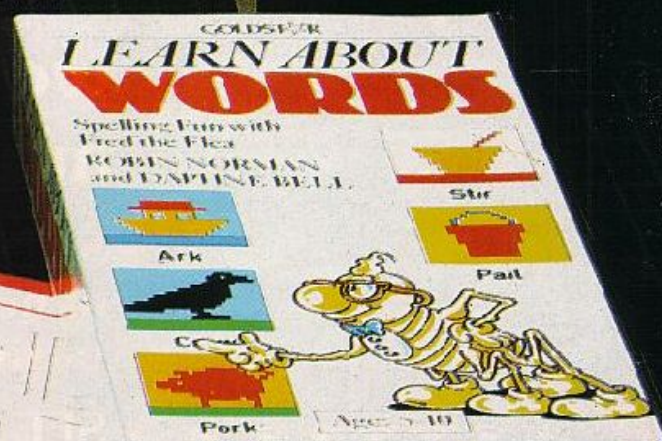


**THE CITY OF 'EHDOLLAH**  
cassette version, ZX Spectrum (48K),  
BBC Model B, Commodore 64

**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





Sponsored by  
The Micro User  
and Electron User

There's much more to show.  
So this summer we go to a  
new home – to give us much  
more room to show it all!



Alexandra Palace, London, Thursday to Sunday, July 19 to 22

You must see for yourself all the rapid  
developments in the ever-expanding  
world of the Electron  
and BBC Micro!

#### MONEY SAVING OFFERS

**School & College Groups:** Only £1 per student if booked in advance. Send cheque (payable to Database Publications) and SAE to:  
Electron & BBC Micro User Show, 68 Chester Road,  
Hazel Grove, Stockport SK7 5NY. Tel: 061-456 8383.  
(Valid for minimum of 10 people).

**Travel & Hotel Offer:** Cut price rail tickets and reduced London hotel rates. Contact: Travel Offer,  
PO Box 1, St Albans AL1 4ED with SAE or  
Tel: St Albans 34475 quoting The Electron & BBC  
Micro User Show.

- ★ **SEE the latest software – hundreds of new games, educational and business programs.**
- ★ **SEE all the latest add-ons – never before have so many exciting new peripherals been launched.**
- ★ **SEE all the latest techniques – and get free advice from our team of experts, writers and programmers.**
- ★ **Make a note in your diary – NOW!**

VOUCHER  
WORTH  
**£1**

This voucher is worth £1 per person  
off the normal admission price of  
£3 (adults) and £2 (children)  
(Valid for a maximum of 4 people)

#### Electron & BBC Micro User Show

10am - 6pm, Thursday, 19 July  
10am - 6pm, Friday, 20 July  
10am - 6pm, Saturday, 21 July  
10am - 4pm, Sunday, 22 July

Alexandra Palace  
Wood Green, London N22

PCW7



## Make USE of your SPECTRUM

ADVERTISE your PRODUCTS or COMPANY.  
DISPLAY your MESSAGES and SLOGANS  
in an EYE CATCHING, EXCITING  
FAST MOVING WAY

with

# BILLBOARD

THIS  
FANTASTIC

Machine-code PROGRAMME

Allows you to display your messages  
in a very COLOURFUL and ATTENTION-  
GRABBING way.

## SEEING IS BELIEVING

For use in SHOPS, at EXHIBITIONS and  
CONFERENCES, in FOYERS, LIBRARIES,  
INFORMATION BUREAUX & at PARTIES.

VERY SIMPLE TO USE.

Only for use with the 48 Kbyte  
SINCLAIR ZX SPECTRUM COMPUTER  
SPECIAL INTRODUCTORY PRICE £7-95  
Send cash or cheque with order

### ORANGE ENTERPRIZES

20 BADBY Rd., DAVENTRY, NORTHANTS, NN11 4AP.

SINCLAIR, ATARI  
COMMODORE

COMPUTER REPAIRS  
by the  
SPECIALISTS

**W**  
**Walkers**  
COMPUTER SERVICE  
AND REPAIRS  
Telephone (021) 643 5474  
Telegrams  
Shiplog Birmingham  
Telx 337124 TWSLOG G

WALKERS will repair your MICRO quickly  
and efficiently.

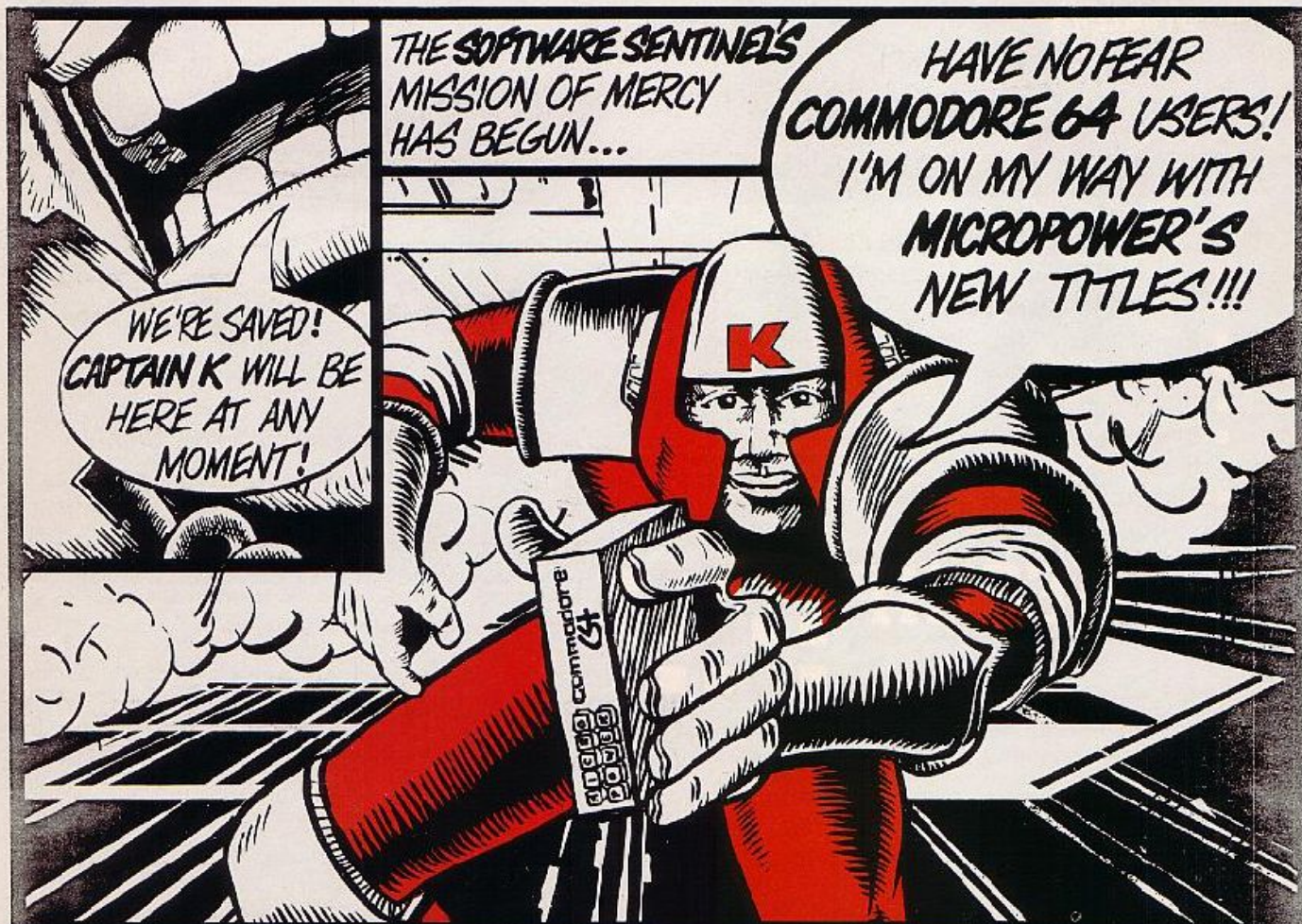
Services available to suit the Customers  
requirements include "one-off" repairs and  
Quotations.

Most Repairs will be in the range  
£15 to £30  
subject to machine

FOR INFORMATION  
PHONE 021-643 5474

CALL IN AT  
58 OXFORD STREET, BIRMINGHAM, B5 5NX

OR SEND S.A.E. FOR DETAILS



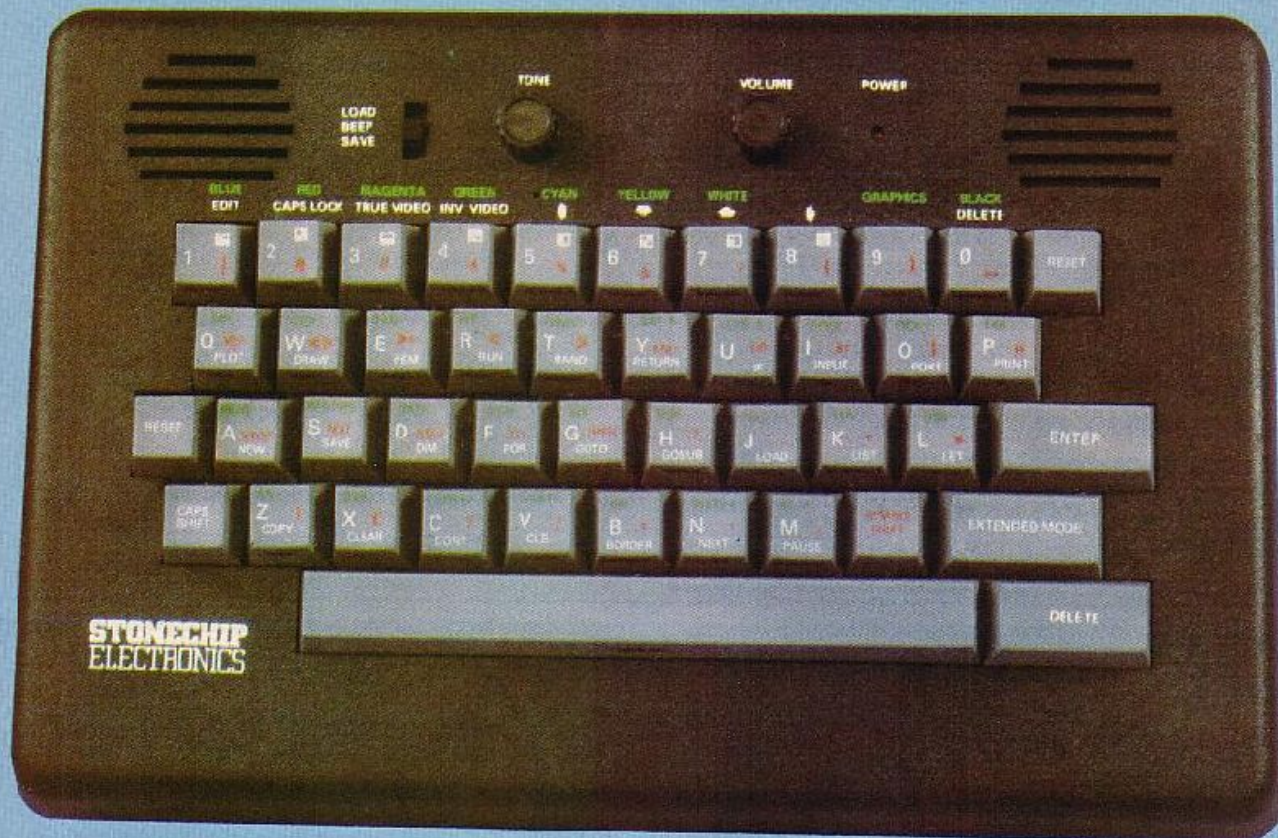


# The Key To Success!

Now, with the new Stonechip Spectrum Keyboard, the user has no worry of damaging the Spectrum itself as improved designing enables it to fit the case perfectly.

Assembling the case is simple as it consists of two halves, the top half containing the keyboard, with a small printed circuit board, attached by ribbon cable, plugging into the rear of the Spectrum. The lower half fits precisely around the Spectrum, thus preventing any risk of damaging through movement.

Your Sinclair guarantee need not be invalidated since the Spectrum does not require removal from its case.



## THE MAIN FEATURES OF THE KEYBOARD ARE:

- ☐ No modifications to Spectrum necessary as it connects via rear port.
- ☐ Full-length space bar.
- ☐ Built-in 'Echo' amplifier and tape interface.
- ☐ RESET keys remove the need to disconnect power supply lead.
- ☐ Single key 'DELETE'.
- ☐ Single key 'Extended Mode' selection (ie one key replaces the CAPS SHIFT and SYMBOL SHIFT function).
- ☐ Fully compatible with Interface 1 and most peripherals.

**STONECHIP**  
**ELECTRONICS**

Stonechip Electronics, Unit 9, The Brook Industrial Estate,  
Deadbrook Lane, Aldershot, Hants. Telephone: (0252) 333361

Extender unit available to use with Interface  
2 and Kemoston Joystick Interface. £2.50.

**£59.95**

DEALER ENQUIRIES WELCOME  
Delivery approximately 28 days

To: Stonechip Electronics, Unit 9, The Brook Industrial Estate,  
Deadbrook Lane, Aldershot, Hants. Telephone: (0252) 333361

Please forward me the following products:

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

Name .....

Address .....



Please debit my Access

Card Number

I enclose Cheque/PO for £



SINCLAIR  
ORIC, COMMODORE  
ACORN, MEMOTECH, ETC

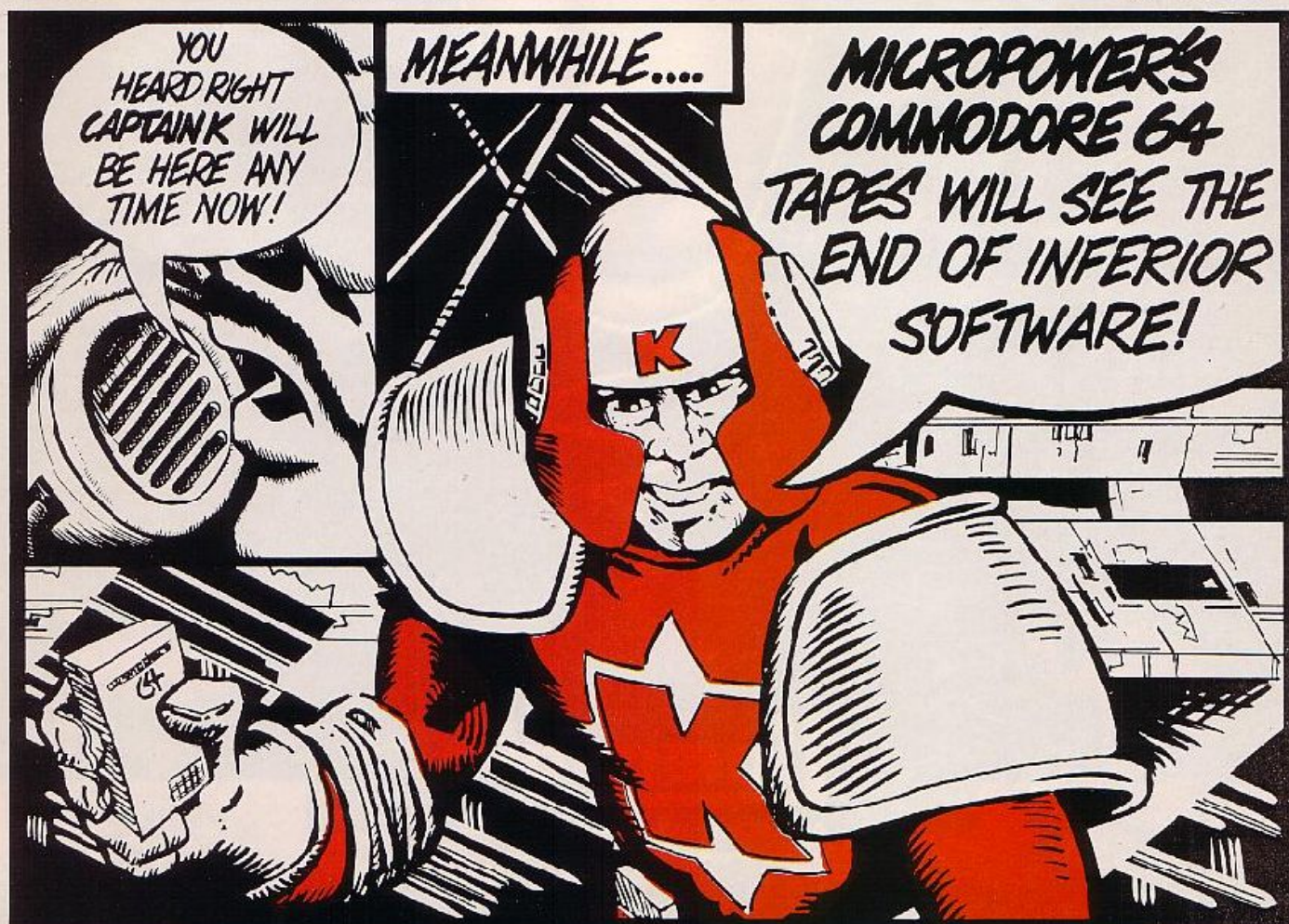
# MICRO---

We export Microcomputers  
and Peripherals to all Countries  
Any make. Any Quantities  
**BIG DISCOUNTS**

send for comprehensive price list:  
MICRO-X LTD (Dept 166)

765-767 HARROW ROAD, LONDON NW10 5NY  
TELEPHONE 01-968 6622 TELEX 915865 MICROX G.

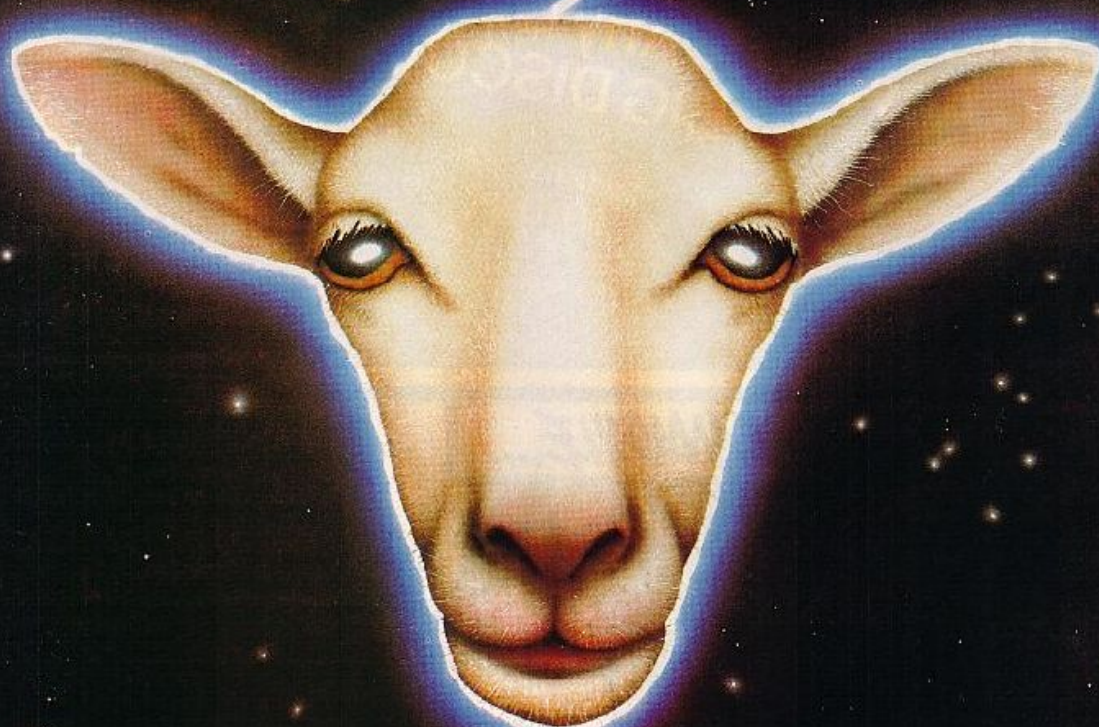
# EXPORT





HOVER BOVVER, REVENGE  
AND NOW

# SHEEP IN SPACE



**Llamasoft**

AWESOME GAMES SOFTWARE



SL

THE LATEST CBM 64 WORK BY JEFF MINTER AVAILABLE FROM LLAMASOFT

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



# NEW! NEW! NEW!

## SPECTRUM SOFTWARE

by **COMPUSOUND**



# BLOCK BUSTER © 1983

BLOCK BUSTER will test your knowledge to the brink. The game starts off easy, but as you pass the 'commercial breaks', BLOCK BUSTER gets harder and harder.

48k SPECTRUM. ONLY £5.95 + 50p post & packing.

## COMPUSOUND



Overseas and Trade Enquiries  
Welcome



DEPT. VC7 32-33 LANGLEY CLOSE, REDDITCH, WORCS B98 0FT  
TELEPHONE: (0527) 21429 (21439 Answerphone)



# 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 crew 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, Always 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:



## selec



SOFTWARE

37 Councillor Lane, Cheadle, Cheshire. Phone: 061-428 7425

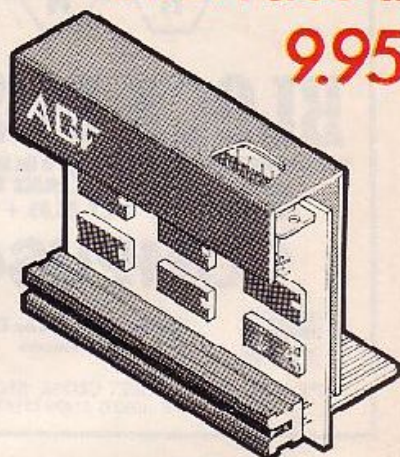
DEALERS  
EVERYWHERE  
CLEAR THE  
DECKS AND  
AWAIT THE  
ARRIVAL OF  
THE SOFTWARE  
SENTINEL...





# STARRUNDO

## Interface II



Supplied with Quick Reference Cards, to speed up setting to your favourite games, demonstration cassette and twelve months guarantee.

**26.95** plus £1 post & packing

Still incorporating the all important rear expansion connector which means other peripherals can be connected at the same time ie Ram Packs, Printers, Special Units etc., and of course the key replication principle used guarantees this will never conflict electrically with any other add-ons.

## Quickshot II

RomSlot is fully compatible with all other add-ons via a rear connector and is cased and fully guaranteed for twelve months.

**only 11.95** plus 50p post & packing



## Quickshot

Please allow up to 28 days from receipt of your order although we normally dispatch from stock within 7 days. All AGF products are guaranteed for 12 months and are supplied on a 14 day money back undertaking. AGF Hardware, Bognor Regis, West Sussex. Telephone: 01243 823337.

OVERSEAS PRICES ON APPLICATION  
DEALER ENQUIRIES WELCOME



## STACK 100 LIGHTPEN - £28.75 GIVES YOUR COMPUTER EYES!

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

**SLR**  
(STACK LIGHT RIFLE)

AS  
SEEN ON  
T.V.!

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

**JUST TWO OF THE EXCITING  
PRODUCTS IN 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.

BORING SOFTWARE HAS  
FINALLY HAD ITS CHIPS!  
**CAPTAIN K - THE SOFTWARE  
SENTINEL**, ARRIVES LADEN  
WITH MICROPOWERS  
COMMODORE 64 TAPES

OUR  
TROUBLES ARE  
OVER! CAPTAIN K  
IS HERE AT  
LAST!!!

COMMODORE  
64 USERS HAVE  
WAITED  
TOO LONG!



# A NEW WORLD OF ADVENTURE

## BLACK CRYSTAL



### BLACK CRYSTAL A THIRD CONTINENT SERIES ADVENTURE

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

### THE CRYPT by Stephen Renton

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

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

## THE CRYPT



## ADVENTURES OF ST. BERNARD

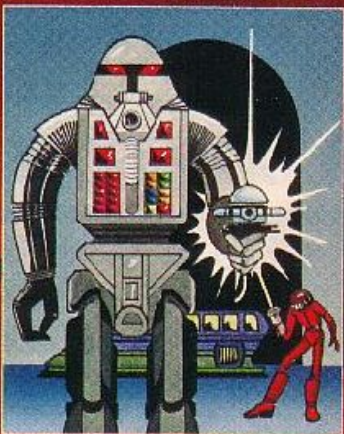


### THE ADVENTURES OF ST. BERNARD

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

Available for 48K Spectrum **£5.95**

## STARFORCE ONE



### 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 Magma and her Evil Allies to rescue the Elvin 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**

### THE DEVIL RIDES IN

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

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

Available for 48K Spectrum **£5.95**

## DEVIL RIDES IN



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

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

**DEALERS:** Contact us for your nearest wholesaler.



# FROM CARNELL SOFTWARE



## **"THE WRATH OF MAGRA" A THIRD CONTINENT SERIES ADVENTURE**

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

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

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

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

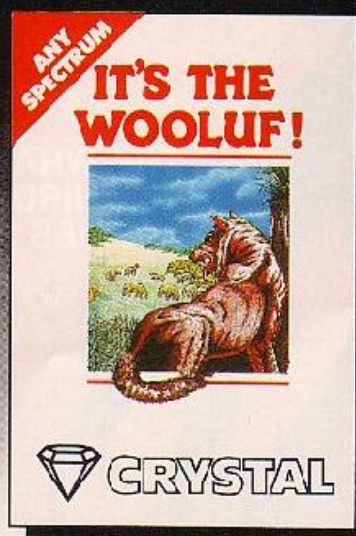
Available from Feb '84



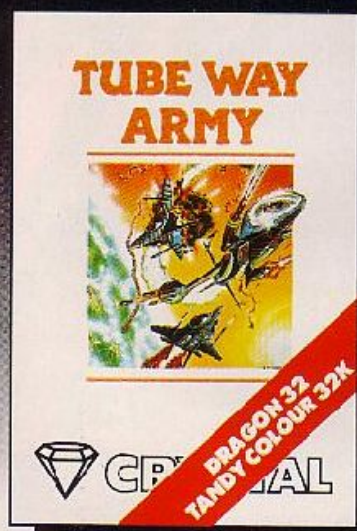
CARNELL SOFTWARE LTD



# 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 Snatchers', 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.



**HALLS OF THE THINGS**

Written by: Neil Mothershead,  
Simon Brattel and  
Martin Horsley



**INVASION OF THE BODY SNATCHERS**

Written by: Simon Brattel  
and Neil Mothershead



Written by:  
Graham Stafford



**ROMMELS REVENGE**

Written by: Martin Horsley



**THE DUNGEON MASTER**

Written by: Graham Stafford

COMING  
SOON  
RETURN  
OF THE  
THINGS

All titles for  
48K Spectrum  
unless  
otherwise  
stated

Selected titles available from:-



other large department stores and all good mail or  
software retailers. Alternatively, send the coupon to:-



CRYSTAL COMPUTING, 2 ASHTON WAY,  
EAST HERRINGTON, SUNDERLAND SR3 3RX.  
**TRADE ENQUIRIES WELCOME:- Tel: 061-205 6603.**

CRYSTAL COMPUTING IS THE TRADING NAME OF CHANCREX LTD.  
The name Crystal is used under license

**PROGRAMMERS!** IF YOU HAVE WRITTEN ANY SOFTWARE THAT COMES UP  
TO OUR STANDARDS? IF SO SEND IT TO US FOR EVALUATION.  
WE OFFER GENEROUS ROYALTIES.

Please supply:

INVASION OF THE BODY SNATCHAS	<input type="checkbox"/> £6.50
HALLS OF THE THINGS	<input type="checkbox"/> £7.50
IT'S THE WOOLUF	<input type="checkbox"/> £6.50
TUBEWAY ARMY	<input type="checkbox"/> £7.50
CATALOGUE OF LATEST SOFTWARE	<input type="checkbox"/>
THE DUNGEON MASTER	<input type="checkbox"/> £7.50
ROMMELS REVENGE	<input type="checkbox"/> £6.50
ZEUS 64	<input type="checkbox"/> £9.95

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

Enclose cheque/p.o. for .....  
P & P included. Overseas orders, please add £1.50 per item.

YC7



## MAIL ORDER PROTECTION SCHEME

If you order goods from Mail Order advertisements in this magazine and pay by post in advance of delivery, *Your Computer* will consider you for compensation if the Advertiser should become insolvent or bankrupt, provided that:

- (1) You have not received the goods or had your money returned; and
- (2) You write to the Publisher of *Your Computer* summarising the situation not earlier than 28 days from the day you sent your order and not later than two months from that day.

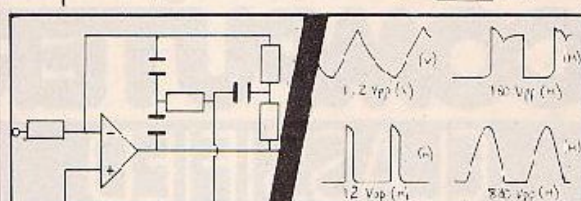
Please do not wait until the last moment to inform us. When you write, we will tell you how to make your claims and what evidence of payment is required.

We guarantee to meet claims from readers made in accordance with the above procedure as soon as possible after the Advertiser has been declared bankrupt or insolvent.

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine not, for example, payment made in response to catalogues etc., received as a result of answering such advertisements. Classified advertisements are excluded.

Spectre

ENFIELD HOUSE  
SWARDESTON  
NORWICH  
NORFOLK



## ELECTRONICS

£ 9.95

**DIGITAL CIRCUIT DESIGNER.** Electronics allows you to draw your circuit diagram in screen using standard symbols for logic gates, transistors, resistors, capacitors, diodes, triacs, diodes, etc. Symbols can be rotated, wiring interconnected or crossed over as required. Once complete the computer will 'power up' your circuit - high voltage levels turn red, low levels turn green. Circuits can be de-activated, modified and re-activated until they function as required, all without touching a soldering iron! Part completed circuits may be saved for future work and displays can be sent to the printer. All components are fully interactive i.e. they can change the state of actions previously performed in the sequence - even oscillators can be seen oscillating. Warning is given of short-circuits. 37 defined graphs are employed.

## LNNET



£ 14.95

**LINEAR NETWORK ANALYSER.** Characteristics of complex 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 16 columns along the paper. LNNET deals with both 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.

48 K SPECTRUM

# 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.

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

£34.95

(p+p £2.00)

### ORDER FORM

Please send \_\_\_\_\_ Rotronics audio/data recorders 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 \_\_\_\_\_

YC7



# YOUR COMPUTER CLASSIFIED

# 01- 661 3036

Contact: Claire Notley

## ADVERTISEMENT RATES

Copy Date

Lineage: 40p per word  
(Min. 15 words)

Bx No: £4.00 extra

Lineage advertisements are prepayable and the order form published in this section should be completed and returned with remittance. Credit Card facilities are available.

Display — rates per scc (Min. 2scc)

One insertion	: £8.50
Three insertions	: £8.20
Six insertions	: £8.00
Twelve insertions	: £7.50
Display advertisers should preferably reserve space by phone.	

Post to  
Your Computer, Classified  
Department, Room H211,  
Quadrant House, The Quadrant,  
Sutton, Surrey SM2 5AS.

## Britain's Biggest Selling Home Computer Magazine

## SPECTRUM CHESS

### Dare you face The Turk

The original Turk was an eighteenth century automaton, 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

## SPECTRUM 48K MOVIE- MAKING ANIMATION & MUSIC

prog. £7 incl.  
MORSE-CODE  
READING progs for ZX81 (1K)  
£7 incl. and SPECTRUM  
16/48K £8 incl.  
S.B.E. for full details:-  
**Pinehurst Data Studios**  
69 Pinehurst Park,  
W. Moors, Wimborne,  
Dorset BH22 0BP

## 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 plays in Spectrum in 10 to 15 seconds. 007 SPY is just £3.95

150

### ZX-GUARANTEED (YC)

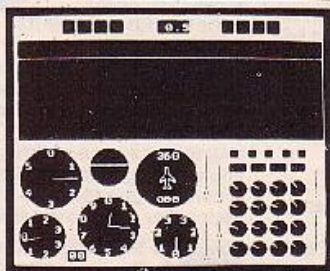
29 Chadderton Drive, Uxworth,  
Bury, Lancs.  
Tel: 061-766 5712

## 747 FLIGHT SIMULATOR

Superbly realistic instrumentation and pilot's view in this simulation which includes emergency such as engine fire and system failure. This program uses 16K resolution graphics to the full to produce a highly realistic flight deck display you won't see on a home computer. There are 31 real data and 25 other indicators (see diagram). Your controls operate modes, weapons, direction, range, speed, altitude, landing gear, engine thrust, flaps, etc. The use of the joystick means to start with, it's a bit of a learning curve. A real simulation, not just another game. Your Computer age, 231. Now on cassette £8.95 (incl. VAT)

O.A.C. Ltd (Dept. YCI)  
25 Waverley Road, Hindley,  
Gr. Manchester M26 3BA

154/4



ACTUAL SCREEN PHOTOGRAPH

## Dee-Kay Systems

THE HOME COMPUTER RAIL  
GAME SPECIALIST

**DRIVE A TRAIN.** We have two games to choose from in our train driver simulation series.

**FLYING SCOTSMAN.** Drive from Kings Cross to Doncaster in an HST Deltic or Brush 47. Performance of motive power is accurately portrayed within this game.

There is plenty of scope for spirited running but watch out for signals.

**CORNISH RIVIERA EXPRESS.** Step aboard a Class 40, HST or Brush 47 and drive from Paddington to Exeter not forgetting your Reading stop. All your concentration will be required on the Berks and Hants section with its many speed restrictions.

Both simulations contain an end of game performance rating to score well you must keep on your toes.

Simulation available for B&C 'B' and Spectrum 48K.

**SPOTTING GAMES** for Steam Railway Enthusiasts.

**SOUTHERN, MIDRAIL and WESTRAIL** — Three great games to take you back to travel as it was in the early sixties. Several hundred steam engines to be seen in each game whilst travelling the length and breadth of the region, with well over one hundred stations in each game. Each engine is graphically depicted with name and number. Treat yourself to a fireside railrover.

Spotting games are the  
Spectrum 48K only.

Available from address as above.

All games £1.50 inc. p&h

SPECTRUM Library, free hire, two tapes, two weeks, hire £1.00. Send £4.00 Life Membership "Softlypost" 49 Stratton Street Wolverhampton 263

## 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

**PROGRAM WRITERS** — We are interested in that Business/Educational/Utility program you are so proud of. We are a small, progressive software house offering a unique partnership to good writers — Ring us and talk it over. Specialist Programs 351 625 5461.

## TOP PROGRAMS TOP DISCOUNTS

### SPECTRUM:

£4.95. Moon Alert, Mr Wimpy, Kang, J.S. Willy, Magic Miner, Pool, Time Bomb, Trashman, Ac Asra, Jack & Beantalk, Spillball, Blue Thunder, 3D Bat Attack.

£5.95. Football Manager, Chuckie Egg, Code Name Matt, Bear Boover, Hunchback, Nightrunner, Fred, Mugsy, Skul.

£6.50. Psytron, Nightlight I, Heathrow, Fighter Pilot.

### COMMODORE 64:

£5.95. Hunchback, Mr Wimpy, Chirase Jockey, Scuba Dive, Super Pipeline, Jammin, Kick Off, Majors, 3D Tank.

£6.95. Galaxy, Flight Path 737, Kong, Cybotron, Space Pilot, Magic Miner, Crazy Balloons, Fire Ant, Ugly, Zoids.

**BBC/ELECTRON (state machine)**

£6.95. Chuckie Egg, Orion Attack, Dare Devil Dennis, Felix Factory, Fruit Monsters, Killer Gorilla, Pod Hal.

**ORIC/ATMOS (state machine)**

£5.95. Galaxy 5, Hammer Attack, Scuba Dive, Hopper Light Cycle, The Ultra, Hunchback, Mr Wimpy.

£6.95. Xenon 1, Zongis Revenge.

**SPECIAL OFFERS**  
The Hobbit (Spec. Orc, Atmos, BBC, CBM64) £10.99

Quickshot II Joystick only £9.95  
Protek Switchable Interface (Spec.) only £17.95

Prices incl. delivery UK (Europe + 50p, others + £1.00)  
Ch. FO's ISAE for info to O.J. Software,  
273 Mossy Lea Rd, Wightington,  
Wigan, Lancs. WN6 9RN.

271



## SPECTRUM & DRAGON TAPE COPIERS (new version)

Makes **EACH UP** copies of ANY type of SPECTRUM (16/48K) program incl. basic files, m.c. (micro) tables easily with MANY UNIQUE features with Tape Copier 5. **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!

**AI Drive** - **GENUINELY** copies BASIC, M CODE arrays into **MICRODRIVE** Stage programs. **VITAL** to alter loading instructions to **HELP** make them run **BETTER** at any time, continue loading feature.

**MAXWELL'S** makes a working copy of programs occupying the full 16K or 48K! Verifies, Repeat copies, Auto, Abort, Program name plus **HEADER** data.

Games **HI-ADVERT** ESS and other types, indeed **ALL** programs that we are aware of. Very user friendly and simple to use, with **FULL** instructions.

**TAPE COPIER 1151** - **TAPE COPIER WITH M DRIVE 1151** - Old customers, updates at £1.50 or £2 with a drive plus SAE and old tape.

**DRAGON COPIER** back up nearly all software only £6.95 with money back guarantee.

LERM Dept YC  
10 Brunswick Gardens, Corby, Northants.

**A BBC, B: WORD PROCESSOR**  
90 columns, editing, justification, saving, printing, inc. instructions suit Microline, Eptom or equivalent.  
**Cassette £6.95 - 40 Track Disk £8.95**  
Send cheque/PO to: **CONE SOFTWARE**  
11a Highview Rd, Sidcup,  
Kent DA14 4EX.

**CASSETTE 50**  
90 games cassette by Cascade for APPLE, ATARI, BBC, CBM 64, DRAGON, ORIC, SPECTRUM, VIC 20, ZX81 at the bargain price of £8.70 per cassette inc. p&p.  
**MAIL ORDER SOFTWARE**  
9 Knowle Lane, Wyke,  
Bradford BD12 9BE.

ORIC/ATMOS Software Club, £5 membership, fortnight's hire £1, discount on purchases, SAE for details: 26 Beechley Drive, Cardiff CF5 3SN 277

## ARROW MICRO SERVICES - Commodore 64 -

### ARROW TURBO-SAVER

Ted up with waiting for those programmes to load! Will you need Turbo-Saver, easy to use and faster than 1541 Disk drive, save a fortune on tapes. £7.00

### ARROW TRANSFER

Transfer your favourite games and programmes to Disk, micro, soft and Auto runs, full instructions included. £7.00

### ARROW SAFE

Make safe back-up copies of many of your favourite programmes, works with most software, easy to use. £3.50

**ARROW MICRO SERVICES**  
20 Portmeadow Walk  
London SE2

## DISCOUNT SOFTWARE

Huge Discount off all Computers.  
12 Page Catalogue including

SPECTRUM	R.S.P.	OUR PRICE
HOB811 (Melbourne)	14.95	11.99
MAN C MINER (Bug Byte)	5.95	4.95
COMMODORE 64		
EVEREST ASCENT (Shepherd)	6.50	5.00
SKI FUN (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 catalogue of software.

For Most Computers to:  
**DISCOUNT SOFTWARE**  
45, Brunswick, Bracknell, Berks

1/53

APPLE IIe Data Star package £170 one, new, includes 280 card, CP/Mos 70 Cols & for micro. Walters, Reading RG5 2D.

## 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

## BACK-UP TAPE COPIERS

Unique machine code programs to allow security backup copies of the majority of protected software.

Available for:	
COMMODORE 64	£5.95
ELECTRON	£5.95
VIC 20	£5.95
ATARI	£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 VAT, Post & Packing, Cheques or Credit Card accepted to

**EVESHAM MICRO CENTRE**  
Bridge St, Evesham, Worcestershire  
Tel: 0585 49641  
NEW SHOP NOW OPEN - Micro Centre,  
1750 Pershore Rd, Cottingham, Birmingham Tel: 021-584 554

# 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







## SPECTRUM and DRAGON TAPE COPIER 5 and now MICRODRIVE 1

WE OFFER ON ALL PRODUCTS A FULL MONEY BACK GUARANTEE, an update service, and FULLY detailed instructions, with USER friendly programs. March that!

TAPE COPIER 5 (TC5) makes BACKUP copies of ANY type of SPECTRUM (16/48K) program (incl. headerless, m/c, unstoppable) easily with MANY unique features.

MAXIMUM 5 STARS from H.C. Weekly just like GRAPHICS and SOUND TOOLKIT — £5.50.

- LOADS in all program parts CONTINUOUSLY — even without pressing a key. Other copiers require many loadings — MASSIVELY saving you time and trouble! Maxbytes even manages a working copy of the full 48K.
- M/Drive — this extra option GENUINELY copies BASIC, M/CODE + arrays onto MICRODRIVE.
- Verifies. Repeat copies. Auto. Abort. Program name plus HEADER data.
- Copies virtually ALL programs. UPDATE service for old customers, to keep pace with latest developments £1.50 (£2 with m/drive) + SAE + old TAPE.

### MICRODRIVE ONE (MD1)

48K Spectrum owners with m/drive can NOW transfer the MAJORITY of their programs (incl. headerless, long programs, + those with LOW addresses — say 16384).

TC5 transfers the bytes, but MD1 has 5 programs to HELP YOU get them running + 2 "CAT" housekeeping programs. Includes advanced header reader, program analysis, and other programs that produce the m/code you need. Manual has examples/exercises. UNRIVALLED!

Spectrum T.Copier £4.50 (or £5.50 with m/drive option), Dragon Copier £6.99, Microdrive Cne £6.50.

OVERSEAS customers: add £1 Europe, £2 others for each product. Please send SAE for enquiries.

LERM, DEPT YC, 10 BRUNSWICK GDNS, CORBY, NORTHANTS.

### 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.

4 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 analysis and small businesses.

Interested? Send cheque/P.O. for £7.50 per cassette (incl. P&P) or £14.95 per microdrive cartridge to:

P. E. MAJOR B. Tech (Hons)  
49, Westbury Road,  
Brentwood,

Essex CM14 4JS  
Supplied with Comprehensive  
Instructions

QUICK DESPATCH

GRAPHX: 48K Spectrum. Print anywhere on screen, variable height/width, sideways, 64 characters/line and more. Smooth box scrolling. Many other routines. £3.95 from A. M. Hay, Glendale, Salcombe Hill Road, Gilmouth, Devon. 319

\*\*\*\*\* ATMOS/ORIC 1 \*\*\*\*\* software club. SAE for details. 26 Beechley Drive, Cardiff CF5 3SN. 320

THE DUKE cassette/micro drive back-up utility. Programme re-writing unnecessary with ultimate, imagine games etc. Even copies Scrabble! £5.95. Mr. M. Alexander, 24 Whitecross Road, Hereford, Herefordshire. 329

When replying to Classified advertisements, readers are recommended to take steps to protect their interests before sending money.

## HOME ACCOUNTS

Put your house in order! Probably the best home use for your computer! Comprehensive coverage of bank accounts, credit cards, HP, etc. Inbuilt accuracy check for all transactions. Project cashflow for any period ahead. Available for CBM 64 or Vic-20. £7.50 or free details from:

DISCUS SOFTWARE  
FREEPOST, Windmill Hill  
Brixham TQ5 9BR  
Tel: 080 45 55532

Sabra Will (Spec.)	£7.99
Twin Kingdom (CBM, BBC)	£7.99
Mr Mephisto (CBM £5.75) Spec.	£4.75
Jet Set Willy (Spec.)	£4.70
Fred (Spec.)	£5.70
Trashmen (Spec.)	£1.65

Write, ring or full list now!  
State comp.

TECHNIPLAY SOFTWARE  
74 Dornoch Drive, Hull HU8 6J.  
0482-712958

## 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, Bamberg Close, Corby,  
Northamptonshire NN18 9PA.

## PERSONAL SOFTWARE USERS' ASSOCIATION

Look at these services:  
LIBRARY with hundreds of titles  
SWAP-SHOP service for exchange of cassettes

PURCHASE of members' cassettes  
SALE LIST — half-price on selected cassettes

If you own a Spectrum, Dragon, Commodore 64, BBC, Vic 20, Oric or T.I. 99/4a send a large S.A.E. to:

P.S.U.A.  
19 Lammerton Terrace,  
Dundee DD4 7BR  
naming your micro

SWAP Adventures with Longfield Exchange. Phone (0422) 831454. Members, to indicate swap. We reply when swap arranged. You only pay ten. Any machine £1.25 cassette, £2.25 disk. 256

## SPECTRUM KOPYKAT

Simply the best. Copying any 16/48K Spectrum program is as easy as LOADING & SAVING your own programs. Even unstoppable programs can now be backed-up onto a fresh tape. Only £4.95.

IT CAN EVEN COPY ITSELF

NEW

## MICRODRIVE KOPYKAT

Transfer your cassette based software onto the ZX Microdrive RELOCATES programs. Steps & reveals programs ESSENTIAL for M/D transfer. Only £4.95.

Both with FREE Header Reader Despatched by Return of Post.

MEDSOFT  
PO Box 84, Basingstoke,  
Hants

## 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 Woodside, ASH, KENT, CT5 2HF

Ph. (0304) 813098 for UPDATE prices.

SPECTRUM SYNTHESIZER. Metronome, Drum, Sounds, Rolling Chords and Piano options. 'Play The Guitar' for all beginners. 'Reading Music', learning from basics with keyboard practice. At 48K Spectrum, £5.00 each. Scott, Massie, No. 1 Bungalow, Friends, Bughfield Common, Berks. 270

FREE SOFTWARE EXCHANGE SAE MEMBERSHIP FOR DETAILS  
Swap your used software for those programs you've always wanted (from 75p).

Vic20 & CBM 64 Spectrum & Dragon  
Maveric Enterprises UKSEC  
101A Underdale Rd. 15 Tunwell Grove  
Shrewsbury SY2 5EF Sheffield S5 9GB  
75p per swap

48K SPECTRUM owners O-level S.C.E. C.S.E. Maths: gives your children private tuition for only £3.99. Mr Sof., Dept YC, 95 Gilton Rd., Northolt, Middx. UB8 4ST. 262

## COPYMATE 64

Simply the best CBM 64 tape back-up utility you can buy. SAVES TO TAPE AND/OR DISK. Two programs on one cassette gives UNEQUALLED RANGE. A professional product supplied on a quality cassette with full instructions. ££.75

RESET SWITCH for CEM 64 and Vic-20, simply plugs into your computer, with free program on tape to recover control from lockouts, auto runs, etc. ££.99

HORIZON SOFTWARE  
15 Bamberg Close  
Corby, Northants NN18 9PA

## SWAP IT!

IF YOUR BORED WITH YOUR SPECTRUM SOFTWARE  
There's 200+ titles you can have Cheap & easy, only 99p per swap, incl. P&P (UK) NO EXTRA COST SEND A SAE+5p (REFUNDABLE) TO SWAP IT! 5 Longhey Road Wythenshawe Manchester M22 7UA (5p ie 5p coin)

HERE AT LAST! Fast M/C programs for 16K ZX-81. Addictive arcade action, ZX-EEL and Meteors both for only £3.00. D. Soft, 6 Wykin Road, Hircley, LE10 0HY.

BUG BITE. Manic Miner, practise with endless lives on any sheet. For instructions send £1 and SAE to Supa Software, 5 Nesh Court, Upton, Chester CH2 1DN. 286



## SPECTRUM SOFTWARE



48K Graphik-Adventure  
DM 34.90 £7.99



16 & 18K Poker Game  
DM 22.90 £5.99



48K Arcade Action  
DM 34.90 £7.99

SABRE WOLF, ATIC ATAC, JET SET WILLY, MT. OF KET, TPL. OF VRAN, FRED ...

XYZ ANTONIUSSTR. 5 D-4400 MUENSTER.  
TEL. 0251/58583

Dealers welcome!

Sendig die neuen Programmlisten anfordern!



## SUPER BREAKER

For the COMMODORE 64, this utility will back-up most popular cassette programs onto Tape or Disk. Also now available a TAPE TO DISK UTILITY for transferring cassette software onto Disk. Both are supplied with full written instructions on a data cassette and both priced at just £4.99 each. For a fast turn round of orders, by First Class Post, Ilush Cheques/P.O., or SAE for details, to:

**Clark Kent Software**  
26 North Cape Walk  
Corby, Northamptonshire.

BROTHER HR-5 printers (Centronics & RS232) £149.90. Imagine games £3.95, 48K Spectrums £119.90, Quicksheet II joysticks £9.50. Pay Computer, 135-137 Glasgow Road, Glasgow G69 6TA. Telephone: 041 771 0074. VAT included. P&P free.

VIC TAPE BACKUP will backup most Vic-20 programs, in BASIC, machine code, or both. Detailed instructions are printed on the card inlay. VIC Tape Backup is easy to use, with prompting by colour and by sound — when the colours change and the tone sounds, the copier is ready! Load errors are signalled, so poor originals can be tried again. Works with all memory configurations — one machine-language program allows automatically for memory differences! Send crossed cheque/P.O. for £7.95 to: Level Software Ltd, PO Box 55, Shirley, SOLIHULL B90 4SL. Tel: 021-643 6725.

## ATARI 400/600/800/XL

### Cartridge Backup System

Back up 816K cartridges to tape and disc. 400/600 with 48K ram. De luxe version has gold edge blades on cartridge slots or Cartridge to tape & disc: £15.00 ex lux £20.00 Spare simulator board: £12.00 ex lux £17.00

### XL Cartridge Backup

Now available. Send for details and price.

### Tape Duplicator

Duplicate almost any single or multistage tape. BASIC program. 18K ram recommended. Tape Duplicator: £6.00

### Fast Loader

Reduce tape loading time of almost all of your single or multistage tapes by up to 50%. No hardware modifications required, uses standard 410 or 010 program recorder. Fast Loader: £10.00

### 600XL Memory Upgrade

Upgrade your 16K to 34K. Complete kit with full instructions. Memory Upgrade: £75.00

### Services

Listing and prompt blowing services also available. Send for details.

Send large SAE for further details on any/all of the above and new products. All prices are inclusive of p&p. Utilities are for 400/800/600XL/300XL unless otherwise specified.

S. Tarrell  
17 Cock Close Road, Yaxley,  
Peterborough PE7 3HJ

## SOFTWARE SALE

Quality original software

at the lowest possible prices

OCEAN: Rocky Adventures £3.95  
Wimpy 64, Hinchback £4.50  
CDS: Safari, Warbirds £3.95  
SHEPHERD: Super Spy £4.50  
LLAMASOFT: Revenge M.C. £5.95  
Gridrunner (VIC) £3.95  
A&F: Cylon Attack (BBC) £4.95

Many other titles in stock.  
Send SAE for list, stating type of micro.

Cheque/P.O. to:  
D J SOFTWARE  
37 Earl St., Clayton-le-Moors  
Accrington, Lancs.

Very short but powerful programs, by professional educators. From simple arithmetic to concepts of volume balance and direction. Mostly as games. Creative graphics. Fully documented. Strongly recommended by educational authorities. A MUST for primary school children.

## EDUCARE'S 50

Book of fifty programs for primary education

Spectrum ZX81 (1K) £5.95 BBC Micro/Becton £7.95

EDUCARE 139a, Stane St., Lond. SW1X 9AY

LYNX 128K boxed as new. CPM 80 column text. Bargain £300, will negotiate. Tel: 0273 688859 266

## Spectrum Repairs

£16.95 inclusive of labour, parts, p&p etc. ZX81 for £1. Fast reliable service. (Av. repair 24 hrs) by qualified engineers. Send computer only to:

IIS COMPUTER SERVICES  
2 The Orchard, Warton, Preston, Lancs.  
PR4 1BE. Tel: 0772 532686 or 634897

## 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

## SPECIAL OFFER

This month only  
we will pay your V.A.T.  
EPSON RX 80T £236.00  
EPSON RX 80FT £269.00  
EPSON FX 80 £372.00  
£5.00 carriage

**CASCOM**  
67 Elstow Road, Bedford,  
Bedfordshire

## WIN A SINCLAIR QL

TIRED OF YOUR OLD TAPES?  
NEW GAMES TOO EXPENSIVE?  
JOIN THE FASTEST GROWING SWOP CLUB  
JUST SEND 3 X 16p STAMPS FOR INTRO  
PACK AND QL COMPETITION ENTRY FORM.  
(quote computer model)

**Swoppatape**

PO Box 18  
HESWALL, WIRRAL,  
MERSEYSIDE L60 1YN.

COMPUTER covers, Vic 20/64, BBC and others at £5.99 inclusive p&p. Send SAE for sample beige leather-look material and order form. P. A. Burke. 260

## PROM SERVICES

ANALOGUE CONVERTERS  
for ZX81 and SPECTRUMS

8 bit 8 channel input £23.95  
8 bit 3 channel output £26.95  
12 bit 8 channel input £57.95  
3 slot motherboard £16.95  
23/28 way edge cards 75p,  
connectors £2.50.

SAE for details of these and many other interfaces.

**EPROM SERVICES**

3 Wedgewood Drive,  
Leeds LS8 1EF  
Tel: (0532) 667183

## SINCLAIR SERVICE CENTRE

We have the spares for all repairs to: Spectrum, ZX81, rampack, printer etc. Also available Spectrum update 16K-48K. By post £27.00 inclusive issue 2 & 3 boards! SAE enquiries to: Quantum, 33 City Arcade, Coventry, West Midlands or Phone Coventry (0203) 24632.

757

ORIGINAL programs urgently needed! Oric and Commodore 64. Educational or Games. Cash payment or royalties. Professional advice strictly adhered too. Send your program for consideration. Knight Products (UK) Ltd., 71 Colne Road, Earby, Lancashire BB8 6XL.

ZX81 M-CODE GFAPICS 3-D TRACER Objects display & print XYZ coordinate realy C.A.D. Cass + manual only. £5.95 cheque payable to Dany Hladky, Krimmer Strasse, 10 D-6050 Offenbach/M/W.G. Trade enquiries welcome (IMP-EX) 296

The Publishers take all reasonable care to ensure that classified advertisements are genuine, but readers must satisfy themselves that they will be obtaining what they require before entering into transactions, particularly if they involve large sums of money.

## COMMODORE 64 AND VIC 20 PROGRAM COPIERS

They copy most cassette based BASIC, machine code and multi-part programs of any size. Both copies are written in machine code. Programs using a range of protection techniques can be copied easily. Audic 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/P.O.s payable to IAN WAITE.

Send orders to:  
IAN WAITE, Dept YC,  
11 Hadenbarrow Road,  
Sheffield, S8 3AU.

## Programming the

## PET/CBM

By Raeo West

### The Reference Encyclopedia for Commodore PET and CBM Users

Comprehensive teaching and reference book on programming Commodore's 2000, 3000, 4000 and 8000 microcomputers and peripherals.

Many programs, charts and diagrams. 17 chapters, appendices, and index. 6 + 644 page large-format paperback. ISBN 0 9507740 0 7. Price in UK and Europe £14.90 each (includes post and packing). 48 hour order turnaround guaranteed.

From dealers and booksellers or direct  
Trade Manager, Edward Arnold (Publishers) Ltd,  
Woodlands Park Avenue, MAIDENHEAD, Berks SL3 3LX.

Tel: (062882) 3104

A masterpiece — Creative Computing

Essential — Educational Computing

Excellent — Jim Strassna

Comprehensive & Accurate — Jim Butterfield

Send orders and make cheques payable to:  
Trade Manager, Edward Arnold (Publishers) Ltd,  
Woodlands Park Avenue, MAIDENHEAD, Berks SL3 3LX.

Send ..... copies Programming the PET/CBM at £14.90

I enclose cheque/P.O. for £.....

NAME .....

ADDRESS .....



### POOLS PREDICTION

Made easy on 48K Spectrum. Outputs best draws, homes and aways. Features analytical draw finder which allows program to learn from its own mistakes, however small comes with free permutation calculator program.

131 dividends won by writer so far. ("This is the best and most scientific of any program I have ever seen" Mr. Rap Secretary, Orpington Computer Club).

British Pools.....at £8.95  
Australian Pools.....£8.95  
Flat Racing.....£19.95

#### FLAT RACE PREDICTOR

Very successful race predictor for the flat racing season. No knowledge of racing required.

Dept. YC, ROMBEST, 9 Hawkstone Avenue, Newport, Salop, TF10 7SE

### 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.

- Can copy multipart programs all in one go automatically.
- Can copy a genuine 48K long program.
- Genuinely the easiest copier to use.
- Has copied all programs we know of.
- Microdrive Compatible AND includes program to transfer tapes to your Microdrive AND they'll work.
- 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

50 COLUMN Lining paper, plain or W/R — buy in bulk and save — box of 2000 sheets £14 (inc. p&p). Cheques or P/O to: S.J.F. Enterprises, 9 Chilton Road, Maidenhead, Berks.

## SPECTRUM SOFTWARE CLUB!

LOWEST COST

FREE CASSETTE!

- \* Hire and Exchange games from just 50p
- \* Buy new games at the best possible discounts
- \* Hundreds and hundreds of games to choose from
- \* Regular Newsletter with details of new releases etc
- \* Every new member gets a FREE BLANK CASSETTE!
- \* All the benefits of other clubs at HALF THE PRICE!

Send just £3.95 and we will rush you your Membership Kit and Free Cassette:

**SPECTRUM SOFTWARE CLUB (YC)**  
287-291 HIGH STREET, EPPING, ESSEX CM16 4DA  
(or send a stamp for catalogue)

## MILLENNIUM Software of the future

Are looking for the millionaire programmers of the future. If you have a suitable games program for any of the popular machines and wish to discuss it's sales and marketing potential.

Write with confidence to:

**Millennium Software**  
18-19 Lower High Street,  
Stourbridge,  
West Midlands

### BECOME A PROGRAMMER

Improve your prospects in the industry of the 80's. We'll develop your skills more quickly and more professionally with our home study Programming Course based on Spectrum. Write for free brochure.

#### IDEAL SCHOOLS

Ref. YC1.  
Freepost Woking, Surrey  
GU21 4BR.

#### 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  
34 Brooks Road, Street, Som. 229

## Make money writing computer programs!

Free details, SAE to:-  
**NOVUS SOFTWARE**  
798 Pershore Road,  
Birmingham, B29 7NG

## SELL IT WITH YOUR COMPUTER

### Classified Rates

Linage: 40p per word (Min 15 words) — prepayable

Linage advertisers should complete the form provided in BLOCK CAPITALS. Phone number, words up to 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'l as below



SIGNATURE

Post to:  
Cut out the order form and return together with your remittance to:  
Classified Department, Your Computer,  
Room H211, Quadrant House, The  
Quadrant, Sutton, Surrey SM2 5AS.  
(01) 661 3036

## CLASSIFIED ORDER FORM

Please insert the following advertisement in Your Computer Classified Section

				LINAGE
				£6.00
				£8.00
				£10.00
				£12.00
				£14.00
				£16.00
				£18.00
				£20.00

No. of insertions required ☐ Box No. required YES/NO

NAME (Please include initials)

ADDRESS

Payment by credit card please state address card is registered

Daytime tel. no

Company Registered Number: 151537 (England, Registered Office: Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.



# microFAST – LATEST PRICE BREAKTHROUGH

## Colour Monitors

Microvitec 1431	£197.00
Microvitec 1451	£297.00
Fidelity CM14	£209.00

## Monochrome Monitors

Sanyo DM2112	£75.00
Sanyo DM8112CX	£99.00
Teco Zcom	£105.00

## Combined TV/Monitors

ITT RL2301	£280.00
------------	---------

## Acorn Products

BBC Model B	£399.00
BBC Model B with fitted disc interface	£469.00
Electron	£199.00
DFS Kit	£97.00
Data Recorder	£32.00

## Torch Products

ZEP 100	£299.00
Z80 DP2	£699.00

## BBC Disk Interfaces

Kenda Mighty Oak	£90.00
Kenda Professional (Double Density)	£130.00

**ALL PRICES SHOWN INCLUDE V.A.T.**

These prices are for cash and carry sales

## Dot Matrix Printers

Star Gemin 10X	£224.00
Star Delta 10	£365.00
KDC FT-5001	£234.00
Epson RX80	£219.00
Epson RX80 F/T	£249.00
Epson FX80	£379.00

## Serial Interface Conversions

8143 – Epson	£30.00
8148 – Epson (2K buffer, XON/XOFF protocol)	£65.00
Juki	£55.00

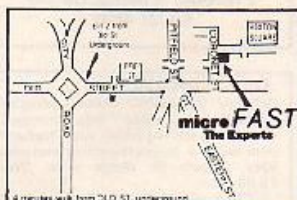
## Daisywheel Printers

Juki 3100	£375.00
Silver Reed	£315.00
Daisy Step 2000	£289.00

## Daisywheel add-ons

Juki Sheet feeder	£239.00
Juki Tractor feed	£109.00

Product range constantly expanding, phone for latest details



## Single Disc Drives

100K (200K) Single-Sided	
40 Track	£150.00
200K (400K) Double-Sided	
40 Track 3-inch	£190.00
400K (800K) Double-Sided	
80 Track	£219.00
80/40 Track	£248.00

## Double Disc Drives

400K(800K) Double-Sided	
40 Track 3-inch	£374.00
800K(1.6M) Double-Sided	
80 Track	£409.00
80/40 Track	£489.00

## Floppy Disks

S/S D/D 40T	£1.80
D/S D/D 40T	£2.10
D/S D/D 80T	£2.90
3"	£4.50
Library Case (free library case with every 10 disks sold)	£2.00
70 Disk Cabinet	£22.00

**microFAST**

57 HOXTON SQUARE,  
LONDON N1

OPEN FOR PERSONAL CALLERS  
FROM MONDAY TO  
SATURDAY,  
9AM TO 6PM.

MAIL ORDER OR OTHER ENQUIRIES  
**01-729 1778**  
SAE for comprehensive Price List

## Computer Concepts ROMs

Disc Doctor	£32.00
Termi	£32.00
Graphics Rom	£32.00
Print Master	£32.00
Wordwise	£42.00

## Acorn Roms

View	£52.00
------	--------

## BBC Roms

Ultracalc	£65.00
-----------	--------

Full range of Software from  
A&F, Program Power,  
Computer Concepts, Level  
9, Acornsoft always  
available at discount prices

## Supplies etc

Printer Cables	£12.00
– Extra quality	£15.00
Monitor Cables	£5.00
– CM14	£8.00
Fibbons	£
– Epson	£4.50
– KDC 2-shot	£7.00
– Daisystep	£4.00
– Juki	£2.00
Paper – 2000 sheets	£12.00

## Mail Order

Software/Firmware	FREE
Hardware	£10.00

## INDEX OF ADVERTISERS

<b>A</b>		<b>F</b>		Micro Technical Support Centre 38	Software Communications Inside Front Cover
AGF Hardware	174	Filesixty	36	Micro X	126, 171
ASC	65			Microdeal	24
Acorn Computers	18, 19, 26, 27	<b>G</b>		Microfas	186
Addictive Games	80	Galaset	9	Microimage	28, 29, 30
Anirog	12, 13	Gem Software	128	Micronet 800	94, 95
Apex Software	77	Gilsoft	14	Micropower	148, 169, 171, 173, 175
Audiogenic Ltd	44			Mikroger	11
		<b>H</b>		Mirrosoft	159
<b>B</b>		H & K Supplies	7		
Beebug	140	Hama	42	<b>N</b>	
Betasoft	9	Haulstrome	14	National Software Library	38
Bowies The Computer People	65	Hi-Tech	116		
British Telecom	110	Hisoft	38	<b>O</b>	
Bugbyte Software	60			Ocean Publishing	Back Cover
		<b>I</b>		Orange Enterprises	169
<b>C</b>		Imperia Software	144	Oric Software	72, 73
C.E. Micros	14	Inmac	50	Oxford Computer Publishing	65
CP Software	22	Interceptor Micros	Inside Back Cover		
CRL	4, 5	Interface	64	<b>P</b>	
Cambridge Micro Electronics	10			PV Tubes	40
Campbell Systems	7	<b>J</b>		Palace Software	132
Carnel Software	176, 177	John Wiley	113	Picturesque	47
Cheetahsoft	148			Plus 80	36
Compusound	31, 173	<b>K</b>		Practical Computing	92
Computer Link	126	K-Tel	93	Protek	78
Creative Sparks	31, 135	Kempston Micro Electronics	08		
Crystal Computing	178	Kosmos Software	77	<b>Q</b>	
		Kuma Computers	89	Quicksilva	74
<b>D</b>					
DACC	31	<b>L</b>		<b>S</b>	
DK Tronics	51, 131	LCL	10	SMT/Rononex	9
Database Exhibitions	168	Level 9 Computing	58	Sci (UK)	46
Dean Electronics	16	Llamosoft	72	Selec	173
Dianetics	40			Silversoft	107
Dorling Kindersley	166, 167	<b>M</b>		Sinc air Research	25
Dragon Data	62, 63	Mail Order Protection Scheme	79	Skywave	145
Durrell Software	6	Marketing Micro Software	34	Slogger Software	36
		Mayfair Micros	34		
		Melbourne House	20, 21		



# TALES OF THE ARABIAN NIGHTS

Full of Eastern Promise!

FROM  
**INTERCEPTOR  
SOFTWARE**

THE SAGA OF IMRAHIL  
THE KALENDAR PRINCE  
ON A QUEST TO FREE  
THE PRINCESS ANITRA  
FROM THE HAREM OF THE  
EVIL SULTAN SALADIN

WRITTEN BY IAN GRAY  
CONTAINS OVER 3 MINUTES  
OF EASTERN MUSIC BY CHRIS COX  
PRODUCED BY RICHARD PAUL JONES



ONLY  
**£7.00**  
ON CASSETTE  
**£9.00**  
ON DISK

CONTAINS  
**SPEECH**  
NO HARDWARE REQUIRED

SUITABLE FOR THE  
**commodore 64**  
NOW WITH **ULTRA LOAD** FAST LOADING

**INTERCEPTOR  
MICRO'S**

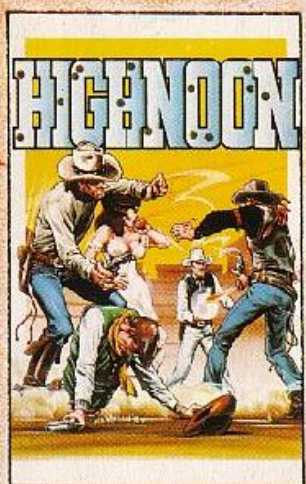
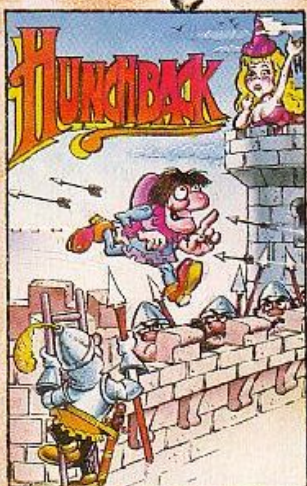
LINDON HOUSE, THE GREEN, TADLEY, HAMPSHIRE

TEL (07356) 71145

**AVAILABLE NOW**  
FROM  
ALL GOOD COMPUTER  
RETAILERS



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



Here's the latest top games from Ocean to test the best of you top games masters.  
For the **Spectrum 48K**: Gilligan's Gold, Hunchback, Pogo, Chinese Juggler and Cavelon.  
For the **Commodore 64**: Gilligan's Gold, Hunchback, Android Two, High Noon, Chinese Juggler and Cavelon.  
For the **Dragon**: Hunchback. See our stunning games now at your local software shop.

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