

TOUR DE FRANCE
Win! Win! Win!
SUMMER GAMES II

YOUR

Denmark	DKr.	36.00
France	Fr.	52.50
Germany	DM.	9.50
Greece	Dra.	310.00
Holland	DFI	8.90
Italy	L	4300
New Zealand	NZ\$	3.70
Singapore	MS	7.20
Spain	Pts.	400.00
Switzerland	SFr.	7.50

£1

COMPUTER

OCTOBER 1985

BRITAIN'S BIGGEST-SELLING HOME

ER MAGAZINE

Vol.5 No.10

**WHAT MAKES
YOU SO
CLEVER, KEV?**

**We spill the beans
on Amstrad's 256K
Word Champion**

PLUS

Sinclair Spectrum 128

**CBM-64 Midnight Express
and Smooth Scroll
Spectrum Impulse and
BBC Pikchachanja
Extra, Extra Basic for
Amstrad and CBM-64**



**Beyond's
Supersecrets**

SCOOPS

KEY IN TO MICRO MUSIC



HOW DO YOU MAKE A COMPUTER SHARPER?



PLUG IT INTO A PHILIPS PERSONAL MONITOR.

A Philips personal monitor gets the very best out of your computer. It makes using your computer more rewarding as the definition and resolution gives the clear display you need.

Philips offers you a complete range of both colour and monochrome monitors. One of them is exactly right for your computer. With over 50 years in screen technology, Philips know how to give you the right image.

Philips personal monitors are suitable for virtually all personal and home computers. Just complete the coupon and we'll send you full information.

Post this to: Stephen Paul, Marketing Manager, Computer Monitors, Philips Electronics,
City House, 420/430 London Road, Croydon, Surrey CR9 3QR

NAME: _____ Tick if trade enquiry ☐

ADDRESS: _____

POSTCODE: _____ YC



PHILIPS. TAKE A LOOK AT OUR IMAGE.

PHILIPS



YOUR COMPUTER *Contents*

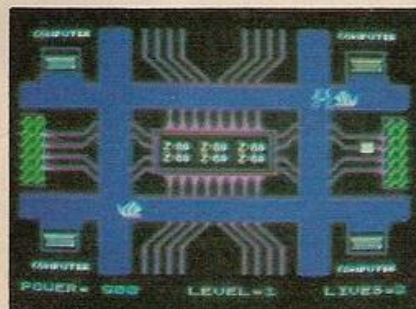
OCTOBER 1985



Music micro, please: page 38.



Beyond's supersecrets: page 44.



Impulse: page 56.



Melody master: page 60.



Cover story — we spill the beans on the new Amstrad: page 46.

12 NEWS: Sinclair Spectrum 128; The £200 QL; Tramiel reveals all; European rival to MSX; Amstrad Word Champion.

19 LETTERS: A Tex maniac writes to explode the QL myth; a loopy letter to the Prof; a letter to Sir Clive from Bruce who? Mike Singleton explains.

23 HARDWARE HITLIST: Epson NLQ board; Turbo for the CBM-64; Beta interface; disc drive starter pack and more.

27 SOFTWARE SHORTLIST: We open the lid on Goonies — another Ghostbusters? Also Spy v Spy 2, Rescue on Fractalus, Summer Games and much, much more.

37 HOTSHOTS: We help you find your way through the Nodes of Yesod, more maps hints tips and wrinkles to boost your scores. Also, our new Helpline.

38 MUSIC MICRO, PLEASE: Tony Sacks tickles the ivories and jams in the MIDI interface to help out microcomputer enthusiasts who are lost in music.

43 LE GRAND PRIX DU TOUR DE FRANCE: Pardon? Yes, another great competition. Win a Commodore 64, a Tour de France T-shirt, by designing a Tour d'Angleterra.

44 BEYOND'S SUPERSECRETS: Beyond Software are full of beans and bursting with new ideas for Christmas. Paul Bond lifts the veil on imminent releases.

46 AMSTRAD WORDCHAMPION: £460, 256K, disc drive, near-letter quality printer, full word-processor for the home, Bill Bennett jumps over the lazy fox.

51 COMMODORE CBM-64 SUPERBASIC: This utility takes up only 4K but expands the resident Basic with 45 commands. R A Mason widens your horizons.

54 COMMODORE CBM-64 SMOOTH SCROLL: Slip into the most widely-used technique in commercial software. Smooth operator Nalin Sharma shows the way.

56 SPECTRUM IMPULSE: You play the part of Max Headrom whose mission is to keep control of the inner workings of the micro in this Chris Handley game.

60 MELODY MASTER: Tom Baker gets into the groove. **64 MICRODRIVE UTILITIES:** Jon Ellis with a Microdrive toolbox.

68 BBC HERMANN IN THE GREAT ESCAPE: Hermann is collecting acorns in the forest when he is surrounded by — no, let Shingo Sugiura spell it out.

72 AMSTRAD BLOKKER: Twist and turn in Chris Turner's pure machine-code program. Force the enemy off the screen, but don't hit their trails.

75 PLOTTING: John Dawson examines plotting on the BBC Micro plus starting to describe a high-level interpreter compiler that he is writing.

80 MIDNIGHT EXPRESS: The game simulates a train running round a maze: three different types of play. Reg Fry puts new life in the Red Star parcel service.

84 BBC PIKCHACHANJA: Simon Woolf introduces an exciting variation on a theme for the BBC. Learn all about in-betweening on your micro.

87 SUMMER GAMES II COMPETITION: Hundreds of pounds worth of sportswear to be won in our second sporty competition this month.

89 QUEST CORNER: Red Moon — a new departure for Level 9? And sample the wit and humour of Infocom's Wishbringer.

91 FIRST BYTES: Our section for people new to computing, features Susan Curran on Logo and more in our bluffers guide to micros.

94 TELSOFT: Programs now available on your modem include: Melody Master; Impulse; Superbasic; Midnight Express; Hermann and Pikchachanja.

96 COMPETITION RESULTS: The winner of the school report competition. **97 RESPONSE FRAME:** Tim Hartnell solves your problems.

99 SOFTWARE FILE: Ten pages of action-packed software for most micros. **114 DATABASE:** Paul Bond rounds up events.

It does accounts, projections,



No wonder people are racing out to buy Amstrad's new CPC 6128 computer.

Not only does it answer all your business needs, it's also compatible with nearly 200 arcade and adventure games. So it can either speed you through your income tax returns or whizz you round a simulated Silverstone.



On the business side we start you off with a free disc which introduces you to the Amstrad CPC 6128's impressive range of capabilities, and the best ways to exploit them.

You'll discover how its massive 128k memory can open the door to over 8,000 CP/M* applications.



Programs like 'Wordprocessing' and 'Database' will file and index records, produce standard letters, mailing lists and even compile reports.

There's a series of business control programs which form a complete invoice, stock control and statement system.

In other words it's easy to choose the software you need to take the big problems out of your small business.

But even if you don't own a business there are plenty of good reasons for owning an Amstrad CPC 6128.

It makes short work of the problems we all face. Like keeping track of rates, mortgage and H.P. payments.

However even software packages as comprehensive



wordprocessing and 180mph.



as Amstrad's are only as good as the hardware they're loaded into.

You need a complete system.

That's why the Amstrad comes complete with a built-in disc drive as well as a monitor (green screen or full colour). So it's ready to go to work as soon as you get it home.

And if you want to go further additional disc drives, printers and joysticks are all available to ensure that your computer can grow with your growing needs.

Finally there's one feature of the Amstrad CPC 6128 that's both good business and a pleasure: the price.



Tell me more about the Amstrad CPC 6128

Name _____

Address _____

With Green Screen around **£299**

With Colour Monitor around **£399**

Amstrad CPC 6128 with 128k memory

Who says business and pleasure don't mix?

Amstrad P.O. Box 462, Brentwood, Essex CM14 4EF

*CP/M is a trademark of Digital Research Inc.

GET EVEN MORE ATTAC



TV Modulator for CPC 6128 £29.95



Joystick with additional joystick adaptor £14.95



Disc Drive with Interface and CPM for CPC 464 £159.95



Speech Synthesiser and stereo amplifier £29.95



Light Pen complete with graphics software £19.95



RS 232C Interface Inc ROM Software £49.95

HED TO YOUR AMSTRAD.



TV Modulator for CPC 464

£14.95



Additional Disc Drive

£99.95



DMP 2000 Printer

£159.95

Amstrad owners start out happy, and get even happier as time goes on.

The first delightful discovery is that both the CPC 6128 and the CPC 464 are complete and ready to use as soon as you get them home.

The CPC 464 comes with built-in datacoder, and the CPC 6128 with built-in disc drive. And both have either a full colour monitor or a green screen.

But Amstrad owners can become even more attached to their computers with the simple addition of the peripherals featured here.

They'll make your Amstrad faster, harder working and more entertaining.

And they're very easy to attach. Simply plug in, and away you go, there's no need for extra interfaces.

You may of course wish to get into some even more serious computing, for which you will need the Amstrad RS 232C specialist interface. This opens the door to modems, networks, and serial printing.

But whichever additions to your Amstrad you care to make you'll find their low prices an additional pleasure.



YC/P/1
Tell me more about the Amstrad range of peripherals.

Name _____

Address _____

Amstrad peripherals

Amstrad, P.O. Box 462, Brentwood, Essex CM14 4EF

"Almost without exception there is only one way to make a great deal of money...and that is owning one's own business..." Paul Getty

THE SHEER LOGIC OF OWNING YOUR OWN SMALL BUSINESS

Let's face it, however good your job is, there's little or no chance it will make you a real fortune. In fact, as Paul Getty said a few years ago - "Almost without exception, there is only one way to make a great deal of money...and that is owning one's own business". The real question is...

Which business should I start now?

Hundreds of business ideas are tried every year. Only a few succeed - and make *real* money for their owners. Yet those few - the ones that make *top* profits, often on very little capital - can be used time and time again. *Today* if you wish. What makes them good businesses is: you know they work.

Where to find proven winners

Now you can find out for yourself what those successful little-known businesses are...why they work...and how you can adapt them in your area for your profit. All this and much more, is in every monthly issue of *Business Opportunities Digest*, the guide to who's doing what, and how, successfully in the hidden world of small business.

'If only I had the time'

The chances are you are short of time...time to investigate all the possibilities...to analyse the pros and cons...to find the really *genuine* opportunities. Well we *do* have the time...plus the experience and the staff. Let *Business Opportunities Digest* do the "leg work" for you. Save *time* and *money* by reading the one comprehensive monthly publication, *packed* with practical *tested* business plans.

How much money do I need?

Some businesses you can *start with little or no cash*...others require larger amounts. *Business Opportunities Digest* covers them all - but concentrates on those that need very little to get started. Not only are these low cost ventures often more profitable but you can actually own more than one business - even sell one off for a large *capital gain*. Remember: *successful business people have "fingers in many pies"*.

How much can I expect to make?

That depends on the type of business and the time you give to it. In most cases, *Business Opportunities Digest* can tell you just what others are making in a similar type of operation. Actual figures you can check against your own results...an invaluable basis for evaluation and comparison.

Above all, you can expect to make much more than you would by investing in the shares of other people's businesses.

Why knock yourself out?

Most clever business ideas do not require long hours or constant personal attention. In the right business your profits are large enough to pay others to do the hard work for you. If 'hard work' was the secret of success, manual labourers would be rich. The truth is that millionaires rarely subject themselves to hard work - they *think* their way to wealth!

Run a 'side-line' business by phone!

Many businesses covered in *Business Opportunities Digest* don't even require your personal presence. A daily phone call to your manager who runs a side line business for you is enough for you to find out the day's takings...and how your bank balance is growing. *Business Opportunities Digest* tells you

just what these 'run-by-phone' businesses are and how to operate them.

What do I need to get into business?

You really don't need any special qualifications or training to start a small business of your own - full or part time. But you *do* need accurate *inside* information. Let others take the risk of trying new ideas...you can then make a lot of money in a business which has *proved* can make money for its owners. These are the only kind of businesses worth starting - and the only kind you'll find every month in *Business Opportunities Digest*.

When can I begin?

There are plenty of tested and *proven business opportunities* around right now for both men and women of all ages. Opportunities to launch new businesses have never been greater. *Now* is the time for you to start *your* small business. Remember: you don't need to run it full time at the beginning. You can do that when your new business is running smoothly.

Where do I start?

With *Business Opportunities Digest*. Even if you are not quite ready to start actually trading, you should make a start towards owning a business of your own by taking *Business Opportunities Digest* for the next twelve months. Let others who have made it (and "have it made") show you what they are doing...how they do it - and how you can do the same. *Business Opportunities Digest* is the *one* publication that can really get you started in a business of your own - now, this year.

What to do next

Take this first step towards starting your own business today: simply *complete and return the attached application form*. Do it now - while you are thinking about it. It will bring you twelve months' issues of *Business Opportunities Digest* - every one packed with ideas for getting you started in business. Remember: you'll never get rich digging someone else's "ditch"!

Claim this FREE gift worth £10!

Return your application within ten days, and we'll send you a *free* copy of "Pounds in Your Post". This eye-opening manual shows you *how to start and run a profitable mail order business from home*. Normal price of 'Pounds in Your Post' is £10 - but you get it free for being prompt with your application. For your free copy, tick the box at the foot of the application form and be sure to return it within 10 days.

© Business Opportunities Digest Ltd. 11 Blomfield Street, London EC2M 7AY.

APPLICATION FORM

To: Business Opportunities Digest Ltd. 11 Blomfield Street, London EC2M 7AY

Name _____
BLOCK CAPITALS PLEASE

Address _____

Postcode _____

To _____ Bank Ltd.

Branch Code _____

Full Address _____

Account Name _____

Account No _____
Please pay to National Westminster Bank Limited
(00-18-437) 2 St. Alphage Highwalk, London Wall, London EC2,
for the account of Business Opportunities Digest Ltd. Account
number 40952802 the sum of £39.50 on receipt of this order and
thereafter on the same date each year until countermanded by me.

Signature _____

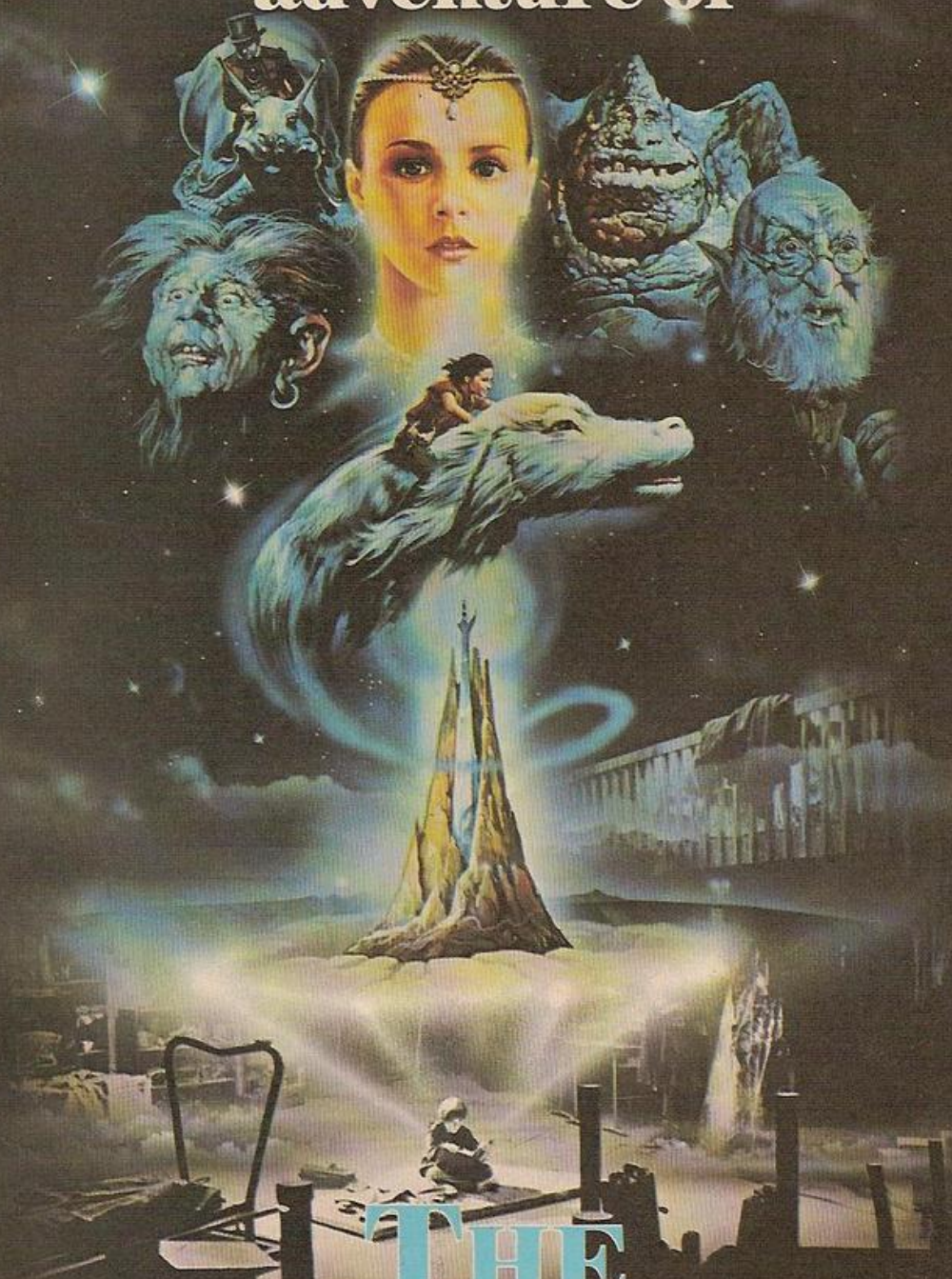
Date _____

For official use only
Membership No. _____

Registered in England No. 1454725

YES I would like to try *Business Opportunities Digest*.
Please enrol me as per these details.
(PLEASE RETURN THE WHOLE OF THIS FORM.)
YC/10/85

From the black and white pages
of a dusty book emerges the
colourfull and gripping
adventure of



THE NEVERENDING STORY

Save the world of "Fantasia" in this thrilling adventure. Cast as the hero Atreyu and aided by Falcor, the Luck Dragon, you face the trials and terrors of the ever consuming "Nothing". Enter the quest in this richly illustrated and highly imaginative computer movie.

COMM. 64
SPECTRUM 48K **9.95**

ocean

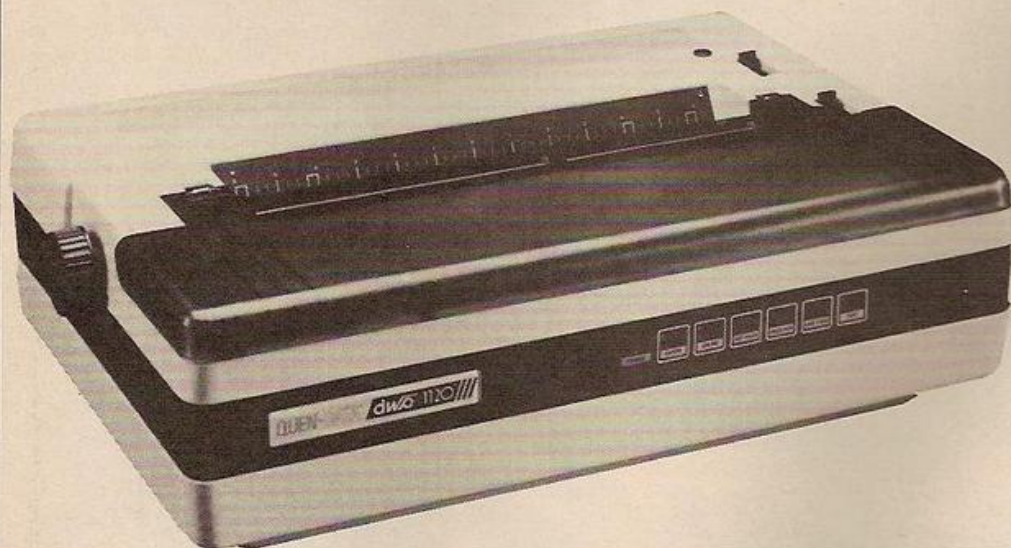
9.95 ATARI
AMSTRAD

Ocean Software Limited
6 Central Street, Manchester M2 5NS

Telephone: 061-832 6633
Telex: 669977 Oceans G

©Neue Constantin Filmproduktion GmbH 1984

MAKE THE RIGHT CONNECTION FOR UNDER £200*



DWP 1120

To find a letter quality daisy wheel printer for under £200.00 you need the right connections.

At Quen Data we've got the right connections in more ways than one.

Firstly our DWP 1120 Daisy Wheel Printer comes with a choice of Centronics interface or an optional RS232C interface.

Consequently it can connect directly with virtually any micro on the market.

Secondly our 'Daisy Chain' of dealers are conveniently spread across the country, making it easy for you to drop by and check out the hardware.

Talking of which, originally designed for professional users, the DWP 1120 combines stylish good looks with total practicality.

With features you'd only expect to find on much more expensive machines it's a powerful companion for any home micro, giving you complete word processing documents and data listing facilities, all at the touch of a button. (Tractor Feed and Single Sheet Feeders are easily fitted options).

In fact whatever your printing requirements, a glance through our list of dealers followed by a quick visit should convince you that with Quen Data you've made the right connection first time.

QUEN-DATA

QUEN DATA BUSINESS MACHINES UK LTD

25 Clarke Road, Mount Farm, Bletchley
Milton Keynes BUCKS MK1 1LO

Tel: 0908 649412 Telex 826343 QUEN UK G

* Recommended retail price £199.00 excluding VAT

DAISY CHAIN

LONDON

MACOB

8 Lister Gardens, LONDON

N18 1HZ

Tel: 01-803 1622

QUIPS

Office Equipment, 62 Tritton Road, LONDON

SE21 8DE

Tel: 01-761 0843

RTS

Unit 12, St. Pancras Comm. Centre, 63 Pratt Street

LONDON NW1 0BY

Tel: 01-267 7541

VIGLEN COMPUTER SUPPLIES

Unit 7, Trumpers Way, Hanwell, LONDON

W7 2GA

Tel: 01-843 9903

ZONE FOUR LTD

122 Dawes St, LONDON

SE17 2EB

Tel: 01-708 0053

HOME COUNTIES & SOUTH EAST

BROMLEY COMPUTERS

417-421 Bromley Road, Bromley, KENT

BR1 4PJ

Tel: 01-697 8933

COMPUTER INTELLIGENCE

3a Mayfield Road, Weybridge, SURREY

KT13 8XD

Tel: 0932 49723

ENOTRE COMPUTER CENTRE

17 Bath Road, Slough, BERKS

SL1 3UF

Tel: 0753 821457

FAXMINSTER LTD

25 Market Square, Hemel Hempstead, HERTS

HP1 1ER

Tel: 0442 55044

JKL COMPUTERS

7 Windsor Street, Uxbridge, MIDDX

UB8 1AB

Tel: 0895 51815

SOUTH WEST

CK SUPPLIES

Unit 5, Norside, Old Mixon Crescent,

WESTON SUPER MARE, BS24 9AX

Tel: 0934 418838

EASTERN COUNTIES

ADAMS & DACK

Adams House, 125-129 King Street, Norwich

NORFOLK NR1 1QE

Tel: 0603 630311

AKHTER COMPUTER GROUP

22-29 Burnt Mill, Harlow, ESSEX

CM20 2HV

Tel: 0279 443521

BAKER BUSINESS SYSTEMS

Manor Way Industrial Estate, Bridge Road, Grays

ESSEX RM17 6DB

Tel: 0375 79453

MIDLANDS

MICRO CITY

1a Queens Road, Nuneaton, WARWICKS

CV11 5JL

Tel: 0203 382049

RAMS COMPUTER CENTRE

117 Queensway, BLETCHLEY

MK2 2DH

Tel: 0908 647744

NORTH

BITS 'N' BITES

Unit 4, Old Swan Shopping Arcade, Green Lane

LIVERPOOL L13 4BX

Tel: 051-259 5748

CROWN COMPUTER PRODUCTS

The Coach House, Bridge Avenue, Ormskirk

LANCS L39 4RL

Tel: 0695 79168

RAPID COMPUTERS LTD

224 Childwall Road, At the Five Ways

LIVERPOOL L15 6UY

Tel: 051-722 0304

LONDON'S LARGEST DISPLAY OF PRINTERS MONITORS COMPUTERS AND PERIPHERALS

DON'T TAKE A CHANCE

—COMPARE BEFORE YOU BUY

**OVER 40
PRINTERS ON
DISPLAY — MOST ON
DEMONSTRATION**

HI-VOLTAGE

UK's Best Printer Prices

DOT MATRIX PRINTERS

Brother HR5	£83.44 + VAT =	£95.95
Brother M1009	£155.90 + VAT =	£179.29
Epson P40 Thermal AC/DC	£83.44 + VAT =	£95.95
Epson RX80/FX100/RX100	POA	
Epson LX80 NLQ (New)	£215.60 + VAT =	£247.95
Epson LQ1500 NLQ	£895.90 + VAT =	£1030.28
Epson JX80 Colour	£449.90 + VAT =	£517.39
Canon PW1080A NLQ	£289.90 + VAT =	£333.39
Canon PW1156A NLQ	£365.90 + VAT =	£420.79
Canon PJ1080A Colour	£479.90 + VAT =	£551.88
Commodore MPS801	£99.90 + VAT =	£114.89
Commodore MPS803	£115.90 + VAT =	£133.29
Panasonic KP1091 NLQ	£255.90 + VAT =	£294.29
Okidata 20 Colour	£235.90 + VAT =	£271.29
Shinwa CPA80	£199.90 + VAT =	£229.88
Anadex	POA Oki	POA
Data Prods. Paper Tiger	POA NEC	POA
Newbury	POA Tec	POA
Micro P. 165	£260.78 + VAT =	£299.90
Seikosha GP50S		
(Sinclair Spectrum)	£79.90 + VAT =	£91.88
Seikosha GP500A	£99.90 + VAT =	£114.89
Smith Corona Fastext 80	£139.05 + VAT =	£159.90
Smith Corona D100, D200 NLQ & D300 NLQ	POA	
Star SG10 (IBM) NLQ	£254.90 + VAT =	£293.14
Kaga Taxan KP810 NLQ	£249.90 + VAT =	£287.39
Kaga Taxan KP910 NLQ	£379.90 + VAT =	£436.89

DAISYWHEEL PRINTERS

Brother HR10	£249.90 + VAT =	£287.39
Brother HR15 (P)	£324.90 + VAT =	£373.64
Brother HR25	POA	
Brother HR35 + sheet feed	£819.90 + VAT =	£942.89
Daisystep 2000	£219.90 + VAT =	£252.89
Diablo 630	POA Silver Reed	POA
Juki 6000	£199.90 + VAT =	£229.89
Juki 6100	£324.90 + VAT =	£373.64
Smith Corona TP1	£179.90 + VAT =	£206.89
NEC	POA Gume	POA
Ricoh	POA Tec	POA
Epson DX100	£339.90 + VAT =	£390.89
Commodore DPS1101	£226.04 + VAT =	£259.95

PRINTER/TYPEWRITERS

Brother EP44	£189.90 + VAT =	£218.39
Brother TC600	£373.50 + VAT =	£429.53
Brother FB100 Disk Drive		
for TC600	£161.50 + VAT =	£185.73
Juki 2200 Daisywheel		
(P or S)	£269.90 + VAT =	£310.39

All popular interfaces, cables, etc. available from stock.
Custom cables made to order.

Let our experts match your computer to the printer of your choice.
Printers — All models parallel-centronics interface Serial RS232C available at same or slightly higher prices.
Prices correct at copy date. Subject to change without notice due to currency fluctuations etc. E. & O.E.

MONITORS

Microvitec Colour		
1431 DS STD RES RGB	£169.90 + VAT =	£195.39
1431 DZ STD RES Spectrum	£199.90 + VAT =	£229.89
1451 DS MED RES RGB	£229.90 + VAT =	£264.39
1451 DQ MED RES QL	£229.90 + VAT =	£264.39
1451 APDS MED RES		
RGB/Composite	£289.90 + VAT =	£333.39
1441 DS High RES RGB	£389.90 + VAT =	£448.39
1456 LI MED RES IBM PC	£395.90 + VAT =	£455.29
1456 DA MED RES Apricot	£349.90 + VAT =	£402.39
Philips Monitors Full Range	POA	
Ferguson Monitors Full Range	POA	

COMPUTERS

Amstrad		
CPC128 Green Monitor	£252.13 + VAT =	£289.95
CPC128 Colour Monitor	£339.09 + VAT =	£389.95
Apricot (monitors extra)		
F1E 256K RAM 1x315K Disk	£539.90 + VAT =	£620.89
F1 256K RAM 1x720K Disk	£759.90 + VAT =	£873.89
F2 512K 2x720K Disk	£1270.87 + VAT =	£1461.50
F10 512K 10MB	£1949.90 + VAT =	£2242.39
FP1 Portable 256K RAM 1x720K Disk	£959.90 + VAT =	£1103.89
Atari 520ST inc DD + monitor	£642.90 + VAT =	£739.34
BBC		
BBC inc DFS	£346.91 + VAT =	£398.95
BBC PLUS	£398.69 + VAT =	£458.50
Commodore		
CBM 128/CPM Compatible	£226.04 + VAT =	£259.95
PC10 IBM Compatible	£1375.00 + VAT =	£1581.25
Sanyo		
MBC 555 128K RAM 2 x 160K Disks	£679.90 + VAT =	£781.89
Sinclair QL	£260.83 + VAT =	£299.95
Spectrum PLUS	£95.60 + VAT =	£109.95
IBM	Phone	Compaq Phone

SUPERDISKS Prices per box of ten ex VAT

	SSDD 40TR	DSDD 40TR	SS96TP1 80TR	DS96TP1 80TR
BASF 5 1/4"	£10.00	£17.80	£18.50	£21.00
3M 5 1/4"	£13.50	£19.50	£19.90	£23.90
VERBATIM 5 1/4"	£14.50	£18.40	£18.40	£24.50
DYSAN 5 1/4"	£15.90	£23.50	£23.50	£28.50
TDK 5 1/4"	£17.50	£16.90	—	£32.00
SONY DS/DD 3 1/2"	£37.50	MAXELL 3"	£38.90	

Add 70p for P&P per order of Disks or Ribbons

PRINTER RIBBONS (Ex-VAT Prices)

Single prices, deduct 10% for 5+

Brother HR15 Corr	£2.65	Epson 80 Series	£2.80
Brother HR15 MS	£4.95	Epson 100 Series	£3.40
Brother HR5	£2.70	Juki 6100 SS	£1.80
Brother EP44	£2.50	Juki 6100 MS	£3.50
Brother M1009	£3.60	Juki 2200	£3.50
Canon PW1080A	£9.50	Kaga KP810	£9.50
CBM 801	£6.50	Mannesman MT80	£5.90
CBM 802/1526	£5.90	Seikosha GP50	£6.50
CBM 1525	£4.00	Seikosha GP100	£4.00
CBM DPS1101 MS	£3.50	Seikosha GP500	£6.50
Daisystep 2000	£3.50	Seikosha GP700	£18.50
		Shinwa CP80	£5.90

All equipment fully guaranteed — Credit terms available

**Mail Order + Export + Trade
Hot Line Phone 01-686 6362**



Delivery by Securicor (3 day) please add £5.00 + VAT per item.
Delivery by T.N.T. (overnight) please add £9.50 + VAT per item.

Send off or order by 'phone quoting your Access,
Barclaycard No. Phone 01-686 6362. Immediate
despatch on receipt of order or cheque clearance.



Or you can Telex your order on: 946240 Attn 19001335

ALSO VAST RANGE OF DISK DRIVES, JOYSTICKS, DISK BOXES, INTERFACES, SHEETFEEDERS, ETC.

HI-VOLTAGE 53-59 High Street, Croydon, Surrey CR0 1BD.

TIME TO GET SERIOUS?

HALF-PRICE QLS and Amstrad's 8256 have knocked real word processing down to around the £400 mark. At last one of the major uses for a computer outside games and education has been opened up to the mass consumer market.

And suddenly everyone's clapping Amstrad boss Alan Sugar on the back for having the insight and for taking the risk in producing the first home computer dedicated to a single application.

Amstrad and Sinclair are obviously trying to sell us something — but they're also trying to tell us something: there are uses for home computer technology apart from games. To some extent that's being backed up by those software houses who have been producing high-quality packages that are serious, useful and fun — products like Oxford Computer Publishing's stunning Art Studio graphics program for the Spectrum.

It makes sense for software producers to spend time working on those kinds of packages. They will continue to sell steadily long after high-flying games have burnt out. Equally, the people who buy them will still find them value for money some time after even the most playable arcade adventure has become boring.

Of course games will be the meat and drink of the industry for a long time yet. But with QLS for £200 and the non-games software manufacturers creating serious products that rival the best games for quality, the whole home computer market will be based on a broader and more stable footing.

The real key to these changes is the Amstrad 8256. Up until now word processing may have appealed to a lot of us, but no one would have been prepared to lay out anything from £800 upwards for a facility that might only occasionally use. For £460 for 256K, monitor, disc drive, printer and CP/M Plus, the new Amstrad marks a real breakthrough — in price if not in technology.

If the 8256 were to fail as the QL at £400 did before it, home computing could be condemned to another term as an ailing entertainment industry.

Even after the disasters of 1985 the current mood is swinging towards optimism.

Editor: TOBY WOLFE; Assistant Editor: MEIRION JONES; Production Editor: IAN VALLEY; Software Editor: SIMON BEESLEY; Commercial Software Editor: PAUL BOND; Editorial Assistant: LEE PADDON; Editorial Secretary: LYNN DAWSON. Editorial: 01-661 3144. Advertisement Manager: NICK RATNIEKS 01-661 3127; Assistant Advertisement Manager: KEN WOLFORD 01-661 8548; Senior Sales Executive: JULIAN BIDLAKE 01-661 8458; Advertisement Executive: KAY FILBIN 01-661 8484; Northern Office: GEOFF PARKER 061 872 8861; Advertisement Secretary: MAXINE GILL; Classified: SUSAN PLATTS 01-661 3036; Publisher: GAVIN HOWE; Group Advertisement Manager: SHOBHAN GAJJAR. Your Computer, Room L221, Quadrant House, The Quadrant, Sutton Surrey SM2 5AS. © Business Press International Ltd 1985. Printed in Great Britain for the proprietors Business Press International Ltd, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Tel: 01-661 3500, Telex/grams: 892084 BIPRESG ISSN 0263-0085. Printed by Riverside Press Ltd, Whitstable, Kent, and typeset by Instep Ltd, London EC1. Subscriptions: U.K. £14 for 12 issues. ABC 131, 769 July-December, 1984.



Guy Taylor and Rainbow Hero at Fulham.

OVER THE RAINBOW

WE DON'T NEED another Hero — or perhaps we do. Maplin's Hero Jr was cunningly disguised as Rainbow, the design for a multi-purpose football crowd entertainer/controller which won Guy Taylor a real Hero in our design a robot competition. He was presented with it at Craven Cottage, but Rainbow may be more use at other London grounds if Arsenal and Spurs

supporters come to blows over a couple of new computer football programs.

Charlie Nicholas is endorsing Rothmans Quick Football Quiz for the Spectrum, while Glen Hoddle is putting his name to a soccer game for the Amstrad. The football quiz sports 1,000 questions and up to four can play, with multiple-choice style questions.

Strad bashing

JAB WITH the left then hook with the right. Amstrad's combination punch of launching first the 6128 battering ram then the 8256 word champion (review page 46) has set the opposition reeling but when complaints come in from angry 664 owners Alan Sugar starts bobbing and weaving.

Just three months after launch the 664 is dead, leaving buyers wondering whether software houses will bother to bring out special mini-CP/M programs now that Amstrad is producing a full 128K model and refusing to offer a 128 upgrade for the 664. The



Hurricane's Amstrad snooker.

464 is now down to £199 or £299 with colour monitor.

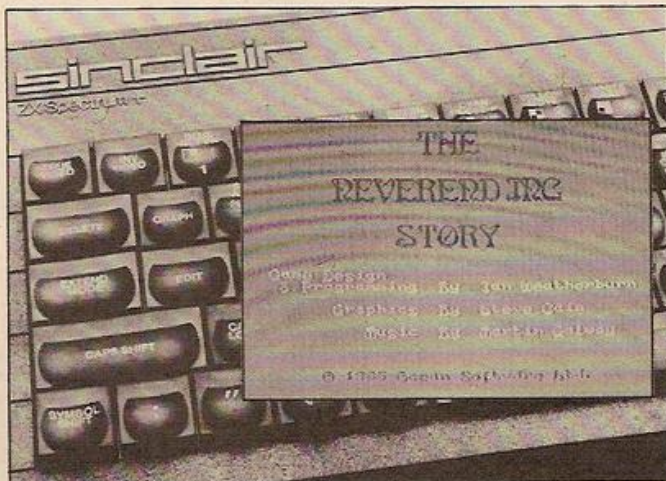
SINCLAIR 128

New Spectrum spotted

OUR SPIES have seen the 128K Spectrum Pluses which Sinclair has sent to a handful of top software houses in preparation for the launch which will happen as soon as the warehouses can be cleared of current stocks. The 128 will be bundled with a program specially written to take advantage of the extra memory — possibly Ocean's *Neverending Story* which is split into three for the 48K Spectrum but loads in one on the 128.

Prototypes consist of a Plus with an additional board hanging out the back and the 128 has twin Roms so that, like its Commodore rival, it can maintain compatibility with existing software in Spectrum mode yet offer improved facilities in 128 mode. These include a better Basic, AY 38910 sound chip, and improved video display.

Machines went out in unfinished form to program writers in June/July. Meanwhile the QL price has been cut to an extremely attractive £200 which makes the

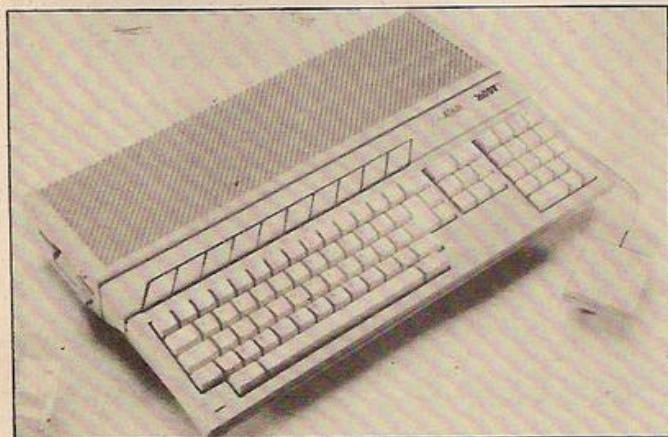


Prototypes of 128 in Plus cases. Inset *Neverending Story*.

Spectrum Plus look over-priced at £140 even if that includes a starter pack. In contrast to three months ago Sinclair looks relatively secure despite Robert Maxwell withdrawing from his attempt to take over the company with a £12 million rescue package, and the complete failure of the C5 electric vehicle project.

Creditors have agreed not to pull the rug on Sir Clive this year which gives him a chance to raise cash through the Christmas sales boom and then release his three new products, the portable Pandora, 128 Spectrum and QL II. QL II will have 256 or 512K, and perhaps Psion software on Rom.

SAINTS ALIVE!—A BUILT-IN DRIVE



Sidewinder 3.5in. disc on 260ST.

JACK TRAMIEL has sprung three surprises at the public launch of the ST in Britain at the PCW show. First the 260 ST "Little Saint" he showed has a built-in 3.5in. disc drive in the side of the keyboard which strongly supports

the suggestion that it will eventually be sold with a mouse but without a monitor for around £500.

Second some of the STs on display turned out to have one megabyte of Ram on board — with

talk of 4Mbyte monsters back home at Atari — and third, there really were 80 software packages up and running on the saints at launch.

These included the fabled Bandersnatch originally an Imagine project of the Spectrum which would have needed a plug-in hardware dongle, which turned into a QL project before emerging on the ST under the name of Brataccas from a company called Psygnosis.

At the same time Atari is threatening to cause chaos in the bargain basement by selling 64K 800XLs for £70 — including a joystick and game cartridge! Atari will also be selling the cheapest 128s at around £140 for a 130XE or £265 including a 1050 disc drive. £350 will buy you a 130XE based word processor with 1027 letter-quality printer and software.

64 music midi sampler + drums



Feargal and programmer Trott.

IS IT FEARGAL or is it Microvox? Feargal Sharkey becomes the first owner of the Microvox sound sampler from Supersoft. The Microvox, at £229.95 offers sampling rate up to 42kHz. You also get a Midi interface as well as pre-emphasis/de-emphasis circuitry and noise reduction.

The sound quality was very impressive, and you get a total of 2,000 notes to play with. If you need some drum backing, try to persuade any Spectrum owning friends into parting with £29.95 for a SpecDrum unit from Cheetah marketing.

Last chance for Oric owners

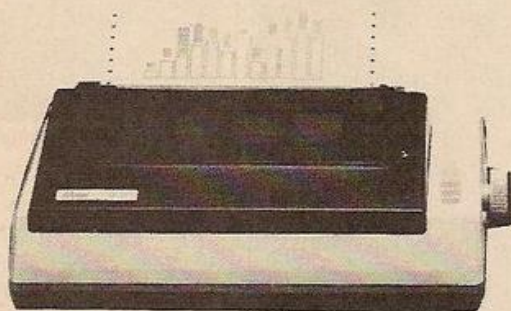
ONE LAST AVENUE of hope for owners of broken Orics may have been opened up by Computer Services. The company is covering the new year-long guarantee offered with a £130 bundled deal of Atmos, data recorder, Quickshot II joystick, interface and software being put together by Dudley Langmead Enterprises. You could try contacting Computer Services for a quote on repairing your old Oric, even though you didn't buy it under the new deal.

Ace trove in Cambridge

AN ISOLATED colony of the long-extinct Jupiter Ace has been discovered in the centre of Cambridge. The small group of the Forth-based computers nesting in Boldfield's showrooms are going for £35 a time. Adopt one on 0223-61175.

OPEN SUNDAYS 10-1

more unbeatable deals from DataStar[®] Systems!



THE INCREDIBLE NEW STAR SG-10 NEAR LETTER QUALITY PRINTER.

Star SG-10 £259 + VAT	£297.85
Parallel cable for any Micro (max. price)	£20
2 Spare ink ribbons	£5
2000 sheets of continuous listing paper	£15
Next day doorstep delivery service	£10
	£347.85

Datastar's all in price £297.85!!!

Just a few of the many features:—

- ✧ Easily switchable between Epson & IBM graphic/print models.
- ✧ Will print all ASCII codes from computers that can only send 7 bits on their parallel interface such as Amstrad CPC 464/664 and Apple II.
- ✧ Compatible with all word processing programs.
- ✧ 50CPS NLQ mode available from switch on.
- ✧ 120CPS draft mode.
- ✧ 2K print buffer — expandable to 10K

AMAZING AMSTRAD WORD PROCESSING OFFER ONLY FROM DataStar Systems

Amstrad CPC 6128 green screen computer ...	£299.00
Tasword/Mailmerge W/P package	£24.95
Star SG-10 printer package as above	£347.85
Next day doorstep delivery service	£20.00

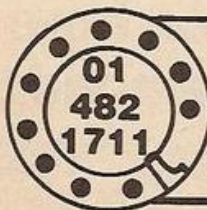
Total value: £691.80



DataStar's Superdeal Price £619.95!!!

Many more package deals available on other Amstrad models and makes of micro's.

All goods despatched FREE OF CHARGE by next day doorstep courier service



**24 Hour
Credit Card
Hot Line**

Post your cheques to

Datastar Systems UK

Unicom House, 182 Royal College Street,
London NW1 9NN.

Telephone: 01-482 1711 Telex 295931 UNICOM G

PERSONAL CALLERS WELCOME — We are situated by the junction of Camden Road, near the railway bridge
MONDAY-FRIDAY 9-6 SUNDAY 10-1 EXPORT ENQUIRIES WELCOME

DIARY

JUST TEN DAYS after a mysterious package arrived in the office with a label saying "warning live hamsters" — it turned out to be the CPC-8256 (continued page 47) — Ocean supremo David Ward tells us that he is prepared to eat a hamster to get on a Your Computer cover.

LITTLE BIRD on a No. 9 bus back in June sees a freckly, wiry lad in running shorts trying to dodge the conductor. Freckles goes up to a plump jovial old bluffer wearing an Oxford United rosette and says "We're old mates, wot about a loan, enough to get me to Christmas". "Love to but if I did that I wouldn't have enough to buy a paper" says bluffer. "OK" says freckles. "How about you pretend to bail me out and give me some nice free publicity in your comic and then when the heat's off you can pull out quietly — if I can get to August no-one will pull the rug on me then till next year." "But what's in it for me" says bluffer. "Simple, you can save the British computer industry — people will love you."

MIND YOU — same little bird also claims that Robert Maxwell visited the PCW show incognito — dressed as Donald Duck and that Sir Clive did his £100 million What If... calculations during the crisis using a QL running Decision Maker.

MSX WORTHIES Chris Greet and Georgie Gibbs worked till midnight to get their stand ready for PCW. Tired but triumphant Chris returned to his hotel to find that the computer had re-allocated his room and there wasn't even any room in the stable. Meanwhile Georgie was scampering back to her apartment for a quick blast of space invaders only to find that a burglar had swiped her telly — and the only other thing missing was a four foot yucca plant. Police are searching for Percy Thrower.

ALSO AT the show, an Imagine reunion. While Colin Stokes paced the Ocean stand Hetherington and Lawson were just out of spitting range, fortunately, at Atari showing off Bandersnatch — sorry Brataccas. Above them all on the balcony stand stood Bruce Everiss shouting "Fight, fight".

Elsie Dee

BIG IN JAPAN

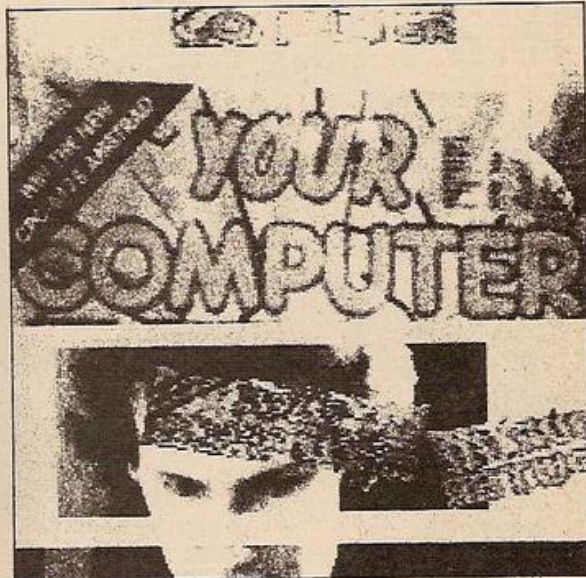
Europe's Eureka rivals MSX



MSX-Toshiba HX23 and Mitsubishi amazing video mix.

JUST AS MSX seems to be getting its act together European governments are teaming up to set up a rival European standard for home electronics. Under the Eureka programme — nothing to do with Elite or Oric — Britain's Department of Trade and Industry is proposing a Eurohome project including "the early development of common European standards" for "home information and entertainment, domestic appliances and associated control systems".

MSX spokesman Mike Margolis is not worried that companies like



GEC and Philips — which at the moment is producing MSX micros might be working on rival Eureka projects "it's very encouraging" he says "that people are beginning to copy MSX".

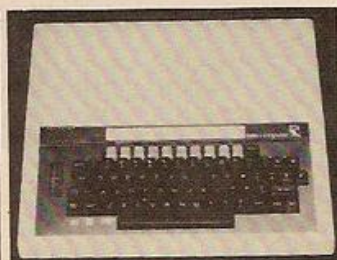
Mitsubishi, Sony, Toshiba and JVC are all emphasising their continuing commitment to MSX. Toshiba is cutting the price of its existing HX-10 to £100 which is also the new price for the Korean GoldStar MSX but Toshiba is also showing the new MSX 2 specification HX-23 which has 80 column display, 512 x 212 resolu-

tion up to 256 colours 128K video Ram and a battery backed calendar clock. Mitsubishi is demonstrating a frame grabber which can superimpose MSX 2 graphics over a TV or video picture with professional effects.

Meanwhile Kay Nishi of Micro-soft ASCII in Japan which pushed MSX says ASCII is concentrating on Large Scale Integration and VLSI to produce an MSX engine which will be CMOS for low power consumption — hence MSX portables in future, with three other chips.

128 POWER FOR BBC B+

ACORN'S NEW 128K BBC Micro is an admission that the B+ has been a disaster. High street stores including WH Smith have given up trying to sell BBCs, so the £499 BBC 128, the price Acorn tried to charge for 64K just a few months ago may be too little and too late to save the company. Dealers will be encouraged to upgrade any Pluses to 128K. Meanwhile, Oak Personal Computers is trying to corner the market in designer Acorns with BBC systems dressed up to look



BBC up to 128K.

like business machines — not, despite the name, made out of wood like the original Commodore Pets.

An hour a day keeps doctor away

TENSE, NERVOUS? Blame the computer says Prem Misra, a Glasgow doctor who is warning parents not to let children play with micros for more than one hour a day.

Memories going cheap

HOW MUCH does 64K of Ram cost these days? About £4 since Matsushita has cut the cost of its 64K bit Ram chips to 50p compared with £2 a year ago.

UPDATE

It's weird how computer shows come too early or too late for software houses.

Quicksilver is following up the success of the Rupert game with a Rupert II — no truth in the rumour that Sylvester Stallone wants the film rights. Also sheltering under the Argus Software banner is Mindgames with the new adventure Evil Crown.

After the success of Spitfire 40, Mirrorsoft is following through with a Harrier flight simulator, natch, with tanks, SAM sites and Mig-23s to shoot at. Cold war mentality aside, the game is billed as more than just a flight simulator. Apart from all that viffing and stuff you can do in a V/STOL jet, obviously you have to take certain strategic decisions about where to strike all this enemy hardware. The game features a head-up display as well as the standard cockpit display. Your mission is to destroy the enemy HQ.

Also new from Mirrorsoft is Fleet Street Editor — no Robert Maxwell jokes, please — a powerful package which apparently enables you to produce your own newspapers, newsletters and notices. Perhaps Mr Maxwell would be interested after all. Available on two discs for the BBC Micro in December you can produce, blow up, and modify pictures — more sophisticated versions for the the Atari ST and Commodore Amiga are aimed at the professional market, says Mirrorsoft.

Shoot-'em-ups are back in fashion. This is the word on the street, we are assured by Hewson Consultants still puffing contentedly away with their recent Brighton Belle steam-engine simulator.

Confronting the space-age, they have made the third part of the Dragontorc trilogy a space adventure. Astro-Clone features the same problem-solving graphics as medieval Avalon and Dragontorc but, in this one, it's clones versus Seiddab warriors. You're never alone with a clone and these guys can actually reach for a weapon, turn and fire it and return it to its holster — a big step forward in animation for author Steve Turner.

RAMBO RUNS

Strife on the Ocean wave

"WHAT MOST people call hell he calls home." And this Christmas you too will be able to share the living hell of Rambo as the US Army Special Forces renegade fights his way back through the green hell of the Vietnamese jungle with rescued American POWs supposedly held by Vietnam since the hasty US retreat a decade ago.

It's only a movie, and whatever the reality of the situation is, Ocean Software has had to work hard to develop a game as action-packed as the film, in which some unfortunate dies every 2.1 minutes. Ocean programmer Bill Barna compares the game under development to an old arcade favourite called Commando, but stresses the greater complexity and sophistication of the Ocean product. "Rambo can move in all directions, not just from side to side, and there is a problem-solving adventure element to the



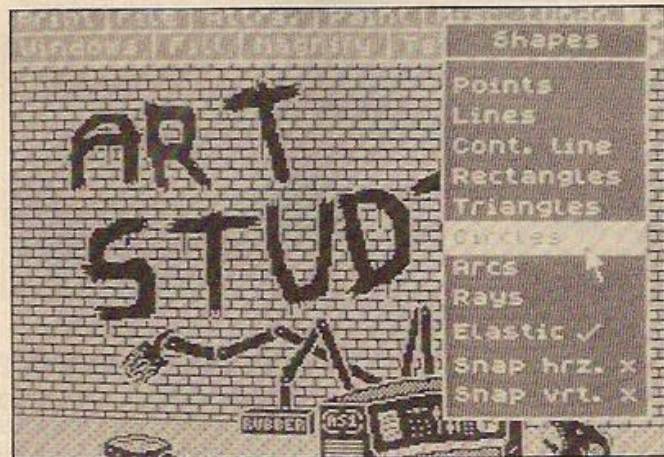
"But if we go to Vietnam who will look after the house plants?" game."

The gung-ho muscleman is given a bow and arrow by someone he meets in the jungle just like in the movie — no bow and arrow and he'll be forced to

backtrack later in the game.

There is to be a flight simulator sequence in the game — could this turn out to be the first Russian helicopter simulator on sale this side of Samarkand?

COLOUR MAC SPECTRUM



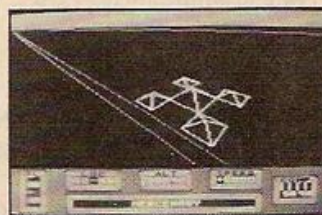
Not a Mac but a Spectrum.

WITH A MACINTOSH-like stroke of Art Studio's spraycan you can find out what Paul Daniels looks like without his toupee, or how Churchill's wartime credibility would have fared if he's sported a Hercule Poirot moustache.

Art Studio is an impressive

Spectrum graphics package from Oxford Computer Publishing. The £12.95 package has windows, icons, pull-down menus, and works from keyboard, joystick or with an AMX mouse. It's fast and takes the Spectrum the closest yet to the Macintosh's graphics.

Mercenary— The Targs of war



Novagen's Mercenary

CBM-64 AND ATARI owners can now crash-land their crippled spacecraft on the war-torn planet Targ. After 18 months' development, Novagen's Paul Woakes has finished mercenary — Escape from Targ, and Spectrum and Amstrad versions should be out in November.

At £9.95 you can play Mercenary as an Adventure — the underground sequences alone have 170 rooms — or as a complicated shoot-'em-up, taking lucrative jobs from both sides in the Palyar-mechanoid civil war. Woakes is already talking about mercenary II with a March blast-off date.

The Spectrum storage system



ROTRONICS WAFADRIVE

- Dual 128K storage
- Fast, reliable access
- Centronics and RS232 ports
- FREE Spectral Writer wp package
- FREE blank wafer

Blank wafers: 16K (£2.49)
64K (£2.79) 128K (£2.99)

Heathrow/Nightflight II £14.95 Space Wars/
Seiddab Attack/Luna Attack £14.95 Bear
Bovver/Wong's Loopy Laundry/World Cup
£9.95 Melbourne Draw £9.95 Starbike £7.95
ZAPP (Assembler/Disassembler/Monitor)
£19.95 Sherlock £14.95 RS232 lead £10.95
Centronics lead £12.95 Mugsy £9.95 Stock
Manager* £19.95 Finance Manager* £19.95
Address Manager* £19.95 VAT Manager* £19.95
* 80 column version

ONLY
£99.95
INCL P&P

All prices include VAT and p + p. Please make
your cheque/PO payable to SMT. Or quote
Access/Barclaycard number. Write your name
and address clearly. Please allow 28 days for
delivery. SMT, FREEPOST, Greens Norton,
Towcester, Northants, NN12 8BR.



SMT


The English Computer Shop

WILLEM OGIERPLEIN 2
B-2000 ANTWERPEN
Tel. 03/233 59 06

GRETRYSTRAAT 31
1000 BRUSSEL
Tel. 02/218 60 26

 **Schneider**
AMSTRAD

sinclair

 **apricot**

 **ACORN**
COMPUTER

EEN BRIT MET BIT!

SURPLUS PRINTER SALE

BRAND NEW PRINTERS FROM TOP MANUFACTURERS AT A FRACTION OF LIST PRICE!

PROFESSIONAL MATRIX PRINTER

- High definition 9x11 Matrix
- Full emulation of Epson MX80
- 100 ch/sec bi-directional printing
- Tractor or single sheet feed
- RS232 and centronics interfaces
- Full graphics capability
- Expanded & condensed print
- Comprehensive self-test
- Many other extra features
- Ideal for business micro systems
- Comprehensive manual



£149
plus VAT and
£11.50 p/p

£69
plus VAT and
£5.75 p/p

PERSONAL COMPUTER PRINTER

- Fast quiet thermal printing 56 ch/sec
- Full 8½in wide paper
- Full 80 column text
- Standard 8-bit ASCII 96 character set
- Standard RS232 interface
- Expanded or condensed print
- Built-in self-test
- Free 80 foot roll of paper
- Ideal for any micro with RS232
- Full instructions included

VIDEO MONITOR SALE

Brand new high resolution video monitors, green screen, in attractive case. Ideal for any micro with composite video out.

9 inch **£44** 12inch **£54**
Add VAT and £12.50 carriage

SURPLUS EQUIPMENT SALE

We have a huge stock of surplus micro systems, printers, terminals, power supplies, and much more. Send SAE for current list.

Example: Brand New
STC Prestel terminals **£99** plus VAT!



CHILTERN ELECTRONICS

HIGH STREET, CHALFONT ST. GILES, BUCKINGHAMSHIRE HP8 4QH TELEPHONE: 02407 71234

Telephone or send your order to Tim Reading

We accept personal cheques or telephone your Access card No.

All items despatched within 24 hours

Europe's No 1 Dealer in DEC PDP11 and VAX Computer Systems and spares.

POP★ TOPS

TOP 20

1	Hyper Sports	Imagine	Sp/64
2	Frank Bruno's Elite Boxing		Sp
3	Cylu	Firebird	Sp/64
4	The Way of the Exploding Fist	Melbourne House	Sp, 64 & Am
5	Frankie goes to Hollywood	Ocean	Sp/64
6	Desert Burner	Sparklers	Sp
7	Booty	Firebird	Sp/64
8	Graham Gooch's Test Cricket	Audiogenic	64
9	Don't Buy This	Firebird	Sp
10	Hyway Encounter	Vortex	Sp
11	Cauldon	Palace	Sp/64
12	Arnhem	CCS	Sp
13	Nodes of Yesod	Odin	Sp/64
14	Dambusters	US Gold	Sp/64
15	Red Arrows	Database	Sp
16	The Fourth Protocol	Hutchinson	Sp/64
17	Softaid	Ethiopia Appeal	Sp/64
18	Pitstop II	US Gold	64
19	Southern Belle	Hewson	Sp
20	Bobby Charlton's Soccer	Holiday Bros	El/Bc

Sp=Spectrum 64=CBM 64
Am=Amstrad El=Electron Bc=BBC
Source = WH Smiths.

TOP 3 BY MACHINE

1	Rockman	Mastertronic	Vc
2	Doodlebug	Mastertronic	Vc
3	Hunchback II	Ocean	Vc
1	Way of the Exploding Fist	Melbourne House	64
2	Frankie goes to Hollywood	Ocean	64
3	Action Biker	Mastertronic	64
1	Frank Bruno's Elite Boxing	Elite	Sp
2	Roland Rat Race	Ocean	Sp
3	Dambusters	US Gold	Sp
1	Repton	Superior	El
2	The Hackers	Firebird	El
3	Overdrive	Superior	El
1	Way of the Exploding Fist	Melbourne House	Am
2	Locomotion	Mastertronic	Am
3	Non Terraqueous	Activision	Am
1	Finders Keepers	Mastertronic	Ms
2	Chiller	Mastertronic	Ms
3	Pitfall II	Mastertronic	Ms
1	Revs	Acorn	Bc
2	Wizardore	Imagine	Bc
3	Nightlore	Ultimate	Bc
1	One on One	Ariolasoft	At
2	Pole Position	US Gold	At
3	Airwolf	Elite	At
1	Formula 1 Simulator	Mastertronic	16
2	Airwolf	Elite	16
3	BMX Racers	Mastertronic	16

Vc = Vic 20 64 = CBM 64
Sp = Spectrum Bc = BBC At = Atari
16 = CBM 16 El = Electron
Am = Amstrad Ms = MSX
Source = Websters Software.

Write to: Your Letters,
Your Computer, Room
L221, Quadrant House,
The Quadrant, Sutton,
Surrey SM2 5AS. Our
Prestel mailbox number
is 019991800.

YOUR Letters

Dear Uncle Clive,

Your recent treatment by the media would have been very trying for most people. But then you're not most people. The British press love the smell of failure, especially when it's one of Maggie's blue-eyed boys. But this won't have bothered you. You have intellectual authority, a superior piece of clockwork between your ears. With courage in your convictions criticism is like water off a duck's back. This, after all is your greatest strength — and weakness.

The early boom days of this industry were ideal for you. You innovated. The MK 14, ZX-80, 81 and Spectrum fed an insatiable demand. Your mistakes, and there were many, were forgiven or forgotten in the mad impetus of the marketplace. Things are different now. The big boys have arrived, you have real competition, your mistakes show. And how. Robert Maxwell and Dixons have between them contrived to give you breathing space. I am going to be cheeky and suggest what you do with this reprieve.

Firstly don't launch your new range, Pandora, 128K Spectrum and QL Mk 2 until they are properly engineered, well made, reliable and available. You used to be able to get away with wobbly Ram packs, exploding power supplies and keyboards that wore out. Not anymore. The

customer is educated now to expect and to get better. If you don't give them what they want Amstrad, Atari and the Japanese will.

Secondly, leave the silly ideas to other people. The city would be more confident, your customers happier and you more successful. The Microdrives are more trouble than they are worth — dirt cheap to make but prodigiously unreliable and universally disliked. Swallow your pride and go for proper discs. Wafer-scale integration, fourth generation and advanced batteries are all very nice but not really the business of a microcomputer manufacturer with limited resources. These projects are really just ego-massaging, you wouldn't catch Alan Sugar or Jack Tramiel playing round with them. So sell them off and buy in technology as and when you need it. It is what you have done in the past when you have been your most successful. As for the C5 and the research and development into future electric vehicles, sell it off. The project is too long term for you to afford. You have marketed it very badly, leaving egg on beard.

Thirdly be nicer to the rest of the industry. Without retailers, distributors, software houses and peripheral manufacturers



your sales would have been small. You had a symbiotic relationship with all these people, but now you need them more than they need you. Three years ago they could only make a living by supporting Sinclair, now they can do very nicely without, thank you. This is why the QL has been such a failure. You must not launch new products mail-order only, creaming off the profit and delaying deliveries. Launch through the trade. Then customers get their product when they pay for it. The product gets support and distributors and retailers get a living. You must be nicer to software houses, otherwise they will write for other computers. Without lots of good software a computer is only useful as a paperweight.

I can only hope your future is as successful as your past and that you continue as a major force in the British microcomputer industry.

Yours sincerely,

Bruce Everiss

Bruce Everiss.

ROM SUBROUTINES

MACHINE CODE programmers may be interested in a few useful Basic Rom subroutines (JSR).

Check for the next Basic character:

SAEF7 — right bracket

SAEFA — left bracket

SAEFD — comma

Print string from lo-byte in accumulator, hi-byte in Y register and stop at first zero:

SB1E

Get next 8 bit number from Basic into X register:

SB79R

Get next 16 bit number from Basic into \$14 and \$15:

SAD8A then SB7F7

There are many other handy subroutines in the Basic Rom — I have used several in my Superbasic program published in this issue. By the way, if anyone can't face typing in all that data I can provide Superbasic on tape or disc for £4 and £6 respectively. Write to Coles Bungalow, Privett, Alton, Hampshire, GU34 3PH.

R A Mason,
Alton,
Hampshire.

MICRONET 800

CONGRATULATIONS to Mr Houlton of St Helens who recently won a VTX 5000 modem in British Telecom's "1000 Modems" competition.

However, Mr Houlton's letter published in September's *Your Computer* was factually incorrect with

regard to joining Micronet 800 and could mislead *Your Computer* readers who are considering going "on-line".

The facts are as follows:

■ Subscribing to Micronet 800 and Prestel costs just £16.50 per quarter. This is NOT subject to VAT.

■ Using a modem to access any on-line service will inevitably incur telephone charges. Micronet 800 is the only home computer network which gives users nationwide access at especially low phone rates — ie only 40p per hour after 6pm and all weekend. Without this facility the unwary modem user may find that regularly accessing even free bulletin boards can be an expensive pastime.

■ Mr Houlton's preference for "try before you buy" is rightly shared by most micro users. With this in mind, (continued on page 21)

AMSTRAD
COMMODORE, ACT
ACORN, ATARI, SINCLAIR, & MORE!

MICRO

We export Microcomputers
and Peripherals to all Countries
Any make. Any Quantities
BIG DISCOUNTS

send for comprehensive price list to:

Dept 1085
MICRO-X LTD
765-767 HARROW ROAD, LONDON NW10 5NY
TELEPHONE 01-968 6622 TELEX 915866 MICROX G.

EXPORT



Rose Software

**EDUCATIONAL TAPES FOR THE SPECTRUM
OUTSTANDING OFFER**

Buy One, Get One FREE!



NOW AVAILABLE

For 4 - 10 year olds:- **YOUNG LEARNERS 1**-
abacus, telling the time, going shopping, snakes.

YOUNG LEARNERS 2 - estimating angles,
times tables, deduce, estimating capacity.

PRIMARY ARITHMETIC - add, subtract,
multiply, divide.

For 10 - 14 year olds:-
INTERMEDIATE ENGLISH 1 or 2
INTERMEDIATE MATHS 1 or 2

For "O" level students - **FRENCH, PHYSICS (Light and Heat)**
Maths (GEOMETRY, TRIGONOMETRY, or EQUATIONS)

For any age:- **HIGHWAY CODE, LEARNING TO READ MUSIC and**
QUAZER, a quiz game.

Rose Software, 148 Widney Lane, Solihull, West Midlands B91 3LH.
Tel: 021 - 705 2895 (Trade enquiries welcome)

Please send me _____

I enclose cheque/P.O. for £ _____

Please send me a FREE _____

Please send me a FREE brochure ☐

Name _____

Address _____

YC10

IMMEDIATE DESPATCH
only **£6.95** each
(includes p&p)

OFFER ENDS 30th NOVEMBER 1985.

BETA BASIC 3.0

SPECTRUM 48K

SINCLAIR USER, JAN. 85 (ABOUT RELEASE 1.8): "HAS ESTABLISHED ITSELF AS THE STANDARD EXTENDED BASIC FOR THE SPECTRUM...TURNS SINCLAIR BASIC FROM A GOOD VERSION OF THE LANGUAGE TO A FANTASTIC ONE." NOW, WITH RELEASE 3.0, BETA BASIC BECOMES PROBABLY THE MOST POWERFUL BASIC AVAILABLE ON ANY 8-BIT MICRO!

- **PROCEDURES** - a terrific implementation that lets you extend your Basic! No PROC keyword is needed; e.g. you can use commands like: swop a,b or draw box 10,20,5 or addup b(),sum. With parameter passing by value or by reference (including arrays), LOCAL variables and recursion.
- Up to 128 WINDOWS with their own attributes and character size.
- **ANY CHARACTER SIZE** (giving from 1 to 64 or more chars/line).
- **LISTINGS** with optional automatic indentation of loops, procedures, IF, etc. Works on existing Spectrum Basic programs too!
- **KEYWORDS** (including the Spectrum Basic ones) can all be entered by typing them in full, or by the "single entry" method, or both in the same line.
- A full range of **TOOLKIT** commands. • **EXCEPTIONAL ARRAY** and **STRING** handling.
- Many powerful **GRAPHICS** commands. • **EXCELLENT EDITOR** - fast and convenient.
- **MICRODRIVE** commands are improved and much easier to use.
- **OTHER FEATURES**, new or improved, are too many to fully list! DO - LOOP structure with WHILE, UNTIL and EXIT IF; ALTER, AUTO, BREAK, CLEAR, CLOCK, CONTROL CODES, DEF KEY, DPOKE, DRAW TO, EDIT, ELSE, FILL, GET, JOIN, KEYIN, multi-LET, LIST a slicer, LIST DATA, ON, ON ERROR, OVER 2, POKE strings, POP, READ LINE, REF, ROLL, SCROLL, SPLIT, TRACE, USING. Faster GOTOs, GOSUBs and FOR-NEXT loops.
- 26 **POWERFUL FUNCTIONS**: AND, OR, XOR, DEC, HEX\$, BIN\$, fast SINE, COS, RNDM, CHAR\$, NUMBER, DPEEK, EOF, FILLED, INARRAY, INSTR, ITEM, LENGTH, MEMOYS, MEM, MOD, SCRN\$, SHIFTS, STRINGS, TIMES\$, USING\$.
- Spectrum Basic compatible - you can run existing programs. Transferable to Microdrive, Wafadrive and other special versions available.
- Comprehensive A5-size manual. More than 80 pages, packed with examples.
- To show you the power of Beta Basic's excellent procedures, we include on each tape a **FREE TURTLE GRAPHICS** package!
- **Upgrades to Release 1.8 customers**: If you bought direct from us, there is no need to return your cassette - just quote the (approximate) original purchase date with your order; otherwise return your cassette and name your supplier. The upgrade price of £6.95 (£7.50 overseas) includes a new manual. Release 1.8 remains available, at a reduced price of £8.95 (£9.50 overseas).
- **TRANSFORM** your Spectrum with **BETA BASIC 3.0** for just £14.95 inclusive! (£15.50 overseas). Or if you want to know more about the program, send us an S.A.E.

(TICK AS APPROPRIATE.) PLEASE SEND ME:
☐ BETA BASIC 3.0. PAYMENT OF £14.95 (OR £15.50 OVERSEAS) IS ENCLOSED.
☐ BETA BASIC 3.0 UPGRADE. PAYMENT OF £6.95 (£7.50) IS ENCLOSED.
☐ BETA BASIC 1.8. PAYMENT OF £8.95 (£9.50) IS ENCLOSED.
☐ MORE INFORMATION ON _____. I HAVE/DO NOT HAVE RELEASE 1.8 ALREADY.
 A STAMPED ADDRESSED ENVELOPE IS ENCLOSED.

**BETA
SOFT**

92 OXFORD RD.
MOSELEY
BIRMINGHAM
B13 9SQ

IN ★ TOUCH

How to write for Your Computer

We called this magazine *Your Computer* precisely because we welcome your views, tips and hints and even your criticisms of machines and software in general. Here's how you go about getting your name into print. Your article should be typed, double-spaced, on A4 paper. A name and address on each sheet would help. Don't forget to tell us which machine it runs on. With programs please include a cassette or disc and some indication of how long it is. Please put what machine it's for on the envelope. Don't forget full instructions to us how to load and list your program and how to enter it for the readers.

The article must be submitted exclusively to *Your Computer*. We pay £35 per published page — that's as it appears in the magazine and includes illustrations.

Telsoft

Telsoft is *Your Computer's* software downloading service. Any program for the Spectrum or the BBC — and soon the Commodore — which has a telephone symbol next to it is available on the service. Both 1200 and 300 baud speeds are catered for. For more details call Colchester (0206) 8068. No more lonely nights typing in endless pages of hex digits.

Message service

You can get messages to us in two ways. Either use the Prestel Telex Link to 892084 BISPRES G or you can use our very own modem, day or night on 01-661 8978. The modem is V21, 300 baud, even parity, 10 bits per character. You simply transmit in upper case "YRC" — our address code, and wait for the acceptance code "+ + + STF GO". Then off you go. Don't forget to tell us who it's for. Sign off with "NNNN" — again in upper case.

(continued from page 19)

we provide a force of around 300 retailers across the UK to demonstrate the Micronet 800 service. Mr Houlton has a choice of two local retailers in St Helens — Microman Computers and Boots (Church St). Alternatively any modem user can access the free Micronet demonstration database using the 444 444 4444 identity and the 4444 password.

All Micronet advertising and sales literature clearly specifies both the subscription price and the low cost phone rates, and our national retailer list appears very frequently in the home computer press.

With modems rapidly becoming one of the most popular home computer peripherals, we would not like to see anyone deterred from going on-line and unable to enjoy the huge range of facilities available.

Ian Rock,
Marketing Manager,
Micronet 800.

A MIRACLE?

IN SPRING '84 I bought a Beta Disk controller for one of my numerous Spectrums. My decision was based on the fact that it was designed to work with any Shugart compatible drive, even with my BASF 6238 which consists of two drives (1 MByte each) and a single half height chassis.

Unfortunately I had to send it back, because it did not work. Although the manual clearly excludes guarantee outside the U.K., Technology Research Ltd. repaired it free of charge. After that the interface worked satisfactorily for more than a year. When I decided to upgrade to the double density version, it kicked the bucket — at the most unfavourable moment, since I merely needed it for copying my single density files onto double density diskettes before superannuating it. So I sent it back.

YOUR Letters

Lo and behold, after two weeks the black magic box was back, repaired for £30; a new one would cost some £100. I found out very soon that it was not really repaired. Believe it or not: Except for the case it is completely new, and several (minor) bugs of the original version have been removed, you remember: for £30 instead of £100.

To my mind the department of Technology Research Ltd. deserves mention in Britain's biggest selling home computer magazine. Readers' Columns in British computer magazines are full of complaints about the black sheep in the computer industry; I sometimes get the impression that this flock is mainly black. Now here is at least one white sheep. You ask me, how I managed to make double density copies of my single density files? Ever heard of Uncle Clive and the network facility of his Interface 1? Try to do the same job on an IBM...

Hans Joerg Rothenberger,
Walenstadt,
Switzerland.

MORE ON MIRA

SOME OF your readers may have encountered some difficulty with Mike Rains otherwise excellent MIRA program, giving Microdrive owners a random access facility — September issue, p60.

In particular, the use of the Restore # command may cause a computer 'lock

up'. The reason for this is that the extended Basic commands were written for an Interface 1 with Issue 1 Rom.

The following Pokes, entered either as an additional line 200 in the Basic loader — listing 2 — or as a series of direct commands to patch the code subsequently, will amend the routines to operate correctly.

POKE 63111,142 : POKE 63112,19 :
POKE 63365,50 : POKE 63366,21 :
POKE 63375,133 : POKE 63376,31 :
POKE 63381,50 : POKE 63382,21 :
POKE 63390,11 : POKE 63391,31 :
POKE 63396,50 : POKE 63397,21

Des O'Hare,
Glasgow.

Mike Singleton, author of 'The Lords of Midnight' and 'Doomdark's Revenge', would like it to be known that the game called 'Snakes' which we published last month was, in fact, a copy of a game he wrote two years ago, released by Postern under the name of 'Snakepit'. He says that, at the time, it was one of his favourites and that it's a sign of how rapidly games software has developed that what was once a commercially viable game (even shown on BBC 1) now seems almost prehistorically simple. Bear in mind, he adds, that the game was originally developed for the 3.5K Vic — most games these days wouldn't even get their title screen onto so few bytes. Though it lacks the variety now expected of commercial games software, Mike still thinks Snakepit has addictive qualities.

THEM GOOD 'OL BOYS FROM TEXAS

HAVING JUST read Colin Grant's QL is OK letter in your September issue, I would like to point out to him that the QL was not the pioneer 16-bit micro he claims it to be. Far from it! Texas Instruments released their TI-99/4 home computer in 1979! This used the TMS9900 16-bit CPU, but was restricted by the use of an 8-bit data bus. The QL's first debugged appearance came in mid-1984, 5 years after the release of the 99/4!

This makes the claims by Mr Grant that the rest of the industry have followed in the QL's footsteps highly dubious. Both the 99/4, and its later model, the 99/4A, took much more slick than the QL! Complaints about the location of the on/off switch, size of the power supply, and the design of cassette cable abounded, resulting in poor sales and TI's resultant withdrawal from the market.

As for Sinclair being 'brave' to

release a 16-bit machine on the market, I reckon the credit should go to Texas, who pioneered, yet paid the price of criticism for their advanced machines, which were way head of their time, in terms of design, Basic, and expandability.

It appears to me that Sinclair

gets too much credit for the development of the micro market, where other companies, such as Atari and TI, receive bad reviews.

Stephen Meadows,
Nutley,
Sussex.



CAR CURE



CAR CURE will transform your micro into an expert mechanic to help you find faults on your car and then determine the cure.

Technical Colleges buy CAR CURE to help students learn about the faults cars suffer, as well as their symptoms and cures. Now you too can benefit!

Complete with comprehensive 5000-word User Guide and packaged in a long-life plastic wallet. Export orders get American-English cross reference. All for less than many garages charge for an hour's work!

Cassette for 48K Spectrum (microdrive transfer instructions free, on request) and Amstrad CPC464 at only £9.95.

Disc for BBCB (state 40 or 80 track) at £11.95.



SIMTRON
PROGRAMS TO HELP YOU

DEPT YC, 4 CLARENCE DRIVE, EAST GRINSTEAD,
WEST SUSSEX RH19 4RZ Telephone (0342) 28188

★ REVIEWS

"...works extremely well, a great deal of effort has gone into making it user friendly as well as functional... a very worthwhile package"

—CRASH

"...an expert system... incredibly easy to use"

—Popular Computing Weekly

"...well produced... a worthwhile addition to your toolkit"

—ZX Computing

"...one of the most useful programs I have ever used. Makes 'xyz' look very childish and useless. A software company to keep an eye on"

—ZX Appeal (Canada)

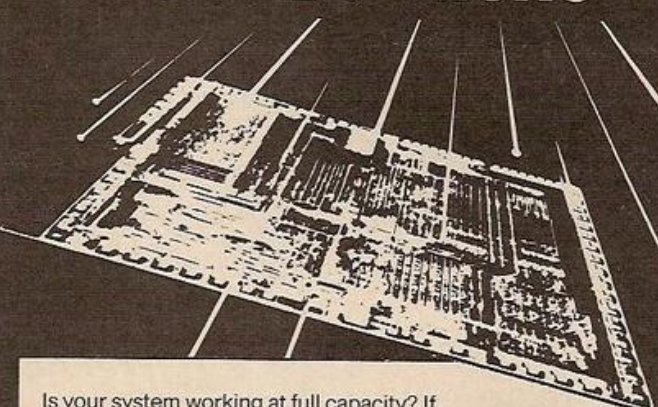
★ COMPREHENSIVE

- + 900 faults
- + 300 symptoms

★ POWERFUL

- + Discover faulty parts for every symptom
- + Display faults for every part
- + Recommended cure for every fault
- + Trace symptoms of any fault
- + Identify faults causing two symptoms
- + Mark items for easy reference
- + Eliminate faults checked OK
- + Review progress on summary screen
- + Call help if in difficulty
- + Save diagnosis in data file

GET THE MOST FROM YOUR BBC MICRO



Is your system working at full capacity? If not, the 'BYTEBOX' is a must! The standard BBC Micro can support up to sixteen 'sideways' ROMs yet has space for only four. You can overcome this problem and add extra facilities with the easy-to-install 'BYTEBOX' described in the October issue. No soldering onto the micro is needed.

PLUS NEW SERIES Micro Systems

What they are, how they work and how they can work for you.

PRACTICAL

ELECTRONICS

October issue OUT NOW

ROMANTIC ROBOT present

Multiface one

No. 1 Spectrum multipurpose interface with

(1) Fully automatic and universal 100% push-button back-up facility of any program to cartridge, disk, wafer, tape. (2) Joystick interface. (3) Composite video interface

All three in one compact box at an amazing price of

£39.95!

MULTIFACE ONE is unique both in unbeatable value and features:

- ★ No extra software — has internal 8K ROM and 2K RAM
- ★ Menu-driven with prompts and one-touch commands turning a complex task into a trivial procedure: (1) Push button. (2) Select function — exit/return/save/change syntax. (3) Input name. (4) Select destination — tape/cartridge/wafer/disk.
- ★ Automatic, intelligent "compressed" saving for fast re-loading and economizing on space on cartridges, disks, etc. MULTIFACE saves only the relevant parts of RAM and leaves out the rest.
- ★ SAVE to any type of peripheral — default syntax for MICRODRIVE, WAFADRIVE & TAPE can be changed for disk systems, etc.
- ★ Transfer from one peripheral to another if both attached at the same time, or save from 1st to tape, swap, reload and save to 2nd.
- ★ Can be used not only for pure back-ups — you can, for instance — stop any program — and restart anytime later or also — study/alter/customise — and then save, continue, etc. This way you can load and continue a game from where you got lost, poke "warm reset" — recover from a "crashed" computer (escape from infinite loops when the keyboard is inoperative, etc.) — save just a screen or leave out screen when saving a program.
- ★ Designed to remain attached to RUN programs it saved as it is meant only for personal use in accordance with copyright laws.
- ★ Through extension bus for connecting other peripherals.

Multiface one ESSENTIAL SPECTRUM COMPANION

I enclose a cheque/PO for £..... (European orders please add £1 overseas £2)

or debit my No.....

Name..... Card expiry.....

Address.....

Please send me (tick as applicable):

- | | | | |
|-------------------------|--------------------------------|--------------------|----------------------------------|
| TRANS-EXPRESS cartridge | £9.95 <input type="checkbox"/> | MULTIFACE | £39.95 <input type="checkbox"/> |
| disk (Opus Discovery) | £9.95 <input type="checkbox"/> | tape (for m'drive) | £ 7.95 <input type="checkbox"/> |
| MUSIC TYPEWRITER | £7.95 <input type="checkbox"/> | wafer (Rotronics) | £ 9.95 <input type="checkbox"/> |
| WRIGGLER Spectrum tape | £4.95 <input type="checkbox"/> | with supplement | £ 9.95 <input type="checkbox"/> |
| WRIGGLER Amstrad tape | £7.95 <input type="checkbox"/> | or cartridge | £ 6.95 <input type="checkbox"/> |
| | | or disk version | £ 11.95 <input type="checkbox"/> |

MIDI compatible with MIDI MUSICIAN package
New overlay for Spectrum — Now at Xmas price!

TRANS-EXPRESS

The software way of transferring Spectrum software. 4 utilities for m'drive, 2 for wafadrive, 2 for Opus Discovery. Invaluable for cartridge/disk maintenance & automatic transfers. Highly professional, user-friendly, versatile and comprehensive. An ingenious piece of software!

***** Features ***** Performance PCN

TOP SOFTWARE AT BOTTOM PRICE

Wiggler

One of the best games for any machine I've seen for very long time.

Wiggler is a totally original game. CRASH SMASH STAR GAME PCN
Great game, good music, well recommended. What Micro?
The graphics and sound are excellent and the game is totally addictive.
10/10 value & playability. 9/10 graphics & sound. C & V Games
This is a great game! CAS 'Well worth buying.' ZX C & Crash
If you've any sense you'll order your copy now. PCN 'A WINNER' PCW

! NOW FOR AMSTRAD!! SPECTRUM version at Xmas PRICE!

MUSIC TYPEWRITER

Complete Spectrum music system for writing, editing, playing, printing & storing music. Its real notation graphics and ease of use make it an ideal educational tool. Great fun to play with & a lot to offer in serious use (transposing, dot matrix printout etc.). A very professional piece of programming, easy to use, excellent screen presentation, error trapping & helpful prompts. If you're interested in music and own a computer then get it! ZX Computing

ROMANTIC ROBOT 77 Dyne Road London NW6 7DR 24 hrs orders 0892 834783

ADD-ON EXTRA

Beta Interface

*Disc Interface
Spectrum
£95.00*

Technology Research has modified its Beat interface to include a magic button which, rather like Interface III, takes a memory image and dumps it to disc, allowing you to back-up protected tape software to disc. The interface itself was reviewed in January and Technology Research are on 0784 63547.

Starter Pack

*Disc Drive
Various
£149 plus*

Starter packs consists of interfaces, drives and software. Together with simple instructions on setting up, it's an easy way for a beginner to buy a disc system "off the shelf".

Multi port

*RS232 interfaces
Amstrad
£99.95*

This consists of the 8251 UART giving various baud rates at correct RS-232 voltages. There is also a 24-pin port, compatible with the BBC user port, and two Rom slots. One Rom slot is reserved for the SYKYCOM Rom which contains Prestel software. Skywave claim that this Rom contains downloading software compatible with a new service to be announced by Micronet.

The user port will allow modems such as the Miracle Modem to be interfaced with the Amstrad and use the software control features. Skywave Software are on 0202 302385.

Eprom burner

*C64
£54.95*

Burn your own Roms with this board for the C64. It will take 128K Roms. However, if you want to use the Roms you've burnt, you'll need the Rom motherboards as well which costs £34.95 for the 128K version or £12.95 for 8K. The Rom burner and the motherboards are both available from Lightwave Leisure on 051 639 5050.

HARDWARE

Future

Turbo

- Commodore 64/128
- Robocom Ltd.
- £24.95 plus

This is an entire cottage industry devoted to correcting the perceived shortcomings of the C64. This latest offering takes the form of a range of cartridges from the humble Turbo 10 to the Turbo 50 at £39.95. The Turbo 50 offers a Basic toolkit, disc and cassette commands, a machine code monitor, a reset switch and Centronics software.

The Basic toolkit does not attempt to be a new Simon's Basic — there are no sprite or Sound commands — it just gives a couple of dozen commands which will be useful for programmers, block

deletes, block lists, rennumbers and so on. The disc and tape commands seek to speed up storage and abbreviate the DOS commands.

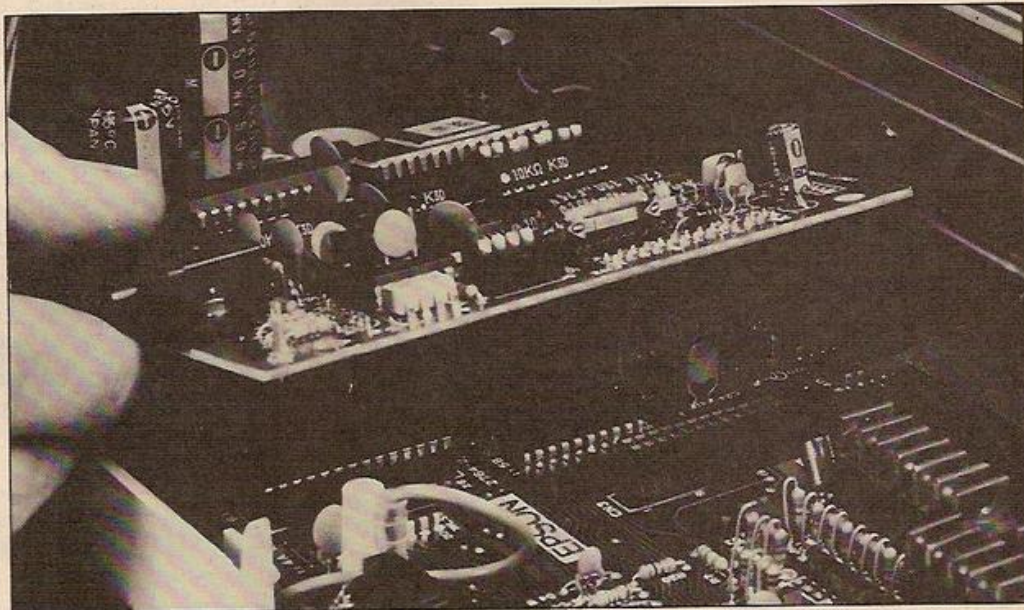
Tape loading and saving is 10 times faster, disc operations five times faster. Merge and copy commands are included. The printer handler can drive a Centronics printer, and program listings have colour and graphics characters "decoded".

The machine code monitor is very comprehensive. It occupies 4K and can be relocated as desired. It has an assembler, disassembler,

breakpoints, single stepping, relocating with conversion of all absolute jumps. There is also a reset switch which, together with the old command, should allow recovery of a Basic program after a crash.

The cartridge takes up no Basic Ram and the small area it occupies — from C000 to CFFF — can be freed using the Quit command.

The various other members of the Turbo family trade off price for facilities and it's up to the customer which functions he wants to buy. Good value packages.



Epson NLQ Board

- Epson Printers
- Epson
- £130

THE RECENT introduction of high quality dot matrix typefaces from Cannon and Star has breathed new life into the established world of dot matrix printers. A little slow off the blocks, Epson have now entered the Near Letter Quality (NLQ) lists. The NLQ board can be fitted to your FX or RX printers, or comes built-in to the new LX80 and FX80+.

The NLQ font is produced by making two passes of the printhead slightly offset, producing an effective 18 pin head width. There are

pica and elite print widths and, in proportional print mode, there is a sans serif NLQ font. This is particularly useful for producing clear super and subscripts.

Italic versions of both fonts are also provided. What you gain in quality, you lose in speed. Being uni-directional, and taking two passes, it's about a quarter of the speed of normal draft mode printing. All normal draft modes are available with the board fitted.

The board also gives the printer some extra formatting commands. The printhead can be given a new position, in character dots relative to either the left margin or the present head position.

You can also produce extra dots between letters. This ability with some clever software would allow

New plug-in Epson near-letter-quality (NLQ) print boards up-rate FX and FX+ series printers.

true right justification of columns of text. Instead of the present rather primitive method of putting in extra spaces, you could add an extra dot to some of the letters, which would be hardly noticeable.

There is a 6K buffer. However, if all of this is available for printing, characters cannot be downloaded. An alternative configuration gives a 2K printer buffer and 128 definable characters. This add-on is a must for business users, although the hobbyist might feel it is a shade expensive. The new printers at £255 for the LX80 certainly look very good value. It looks like Epson are back on top in the performance/cost contest.

Thinking software?

THE TASWORD WORD PROCESSORS

The extensive features of the Tasword word processors are ideal for both the home and business user. Every Tasword comes complete with a comprehensive manual and a cassette or disc. The cassette or disc contains your TASWORD and TASWORD TUTOR. This teaches you word processing using TASWORD. Whether you have serious applications or simply want to learn about word processing, TASWORD and TASWORD TUTOR make it easy and enjoyable.

TASWORD TWO (Spectrum)

64 characters per line on the screen!

"Without doubt, the best utility I have reviewed for the Spectrum."

HOME COMPUTING WEEKLY APRIL 1984

"If you have been looking for a word processor, then look no further."

CRASH JUNE 1984

The cassette program is supplied with instructions for microdrive conversion.

TASWORD TWO* ZX 48K Spectrum cassette **£13.90**
microdrive cartridge **£15.40**

TASWORD EINSTEIN

A sixty-four character per line display and the ability to hold over five hundred lines of text at any time are just some of the features of this, the most recent of the Taswords. Full interaction with the disc system — e.g. Tasword detects the presence of added drives and allows their use.

TASWORD EINSTEIN Tatung Einstein disc **£19.95**

TASWORD MSX

With all the features of the Spectrum Tasword Two including the amazing sixty four character per line display. The Tasword MSX machine code program utilises the 32K of memory not normally available to Basic allowing over five hundred lines of text to be held in memory.

TASWORD MSX* 64K MSX Computers
Fully inclusive mail order price **£13.90**
(cassette includes both disc and tape versions)

TASWORD 464

"There is no better justification for buying a 464 than this program."

POPULAR COMPUTING WEEKLY NOVEMBER 1984

A particularly sophisticated yet easy to use program. Now available on disc. The cassette version is supplied with instructions for transferring to disc.

TASWORD 464* Amstrad CPC 464 & 664 cassette **£19.95**
disc **£22.95**

TASWORD 464-D

This is the new Tasword especially developed to utilise the capabilities of the CPC 464 and 664 disc drives. A major new feature is a powerful mail merge facility. Tasword 464-D will only run on, and is only supplied on, disc. ▶

TASWORD 464-D Amstrad CPC 464 & 664 disc **£24.95**

THE TASPRINT STYLE WRITERS

A must for dot-matrix printer owners! Print your program output and listings in a choice of five impressive print styles. The Tasprints utilise the graphics capabilities of dot matrix printers to form, with a double pass of the printhead, output in a range of five fonts varying from the futuristic Data-Run to the hand writing simulation of Palace Script. A TASPRINT gives your output originality and style! The TASPRINTS drive all Epson compatible eight pin dot-matrix printers, e.g.

EPSON FX-80	NEC PC-8023B-N	BROTHER HR5
EPSON RX-80	MANNESMANN TALLY MT-80	SHINWA CP-80
EPSON MX-80 TYPE III	STAR DMP 501/515	DATAC PANTHER
	COSMOS-80	DATAC PANTHER II

Five impressive print styles for your use:

COMPACTA - bold and heavy, good for emphasis

DATA-RUN - A FUTURISTIC SCRIPT

LECTURA LIGHT - clean and pleasing to read

MEDIAN - a serious business-like script

PALACE SCRIPT - a distinctive flowing font

Typical Tasprint output. Please note that different makes of printer produce different sized output.

TASPRINT (Spectrum)

Drives all the printer interfaces compatible with TASWORD TWO and can be used to print TASWORD TWO text files as well as output from your own Basic programs.

TASPRINT 48K Spectrum cassette **£9.90**
microdrive cartridge **£11.40**

TASPRINT EINSTEIN

Print TASWORD EINSTEIN text files in one or more of the TASPRINT fonts.

TASPRINT EINSTEIN disc **£14.95**

TASPRINT QL

TASPRINT QL includes a screen editor used to modify files created by other commercial software, such as QUILL, or by the user from BASIC. These modified files include TASPRINT control characters and may be printed, using TASPRINT, in one or more of the unique TASPRINT fonts.

TASPRINT QL Sinclair QL microdrive cartridge **£19.95**

TASPRINT 464

Can be used to print AMSWORD/TASWORD 464 text files in addition to output from your own Basic programs. Drives the **Amstrad DMP-1** in addition to the printers listed above.

TASPRINT 464 Amstrad CPC 464 & 664 cassette **£9.90**
disc **£12.90**

TASWORD UPGRADES

Tasword 464 and Amstrad owners: send your original cassette or disc (not the packaging) as proof of purchase. Your original will be returned together with Tasword 464-D on disc.

£13.90

... think Tasman

THE TASCOPY SCREEN COPIERS

The TASCOPY screen copiers print high resolution screen copies with different dot densities and patterns for the various screen colours. This gives the screen copies a shaded effect which presents on a monochrome scale the colours on the screen. With TASCOPY you can keep a permanent and impressive record of your screen pictures and diagrams. TASCOPY supports all the printers mentioned under TASPRINT.

TASCOPY (Spectrum & Interface 1)

The Spectrum TASCOPY is for use with the RS232 output on ZX Interface 1. It produces monochrome copies (in a choice of two sizes) as well as copies with the shaded "grey scale" effect described above.

TASCOPY ZX Spectrum cassette **£9.90**
microdrive cartridge **£11.40**

TASCOPY QL

TASCOPY QL adds new commands to the QL Superbasic. Execute these commands to print a shaded copy of the screen contents. Print the entire screen or just a specified window. TASCOPY QL also produces large "poster size" screen copies on more than one sheet of paper which can then be cut and joined to make the poster, and high speed small copies.

TASCOPY QL Sinclair QL microdrive cartridge **£12.90**

TASCOPY 464

Adds two new commands to the 464 Basic to give both a standard shaded screen copy as well as a "poster size" copy which is printed onto two or four sheets which can be cut and joined to make the poster.

TASCOPY 464 Amstrad CPC 464 & 664 cassette **£9.90**
disc **£12.90**



Available from good software stockists and direct from:

TASMAN SOFTWARE

Springfield House, Hyde Terrace,
Leeds LS2 9LN · tel (0532) 438301

Telephone Access/Visa orders: Leeds (0532) 438301

PLUS ...

TASWIDE The Screen Stretcher

With this machine code utility you can write your own Basic programs that will, with normal PRINT statements, print onto the screen in the compact lettering used by TASWORD TWO. With TASWIDE you can double the information shown on the screen!

TASWIDE ZX 16K + 48K Spectrum **£5.50**

TASMERGE The Mail Merger

Transfer data from MASTERFILE to TASWORD TWO! Letters and forms typed on TASWORD TWO can be printed with addresses and data taken from MASTERFILE. The mail merge facility allows, for example, multiple copies of a letter to be printed, each containing a different name and address taken from your MASTERFILE data. To use TASMERGE you must have one or more microdrives as well as TASWORD TWO and MASTERFILE by Campbell Systems (version 9 or later).

TASMERGE ZX 48K Spectrum **£10.90**

TASMAN PRINTER INTERFACE

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable and driving software. The user changeable interface software makes it easy to send control codes to your printer using the method so successfully pioneered with TASWORD TWO. The cassette contains fast machine code high resolution full width SCREEN COPY SOFTWARE for Epson, Mannesmann Tally, Shinwa, Star, and Tandy Colour Graphic (in colour!) printers. TASCOPY, shaded screen copy software for this interface (value £9.90 — see description on left) is included in this package.

CENTRONICS INTERFACE ZX Spectrum **£39.90**

COMPUTER PRINTER CABLES

RS232 for ZX INTERFACE 1	£14.50
MSX CENTRONICS	£8.00
AMSTRAD CPC 464 CENTRONICS	£9.90

If you do not want to cut this magazine, simply write out your order and post to:
TASMAN SOFTWARE · DEPT SU · Springfield House · Hyde Terrace · Leeds LS2 9LN
I enclose a cheque/PO made payable to TASMAN SOFTWARE Ltd OR charge my
ACCESS/VISA number: _____

NAME	ITEM	PRICE
_____	_____	£ _____
ADDRESS	_____	£ _____
_____	_____	£ _____
_____	_____	£ _____
_____	_____	£ _____
_____	Outside Europe add £1.50 airmail per item	£ _____
_____	TOTAL	£ _____

Send me the free Tasman brochure describing your products: ☐ Tick here

I would like to know more about your programs for (please tick):

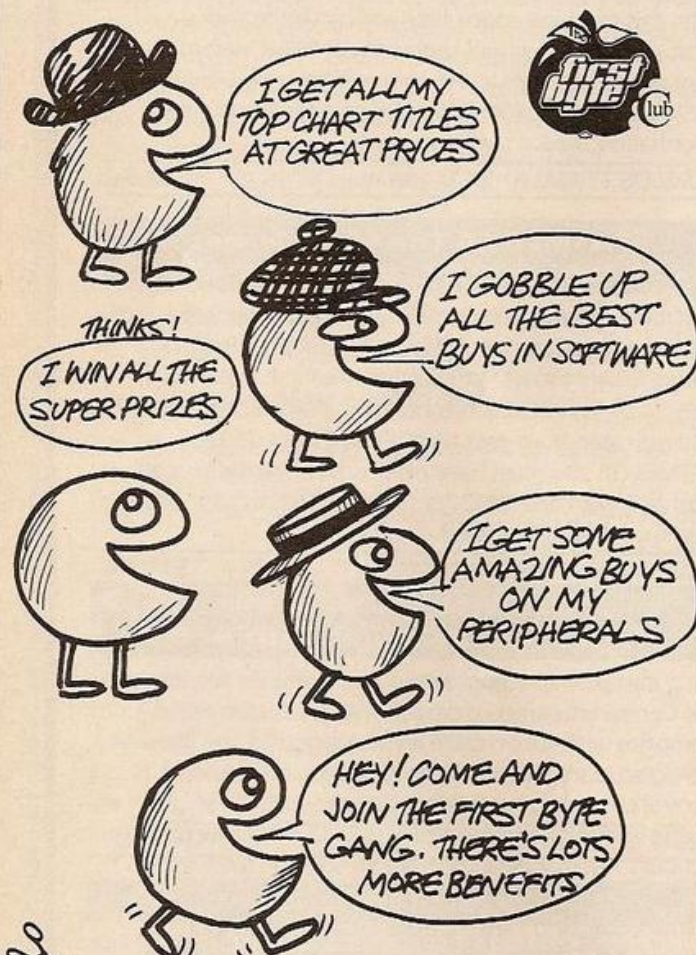
QL ☐ Tatung Einstein ☐ ZX Spectrum ☐ MSX ☐ Amstrad CPC 464 & 664 ☐

All prices include VAT and packaging.

JOIN 'THE FIRST BYTERS'

MAKE SUPER SAVINGS ON ALL SOFTWARE AND GET INCREASED ENJOYMENT FROM YOUR COMPUTER. MEET THE 'HAPPY FIRST BYTERS'

From



Some Great Buys for new members

Title	RRP	Club price
SPECTRUM 48K		
BOULDERDASH	£7.95	£1.99
ICICLE WORKS	£7.95	£1.99
DOOMDARKS REVENGE	£9.95	£2.99
AD ASTER	£5.95	£1.95
COMMODORE 64		
BRIAN BLOODAXE	£7.95	£1.99
DEATH STAR INTERCEPTOR	£9.95	£2.99
QUO VARDIS	£9.95	£2.99
BOULDERDASH	£8.95	£2.25
FIREQUEST	£9.95	£2.99

Join now to receive Newsletter and Comprehensive Price List.

Send £1.00 (which is refundable) or order from the New Member great buys.

Cheques/Postal Orders payable to: First Byte club. Price includes VAT and postage. (Overseas add £1.00)

Name _____

Address _____

Computer _____ Enclosed payment £ _____

Send now to F.B.C., Unit 36, Camphill Ind. Estate, John Kempe Way, Birmingham B12 0HU. Tel: 021 771 4480.

EXPERT SYSTEMS ON YOUR MICRO!

Now you can explore the exciting world of Artificial Intelligence in action, with the latest book from top-selling computer author, Tim Hartnell.



Exploring Expert Systems on your Microcomputer

makes Expert Systems accessible to you in a way which has never been done before. With machine-specific listings for SPECTRUM+ and SPECTRUM, AMSTRAD, BBC MICRO, COMMODORE 64, and all MSX machines, plus any machine furnished with Microsoft BASIC, Tim's new book opens up the world of Expert Systems in a direct, practical way.

The book discusses, in some detail, the most successful Expert Systems developed to date (including PROSPECTOR, MYCIN and DENDRAL) and shows how the field has developed over the past decade. Ready-to-run Expert Systems programs in the book include AUTO MECHANIC and MEDICI (to give yourself a quick 'stress check'). The major Expert System in the book delights in the name of FUZZY RITA. This program uses fuzzy logic within the framework of an Expert System shell to produce a genuinely useful expert on just about any subject you choose, from chicken sexing through to medical diagnosis and weather forecasting. You'll also be given the chance to explore the languages which dominate the Artificial Intelligence and Expert Systems worlds. The book contains BASIC emulators of PROLOG and LISP so you can get them up and running on your computer, without having to actually buy the languages.

Exploring Expert Systems on your Microcomputer, by Tim Hartnell (ISBN 0 907563 74 0), is £7.95, and is available from most book and computer stores, or you can get it direct by mail, post free, from the publishers:

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

(Trade only: WHSD Leicester)

Interface

POOLSWINNER

THE ULTIMATE POOLS PREDICTION PROGRAM

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available - 22000 matches over 10 years. The database updates automatically as results come in.
- **PREDICTS** Not just SCOREDRAWS, but ALWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture - choose as many selections as you need for your bet. The precise prediction formula can be set by the user - you can develop and test your own unique method.
- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **DISC/MICRODRIVE COMPATIBLE** Tapes supplied with conversion instructions.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

AVAILABLE FOR Spectrum (48K), Commodore 64, VIC 20 (+16K), AMSTRAD, BBC B, Atari (48K), ZX81 (16K), Dragon, Apple II, ELECTRON

PRICE £15.00 (all inclusive)

NOW AVAILABLE

FIXGEN 85/6

AT LAST! No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish fixtures for 1985/6. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner.

POOLSWINNER with FIXGEN £16.50 (all inclusive)

COURSEWINNER v3

THE PUNTERS COMPUTER PROGRAM

You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricast etc. The database includes vital course statistics for all British courses. You can update the database - never goes out of date.

AVAILABLE FOR Spectrum (48K), Commodore 64, BBC (B), AMSTRAD, Atari (48K), Apple II

PRICE £15.00 (all inclusive) includes Flat AND National Hunt versions.

Send Cheques/POs for return of post service to ...



phone 24 hrs



phone 24 hrs



phone 24 hrs

37 COUNCILLOR LANE, CHEADLE, CHESHIRE. ☎ 061-428 7425

(Send for full list of our software)

Star★ chart

KEY

- ★★★★★ Best of its type
- ★★★★ Very good
- ★★★ Good
- ★★ Average
- ★ Below par

Talos

Spectrum
Silver Soft
Arcade adventure
£7.95

★★★

You get to put your giant war robot back together again, starting with a hand which rather amusingly crawls about the screen under your control. You can shoot at the various savage snails etc which assail you, but first find your arm. Once you've got this, you can assemble the rest of the robot body. Of course, the bigger you get, the more of a target you present. Having got yourself together, you must go and find the Crown of Eternity. Not wildly innovative as a game, but will appeal to compulsive puzzle-solvers.

Wizard and the Princess

CBM-64
All American Adventures
£14.95

★★★

This is the second All American adventure from US Gold at £9.95 on cassette and £14.95 on disc.

It's down to you to rescue the fair princess from the wizard Harlin, who is definitely not a nice guy. There is a fast graphic display from disc, but overall the game gives the impression of being rather less sophisticated than, say, the Hobbit.

The game syntax is traditional adventurespeak, which means you can spend a lot of time looking at snakes and scorpions without any constructive ideas as to what to do with them. The road to Harlin's castle is long and confusing — but that's what adventures are all about, isn't it?

SOFTWARE

Goonies

■ *CBM-64*
■ *Platform game*
■ *Datasoft*
■ £9.95, disc £14.95

★★★★★

MARSHMALLOW MAN scared you into making Ghostbusters into the smash-hit of 1984. Mama Fratelli and her awful gang aim to do the same in 1985. Goonies is more fun to play than Ghostbusters, even if Cyndi Lauper's soundtrack won't have you up and rapping round the house as it loads.

Stephen Spielberg's movie *Goonies*, on which the game is based, will be out this Christmas. When it was released in the States early in the summer it raced up the box-office charts although it never made it into the Ghostbusters blockbuster league.

The Goonies are a group of seven kids who have to evade the evil Fratelli gang and find their way to the treasure of One-Eyed Willy the pirate. Behind this bland-sounding plot lies one of the most complicated platform games you're ever likely to meet. It requires so much concentration that Datasoft opted to give you eight lives after extensive testing in California showed that any fewer and you wouldn't stand a chance of getting through the eight screens intact.

You're in control of two of the Goonie band in each screen. Two can play the game as a team helping one another through a complex series of chambers and trapdoors to the next screen. Or you can play



Screen 2: Spot the killer bat.

alone, switching control from Goonie to another with a touch of the fire-button.

The graphics are good and very smooth, and if the Cyndi Lauper numbers interfere with concentration you can always kill her off and just keep the usual game crunches and plops.

Mama Fratelli and her boys hang out in the lighthouse where the game action starts. This first screen is a doddle compared to what is to come. Rush Mikey up the lighthouse tower to the printing press which churns out greenbacks. Mama Fratelli can't resist picking them up, and while she's away

from her post, Chunk can smash the water cooler into the fireplace to reveal the first secret passage.

Now you're into the caverns and time for your first meeting with the killer bats. After slipping under some dangerous boulders, and a bit of barrel rolling to collect the key you're through to screen 3 and its pipes of scalding steam.

I found this very tricky and rather tiresome, but getting through it is worth the effort — the cannonball runs in the next screen will blow a few fuses. I never made it past them but I can reveal that Goonie-eating birds, slime-spewing organ pipes and a vicious octopus await you.

... BEHIND THE SCREENS ... BEHIND THE SCREENS

SCOTT SPANBURG and the Goonies programming team hadn't even seen rushes of Spielberg's film when they started work on the game. They had to make do with the script and a belated visit to the set where the pirate galleon was being built.

As Scott was writing the early versions of the game, one of Datasoft's in-house artists Kelly Day was designing the graphics. As soon as they had decided on the basic look and feel of the game, three contract programmers were brought in to help — or translated into American blatherspeak "facilitated in the concept development".

Goonies took six months to write from beginning to end. Self-taught programmer Scott's biggest headache was to make the game as easy



Cyndi Lauper: Girls just want to have fun.

to translate from one computer to another as possible.

To do it he created what came to be called the Spanburg Universe. It's a whole set of floors, cavern ceilings and walls that enable the game to play without any graphics interaction. That means the game can be switched

easily to any other 6502-based system with only the graphics needing reworking.

But the real knack a programming team leader must have is to recognise a good concept — you can't afford to wait until the final programming to find out that it just doesn't play well.

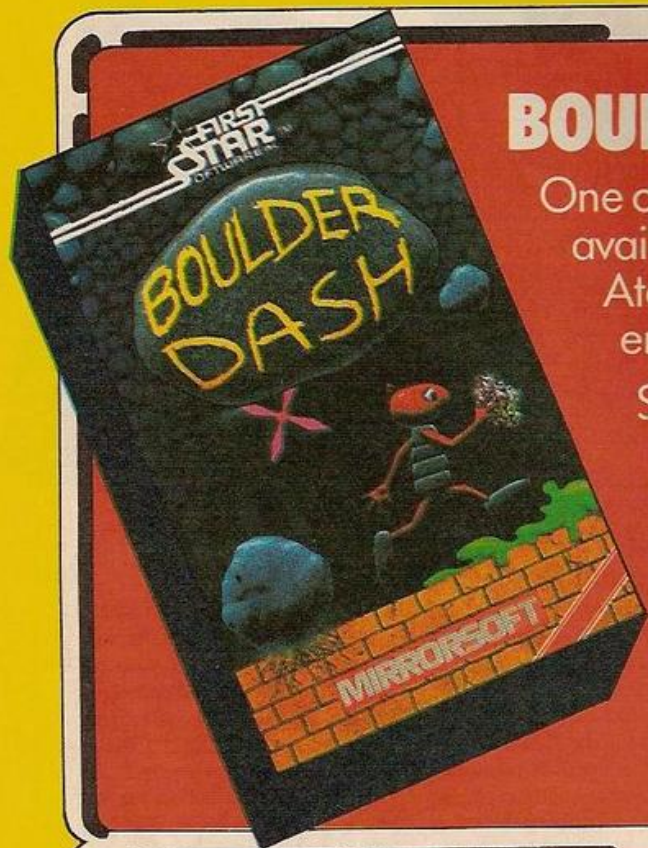
The whole game and all its screens are based on Rube Goldberg-like cause and effect puzzles. He's the US equivalent of Heath Robinson, and his whacky drawings and inventions are well known to readers of *Mad* magazine.

What is Scott Spanburg's next project? No one at Datasoft seems to know. He's left the company and is apparently roaming the Midwest.

Toby Wolpe

MIRRORSOFT

SEPTEMBER SIZZLER



BOULDER DASH

One of the great classic games of all time is now available to even more of you – Amstrad and Atari owners everywhere can now experience the ultimate underground journey.

Search through the 16 caves, each with 5 levels of difficulty, and collect as many jewels as quickly as possible. Don't forget to block the amoebas, transform the butterflies, or outmanoeuvre the fireflies – or you'll never get out alive!

Available September 5th

Amstrad CPC464 and Atari 48K versions
back-to-back on one tape at £9.95.

ASHKERON!

'Ashkeron is something for everyone: a complex, challenging, witty game for the adventurer, and its got pretty pics for the zap'em crowd. An excellent game – buy it!' – *Home Computing Weekly*

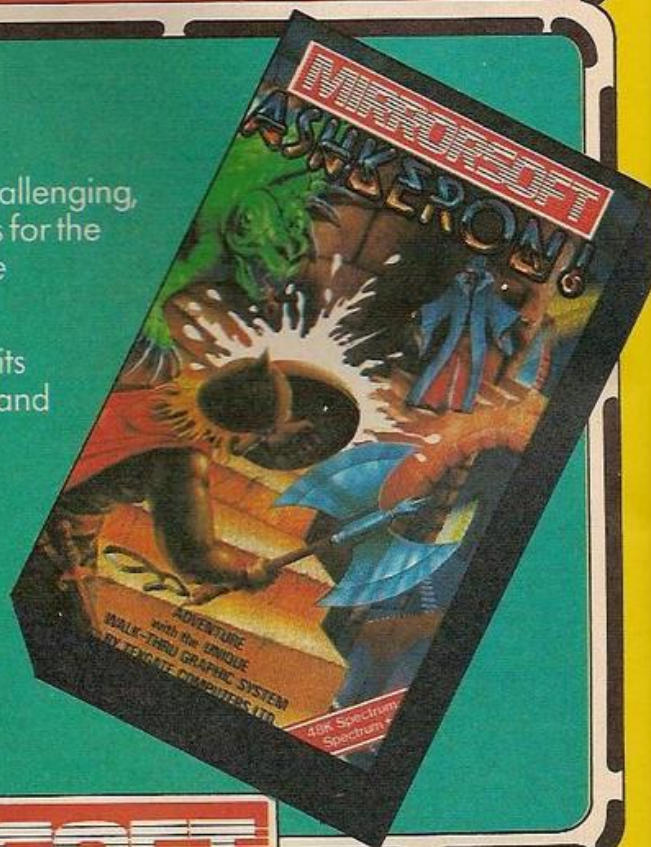
'It is highly professional, sophisticated software... in its walls lies a challenge everyone will find interesting and rewarding' – *Crash Micro*

'This game gets my royal assent' – *Your Spectrum*

'A charming graphic adventure' – *MicroScope*

Available now for
Amstrad CPC464 £6.95
Spectrum 48K £5.95

With built-in competition!



MIRRORSOFT

Maxwell House, 74 Worship Street, London EC2A 2EN
Trade orders to: Purnell Book Centre, Paulton, Bristol BS18 5LQ

The 8th
**Personal
Computer
Show**

Star★ chart

Toolbox 2

BBC
£9.95
BBC Soft
Utilities
★★★★★

Even better than Toolbox 1, Ian Trackman's second tape provides a choice collection of 29 utilities, written in machine code. Pick of the bunch are a symbolic disassembler and a monitor which allows you to step through a program without corrupting the display.

Other items include sprite, scrolling and screen compactor routines. It is worth spending a further £10.95 on the book, which gives the source listings.

Out On A Limb

CBM-64
Anirog
Platform
£7.95

★★★
Good old platform games, where would we be without them. 23 screens with nice chunky graphics, as our hero, Jack, climbs the beanstalk to get the golden egg, harp and gold. As usual, timing of jumps is of the essence, and it is a process of working out the technique for each screen. A few bits of Anirog speech thrown in for good measure.

3D Munchy/ Hangman

BBC
Blue Ribbon
£2.50

★★★★
Excellent graphics and price, shame about the lack of originality. The 3D version of Pac-Man has an interesting feature apart from the usual pill-munching and monster-eating. The four monsters also dig holes which can be filled in with shovels — of which there are three provided. As for Hangman — which again has a very attractive display — perhaps we should quote the instructions on this two-game pack: "Normal rules apply". Need we say more?

(continued from page 27)

Speed King

■ CBM-64
■ Digital Integration
■ Motorcycle racing
■ £9.95

★★★★★

THE FIRST hairpin bend: lean into the corner, come off the gas, crash the gears down into fourth and pray you don't end up like Barry Sheene — a piece of human scaffolding.

This is a first-rate racing game from the company that brought you Fighter Pilot and Night Gunner. Race graphics are very good with a Pole Position-type view of the track.

The road ahead and the landscape beyond that scroll smoothly at different speeds, but that's the least you expect from any racing arcade game worth the name. What is really convincing is the way the bike and rider under your control lean into the bends. If this game sells well, the UK will soon be echoing to the crunch of Speed King players falling off their chairs as they succumb to the realism.

You won't have to spend hours learning the racing controls either. They're neatly logical whether you're using the keyboard or a joystick. Fire-button to accelerate, left and right to steer, forward to change down, and back to move up through the six gears to reach top speeds of around 250mph.

There is a catch, however. Your high-performance bike comes without any brakes. The only way to reduce speed quickly is to forget the accelerator and zoom down through the gears. The excellent sound effects scream out the high revs as you use the gearbox as a brake.

Whichever of the three levels you choose — novice, pro or champion — you always start off at the back of a field of 19 speed-crazed riders. The higher the level, the more likely they are to box you on the bends and send you crashing to the ground.

As well as practice and track preview options you can keep up interest by picking any one of 10 different circuits ranging from Silverstone to San Marino.

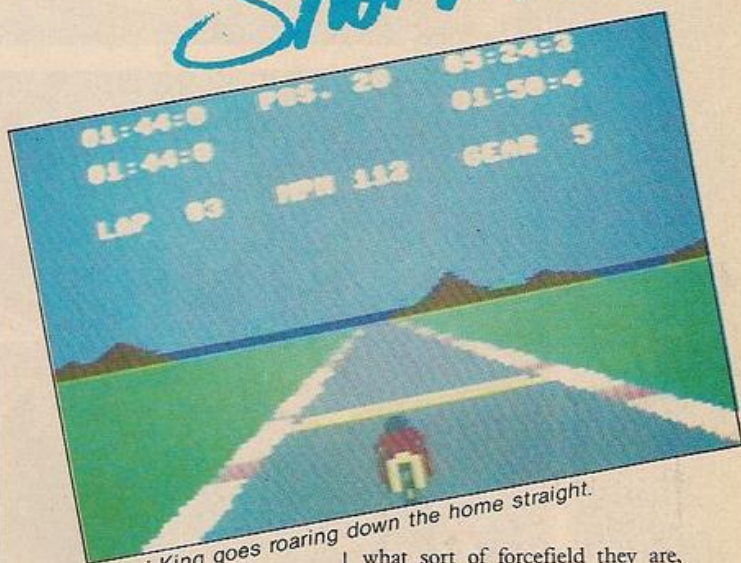
A thoroughly good game, and



Cylu wants to be a leader — ultimately Ultimatesque.

SOFTWARE

Shortlist



Speed King goes roaring down the home straight.

Digital has more where that came from. They've spent the last two years developing a motorbike racing simulator, TT Racer, for the Spectrum. When's the off? — Digital says November for this late-starter.

Toby Wolpe

Cylu

■ Spectrum
■ Firebird
■ Arcade adventure
■ £2.50

★★★★★

WANNA BE a leader? Cylu does, but it's not a question of going down to the Job Centre. He must pass a test of wits, speed, logic and cunning — he has to travel through a 3D maze collecting items and depositing them into the IO unit of the computer. The lower the efficiency rating the better, if Cylu is to please the Otsan.

Programmed by Geoff Foley for Firebird's Silver label, it is a challenging game with excellent graphics but, it must be said, ultimately Ultimatesque. This is more of a recommendation than a criticism, I guess.

Cylu is a little hard to distinguish from the furniture on the first screen — you start standing next to the IO unit — but once you get him going he blunders cheerfully about like the robot in Alien 8. Hidden in the maze are 24 objects which must be collected, returned to the starting point and deposited in the master computer. This will please the Otsan.

Barring his way are 32 forcefields. These can be opened up first by examining them to find out

what sort of forcefield they are, then finding the corresponding microprocessors and placing them in the master computer. It's necessary to refuel frequently otherwise you fail and the Otsan are not pleased. The trick here is that there is a Use command as well as a Get command — just grabbing one of the 30 fuel packs doesn't make any difference to your fuel rating. According to the hints it is also possible to refuel from forcefields, but this didn't work for me and the Otsan were not pleased. Nine teleport terminals when used with the correct teleport key enable you to tesser to isolated areas of the maze. To teleport, stand facing next to a teleport, select the teleport key which you want to use, then press use.

Paul Bond.

Nightshade

■ Spectrum
■ Ultimate
■ Arcade adventure
■ £9.95

★★★★★

"VERY PRETTY" splutter the wretched cynics from SlamBang Software every time Ultimate launches a new masterpiece "but" and here you sniff a whiff of

(continued on page 31)



Nightshade — does Ultimate play the game?

INTERNATIONAL KARATE



**..And you thought
you'd seen a Karate game**

As you know, like the Martial Arts, Perfection
is the only accepted standard, so play nothing
until you play — SYSTEM 3's — INTERNATIONAL KARATE

For the Spectrum,
C.64, Amstrad and
all 48k Ataris at ONLY

£6.50

SYSTEM 3 SOFTWARE. SOUTHBANK HOUSE, BLACK PRINCE ROAD. LONDON SE1 TEL: 01-735 8171. Ex. 68

Star★ chart

Programmer's Toolbox and Basic Extensions

Amstrad
Sideways Rom
Micropower
£39.95

★ ★ ★
Designed to fit into Micropower's sideways Rom card, this Rom supplies the Amstrad with 33 new commands. Some, like Turtle — for turtle graphics — and Screen which sets up an alternative screen, can be used within Basic.

Others such as Find, a search and replace facility, are debugging and programming utilities. Quite a few of these facilities have already been provided on tape or in magazine listings.

Way of the Exploding Fist

Amstrad 464
£9.95
Arcade
Melbourne House

★ ★ ★ ★
Exploding Fist has survived the trip from the CBM-64 to the CPC 464 almost undamaged. The graphics are as good as on the original, speed of response is just as crisp, and the 18 different types of blows, jumps, blocks and kicks are all there.

Only the sound is disappointing. What came out of the CBM's speaker as the sickening thud of fist on chin, followed by a convincing grunt of pain, on the Amstrad sounds more like the noise of a tin being banged with a spoon.

Fu-Kung in Las Vegas

Amstrad 464
Amsoft
Platform
£7.95

★
The story line has it that you are a US Marshall — of Chinese extraction — working undercover in a series of Las Vegas casinos. However you would be hard put to fathom this out from the opening screen.

(continued from page 29)

vinegar "it's not a game". Well Nightshade is the prettiest show from the Zouche gang yet with Filmation II allowing you to smoothly scroll where no Spectrum has scrolled before.

As your knight errant walks through the 3D village maze, walls disappear leaving a line on the floor to remind you not to bump your nose. You must collect four charms to wipe out four plagues but your quest is hampered by some of the zaniest monsters ever.

These range from lower forms — lampshades, fizzers, slimes and blobs and supermonsters including a Chelsea supporter — well it looks like one, waving a scarf above its head, except that it has not noticed that the scarf has been knicked so it still gormlessly waves its mits in the air — mohicans, mini-mohicans and owls.

Stop reading now if you want to stay honest. Otherwise — you can collect a stack of antibodies to fire at monsters. Antibodies come in four delicious flavours — maces, spinning crosses, whirlpools and cucumber slices.

Any of these will kill the lowlife but beware if you hit an owl with a mace or a mohican with a whirlpool, a hooligan with a cucumber or a mini-moke with a cross, they turn into lowlife. Firing a cucumber at an owl turns it into a mohican which splits to cause double trouble if you hit it again. Likewise whirlpools turn mini-mokes into owls and split on a second hit, while crosses turn mohicans into hooligans before splitting, and maces turn hooligans into mini-mokes which split.

Stepping on a banana skin speeds you up and bottles restore your life. I said this genetic engineering sounded dangerous. And so to the plagues. An egg-timer will kill the grim reaper, hammer kills skeleton, crucifix kills monk and bible kills ghost. When you are close to your target the charm flashes. So much for problem-solving. Very pretty, technically brilliant, but ultimately not much of a game. Nightshade has finally turned this Alien 8 fanatic into a cynic.

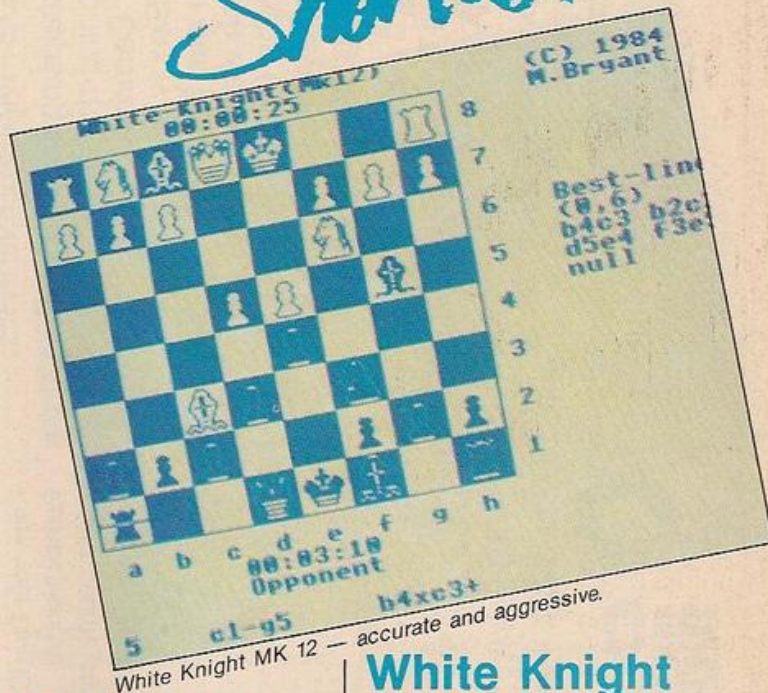
Meirion Jones

Project Future — eminently playable.



SOFTWARE

Shortlist



Project Future

■ Amstrad
■ Arcade Adventure
■ Gremlin Graphics
■ £8.95

★ ★ ★

CONVERTING SPECTRUM games to the Amstrad must be an easy number for any competent games programmer — the sort of job you can do in a month while waiting for inspiration for your next chart-buster. Both machines have the same processor so the task is largely a matter of rewriting the graphics routines. The trouble is that the Amstrad's graphics and sound are far superior to the Spectrum's, and straight conversions usually fail to exploit them to the full.

In this respect Project Future — a translation from a Micromega Spectrum game — is a little better than most. The graphics, at least, are a substantial improvement on the original; while the sound effects are almost orchestral in comparison with the Spectrum's beep.

As for the game itself, it sets you loose in a space ship with five different levels. Your aim is to collect eight destruct codes, activate the self destruct system and make your escape. All this is spread over 256 screens, although many of them are broadly similar, consisting of a network of tunnels and chambers.

There are also scores of different (continued on page 33)

White Knight MK 12

■ BBC
■ Chess game
■ BBC Soft
■ £9.95/£18.95 — Tape/Disc

★ ★ ★ ★

UNTIL MEETING White Knight MK 12, the successor to MK II, it was this reviewer's boast that he had never been beaten at chess by a computer — despite challenges from such heavyweights as Cyrus Chess, Colossus, and QL Chess.

In fact, the program's author, Martin Bryant, concedes to QL Chess a slight edge, but for my money White Knight MK 12 reigns supreme. With an ELO rating of over 1850 it can handle all but the strongest club players.

Playing strength and speed of response, are of course, the most important features of a chess program. In other respects — graphics, ease of use, number of playing options — White Knight is also well up to scratch.

Instead of choosing a level you simply enter the average time you want the program to spend on each move. Entering a move is just a matter of positioning the cursor. There are also options for back-step, fore-step, Tournament Play, problem solving, and saving a game to disc or tape.

If you're feeling smug about your superiority to micro chess programs, White Knight will give you a jolt.

Simon Beesley.

Star★ chart

Amazon Warrior

CBM-64
New Generation Software
Arcade Adventure
£7.95

★★★

At first glance this game resembles that US chart-topper *Forbidden Forest*. In the opening scene, the Jungle, armed with only a blow pipe you have to cope with snakes as they fall from the tops of the foliage. The similarity here is striking: there is the same sinister atmosphere and the same doomy music.

But if you manage to pass on to the later levels — no easy task since a blow pipe is a tricky weapon to use accurately — the game reveals its differences: underground cavern and a ruined temple. The graphics are even better than in *Forbidden Forest* and the soundtrack throughout is superb.

Cheops

Amstrad CPC-464
No Man's Land
Adventure
£8.95

★★★

Welcome stranger to the year 2300 BC. You are an Egyptian brigand attempting to violate the Pharaoh's inner sanctum (isn't it a lovely day for violating the Pharaoh's inner sanctum, missus) and seek out the fabulous treasures hidden in the burial chamber.

There are over 300 chambers to search, and watch out for the blood-sucking tarantulas and the venomous serpents. Keep taking the hieroglyphs. This game is worth playing if only for its unbelievably detailed and whimsical introductory sequence which tells you how to play the game — shocking departure for an adventure. "This nice little tarantula is keen to test your blood group". And they say the French have no sense of humour. This well-executed 3D arcade adventure is a welcome foray away from the Oric territory by the French company.

(continued from page 31)

alien types, automata mainly, which come at you from all corners in Robotron style. A minor flaw in the game is that the aliens do not play fair when you shoot them. Instead of counting to 10 they regenerate immediately on the spot. This means that if they pen you in a corner there is no chance of escape, even if you come out with your single gun blazing.

None of this is particularly original, and, in fact, the game is a standard fare multi-screen arcade adventure. But it is eminently playable, and no worse than the bulk of Amstrad software to date. Developing software is a lengthy process, and it will be a while yet before we see programs that really take advantage of the Amstrad's potential.

Simon Beesley.

Summer Games II

■ CBM-64
■ Decathlon
■ US Gold/Epyx
■ £14.95 — disc

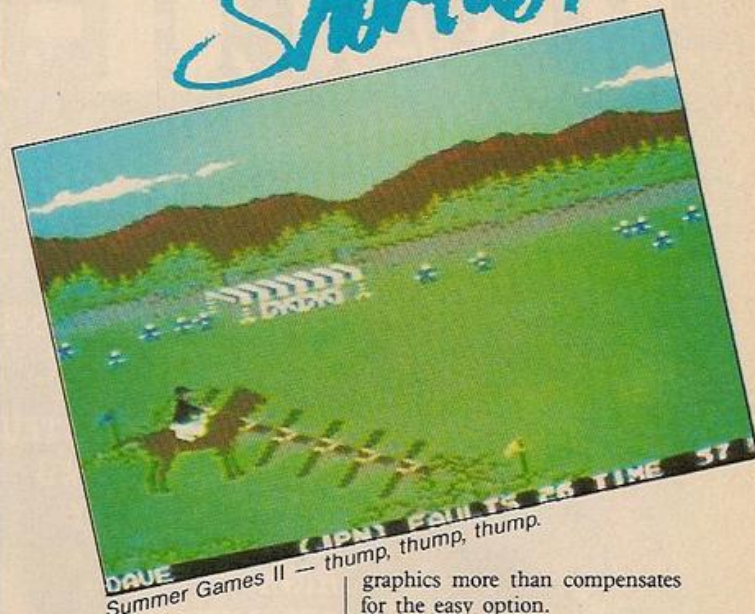
★★★

THUMP, THUMP, THUMP. An athlete pads across the screen, torch in hand, to light the Olympic flame. Doves fly off and as your finger itches for the fire button — this is a US Gold game after all — you relax into the opening ceremony of the classiest decathlon game yet. Up to eight of you can don the shirts of your adopted countries. The CBM-64 solemnly plays your national anthem — or not as the case may be. Australians may be unwilling to stand for *Waltzing Matilda* and if this game ever threads its way through the iron curtain Russians will point out that although the Internationale is one of their four anthems this century it has not been used since the Second World War. Never mind, "Arise ye starvelings from your slumbers" must be a red flag to bullish Americans.

The quality of the 10 sports game is variable — as usual with these programs but the strength of the competitive atmosphere carries it through the weaker moments. In the triple jump all the competitors are black — even if they are Norwegian — and in most other events they are all white. You race down the track and time your hop, skip and jump. The big stadium TV screen in the background showing a close-up is a neat touch. Rowing is again a matter of timing the reach and pull. Throwing the javelin was my favourite. Down the

SOFTWARE

Shortlist



runway, time your plant and then throw when the angle reaches about 30°. Most of the work has gone into the show-jumping with good tapestry graphics and great animation even if the horse looks more like Muffin the Mule than a thoroughbred jumper. Cycling is a real joystick destruction derby as you grind the stick around the contacts continuously — with no gears it hardly seems worth it.

Kayaking needs some of the skills of a River Raid and is an enjoyable game in its own right as you try to negotiate the gates in the rapids — and there's high jump and fencing too. Then comes the grand finale closing ceremony with fireworks, jet-pack man and balloons. Overall *Summer Games II* is the best computer Olympics even if some of its component parts are weaker than Daley Thompson and the rest.

Meirion Jones.

Tour de France

■ CBM-64
■ Activision
■ On yer bike
■ £9.99

★★★

PARIS, LOUVROIL, Bordeaux, Saint Giron, Grenoble — developed with the Society of the Tour de France, this is geographically and graphically one of the best sport simulations around. The main carp is that though there may be up to six players on the scoreboard, only one cyclist may race at a time. Nevertheless, the quality of the

graphics more than compensates for the easy option.

It is a real joy to hear the Marseillaise during loading — such a relief from the Stars and Stripes Forever. And you get to hear such gems as the Finnish, Danish and Hungarian national anthems.

But before you indulge yourself in an orgy of international jingoism you must choose between Competition et Entrainement. A bit pretentious when it seems de rigueur for every French person to have a T-shirt saying "Training" on it. If you choose Competition, the name/country selection screen appears. Hungary is your first choice, nothing to do with the programmers having names like Zoltan Mericske, Pal Balog, Gyula Valovics and Ivan Balazs.

And now we must choose between Le Grand Circuit and just doing a few stages or etapes. The method of play is the same, only one cyclist on screen at a time. After the route selection, the data for each etape is loaded and played separately. Did you know the French for fast-forward is bobiner?

This is a joystick waggler à la Decathlon, but once you have wrecked your joystick there is a keyboard option to keep you going until the shops open on Monday.

Paul Bond.

Tour de France — hear the Marseillaise.



(continued on page 35)

THEIR ONLY HOPE WAS YOUR
PROMISE TO BRING THEM BACK ALIVE....

BEACH-HEAD II



**INCREDIBLY REALISTIC
VOICE SIMULATION**

**ONE PLAYER PLUS TRUE
HEAD-TO-HEAD TWO
PLAYER FACILITY**

**HIGH
RESOLUTION
ANIMATED
GRAPHIC
SCREENS**

OVER 100,000
PEOPLE CAPTURED
THE BEACH-HEAD
IN 1984!
DARE YOU RETURN
IN 1985?!!

*"Beach-Head II
must be one of
the best games
to make its way
across the
Atlantic."
ZZAP 63*

**U.S.
GOLD**
All American Software
ACCESS

C64 £9.95 C84 £14.95
CASSETTE DISK

The continuing saga pits allied forces against the cruel dictator who escaped the destruction of the fortress with remnants of his army and prisoners captured during the land battle.

Produced for the COMMODORE 64 and coming to a computer store near you!

Written by Roger & Bruce Carver • Directed by Bruce Carver • Produced by Chris J. Jones • Distributed by David L. Ashby
Illustration by Oliver Frey (Newsfield Publications) • Manufactured in the U.K. by U.S. Gold.

Star★ chart

Barry McGuigan World Championship Boxing

CBM-64
Artic
Sport simulation

★ ★ ★

Along with Rocco, Frank Bruno, we now have a Barry McGuigan program. All of these games seem to lack a certain je ne sais quoi which is present in games like Way of the Exploding Fist.

The central characters seem strangely unresponsive to joystick control in all boxing games whereas in Fist you can at least get your boy to move about a bit instead of standing there taking endless right hooks until he falls down.

This version of the idea has some nice touches: training camp, where you can build up endurance, stamina and so on.

Steve Davis Snooker

CBM-64
CDS Software
Snooker simulation
£8.95

★ ★ ★

Just beyond the far cushion lie the icons, and they're what mark this game out from most snooker simulations. Flick the cursor across to them and you can pick options from the main menu like speed, playing colours or two-player game. You can even pick the edit mode to fudge some trick shots.

You can also be very precise about the type of spin you want to use. In the bottom left of the display is a large version of the cue ball. Place the cross at the point on it you want to strike, and then move the joystick or keyboard control to select the weight of the shot.

Spin and power controls allow everything from fine cuts to deep screw-backs. But seven points away for the sound — more like machine-gun fire than ivory on ivory.

(continued from page 33)

Spy vs Spy

■ CBM-64
■ Arcade Adventure
■ Beyond
■ £9.95

★ ★ ★ ★

AS YOU FLOAT down on to the desert island with only your parachute to shield you from the sun all is quiet. All that is, except for the sound of waves gently smashing the wrecks of Simon le Bon's and Richard Branson's boats on the beach and the cries of a few lost seagulls.

Your mission is to locate the parts of the missing XJ4½ missile before a rival agent beats you to it and then escape by submarine before the volcano erupts. It is in other words a rerun of Spy vs Spy I with palm trees instead of furniture and coconut bombs instead of umbrella stand traps.

The top half of the screen shows your agent — the white spy and the bottom shows the rival black spy which can be a friend or the computer. You can hamper the opposition by digging pits and covering them with a stick to hide them, setting rope snares from trees using coconut bombs and napalm as land mines and fire up to three shots from a gun if you can find it.

The traps and map are set out on the icon-style trapulator — just as in the original but the cartoon graphics are more ambitious than in the first part. Quicksand is the major natural hazard not counting drowning if you try to reach your



Death Star — over-active.

Death Star

■ BBC
■ Superior Software
■ Shoot'em-up
■ £9.95 (£11.95 disc)

★ ★

TWO YEARS ago, this game would have been described as fast and furious. Now it seems merely over-active. One likes to pause for breath occasionally but Death Star never gives you a moment's peace. For a start there is four-directional scrolling which means that the screen is slipping and sliding all over the place.

At the same time Workers and

SOFTWARE

Shortlist



Spy vs Spy on a desert island.

submarine when you are not strong enough. The game can be played at seven levels each with different island layouts including some where you have to swim from one island to another.

All very nice if not original. The Antonio Prohias cartoon strip in Mad Magazine which the game is loosely based on has been running for 25 years but please Beyond don't try it with the computer game unless you can come up with some new ideas.

Sam Son.



Android 2 — tough to play.

Warriors are constantly harassing you. When you have steadied yourself you have to latch on to one of the passing planetoids and pump it with bullets until it emits crystals. Collect enough of these and you can destroy the Death Star, a large mothership being created elsewhere. Then you move on to the next Zone.

All these complications cannot disguise the fact that the game is at heart another space shoot'em-up. Most of us thought this category had been laid to rest. It is also another Mode 2 game that uses a black background. After a while they all look the same.

(continued on next page)

Android 2

Amstrad CPC-64
Vortex
Shoot'em-up
£7.95

★ ★ ★ ★

VORTEX HAVE produced consistently good games like TLL and Cyclone not to mention the amazing Highway Encounter — but the first version of Android is remembered in this office as a bit of a fall from grace. The new game in its Amstrad incarnation is an excellent overhead view of a maze in which assorted millitoids, mutants mines and bouncers are busy enacting an everyday story of cosmic weirdness. And the Maze of Death is only the first screen. You can also visit the Paradox Zone and the Flatlands.

You control the Android 2 in its mission to rid these areas of their gruesome denizens. The millitoids are very big millipedes oozing their way round the maze corridors. You must shoot them in the head three times. To score extra points you can dispassionately dispatch the unhappy mutants, whilst trying not to trip over mines. The obstreperous bouncers are invulnerable, hence better left to themselves.

Fair warning — this is a tough game to play; you will need to summon all your reflexes, co-ordination and base cunning to get out of the Maze of Death, let alone the other places.

You have to achieve all this and return to the transporter capsule before the departure deadline. Excellent graphics, notably the multi-screen wraparound effect.

Paul Bond.

Star★ chart

World Cup II

CBM-64

Artic

Sport simulation

★★★★

It may lack the sophistication of the Commodore 3D football program — for example, players can run straight across the top of the goal — but still an enjoyable game for all that.

You can choose from only two shirt colours whether you are Brazil, Argentina, West Germany or England. Control is as in the Commodore game, you control the player nearest the ball, and you can play against the computer.

Sound effects are minimal and the background music restful. Maybe music hath charms to soothe the Inter-City Firm.

Red Arrows

Spectrum

Database

Aerobatic simulation

★★★★

Concorde flypast, Manhattan loops, pyramid rolls — not exotic forms of confectionery but all manoeuvres you can perform in this interesting variation on the flight simulator theme. Flying a British Aerospace Hawk you can practise individual manoeuvres or fly in a display.

Red Arrows pilots were consulted about the game, so it has to be about as good as you can get it on the Spectrum. If you buy the game you can win a weekend with the Red Arrows by submitting the highest score achieved in any month until the competition ends on January 31, 1986.

3D Stunt Rider

Amstrad CPC-464

Amsoft

£8.95

★★★★

The 3D bit is at the beginning where you steer towards the ramp. Then you switch to an Eddie Kidd side-view. Instead of barrels you jump over buses.

There are five increasingly difficult levels.

(continued from previous page)

The graphics in Death Star are not, as is claimed, stunning; not when you compare it with Mode 1 games like Frak and Contraption, or, for that matter, with Superior Software's excellent previous game, Repton.

If anyone still wants to write shoot'em-ups, why not go back to their roots — with Space Invaders in Mode 1? Of its kind the game has never been bettered.

Simon Beesley.

Pinball Construction Set

■ CBM-64

■ Ariolasoft

■ DIY

■ £11.95 (£14.95 disc)

★★★★

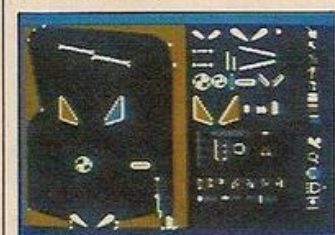
ARIOLASOFT is giving maximum support to pinball addicts. First it brought over from the US the best pinball game ever written, David's Midnight Magic; now here is a program for designing your own pinball game. It gives you total control over every element on the table, from the layout and colours right down to the speed of the ball and the sound each bumper makes.

There are five demo games to get you started, but doing it yourself is easy. The screen is divided into two parts. On the left there is the board, on the right a selection of command icons plus all the normal pinball items — flippers, kickers, slingshots, magnets, gates, roll-overs, and so on. To build a game you just position a hand shape over the parts you want and drag them onto the board. With the command icons you can fine tune a game.

They let you adjust factors such as the scoring values and flipper action, load or save games, and change the shape of objects.

Creating your ideal pinball game is, of course, the main thing. But there is also pleasure to be had in just fiddling with the controls. Turn down the gravity, for example, and the ball takes five minutes to drop to the bottom; step up the elasticity and it whizzes around in perpetual motion.

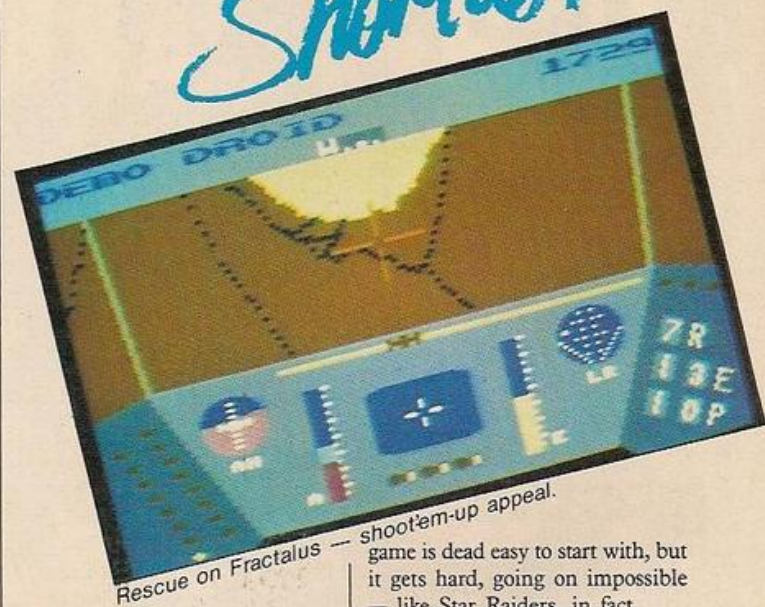
Simon Beesley.



Pinball Construction Set — create your ideal.

SOFTWARE

Shortlist



Rescue on Fractalus

■ CBM-64

■ Activision

■ Shoot'em-up

■ £9.95

★★★★

IT STARTS OUT like a Space Shuttle simulator, with a cockpit full of controls and a view out of the window of your Valkyrie fighter. When you reach the planet Fractalus you fly in and out of a cavernous three-dimensional landscape, which is brilliantly drawn. Laser gun emplacements on the hilltops try to blast you out of the skies — this is a shoot'em-up, with the Jaggies as enemies. But your mission is to locate downed pilots, land and rescue them.

When you have enough, or all of them, you can boost back to the mother ship to refuel, and the game moves you up to the next level... this goes on for hours.

Picking up a pilot involves landing close by, turning the engines off, waiting as he stalks towards you in 3D, knocks on the airlock door and climbs aboard. At the higher levels this gets quite tense. (And "don't worry about being captured — they don't take prisoners".)

As the levels get higher the Jaggies get more numerous and more accurate. They send saucers at you. Pilots get more numerous, and not all are what they seem. Also you discover that away from the pole, Fractalus has a nine-minute day, so you have to learn instrument (night) flying. So, the

game is dead easy to start with, but it gets hard, going on impossible — like Star Raiders, in fact.

Rescue on Fractalus was written by Lucasfilms, and uses fractals — the mathematics of fractional dimensions — to produce the convincing landscape. These were developed for the "genesis effect" sequences in Star Trek II and III, using a Dec Vax minicomputer.

The game first appeared on the Atari micros about two years ago. While it was never officially released, it has a wide circulation as "Behind Jaggi Lines". Atari cognoscenti consider it the best game ever written — after Star Raiders itself.

Activision has now released it for the Commodore 64, Atari and Apple micros. The Commodore graphics look just the same as the original Atari ones, the sound effects are almost as good, and there seem to be few other changes. Instead of turning the engines off (hit E), you now turn the System off (hit S). Also there are "Ace" pilots to rescue — worth 2000 each instead of 200.

The original Atari version had 99 levels. I'm not sure how many the Commodore one has — you aren't allowed to start higher than 16. Also, on the Atari version, the ship responds better to the controls — the Commodore one suffers from terrible oversteer.

Finally, the landscape does not seem as stable. It's like playing a record on a music centre instead of a real hi-fi — the notes seem to be there, but some of the impact is missing...

However, Rescue on Fractalus is still a brilliant game, and should appeal to any shoot'em-up fan.

Jack Schofield.

It's the dead of night — no one can hear you scream. No one, that is, except David Williams, our adventure expert. Call him on 041-774 8937 after 9pm for help with your adventure problems — or nightmares ...

HOT SHOTS

Heard any good pokes lately? Smashed any high-score barriers? Or perhaps you've just put the finishing touches to a game map that will put thousands out of their misery. Publish and be damned — and paid! Send in your secrets, high scores and maps to Hot Shots, *Your Computer*, Room L221, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

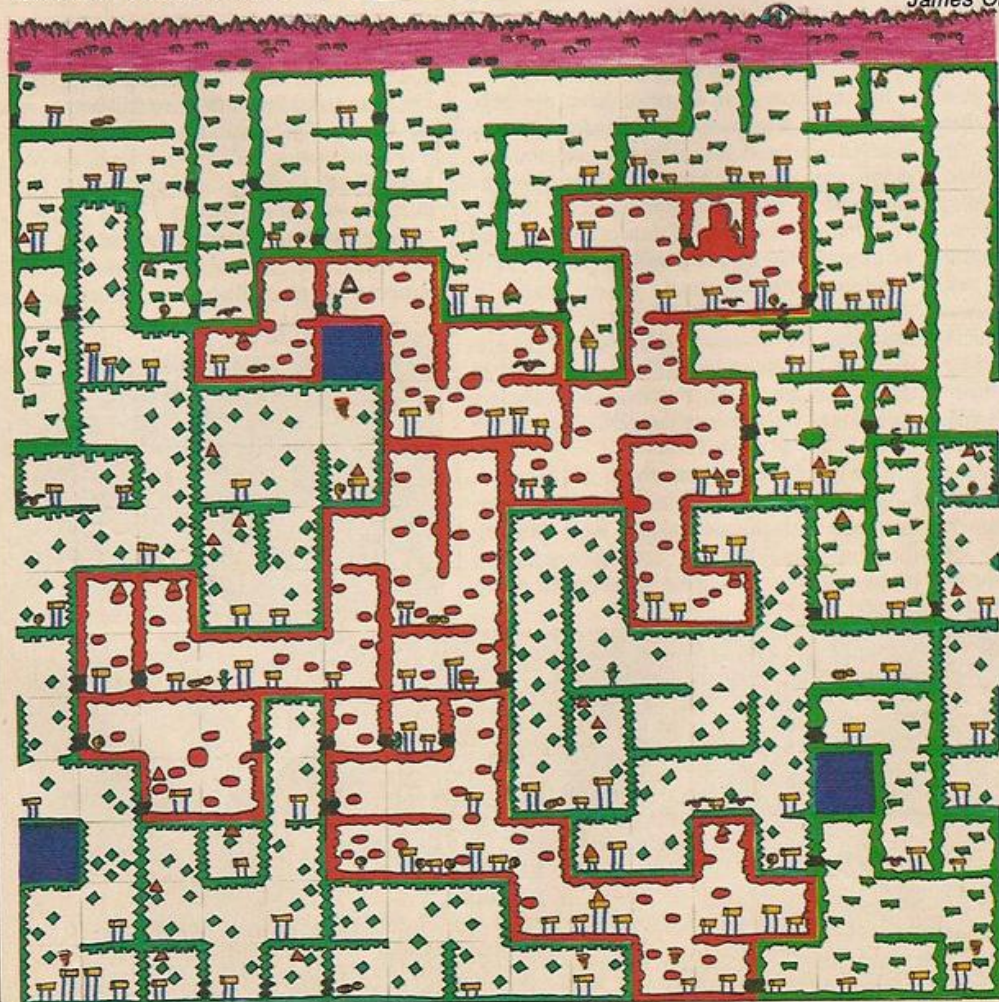
By James Closs

Nodes of Gesod

First locate your position on the map. Next, catch the mole. Wait for the mole on any surface screen, preferably with three craters. When it appears, simply somersault into it, fall down a hole into the rock caverns. To dig, press 1 to release your mole, then move it to the position of the Mole Hole. The spaceman cannot move while

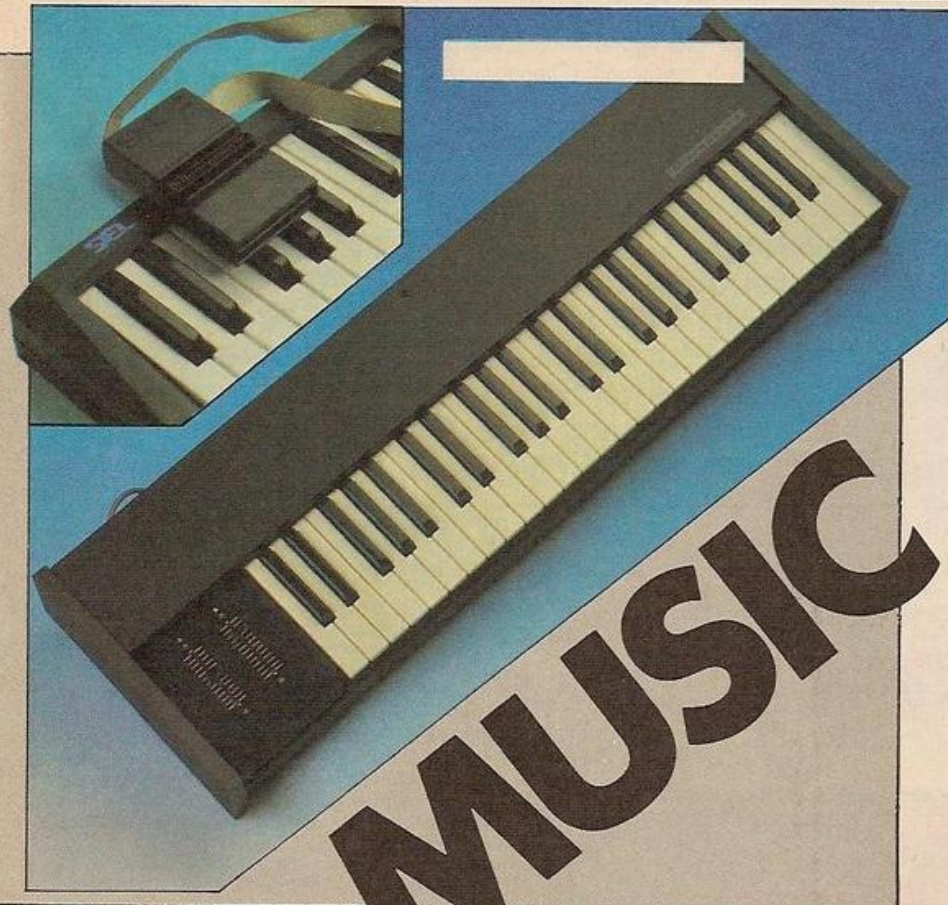
the mole is digging. Goobers, goatmen, birds, and caterpillars must be avoided at all costs. Other sprites can be destroyed by releasing your mole and moving it into their path. When you dig make sure you are on a safe platform, and destroy Stunners with your mole at once. To avoid teleporting move your mole immediately into the whirlwinds. When no more come, it is safe to move. If you do wish to teleport, jump into the whirlwind — otherwise you may find yourself in the middle of a breakneck fall. A teleport always transports you to the square to the right or left of it. Falling too far results in your candle being snuffed but the deep chasm at the top right can be dropped through and you will not die. To complete the game bring eight alcheims of the same colour to the monolith. The red spaceman will steal one of your alcheims and return it to from whence it came. On the map only possible alcheim positions are shown. Sometimes you may find a space helmet — extra life — or nothing at all.

James Closs



Key

	Caterpillar
	Goatman
	Goober
	Bird
	Monolith
	Alcheim Position
	Pedestal
	Crystal Cavern
	Blob Cavern
	Rock Cavern
	Inaccessible
	Teleport
	Mole Hole
	Hidden Hole



Above from left to right: Music-sound 64; Music 500; Sound Buggy detail; Screen shot of Romantic Robot's Music Type-writer; screen shot of Island Logic's The Music System.

IS THE HUMBLE home micro being reborn as a musical instrument? The signs are strong that it is. There has been a dramatic upsurge recently in the quality and scope of musical software and add-ons for the home micro, and, in some cases, an equally dramatic drop in prices.

And a new generation of micros is emerging in which the sound-making facilities are not merely there to give added zap and pow to games.

In coming months the trail-blazing Yamaha CX-5M synthesiser-computer will be joined by a similar MSX machine from Toshiba. Meanwhile, Yamaha has developed a CX-7M based on the new, improved second generation MSX specification.

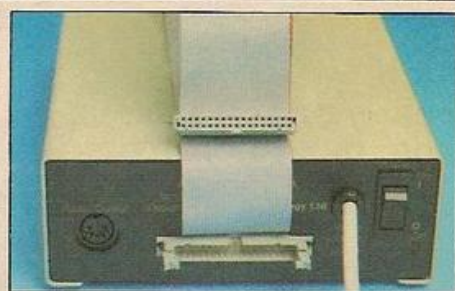
Even Sir Clive who, until now, has resisted the mixing of music and micros, has given in to the orchestrated requests of Spectrum owners by including a sound chip, albeit a simple, three-voice affair, in the 128K version of the Spectrum.

Further up-market, Atari's 16-bit ST models will come equipped with the MIDI interface for direct connection to electronic instruments. And Commodore's Amiga promises to have some of the most sophisticated sound-making facilities ever offered on a microcomputer.

But existing micro owners have not been abandoned. Several powerful add-on music synthesisers for home computers are about to reach the market. One of these is from Commodore who have spent about £250,000 developing a new range of musical software and peripherals. Commodore will be giving music a big push this Christmas.

Almost every post-ZX-81 home computer has had some sort of sound-making facility built into it. These have ranged from the dreaded Beep of the Spectrum to the relatively sophisticated multi-voice synthesisers of the BBC, Commodore 64 and Enterprise machines.

With the notable exception of Yamaha's CX-5M, no existing home micro has been designed with music-making as a primary function. But, with a little programming ingenuity, almost any home micro can be put to musical use.



MICR

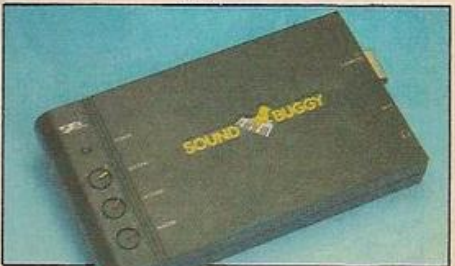
Even the ZX Spectrum has been given a musical role. Romantic Robot's **Music Type-writer** — cassette £9.95 — manages to coax the Spectrum Beep into producing recognisable tunes. An overlay — not suitable for the Spectrum+ — converts the computer keyboard into a musical keyboard and allows notes to be entered on an on-screen staff — the set of five parallel lines on which music is written.

The composition can then be played back with the music scrolling past on the screen as it Beeps. You can produce a very legible print-out of your masterpiece and an optional data converter program — £4.95 extra — allows you to turn it into a machine-code routine for use in your own programs.

The Music Typewriter takes the Spectrum about as far as it is possible to go within the limitations of the Beep command. But you are still stuck with one, rather feeble, note at a time. For more and fuller sounds you will have to move outside the Spectrum and Romantic Robot is now collaborating with another company, Micro Musical of Coventry, to produce a MIDI interface that will allow the Music Typewriter to drive external electronic instruments.

Compared to the Spectrum, Acorn's BBC computer is a musical virtuoso. In fact, so many

Below: Sound Buggy.



Suppliers of musical software and add-ons.

Musical software

Spectrum	Music Type-writer	£9.95 (c)
BBC	Music Maker	£9 (c) £12 (d)
	The Music System	£12.95 (c) £24.95 (d)
CBM-64	The Music	Advanced

Romantic Robot,
113 Melrose Avenue,
London NW2 4LX
(01) 625 9463
FSoft
PO Box 352,
Brighton BN1 3AY
(0273) 736042
Island Logic,
22 St Peter's Square,
London W6 9NW
(01) 741 1511
Island Logic,

System:	£34.95 (d)
	Concise
	£15.95 (c)
	£19.95 (d)
Music Studio	£14.99 (c)
	£19.99 (d)
Music Construction Set and Studio.	£14.95

Add-on keyboards.

CBM-64	Music Maker	£19.99
CMM 25		£19.99

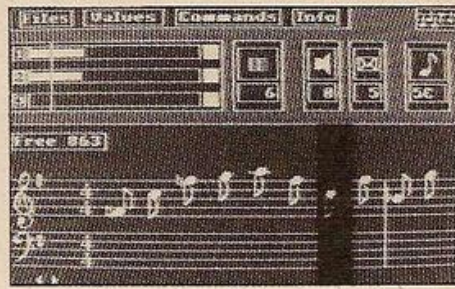
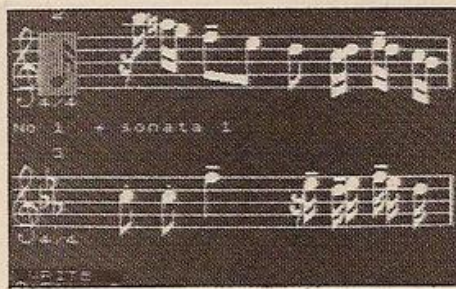
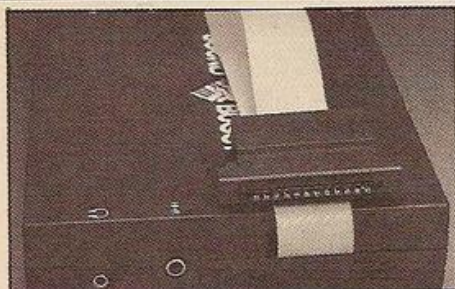
22 St Peter's Square,
London W6 9NW
(01) 741 1511

Activision

Ariolasoft

Commodore

Commodore
(as above)
Siel (UK),
Ahed Depot, Reigate



NO, PLEASE

Tony Sacks rides with the tide, eats to the beat and goes with the flow.

parameters are needed to define a sound that they can easily deter the Basic programmer. Several software packages are now available to ease this process.

One of these is FSoft's **Music Maker** — cassette £8, disc £12 — which provides high-resolution graphical images of how the sound varies with time. There are two of these displays — one for amplitude, the other for pitch — and they give the user an instant visual indication of any changes made to the sounds.

Audible feedback is provided by pressing keys in two rows of the qwerty keyboard that are converted into a musical keyboard. Up to three notes can be sounded simultaneously and the "keyboard" can be split to allow two different sounds to be played in each half.

Once you are happy with your sounds you can use them — or the preset sounds supplied with the package — to "record" a piece of music using the sequencer section of the program. A rudimentary musical stave display is provided of the notes you play.

Music Maker's greatest strength is that it shows you clearly, at a relatively low cost, the effects of varying the many BBC sound parameters. FSoft is now working on a similar package for the Amstrad computers which have until now been starved of quality musical software.

It is possible to take the BBC even further as a music-making machine with the aid of Island Logic's **The Music System** — cassette £12.95, disc £24.95. This is a meticulously-designed piece of software that uses icons and pull-down menus to allow music to be entered, stored, edited and printed out with the greatest of ease.

After selecting the appropriate icon from the main menu screen you find yourself in one of five modules. These are: a synthesiser which allows you to create sounds using the BBC's

music chip; a keyboard, which turns the BBC into a four-channel "tape recorder" that stores tunes as you pick them out on the Qwerty keyboard; an editor which allows you to enter notes directly on a musical stave or two change notes already displayed; a printer to produce hard-copy versions of your compositions; and a Linker — only in the disc version — that allows up to 10 separate compositions to be played back together in any order you choose.

This may sound complicated but the beauty of The Music System is that it is so well designed that you can be creating music within minutes of starting to play with it. Using TMS is made even easier by the excellent graphics and the professionally produced instruction manual which could serve as an example for games publishers.

There are some niggles — for example, the stave displays only one channel of sound at a time — but the overall design is almost faultless.

Island Logic have now converted TMS to run on the Commodore 64 and, in doing so, have improved and expanded some of the functions to take advantage of the 64's bigger memory capacity.

The most significant change is the addition of a sixth module that allows the package to communicate with the outside world via a MIDI interface plugged into the back of the 64. You can use this either to "record" external music synthesisers or to drive these outside instruments from music originally written for the 64's internal chip.

You can record an external MIDI instrument on any of six "tracks" while listening to any or all of the other tracks being played back. The music recorded via MIDI can be converted into a form which will drive the Commodore's SID sound chip.

Other changes from the BBC version of TMS include a simplified filing system; the ability to include lyrics on print-outs; and the inclusion of a cut-and-paste facility in the editor section that allows you to move chunks of music around within a composition.

Island is producing the Commodore TMS in two versions: an Advanced version — disc £34.95 — and a cut-down Concise version — cassette £15.95, disc £19.95 — which consists of the editor and keyboard functions. There is also talk of cheap — under £20 — MIDI interfaces for both the BBC and Commodore machines but no release dates have yet been scheduled.

The Commodore version of TMS still displays just one musical part at a time. If you want all three musical parts to appear on the screen simultaneously you could try Activision's fun-filled **Music Studio** — cassette £14.99, disc £19.99.

Activision's games heritage shows in this colourful package which uses a joystick to control the movements of a conductor's baton — looking more like a demented tack — which picks up notes and deposits them on a stave to create a composition.

A particularly attractive feature of this package for newcomers to music is an alternative composing screen which uses splodges of differing colours and sizes to depict notes. This avoids the confusing "sticks and blobs" notation of conventional scores and allows the musically illiterate user to compose music intuitively. By reverting to the conventional display, these splodges are "translated" to their traditional equivalents.

A third screen allows the user to tinker with the 64's sounds using the joystick to manipulate a synthesiser control panel.

(continued on next page)

CMK 49 £125
MusicMate £99

MusicWare £34.95
packages each
Echo 1 £100

Road, Hookwood,
Horley, Surrey RH6
0AY
(0293) 776153/4
Siel (UK) — as above
Sequential Circuits,
PO Box 16,
3640 AA Mijdrecht,
The Netherlands
(02979) 6211
Sequential Circuits
(as above)
LVL,
Scientific House,
Bridge Street,

Microsound 64 £150

BBC Echo 1 £100
Symphony £125

Sandiacre,
Nottingham NG10
5BA
(0602) 394000
Microsound,
PO Box 14,
Petersfield,
Hants. GU32 1HS
(0730) 87403
LVL (as above)
ATPL,
Station Road,
Clowne, Chesterfield
(0246) 811585

(continued from previous page)

The comprehensive — and largely comprehensible — instruction book for the Music Studio mentions the possibility of a MIDI interface but this has not yet been implemented. Beneath the glossy surface of this package lies a well thought out piece of software that offers many of the facilities of Island's TMS — with the notable exception of real-time recording — and is probably more accessible to the games-playing non-musician.

A third package designed to exploit the Commodore 64's SID chip is the **Music Construction Set** — disc £14.95 — from Ariolasoft. This does not have the striking graphic presentations of the other packages — in fact, the screen is rather cramped and notes on the staff tend to blur into one another — but it does include some impressive examples of what the SID chip can achieve when pushed.

A particular tour de force is a rendition of the Flight of the Bumblebee in which, as the music plays, the notes scroll past at an unreadable speed.

The Music Construction Set has just 13 preset voices which cannot be altered. It does not allow any form of real-time recording and cannot produce print-outs of musical scores.

An interesting looking package which was still in a pre-production form as *Your Computer* went to press is Commodore's own **Sound Studio** — £14.95. This includes a synthesiser section which allows the user to create sounds and to use them in compositions, and a "multi-track recording studio" which allows music to be recorded in real time from the Qwerty keyboard or from an external MIDI keyboard.

The MIDI option looks particularly promising as Commodore — in association with the music publisher Music Sales — is planning to market a MIDI interface costing around £20. This compares with prices ranging from £80 upwards for existing MIDI interfaces.

Admittedly, the Commodore interface will be a fairly basic affair without some of the facilities offered by the interfaces aimed at the professional musician, but it should be more than adequate for the computer enthusiast exploring MIDI for the first time.

One existing Commodore peripheral that can be used with the Sound Studio package is the miniature £19.99 **Music Maker** keyboard which clips onto the 64's qwerty keyboard to convert it into a two-octave musical keyboard. More than 185,000 of these have been sold, so there must be some Commodore owners interested in



Above: SIEL CMM25; Right: screen shot of FSoft Music Maker; Below: Sequential Music Mate.

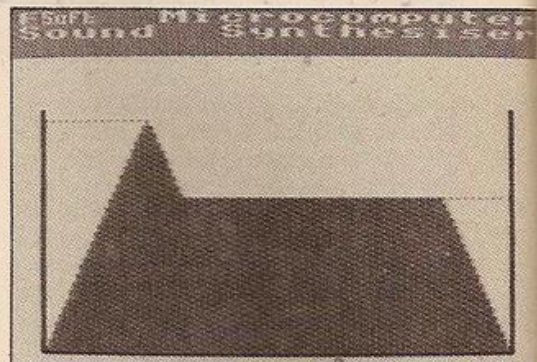
making music with their machines!

A similar, but flimsier, clip-on keyboard is made by the Italian SIEL company whose main line of business is making synthesisers. The company is also becoming an important force in the musical micro world. In addition to the clip-on keyboard, SIEL also produces a separate full-size, four-octave keyboard for the Commodore 64. Both the miniature **CMM 25** — £19.99 — and the stand-alone **CMK 49** — £125 — keyboards are provided with software on tape or disc to fiddle with the SID chip.

The larger keyboard also offers the option of expanding to MIDI control by adding a £87.95 interface. What it doesn't do is provide any method of storing music either while you play, or as notes on a staff. Future software updates may change this, but at the moment the CMK 49 is only suitable for real-time music playing.

Another synthesiser maker, the American Sequential Circuits company, does offer the possibility of musical storage with its **MusicMate** add-on keyboard and **MusicWare** software for the Commodore 64. The £99 MusicMate is just 2½ octaves long and comes with a disc-based program which allows you to control the SID device using one of eight pre-programmed sounds. Some very basic modification of these sounds is possible.

To be more adventurous with the MusicMate



you have to invest in one or more of the additional MusicWare packages retailing at £34.95 each. These include a Sound Maker package to meddle with the SID parameters, a Song Builder package — called, confusingly, Song Recorder in its instruction booklet — for recording music played on the keyboard, a Song Editor which converts the music into conventional notation which can then be edited, and a Song Printer, which does as it says.

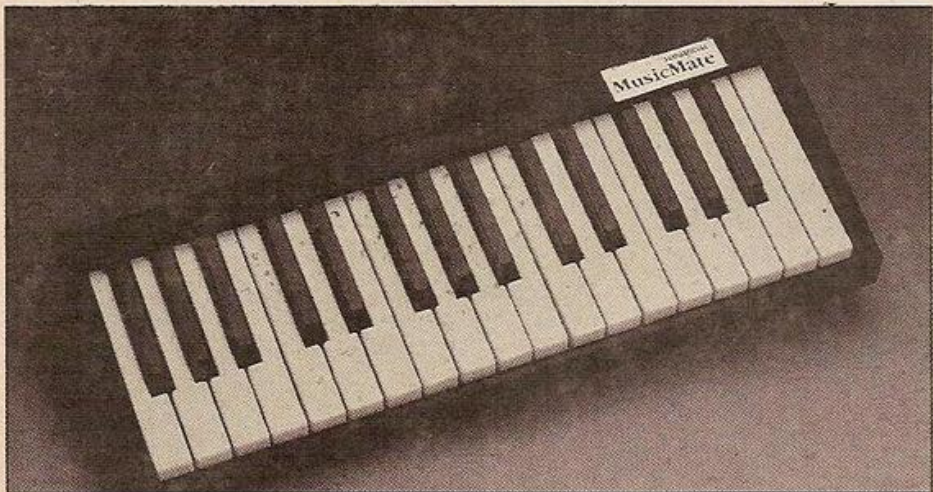
All of these packages perform adequately but as each one costs the same as Island Logic's Advanced Music System, they can hardly be recommended as being good value. The Sequential system has no provision for MIDI which is strange for a product from a synthesiser manufacturer, especially as Sequential was the original driving force behind MIDI.

Another Commodore keyboard add-on is LVL's **Echo 1**, a £100 three-octave device which comes with a piece of software called Organ Master providing several preset sounds for your delectation. A version of the LVL keyboard for the BBC computer is also available.

Finally, for the Commodore 64, there is the £149 **Microsound 64** keyboard and software package. In its basic form this is another SID-controlling keyboard but, as we shall see next month, it has a rather impressive trick up its sleeve.

The Microsound provides the user with more control over the SID parameters than SIEL's MK49 or the basic Sequential MusicMaker packages. It also provides a sequencer which will store up to 200 notes for each of the 64's three voices.

It is not a real-time recorder but a "step time"



sequencer which accepts only pitch information from the musical keyboard and assigns the note a fixed length, independent of the timing of the keyboard playing. The music stored in this way can be edited but tends to sound rather lifeless on replay.

Next to the musical keys are two slider controls that can be assigned by the user to control various SID parameters, such as the filter cut-off point and pulse width, as the keyboard is being played. A useful addition.

The only other home micro to have dedicated musical keyboard add-ons is the BBC and the choice here is far more limited than for the Commodore 64. Other than the LVL Echo mentioned above there is only one keyboard designed to work with the BBC micro's internal sound-making device. This is ATPL's £125 **Symphony** keyboard, another four-octave affair supplied with software to drive the BBC sound chip. Up to 100 different sounds can be defined, manipulated and then played from the keyboard.

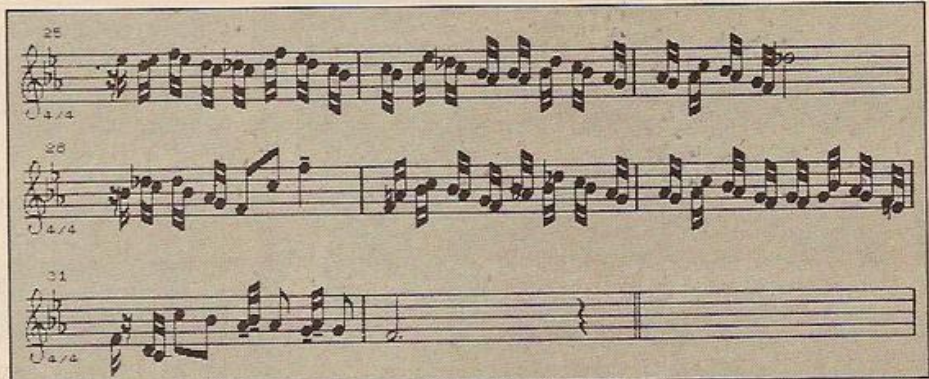
The **Symphony** package does not include any provision for sequencing or recording or for MIDI connections. But it does offer an escape path from the limitations of the BBC sound chip. This takes the form of an additional £11.50 piece of software which will allow the keyboard to drive the Acorn Music 500 synthesiser.

The £199 **Music 500** was introduced as an add-on for the BBC about a year ago. In hardware terms it offers a powerful and versatile 16-channel sound synthesiser with a stereo output. Equally important is the software used to drive the synthesiser.

The developers of the **Music 500**, Hybrid Technology of Cambridge, have produced a new language called **Ample** especially tailored for music-making. **Ample** is similar to Logo or Forth in that it uses structures called "words" to define sounds, to generate these sound, and to create new musical notations. Once a word has been defined it can be incorporated in other, more complex, words.

This might sound complicated but, on the whole, it isn't. It allows complex, multi-part tunes to be defined with relative ease. Defining sounds is a bit more complicated and involves a lot of trial and error especially as no graphical assistance is given. However, a useful selection of preset sounds is supplied with the **Music 500**.

The 16 sound channels, usually configured as eight voices, can be placed at any of seven stereo positions to provide an impressive spread of sound. **Ample** is multi-tasking to allow these voices to be heard individually or together.



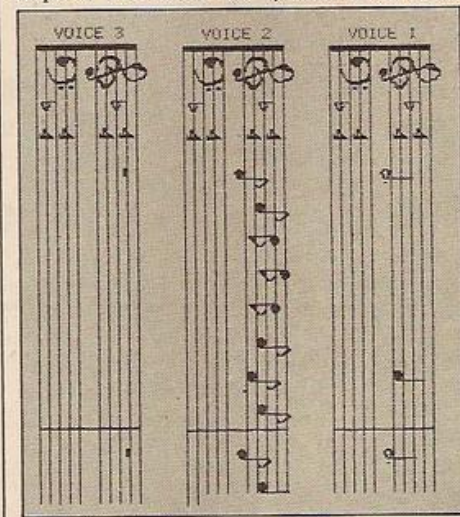
Above: *Romantic Robot's Music Typewriter* on a Spectrum printed on Epson printer. Below: *Island Logic's The Music System* on a CBM-64 printed on Commodore MPS801 printer.

Hybrid Technology have continued to develop the system since its launch and are about to produce a clutch of add-ons and modifications. Central to these is a Rom version of **Ample** called **Nucleus** which extends the language and supports new peripherals. One of these is a £129 MIDI interface that will allow **Ample** programs to control external synthesisers or will allow these synthesisers to drive the **Music 500** sound module.

Another new peripheral is a £129 four-octave keyboard. Notes played on this device can be transcribed automatically into **Ample** scores.

Another planned add-on is an £89 stereo amplifier designed to complement the rest of the **Music 500** system. Like the MIDI interface and the original synthesiser, it is built into a disc drive case.

These additions should greatly extend the scope of the **Music 500** system. In its basic



format, it is primarily a computer programmer's plaything without the sort of immediate real-time feedback that the musician usually needs. The MIDI and keyboard options will change that.

If you want to hear the types of sound that the **Music 500** can produce, Hybrid Technology have produced a 40 minute cassette of music generated on the system. The tape is available from Hybrid for £1.95.

An exciting prospect for Commodore 64 users is that Hybrid plans to produce a version of the **Music 500** for the 64 early in 1986.

Although the **Music 500** has the market for BBC add-on synthesisers almost to itself, it will have to face strong, and growing, competition from other synthesiser add-ons for the Commodore 64, as we shall see in a moment.

The only competition at present in the BBC market comes from Clef Products of Cheshire with their **Programmable Digital Sound Generator (PDSG)** costing £495. This may seem expensive but it comes complete with a five octave keyboard that senses how hard you are hitting the notes and uses this information to alter the synthesiser output. This facility is normally only available on synthesisers costing £700 or more.

Commodore 64 owners can enter the world of the add-on synthesiser module — known in synthesiser lingo as an "expander" — for a more modest £99.95. That is the asking price for a hardware and software package just launched by Siel. Called the **Sound Buggy**, this package includes a box of tricks which provides automatic rhythm and bass accompaniments for simple tunes picked out by the player.

Commodore itself is producing a sound module for the 64, also expected to sell at around £100. A matching full-size, four-octave keyboard will be available at £49.99. Details were sketchy as *Your Computer* went to press but the expander appears to be an eight-voice module with sophisticated automatic accompaniment facilities.

It is said to produce sounds of comparable quality to those of Yamaha's DX FM synthesiser series and will be able to interface with MIDI instruments. If it does live up to these claims, it could be a very impressive little beast.

And finally, on the expander front, a ray of hope for a select group: music-loving MSX owners who do not have a Yamaha machine. Toshiba is planning to launch an add-on keyboard and expander for MSX machines which, in some ways, seems similar to the **Sound Buggy**. It will offer 60 preset instrument sounds, 20 rhythm patterns, automatic bass and chord accompaniments, and something called a "harp sensor".

CONCLUSIONS

- There is a lot of software and hardware designed to turn home micros into music-making machines, but the best packages are limited to the BBC and Commodore 64 machines.
- For the musically-inclined BBC owner, Island Logic's *The Music System* has no equal for getting the most out of the machine.
- There are no cheap ways of bringing outside sound sources under the control of the BBC. But the **Music 500** system does provide a flexible and challenging means of widening your musical horizons, providing you are prepared to persevere with **Ample** and can manage without graphical aids or conventional music notation. The rather costly new

MIDI module will increase the system's versatility.

- For the Commodore owner, the choice is more difficult. Island's TMS is probably the best package if you are seriously interested in music or are thinking of moving into MIDI; Activision's *Music Studio* is more fun. Commodore's *Sound Studio* could pose a strong challenge.
- If you are looking for a musical keyboard, Commodore's sub-£50 device appears to offer extremely good value for money and could form a powerful package with the company's £100 sound expander.
- MSX owners should keep an eye open for Toshiba's expander and keyboard.
- For owners of Amstrad and Spectrum computers there is the option of expanding musically via a MIDI interface.

CREATE C64 ARCADE GAMES!

Now you can learn how arcade games are created from scratch. Step-by-step, in easy-to-understand detail, commercial software developer Robert Woolford lets you into the secrets of the professionals.

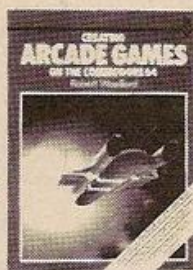
You'll discover how to think up ideas for arcade games on the 64, and then learn how to turn those ideas into fast-moving, challenging, marketable software.

You'll discover how the experts make their programs run more quickly. You'll be shown how to maximise the real-time interaction between the machine and the player, to ensure the highest possible level of excitement is created by the games. Sample programs are included throughout the text, so techniques can be seen in action as they are described.

The book also includes a fully annotated, complete arcade game listing.

Creating Arcade Games on the Commodore 64 by Robert Woolford (ISBN 0 907563 75 9) is £7.95, and is available at most book and computer stores, or directly from the publishers, post free:

**Interface Publications Ltd., Dept YC,
9-11 Kensington High Street,
London W8 5NP**
(Trade only: WHSD Leicester)



Interface

BUSINESS COMPUTERS

Apricot F1E £637 (£614) £658. Apricot F1 £894 (£870) £933. Epson PX8 £900 (£872) £892. Commodore PC10 £1595 (£1564) £1664. Commodore PC20 £2573 (£2485) £2695. Sanyo MBC 775 £1920 (£1898) £1999. Canon A200C £1609 (£1586) £1686. Sanyo MBC550 £723 (£699) £799. Sanyo MBC550-2 £975 (£939) £1039. Sanyo MBC555-2 £1343 (£1322) £1422.

ORIC AND SINCLAIR COMPUTERS



MCP40 Oric printer/plotter £109 (£110) £122. Sinclair pocket TV £97 (£95) £101. Sinclair QL Computer £374 (£365) £386. QL Floppy disc interface £107 (£103) £109. 3.5" disc drive to suit this interface £177 (£176) £196. Sinclair Spectrum Plus Computer 48K £123 (£127) £147. Original 48K Sinclair Spectrum £89 (£95) £116. Kit to upgrade the Spectrum to Spectrum Plus £30 (£30) £40. Microdrive £49 (£50) £60. RS232 interface 1 £49 (£50) £60. Special offer: Microdrive + Interface 1 + 4 cartridges £97 (£99) £107. Blank microdrive cartridges £2-50 (£3) £4. Spectrum floppy disc interface (see Cumana disc section for suitable disc drives) £97 (£99) £99. Interface 2 £20-45 (£20) £24. 32K memory upgrade kit for 16K spectrum (issue 2 and 3 only) £31 (£28) £30. Spectrum Centronics printer interface £46 (£42) £47. ZX printer has been replaced by the Alphacom 32 £61 (£59) £72. ZX81 computer £29 (£29) £39.

COMMODORE COMPUTERS

Commodore 128 £269 (£249) £279. Commodore 64 £161 (£159) £189. Commodore 64 + Recorder + software £187 (£213) £243. Converter to allow most ordinary mono cassette recorders to be used with the Vic 20 and the Commodore 64 £9-78 (£9) £11. Commodore cassette recorder £43 (£44) £50. Centronics printer interface for Vic20 and the Commodore 64 £45 (£41) £46. Disc drive £191 (£186) £217.

AMSTRAD, ATARI, ENTERPRISE AND MSX COMPUTERS

Amstrad 464 Colour £342 (£348) £388. Amstrad 464 Green £232 (£247) £287. Amstrad 664 Colour £439 (£431) £481. Amstrad 664 Green £331 (£332) £382. Atari 130XE computer £158 (£163) £183. Atari 520ST computer with 3.5" disc drive, mouse, monitor and software £675 (£670) £730. Atari 800XL computer + recorder £120 (£123) £143. Atari 800XL Computer + disc drive £229 (£230) £260. Atari data recorder £34 (£37) £47. Atari disc drive £172 (£171) £191. Atari 1020 printer £93 (£99) £115. Enterprise 64 computer £172 (£170) £190. Enterprise 128 £233 (£229) £249. Goldstar MSX £138 (£138) £158.

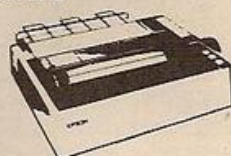
ACORN COMPUTERS

Acorn Electron £119 (£119) £139. New 64K BBC Model B Plus with double density disc interface £457 (£441) £471. BBC Model B £345 (£333) £373. Acorn disc II + DNFS £97 (£95) £100. See below for suitable disc drives. Colour monitor £188 (£228) £268.

CUMANA DISC DRIVES

To suit disc interfaces of Sinclair Spectrum and BBC Model B Plus with double density disc interface £457 (£441) £471. BBC Model B £345 (£333) £373. Acorn disc II + DNFS £97 (£95) £100. See below for suitable disc drives. Colour monitor £188 (£228) £268.

PRINTERS



New Epson LX80 £249 (£249) £282. Tractor for LX80 £25 (£33) £53. Brother HRS £148 (£152) £184. Brother M1009 £201 (£203) £234. Shinwa CTI CPAB0 £218 (£222) £258. Cannon PW1080A £309 (£306) £356. Brother EP22 £125 (£114) £134. Brother EP44 £224 (£220) £240.

SWANLEY ELECTRONICS

The computer Export Specialists
Dept. YC, 32 Goldsel Rd., Swanley, Kent BR8 8EZ, England
Tel: SWANLEY (0322) 64851

Official orders welcome. UK prices are shown first and include post and VAT. The second price in brackets is for export customers in Europe and includes insured airmail postage. The third price is for export customers outside Europe (including Australia etc) and includes insured airmail postage.

Arnor LTD

THE PIONEERS OF ROM SOFTWARE FOR THE AMSTRAD NOW PRESENT -

* PROTEXT * WORD PROCESSOR

TO THE ARNOR STANDARDS

- **SPEED** - TOUCH TYPING SPEED & SUPER-FAST SCREEN HANDLING
- **SIMPLICITY** - SO EASY TO USE & INCLUDES COMPREHENSIVE HELP FACILITIES
- **POWER** - SO MANY FEATURES... LOAD, MERGE, SAVE, POWERFUL FIND & REPLACE, COUNT, CATALOGUE, INSERT, DELETE, WORD-WRAP, JUSTIFY, BLOCK COMMANDS, TABS, MARKERS, MARGINS, FORMATTING, HEADERS & FOOTERS, FULL/EASY PRINTING, QUICK COMMAND ENTRY FOR EXPERIENCED USERS, DIRECT ACCESS TO DISC/EXTERNAL COMMANDS.

NEED WE GO ON?

- * **REMEMBER** * Protext is available in Tape/Disc/Eprom or AD1 Cartridge
- * **REMEMBER ALSO** * "If this is their editor, I wait with baited breath for their word processor....."
(ACU JUNE '85)

THE PROFESSIONAL TEXT EDITOR AT A SENSIBLE PRICE:-

FOR PROTEXT (P) OR MAXAM (M) ON CPC 464

ALL
ENGS,
CREDIT CARD
SALES ETC
01-688-6223

ROM + AD1 CARTRIDGE (code AD1P or AD1M)	£49.95
16K EPROM ALONE (code EP or EM)	£39.95
DISCS (DP or DM)	£26.95
CASSETTES (CP or CM)	£19.95

For the CPC 664: Please quote AD2P, AD2M and add £5. EPROMS DISCS & CASSETTES are the same codes and prices as the CPC 464

Trade & Overseas Orders Welcomed

leaves
40K
TEXT
SPACE

SEND LARGE SAE FOR FULL CATALOGUES

TURN PRO TODAY!!

* UTOPIA * £29.95

BASIC UTILITIES ROM (Prod Code EU)

40K
USER
RAM

Beebug's TOOLKIT is the standard utilities ROM for the BBC Micro and has sold thousands of copies. Now the author has written an Amstrad version. Available only on ROM the program contains numerous Basic Programming AIDS including search/replace within Basic program, listing basic variables, moving basic lines, load, save, verify, type, dump, format, copy and much more.

ALL INCL PRICE £29.95

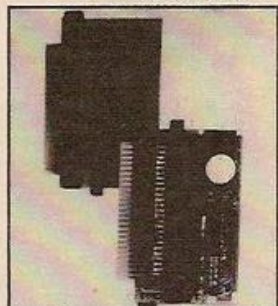
AND GREAT NEWS FOR MACHINE-CODE ENTHUSIASTS:

MAXAM

IN CARTRIDGE NOW ONLY £49.95 (incl VAT, p&p)
NOW ALSO AVAILABLE IN ROM ALONE FOR ONLY £39.95
ALL VERSIONS NOW CONTAIN FULL SPECIFICATION
DISC £26.95 TAPE £19.95

PRESS COMMENT

- "Innovative device this article finished on the ARNOR editor... well worth the money" - **AMSTRAD COMPUTER USER**
- "Assemblers... look no further ARNOR is the best I have seen" - **COMPUTING W.T. AMSTRAD**
- "Absolute magic! - ARNOR must be the market leaders" - **POPULAR COMPUTING WEEKLY**
- "Quite Special... difficult to match" - **COMPUTING TODAY**
- "ARNOR are to be congratulated on a superb job... definitely the best" - **HOME COMPUTING WEEKLY**
- "A product no serious AMSTRAD user can afford to be without" - **YOUR COMPUTER**



AD1 ROM CARTRIDGE

IN GOOD COMPUTER STORES EVERYWHERE - OR DIRECT.....

PLEASE SEND ME
(PRODUCT CODE)

(PRICE)

I enclose Cheque/PO for £
(PAYABLE ARNOR LTD)

OR
Please debit my Access/Visa

Card No

Total £

NAME:
ADDRESS

SIGNATURE:

ALL TRADE/CREDIT CARD SALES, ENQUIRIES ETC 01-688 6223
SEND TO ARNOR Ltd Dept Y, THE STUDIO, LEDBURY PLACE, CROYDON, SURREY CRO 1ET



TOUR DE FRANCE

Competition



Win a Commodore 64 and Activision's Tour de France to play on it, together with a

fabulous Tour sweat-shirt in this racing competition. All you have to do is invent a

new circuit for the cyclists to race round. Game and sweatshirt to the 20 runners up.

COMPETITION RULES

- The winners of the competition will be the people who, in the view of the editor, invent the most interesting, unusual or imaginative cycling circuit for Activision's racing game.
- The names of the winners will be printed in the January issue of *Your Computer*.
- All entries must arrive at the *Your Computer* offices by the last working day in October 1985.
- Each person may enter the competition only once.
- Entries to the competition cannot be acknowledged.
- No employees of Business Press International or their relatives may enter the competition.
- The decision of the editor is final.
- No correspondence on the result of the competition will be entered into.
- Business Press International assumes no responsibility or liability for any complaints arising from this competition.

**YOUR
COMPUTER**

TOUR DE FRANCE COMPETITION

Don't forget to enclose this coupon, or a photocopy of it, when you send in your entry to Tour de France Competition, *Your Computer*, Room L221, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. If you need more space than this coupon allows, you can send us your designs or descriptions on separate paper.

Name _____

Address _____

BEYOND'S SU

"If you meet Manuel he'll teach you how to use a machine pistol". No, Beyond's mild-mannered marketing manager Clive Bailey isn't fomenting urban revolution down there in the Farringdon Road, but explaining how to free your friend from the clutches of an evil drug syndicate based in Colombia. Nexus is not just a game, it is also a software development house and a new marketing concept. As any mafioso knows, a successful operation spawns many front organisations. Beyond's new labels are Nexus and Monolith.

"Beyond is more orientated towards innovative action/strategy type programs," says Clive Bailey. An apt description — although backed by EMAP Publishing, Beyond wouldn't be where they are today without strong products like Lords of Midnight, Doomdark's Revenge, Psytron and Psi Warrior.

Monolith is seen as being sophisticated, too, with more elements of arcade/shoot'em-up action. But there's more to Beyond's subdivision than mere aesthetics: "A lot of retailers look at various

says Tayo Olowu. "The development house is still just us at the moment, but we will be getting other programmers in, working almost over a modem."

In Nexus for the CBM-64 you are an investigative reporter trailing a buddy who has disappeared on assignment in Colombia. Here you contact Nexus — a dissident group determined to break the ring from inside.

The screen shows a sideview of a corridor at the top with a central control display. By moving the joystick in various directions you can walk, run and punch. You can even do Exploding Fist style flying kicks. The move selected is displayed in the panel, and executed when you push the fire-button.

"There are two things I don't like in computer games," says Tayo Olowu, "I don't like lives and I don't like giving points." Apart from rescuing your friend, you must gather evidence of the

Paul Bond with the view from Beyond.

like being able to pick up a joystick and play. All the information you want is fed to you when you need it." The game is to be marketed in a special plastic container with a minimum of printed instructions. "What I look for in a game," says Paul Voysey "is playability — something like Boulderdash as a target — and originality, that you're not playing just another version of Jet Set Willy. The game should have depth in the way that adventure games have depth. You should feel that you are somewhere and that all your actions are important."

And what could be more important than freeing the fair land of Elindor from the evil king

BOUNCES



This Viking can take a lot of punishment — he needs to in Bounces, programmed by Denton Designs for Beyond.

NEXUS



With a Protek digitiser and a standard video camera, Paul Voysey and Tayo Olowu were able to achieve some fascinating effects. Beyond advertising manager and karate expert Francis Lee (no relation) modelled the flying kicks. Nexus will be available from Nexus on the Spectrum and Commodore for £9.95.

ENIGMAFORCE



Enigmaforce is the sequel to Shadowfire but a very different type of game. This is a provisional development sketch of one of the characters in the game.

catalogues and say to themselves: 'Okay I'll have, like, three Beyond products, three Ocean, three US Gold, three something else. It just enables us to put more products on the market.' Making their debut on the Monolith label are Rockford's Riot (reviewed in Your Computer Software Shortlist in September) and Quake Minus One, of which more later.

And Nexus? "It's going to be like the National Aeronautics and Space Administration," says Clive Bailey, "with the same corporate/authoritative/scientific image as NASA, but not too high a profile — just when a new project is being announced."

Nexus the program was written by Psi Warrior/Psytron veterans Paul Voysey and Tayo Olowu. "We always wanted to set up our own company"

complex's activities and transmit this back to your editor from one of the several transmission rooms. These rooms get more heavily guarded as the game progresses and your success grows.

Some of the gadgets strapped around your person include a tape recorder which enables you to record messages printed out at the base of the screen plus a camera for photographing documents and key personnel. To increase your skills within the game you must co-operate with members of Nexus who will train you in explosives, fire-arms, unarmed combat, forging, knife-throwing, gymnastics, lock-picking and so on. This is done by arranging a rendezvous in a training room where the joystick controls are explained to you.

Tayo and Paul learned from their experiences with Psytron and Psi Warrior — "Psytron was involved and you had to read a manual — a game like Nexus would warrant a huge manual — I

Sorderon's Shadow? In this program, written by Nick Eatock and Simon Welland, for Beyond, you are guided by the people who summon you to Elindor. They tell you which tasks to complete next, in a series of about nine major and five minor quests. So this is a game which would be in tune with the pick-up'n play philosophy of Nexus.

"We just had it at the landscaping stage, with some clouds and a scrolling sun and moon," explained Nick Eatock. More adventure-orientated than the primarily strategic Midnight series, Sorderon's Shadow features a high degree of characterisation and graphics. "We used a sort of line-drawing system like that in the Spectrum's Rom — Mike Singleton got his data in 17K, we got ours in about eight."

"I was very impressed by it — it's got a bit more variety," said midnight supremo Mike Singleton. "And the way that they presented it to Beyond, landscaping first, was pretty much the way I came up with Lords of Midnight." And that, funnily enough, was also the way in which

SUPERSECRETS

Mike's new game Quake Minus One came into being. "I thought it would be interesting to animate a landscape. Once I'd got it, I had to use it."

Co-written with Warren Foulkes, the futuristic game differs from the Tolkienesque Lords of Midnight in all other respects. In Quake, the Robot Liberation Front demand freedom of thought and association for droids. They seize control of the Titan Undersea Power Station and hold humanity to ransom. You seize control of one of the complex's computers and its fleet of armed mobiles. You must capture or destroy the remaining Titan computers. It's an enterprising blend of arcade action and strategic thinking.

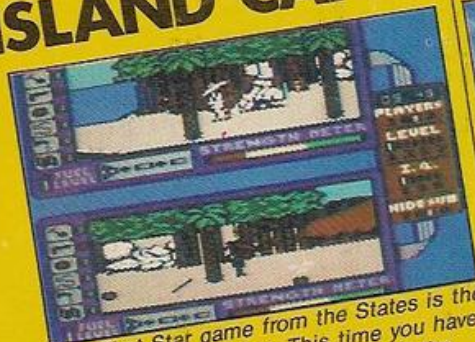
the ubiquitous Liverpool design house Denton Designs. They helped smarten up Sorderon's Shadow by putting representations of characters at the base of the screen, but they have two full-blooded games in their own right for Beyond: Enigmaforce, the follow-up to Shadowfire; and Bounces, which was developed under the working title of Iron Heroes.

"We've tried to avoid the Ultimate trap", says Steve Cain of Enigmaforce. "The follow-up has some of the feel of the original game — the lower

identifies with — each has his or her own characteristics.

A man who took a computer program and turned it into a software house is Fernando Herrera. This could only happen in America, which is where Fernando founded First Star Software after Atari awarded him \$25,000 in a software competition. He wrote an alphabet program for his son. Close questioning revealed another

ISLAND CAPER



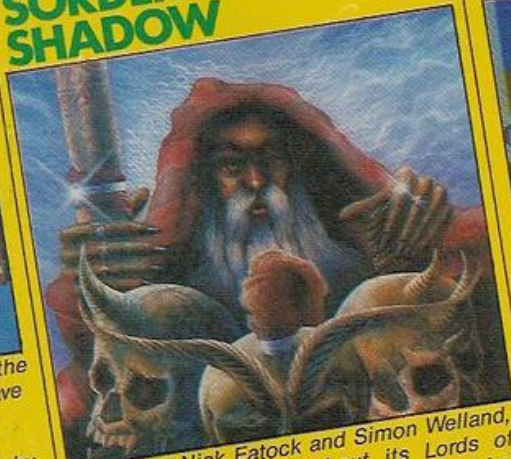
This First Star game from the States is the follow-up to Spy v Spy. This time you have to assemble a rocket and sneak off the island in a submarine — or else be engulfed in a volcanic eruption. Written by Mike Riedel, it's for one or two players playing simultaneously. The bottom half of the screen shows the black spy, either friend or computer.

Each of the four enemy computers has a particular defence function. To locate them and travel to them you can call up either a stylised three-dimensional map of the complex, or a through-the-gunslit of the local landscape. Zeus computer is the overall co-ordinating machine, the others deal with attack, defence and counter-attack. So if you destroy the attack computer, Ares, for example, you won't encounter so many heavy attacks. If you destroy Zeus, it is more difficult for the enemy to think ahead and stop you from achieving your goals. So there are a number of strategies open to you.

Midnight fans (or "frothers" in Beyond jargon) may want to know about the delayed third part of the trilogy, Eye of the Moon. It involves a much larger area, 12 different countries, and much more individualisation of landscape — every tree will look different, for example. Morkin has gone south to find the Eye of the Moon, which will enable him to see into the future. He encounters various evil influences in the Blood-march, but this game can be played with two sets of goodies against the evil. Morkin's son by Shareth the Heartstealer turns up to lend a hand.

Also lending a hand frequently to Beyond are

SORDERON'S SHADOW



Written by Nick Eatock and Simon Welland, they make no bones about its Lords of Midnight look. At £9.95 on the Beyond label this will doubtless be snapped up.

part of the screen is similar — but the top section is quite different, there are characters moving against a background."

In Enigmaforce four of the Shadowfire characters, Zark, Sylk, Maul and the fair Sevrina crash-land along with the evil Zoff on Sylk's home planet. Two armies are locked in battle on the planet's surface; Sylk's people are fighting a pro-Zoff force. Zoff escapes into an underground complex to link up with his allies. The aim of the game is to stop Zoff, take him alive — you can kill him in this game, but it's inadvisable because he's got the key to the spaceship and you need him as a hostage to get by the hostile soldiers.

Even more zappy is Denton's cathartic little number called Bounces, based on an imaginary sport of the future that enables the peace-loving people of the world to let off steam by hiring a champion to fight a particular violent form of pelota for them.

"Sort of state-of-the-art bat-and-ball", says modest Steve Cain. The two champions face each other and try to bounce balls through a hole in the ceiling. But when these guys get going they make McEnroe look prim. No holds barred stuff this, even for the lady combatants. The idea is to store six or seven different combatants on tape, so that the player can pick the one he or she

QUAKE MINUS ONE



Revolt of the robots. Time is ticking away until they destroy a major power station endangering human life on the planet earth. Written by Mike Singleton of Lords of Midnight fame, together with Warren Foulkes (together they pioneered the first play-by mail computer game in this country, Star Lord) this will make its appearance on the Monolith label at £9.95.

South American connection for Beyond — not only is the Nexus game set in Colombia, but this is where Superman game programmer Fernando was born.

Since a big Superman image would consume too much memory, and a small one would be reminiscent of the relatively primitive Atari Superman game, First Star compromised and produced "intermission" or transition sequences which allow the player to see Superman in close up, as well as the main sequence involving the confrontation between Superman and the evil super-alien, Darkseid. Darkseid, who is growing in popularity in the USA — "he represents all the evil things in us that we try to control" — comes to earth seeking the anti-life formula hidden in the brain of one human on earth. This will give him total mental control over every being in the universe. It's Superman's job to conduct the hapless humans away from Darkseid's evil influence. Moving from screen to screen entails fighting out one of the large-size transmission sequences. Darkseid's Omega ray can kill or teleport people. Superman uses a giant mirror to deflect it. As Superman flies between the city blocks of Metropolis, Darkseid hurls chunks of kryptonite at him. So continues the endless struggle between good and evil.

This struggle is also to be found in the other First Star game which Beyond are releasing in the UK — the follow-up to Spy V Spy, The Island Caper (see page 35).

IN THE CROWN of thorns that is the U.K. microcomputer industry, one jewel shines out — Amstrad. While the boffins at Sinclair Research and Acorn have been scratching their egg-heads trying to make ends meet, Amstrad's barrow boys have been out touting their wares. In little more than a year Alan Sugar's Amstrad has unleashed four new machines into a market that others said was saturated.

Unlike Sugar's first three micros, the new PCW 8256 is not so much a home computer as a home word processor. A sensible move for this fast-moving computer manufacturer when you realise that, after playing games, the next most popular use of computers is word-processing.

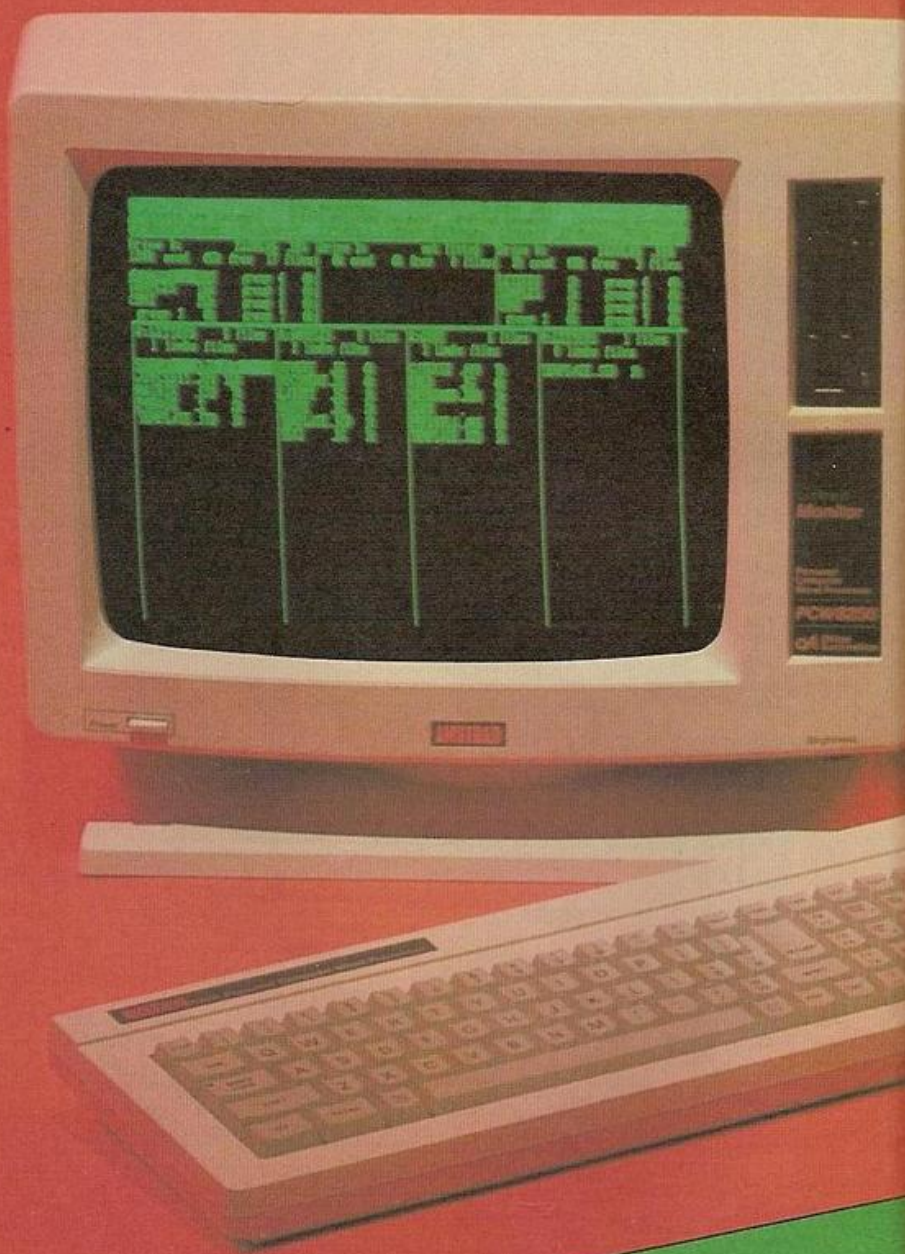
Amstrad claims it is a complete word processor for less than the price of a typewriter. At £399 plus VAT — £460 take home — there are not many competing typewriters or micros. In one package there is: a proper micro, a decent green screen monitor, a built-in floppy disc drive, dot-matrix printer and word-processing software.

Although the PCW 8256 is related to the rest of the Amstrad family, it is not merely a souped-up CPC 6128. That machine is an up-market toy with small business pretensions. This is the kind of system which could sit on a business-person's desk, and look at home.

It takes about five minutes to unpack the huge fridge-sized box that contains the system, connect up the components, put on a plug and get the machine going. Although the package comprises a number of elements, there is only one plug for the whole system. This makes life simpler and safer because power leads and multiple plugs trailing all over a room can be downright dangerous.

The two rather hefty manuals that come with the system are hardly light reading. Most aspects of the computer are covered and they tend to be exhausting, as well as exhaustive. There are complete sections on the word processor, CP/M, Basic and Logo. A simple little starter leaflet outlining the main word processor commands would be useful.

One lead trails from the main system unit to the keyboard, and a second lead, together with a ribbon cable, connects the printer to the rest of the system — all very straightforward. There is only one other port; it sits on the rear of the main unit and is a non-standard general expansion



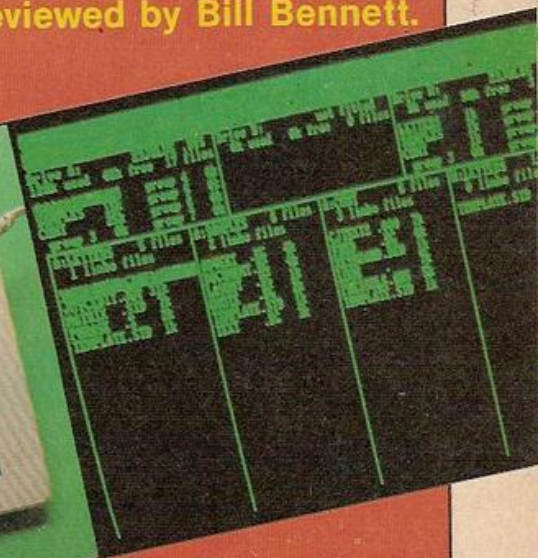
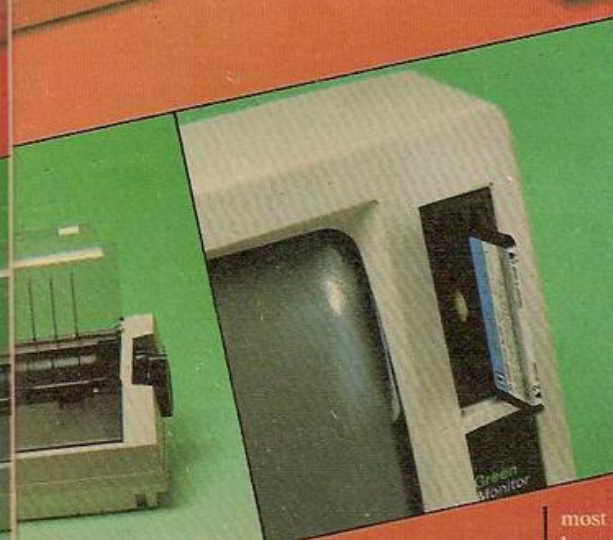
Left to right: Apricot-style keyboard; non-standard expansion port; near-letter-quality printer; Macintosh-style built-in drive in monitor; spot the enter key; green screen.

sion bus. It combines serial and parallel interfaces and can be used for modems, networks and so on.

Of all the links in the PCW chain, the weakest is probably the keyboard which is not up to BBC standard. True, it has 82 keys including an integral numeric keypad, but it is

WORD CHAMPION? AMSTRAD PCW 8256

Not £2,000, not £1,000 no
not even £500. This
complete word processor
is just £460.
Reviewed by Bill Bennett.



not very easy to use. Not all the 82 keys are in sensible places; for example the Enter key is no larger than the others and sits in the bottom right corner. Many of the keys provide a variety of different characters. This is not really a problem, but users will take time to learn about the machine.

Four function keys sit in the middle of the keyboard — doubling up to eight with Shift. Like the keyboards with the Sinclair QL and the Apricot F1c, the Amstrad keyboard is disturbingly lightweight, which may not worry

most users, but will cause problems for users brought up with typewriters. It is moulded from the same grey plastic as the rest of the system, which looks like a proper business computer rather than a toy.

Being primarily a business tool, there is little need for a full colour screen on the PCW 8256. After all, there is not much 8-bit business software that makes use of it. Not only that, but a colour monitor would add greatly to the cost. Green screens can be kinder on the eyes than a blaze of colour.

The screen is larger than usual — about 13 inches diagonally, and capable of displaying more information. It has 90 columns by 32 lines

of text, compared with the usual 80 x 24 or less. Because the screen is slightly curved lines can appear bent, and characters distorted. Even so they are much easier to read than on a TV, and at least as good as those on any other green screen monitor. Under the screen is a knob for adjusting the screen brightness.

Maybe the best individual feature of the system is the printer. It is smaller than most dot matrix printers — a simple, unfussy unit, which accepts sheet-fed paper with an optional tractor feed for use with continuous stationery. Given decent paper, the results can be stupendous.

It is a NLQ, or near-letter-quality printer, though it is capable of printing in two modes; draft and high quality. Draft mode is relatively quick, at a claimed 90 characters per second,

(continued on next page)

THE 8256'S BUNDLED SOFTWARE

THESE DAYS, when someone considers buying a computer, one of the most important factors to consider is the bundled software. The PCW 8256 comes with a complete word-processing package that contains its own operating system, together with a copy of Digital Research's CP/M Plus. Also included in the price of the system is a version of Basic and DR Logo as well as GSX.

CP/M Plus means that software

developed for any other CP/M micro will, in theory, run on the Amstrad. That is the theory. However, in practice software developed for one CP/M machine will not necessarily run on another for a number of reasons, to do with the differing specifications of machines. For the most part this is not a problem with the Amstrad as it exceeds the usual CP/M specification. This means that while most CP/M software will run on the machine, it might not

make full use of the machine's features, particularly the extra-wide screen and the large memory.

One problem that the Amstrad PCW has in relation to CP/M is that the micro uses a non-standard disc format. Apart from Amstrad, no manufacturer of significance uses 3in. discs with CP/M, and those that do use a different format. So the only CP/M software that you will actually be able to use with the machine is that which has been specially converted to the Amstrad format. Fortunately Amsoft has tied up a deal with a software distributor to make CP/M software available for all Amstrad machines via mail order. Among the packages on offer are: SuperCalc, dBase II and the Touch 'n Go typing tutor.

The actual implementation is CP/M Plus, which makes use of the extra memory by bank switching. GSX is a graphics system, the forerunner of Digital Research's GEM environment, which is available on the new Atari 520 ST.

Amstrad Basic is also included with the machine. It is more or less the same as the implementation on the other Amstrad micros; similar in many respects to BBC Basic. To help business users who want to develop their own applications software there are a number of extra features such as record management and double precision arithmetic. As well as Basic there is DR Logo, which is not really a language for business users. Maybe it is a clue that this machine is also intended for the educational market.



(continued from previous page)

it is good enough for most printing needs, and even in this mode is vastly superior to the Commodore 64 printer or a standard Seikosha.

High-quality printing is slower — after all each line needs to be printed twice with the print head displaced slightly. Even so, at 20 characters per second it provides copy that is good enough for even the most demanding recipient. Printing can be a little noisy, but not offensive.

Sitting next to the screen in the main unit is the computer's single disc-drive. Like other Amstrads, the PCW uses 3in. disc drives. These discs are double sided. Each side stores 180K, comparing well with the 100K stored on a 5.25in. disc by the Commodore 64, though other machines cram many more bytes onto a floppy. Amstrad's discs seem far more reliable than the Commodore units, or Sinclair's micro-drives.

The discs work well. They make a bit of noise, and the LED flashes on and off a bit, but they do the business. However, the individual discs are expensive — about £4 each — and difficult to find in the shops. Also, if you are getting down to serious work on the machine, turning a disc over is annoying.

One innovative feature of this machine is the Ram disc — new to this part of the computer market. It is an area of Ram which acts like a floppy disc as far as the user is concerned. But a Ram disc is far faster than any floppy; data and files are whisked in and out at breakneck speeds.

In addition to the large memory, and the familiar Z80A processor, there are a couple of specially designed microprocessors to control the printer and the keyboard. The PCW 8256

can be used as an intelligent terminal on a multi-user network, maybe not something that many *Your Computer* users will be doing, but still a useful facility.

This machine is definitely a serious business tool — at the price of a toy computer. And it certainly makes most of the competition look silly; for the same price you could buy a BBC B Plus, with only 64K of Ram, no monitor, no disc drive, no printer and no word processing software. An equivalent system based on the Beeb would set you back a cool thousand or so. You simply could not build a comparable system based on the Commodore 64 — the discs are too slow, the memory too small, and the screen unable to display 80 characters, let alone the 90 the Amstrad boasts.

Sinclair's troubled QL fares better in comparison now its price has dropped to £199. Add

extra Ram, a monitor, and a decent printer, make do with the Microdrive and Psion's Quill and you could have something approaching the PCW for around £750.

Higher up the computer league table machines like the Apricot F1e and the cheapo IBM compatibles begin to compete on specification, but not on price. These machines represent the territory where Amstrad's new baby will make its greatest impact.

Despite the PCW's pedigree, it is not really a games machine. Doubtless some backstreet entrepreneur is currently planning to release "Revenge of the Drunken Pac Invaders" for the machine, but thanks to its specification, this is not really a suitable machine for the average arcadian. However, there may be an adventure game or two converted from another CP/M format for the machine.

CONCLUSIONS

- PCW is an important breakthrough, being a complete, ready to run business system for the price of a home computer. Purchasing the component parts of the system individually would be very expensive.
- However, home computer fans will be disappointed with its lack of games playing features — no colour and little sound.
- The computer is excellent, with plenty of memory for every application. The disc drive and monitor would be adequate on a system far more expensive than this. A software bundle like that

included on the PCW would have cost around £400 a year or so ago and the quality of print from the printer is incredible.

- Rival machines are few and far between, and although the PCW 8256 is really a business tool, it would also make an ideal machine for the fanatical programmer. This is especially so if you consider the excellent range of development software available for CP/M.
- With the inclusion of DR Logo and a network option, the PCW 8256 would also be an excellent micro for the educational user. It would teach pupils far more about the computerised work environment than a BBC micro.

What Looks Like A Book, Feels Like A Book And Works Like A Computer? The New Electronic Book From Tandy®



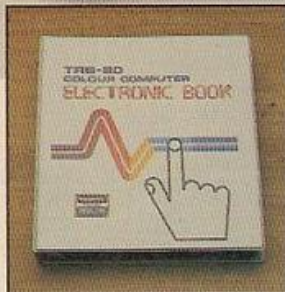
• To Be Used With Tandy Colour Computer (Extended Basic) And BBC Micro

Lead your children in to a new world of computer-assisted learning with the Tandy Electronic Book and its many software packages. With each package unfolds a new adventure of fantasy and fun! Each package contains an interactive booklet which is inserted into the Electronic Book. Different areas of the touch-sensitive surface are pressed to make selections and then watch the screen come to life! It's an easy-to-use educational aid. Simply attach it to the joystick port of your Colour Computer. Both the Electronic Book itself, and the superb software to accompany it were written and developed by British experts in the field of computers in education. Not only will children derive hours of pleasure from using the Electronic Book, but at the same time they will be building their knowledge with this state-of-the-art learning system. And what's more, BBC Micro users can also use the Electronic Book and most of its software by using the adapter available from Tandy stores. (See below).

- Electronic Book. 26-3141** £16.95
64K Extended BASIC Colour Computer 2.
26-3127 £199.95
BBC Adapter. 26-7228 £5.49
Electronic Book DIY Software Pack. A simple explanation of how to write software for the Electronic Book's unique format.
26-7343 £8.95
Electronic Book Guitar Tutor. Learn the fundamentals of guitar playing!
26-7344 £14.95
Earthquake Adventure Game. Have you got the power and skill to save the population of Hometown?
26-7345 £14.95
Viking Voyage Adventure Game. Exciting, authentic adventure voyage that takes a look at the Viking settlement of Britain.
26-7346 £14.95



Tandy - A Leader
In Computer Education...



Introduces A Unique
Concept In Learning...



And Leads You In To
Whole New Adventures...

Village of Spellwell. Introductory pack to a new and exciting concept, a totally new way of introducing children to reading using the Electronic Book - provides hours of amusement too! Join in a new adventure! There are many interesting characters to meet, each one having an accompanying reading book and audio cassette tape for you to follow along and join in with. Includes software and documentation. Language options ranging in difficulty may be selected, according to the child's ability. Progress as you go along! **26-7340** £24.95

NEW! Well of Knowledge. Follows on from the "Village of Spellwell" package and further develops this reading series.
26-7348 £16.95

Spellwell Reader Packages:-

Pack 1: Two Spellwell characters to be introduced to - Wally the Wordsmith and Growit the Poet are featured - see them in their books, hear them on the audio cassette included. **26-7341** £9.95

Pack 2: Two more characters from the Village of Spellwell - Two Across Floss and Mr. Frazer. Reading is made easy and fun for every child!
26-7342 £9.95

Halley's Comet. An exciting adventure where you can explore the myths and legends about comets. The forerunner of the Cosmos series.
26-7347 £14.95

Tandy Road Safety Software. Three important and exciting packages designed to make learning the rules of the road, recognising potential hazards and road safety interesting, challenging and fun!

Drive and Survive*. 26-7375 £4.95

Mirror, Signal, Move*. 26-7376 £4.95

Read The Road*. 26-7377 £4.95

*Not Compatible With BBC Micro

Tandy®

Take A Look At Tandy, Today!

Visit your local store or dealer
and ask about our expanding
range of microcomputers and
software

See Yellow Pages For Address Of Your Nearest Store

ELECTRONIC
BOOK
Software
Series

Table 1. The new commands.

I CAPSON	Turns capitals lock on.
I CAPSOFF	Turns capitals lock off.
I SHON	Turns shift lock on.
I SHOFF	Turns shift lock off.
I MOTORON	Turns on cassette motor.
I MOTOROFF	Turns off cassette motor.
I RESET	Resets paper pen and colours to those at switch on. (Handy if you get in a muddle.)
I RESKEY	Resets the key definitions to normal.
I LIST	List all the new commands to jog your memory.
I FASTSAVE	After this command all saves are made at approx 400 Baud. to revert to normal use the seed write command.
I FLUSH	This flushes the keyboard buffer.
I HEADER	This will read the first header it comes to on a cassette and displays all the relevant info.
I :DEC,n	This command will give the decimal value of any Hex or binary number up to the value of 65536. n=number to be converted.
I GRPEN,n	Sets graphics pen colour where n=colour.
I GRPAPER,n	Sets graphics paper colour where n=colour. Both of these are very useful when using the Tag facility.
I KEY,@A%	Waits until a key is pressed then returns the ABC value in A%. (Although A% is used as an example any variable can be used as long as it has been previously defined in

I CHAR,s,x,g,@
A%

I DOKE,m,n

I DEEK,n,@A%

GRID,n

I LOOK,n

your program. Note the @ symbol before the variable, this must not be omitted.

Returns the ASC value of the character at position x,y in A%. s=Stream number. x=Position across. y=position down. (For explanation of A% see I Key.)

This is a 16 bit version of Poke that allows numbers up to 65535 to be poked into two bytes instead of the normal one.

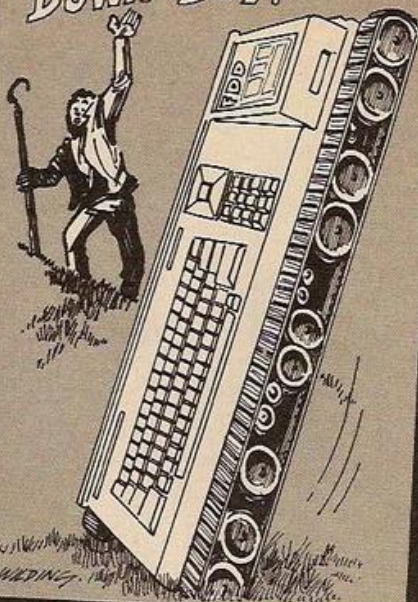
m=Location to be poked. n=Number. As for I Doke but a 16 bit version of Peek. n=Location. (For A% see I Key.)

If you are using a DMP1 printer, this will print out grids for you to use when planning screen layouts. The grids are similar to those on pages 1,2 and 3 in Appendix 6 of the User Guide.

n=Either 20,40 or 80. Prints out a section of memory starting at location n in sections of 200 bytes. Output can be sent to either the screen or printer. (Follow prompt.)

Press large Enter to return to Basic or any other key for the next 200 bytes. (Best used in Mode 2.)

DOWN BOY!



AMSTRAD BASIC is very fast and versatile but does lack one or two useful commands.

If the Basic program is entered and run, the code that is generated will add 21 new commands to Amstrad Basic that can be used from within your own Basic programs or as direct commands.

The new commands are logged on via the excellent RSX capability of the Amstrad. This allows machine-code routines to be called by names rather than using the unfriendly Call command. All new words must be preceded with the I symbol — shifted @. The code generated by the Basic program can be reloaded into memory with:

MEMORY 39999:LOAD "RSK.BIN":CALL 40000:
CLOSEIN

The call to 40000 is needed to log on the new commands.

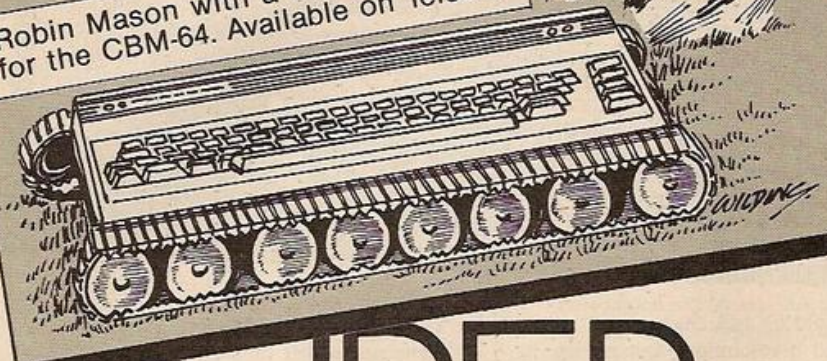
AMSTRAD

EXTRA POWER

```
60 MEMORY 39999:RESTORE 230
70 DEF FNx=VAL("&"+A%)
80 sum=0
90 MODE 1:PRINT"PLEASE WAIT!!"
100 FOR n=40000 TO 41320
110 READ A$:POKE n,FNx
120 sum=sum+FNx
130 NEXT
140 IF sum<>137942 THEN PRINT"ERROR IN DATA. PLEASE CHECK!!":END
150 CLS:PRINT"PLEASE INSERT TAPE TO SAVE BYTES."
160 SAVE "RSK.BIN",B,40000,1321
170 END
180 *****
190 *** TO RELOAD THE CODE USE EITHER AS A DIRECT COMMAND, OR AS THE FIRST
200 *** LINE OF YOUR OWN PROGRAM:
210 *** MEMORY 39999:LOAD"RSK.BIN":CALL 40000:CLOSEIN
220 *****
230 DATA 01,53,9C,21,4F,9C,CD,D1,BC,3E,00,32,5C,A1,C9,00,00,00,00,94,9C,C3
240 DATA 84,9F,C3,06,9D,C3,0C,9D,C3,10,9D,C3,16,9D,C3,22,9D,C3,28,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,9D,C3,67,9D,C3,6D,9D,C3,71,9D,C3,77,9D,C3,7D,9D,C3,83,9D,C3,89,9D,C3,95,9D,C3,9B,9D,C3,A1,9D,C3,A7,9D,C3,AB,9D,C3,B1,9D,C3,B7,9D,C3,BC,9D,C3,C1,9D,C3,C7,9D,C3,CD,9D,C3,D1,9D,C3,DF,9D,C3,E5,9D,C3,EB,9D,C3,EF,9D,C3,F5,9D,C3,FB,9D,C3,FD,9D,C3,03,9D,C3,09,9D,C3,0F,9D,C3,15,9D,C3,1B,9D,C3,21,9D,C3,27,9D,C3,2D,9D,C3,32,9D,C3,38,9D,C3,3D,9D,C3,41,9D,C3,47,9D,C3,4D,9D,C3,51,9D,C3,57,9D,C3,5D,9D,C3,61,
```


CBM-64 **FETCH**...

Robin Mason with a Basic extension for the CBM-64. Available on Telsoft.



SUPER BASIC

THIS IS A 4K program written entirely in machine code. It is a utility to extend the resident Basic with 45 new commands.

The technique used is to copy the Basic Rom into the underlying Ram. Switch from Rom to Ram and alter it to jump to a new command list after all the existing commands have been checked. The program resides between \$C000 and \$D000.

If the program is called in direct mode there is a short delay before the title screen is displayed. If the call is from program mode there is a similar delay but no title screen will appear, and there will be no other effect on program running. All keys auto-repeat when Superbasic is in operation.

All the commands may be used in either direct or program modes, most will accept variables. The memory available to Basic is not affected unless the title command is used when the top of memory is lowered by 256 bytes to provide storage room. The existing Basic Rom can be reactivated by pressing Runstop Restore. The speed of the existing commands is not affected except where variables are assigned. If the program includes loops where variables are assigned and speed is important the command Let should be used.

The commands Windo, Fix and Title use interrupts and only one can be in operation at any one time. These commands should be turned off before attempting any input/output operations.

I have converted the machine code into Data statements and written a short Basic loader

program to poke the data into memory. There are several data checks in the loader but it is possible to fool them, so I recommend saving the loader and data before running, as even one wrong piece of data could cause a system crash.

Should a mistake be detected the loader will stop and a warning will appear on screen. If the mistake is a data error simply press Return and the faulty line will be listed, correct it and re-run.

To load in Superbasic enter
LOAD "SUPERBASIC",device,1

Where one is the device number for tape, eight for disc. Activate Superbasic by entering New followed by Return, and then
SYS50000.

Use the program line:
1 IF SU=0 then SU=1 : LOAD "SUPERBASIC",device,1
to load from within a Basic program.

The new commands

1. **VDU** syntax: VDU,B,S
where B=0 to 15
S=0 to 15
Sets border and screen colours.
2. **INK** syntax: INK,C
where C=0 to 15
Sets current character colour.
3. **PLOT** syntax: PLOT,V,H
where V=0 to 23
H=0 to 39
Positions cursor.

(continued on next page)

```

1 GOSUB10
2 GOSUB20
3 IF N=1 THEN30
4 IF N=1 THEN60
5 GOTO20
10 POKE3200,0:POKE3201,0
11 PRINTCHR$(147);CHR$(30):"ASSEMBLING SUPERBASIC NOW"
12 PRINT"PLEASE WAIT..."
13 RETURN
20 IF=ADDSCHENH1:GOTO28
21 FOR=0TO7
22 READ POKE49152+B,D
23 B=B+1:CHC=D:T=T+D
24 NEXT
25 PRINTCHR$(19):PRINT"PRINTAB(14);312-B/8;CHR$(157);CHR$(32)
26 READ:IFD<0 THENR=1
27 CH
28 RETURN
30 READ:IFD<0 THENGOTO50
31 PRINTCHR$(147):"SUPERBASIC ASSEMBLY COMPLETE"
32 PRINT"PLEASE SAVE ROUTINE"
33 PRINT"PLEASE PRESS DEVICE NUMBER FOR SAVE"
34 PRINT"DATASETTET01"
35 PRINTTAB(5),"DISK"
36 GETA:IFR="":THEN36
37 DE=VAL(LEFT)
38 IF DE<0:INDE(0) THENGOTO36
39 PRINT
40 IF DE=1 THENPRINT"PLACE CASSETTE IN DATASETTET01:GOTO42
41 PRINT"PLEASE DISK IN DRIVE"
42 PRINT"THEN PRESS 'S' TO SAVE"
43 GETA:IFR="":THEN43
44 IFR="S":THEN43
45 POKE2,DE:POKE4,0:POKE4,192:POKE45,0:POKE46,200
46 SAVE"SUPERBASIC",PEEK(2)
47 SYS50000
48 PRINTCHR$(147):"DATA ERROR...MISSING LINE"
51 PRINTTAB(13):"LINE ENTERED TWICE"
52 PRINTTAB(13):"OR CHECKSUM DATA ERROR"
53 PRINT"PLEASE CHECK DATA LINES THEN RE-RUN"
54 END
60 PRINTCHR$(147):"DATA ERROR...PLEASE CHECK LINE":99-B/8
61 PRINT"PRINT"PRINT"LIST":99-B/8
62 FOR=0TO2:PRINTCHR$(145);NEXT
63 END
100 DATA96,069,213,000,073,078,203,000,0721
101 DATA96,076,079,212,000,069,069,076,0660
102 DATA96,217,000,002,000,200,000,076,0731
103 DATA97,215,000,067,076,069,065,210,0701
104 DATA98,079,076,196,000,066,069,065,0655
105 DATA98,000,065,003,003,205,000,072,0716
106 DATA98,067,079,204,000,072,082,090,0676
107 DATA99,082,207,000,000,073,088,069,0668
108 DATA99,000,072,082,083,065,086,162,0754
109 DATA99,072,082,083,000,082,212,000,0611
110 DATA99,073,078,068,207,000,072,082,0667
111 DATA99,065,216,000,072,082,069,082,0663
112 DATA 210,000,074,085,077,208,000,076,0730
113 DATA 073,071,072,212,000,074,079,217,0798
114 DATA99,084,065,067,212,000,084,068,0580
115 DATA99,067,212,000,084,073,084,076,0661
116 DATA99,000,083,079,085,078,196,000,0718
117 DATA99,085,083,073,195,000,080,073,0666
118 DATA99,067,200,000,080,076,065,217,0789
119 DATA99,071,065,084,197,000,086,079,0582
120 DATA99,085,205,000,080,085,076,083,0690
121 DATA99,000,082,073,078,199,000,083,0712
122 DATA99,078,195,000,070,073,076,084,0665
123 DATA99,210,000,083,069,212,000,083,0726
124 DATA99,082,073,084,197,000,083,080,0679
125 DATA99,069,205,000,083,080,088,217,0819
126 DATA99,083,080,078,066,204,000,083,0594
127 DATA99,067,079,204,000,083,080,068,0661
128 DATA99,212,000,083,080,077,069,065,0650
129 DATA99,000,083,080,077,085,076,212,0825
130 DATA99,079,073,216,000,076,079,067,0581
131 DATA99,000,085,078,076,079,067,203,0791
132 DATA112,195,132,195,142,195,173,195,1339
133 DATA192,195,195,195,207,195,034,196,1413
134 DATA99,196,097,195,195,196,233,196,1366
135 DATA99,197,043,198,088,198,072,199,0997
136 DATA99,199,043,199,087,199,100,199,1062
137 DATA170,199,243,199,170,200,200,200,1589
138 DATA154,201,029,202,106,203,149,203,1247
139 DATA180,203,211,203,232,203,041,204,1477
140 DATA99,204,141,204,005,205,021,205,1076
141 DATA174,205,204,205,051,206,074,206,1325
142 DATA176,206,018,207,184,207,216,193,1407
143 DATA233,207,239,207,000,000,000,000,0896
144 DATA99,000,162,064,160,000,185,001,0572
145 DATA99,153,000,004,138,153,040,004,0496
146 DATA173,134,002,153,000,216,153,040,0071
147 DATA216,200,192,040,208,232,096,000,1184
148 DATA147,032,032,032,032,032,032,032,032,0321
149 DATA99,032,032,032,032,032,032,032,032,0677
150 DATA99,096,031,096,154,067,079,077,0630
151 DATA99,079,068,079,082,069,032,054,0540
152 DATA99,031,096,030,096,158,096,123,0680
153 DATA99,028,096,013,154,067,073,084,0631
154 DATA99,032,083,085,080,069,082,066,0569
155 DATA99,083,073,067,032,032,032,032,032,0416
156 DATA99,032,032,032,032,032,032,032,032,0306
157 DATA99,065,046,077,065,083,079,078,0539
158 DATA99,049,057,056,053,013,000,000,0260
159 DATA160,039,185,000,004,153,072,201,0814
160 DATA185,000,216,153,112,201,136,016,1019
161 DATA241,120,169,052,141,020,003,169,0915
162 DATA201,141,021,003,088,096,000,000,0550
163 DATA99,000,000,000,000,000,000,000,000,0000
164 DATA165,157,240,015,169,000,141,032,0919
165 DATA99,141,033,200,169,128,160,193,1240
166 DATA99,030,171,169,000,133,034,169,0738
167 DATA160,133,035,162,032,160,000,177,0859
168 DATA99,145,034,136,208,249,230,035,1071
169 DATA99,016,244,165,001,041,254,133,1056
170 DATA99,169,024,141,242,167,169,000,0993
171 DATA141,012,168,169,194,141,013,168,1006
172 DATA165,157,240,003,032,116,164,096,0973
173 DATA165,034,240,039,076,006,194,000,0834
174 DATA169,000,133,034,162,255,160,255,1168
175 DATA232,200,177,122,056,253,000,192,1232
176 DATA240,246,201,128,240,017,232,240,1544
177 DATA10,189,000,192,208,248,230,034,1111
178 DATA97,072,194,076,165,169,000,230,0982
179 DATA122,208,002,230,123,136,016,247,1084
180 DATA165,034,010,170,189,000,193,141,0902
181 DATA147,194,189,001,193,141,148,194,1207
182 DATA108,147,194,002,197,000,000,032,0680
183 DATA99,255,032,225,055,096,000,000,1097
184 DATA99,000,000,000,000,000,000,000,000,0000
185 DATA99,000,000,000,000,000,000,000,000,0000
186 DATA99,000,000,000,000,000,000,000,000,0000
187 DATA99,000,000,000,000,000,000,000,000,0000
188 DATA169,000,141,242,194,134,194,1324
189 DATA162,000,078,241,194,144,004,024,0855
190 DATA169,240,194,106,110,242,194,202,1397
191 DATA208,240,141,243,194,096,032,018,1172
192 DATA195,162,017,165,020,240,002,162,0963
193 DATA99,142,213,197,032,018,195,096,0974

```

(listing continued on next page)

FETCH...



Saves bit-map to device D.

Provides a conditional jump to any Basic

used.

i.e. $D\$ = A\$ + B\$ + C\$$

When this command is used the top of Basic memory is lowered to provide storage space for the message, so this command is best used near the beginning of the program.

21. **TACT** syntax: TACT

Activates the scrolling titles.

22. **TDACT** syntax: TDACT

De-activates the titles.

Also de-activates the Fix command.

23. **FIX** syntax: FIX

Uses interrupts to fix the top screen line — even if a clear screen is used.

Use Tdact to de-activate.

24. **SOUND** syntax: SOUND V, W, A, D, S, R

where $V=1$ to 4

$W=1$ to 4

$A=0$ to 15

$D=0$ to 15

$S=0$ to 15

$R=0$ to 15

Sets waveform, attack, decay, sustain and release for voice V.

25. **MUSIC** syntax: MUSIC,V,N,O

where $V=1$ to 4

$O=1$ to 8

Sets the frequency of voice V to the note indicated by N and octave O. N cannot be a string variable but must be one of the following: C,C#,D,D#,E,F,F#,G,G#,A,A#,B

26. **PITCH** syntax: PITCH,V,F

where $V=1$ to 4

$F=0$ to 255

Sets the frequency of voice V to F.

27. **PLAY** syntax: PLAY,V

where $V=1$ to 4

Turns gate to voice V on.

28. **GATE** syntax: GATE,V

where $V=1$ to 4

Turns GATE to voice V off.

29. **VOLUM** syntax: VOLUME,V

where $V=0$ to 15

Sets SID volume to V.

30. **PULSE** syntax: PULSE,V,P1,P2

where $V=1$ to 4

$P1=0$ to 15

$P2=0$ to 15

Sets pulse bandwidth on voice V.

31. **RING** syntax: RING,V,S

Sets output of voice V to ring modulation if $S>0$. If $S=0$ the ring modulation is turned off.

32. **SYNC** syntax: SYNC,V,S

Sets output of voice V to synchronisation if $S>0$. If $S=0$ the synchronisation is turned off.

33. **FILTER** syntax: FILTER,V,T,F

where $V=1$ to 4

$T=L$ or H or B

$F=0$ to 255

Provides filtering of voice V.

T cannot be a variable but must be either

L for low-pass

H for high-pass

B for band-pass

F gives the cut-off frequency of the filter, or the centre of the band-pass.

34. **SET** syntax: SET

This command should be used once hear the start of a program using the sound commands.

It zeroes all SID registers.

35. **SPRITE** syntax: SPRITE,S,M,PV,H

where $S=1$ to 8

$M=0$ or 1

$P=0$ or 1

$V=0$ or 1

$H=0$ or 1

Sets multicolour mode, background priority, vertical and horizontal expansion on Sprite S.

36. **SPMEM** syntax: SPMEM,S,M

where $S=1$ to 8

$M=0$ to 255

Sets 64 byte memory block for Sprite S.

For safety M should be in the ranges 13 to 15 and Peek $((50*+1)/64)$ to 255.

37. **SPDAT** syntax:

SPDAT,S,L,000000000000111111111111

where $S=1$ to 8

$L=1$ to 21

This command must be preceded by the SPMEM command.

Defines sprite data.

S indicates the sprite to be defined.

L indicates the line of the sprite to be defined.

There must be 24 zeroes or ones.

A zero makes that sprite pixel transparent.

A one makes that sprite pixel solid.

38. **SPMDAT** syntax:

SPMDAT,S,L,000111222333

where $S=1$ to 8

$L=1$ to 21

S indicates the sprite to be defined.

L indicates the line of the sprite to be defined.

There must be 12 zeroes, ones, twos or threes.

This command is used in a similar way to the SPDAT command except that it defines multicolour sprite data.

A zero produces a transparent pixel.

A one produces a pixel in sprite S colour.

A two produces a pixel in sprite multicolour one.

A three produces a pixel in sprite multicolour two.

39. **SPMULT** syntax: SPMULT,C1,C2

where $C1=0$ to 15

$C2=0$ to 15

Sets sprite multicolours.

40. **SPCOL** syntax: SPCOL,S,C

where $S=1$ to 8

$C=8$ to 15

Sets Sprite S to colour C.

41. **SPXY** syntax: SPXY,S,V,H

where $S=1$ to 8

$V=0$ to 255

$H=0$ to 350

Sets the vertical and horizontal position of Sprite S.

The MSB of the horizontal position is automatically set if above 255.

42. **SPNBL** syntax: SPNBL,S

where $S=0$ to 255

Enables Sprite S.

sprite1=1 3=4 5=16 7=64

sprite2=2 4=8 6=32 8=128

add sprite codes together

to form S.

43. **OLD** syntax: OLD

Recovers a 'newed' program.

44. **LOCK** syntax: LOCK

Prevents the use of Runstop/Restore to protect your program from prying eyes.

45. **UNLOCK** syntax: UNLOCK

Re-enables the use of Runstop/Restore.

```
403 DATA862,002,024,135,181,006,062,254,0726
404 DATA862,062,030,062,062,254,062,014,0608
405 DATA862,062,006,005,007,024,002,000,0168
406 DATA806,000,240,000,000,200,000,000,0448
407 DATA800,000,032,018,195,032,021,282,0710
408 DATA144,005,162,014,108,000,003,032,0468
409 DATA250,202,032,018,195,032,000,231,1020
410 DATA176,240,234,234,172,153,201,200,1610
411 DATA200,200,166,020,109,190,282,1375
412 DATA153,160,194,032,018,195,032,013,0797
413 DATA153,176,153,165,020,104,106,106,1897
414 DATA106,166,133,002,032,018,195,032,0624
415 DATA1813,203,176,190,172,153,201,200,1316
416 DATA200,200,200,165,020,024,101,1110
417 DATA002,153,160,194,153,000,212,032,0965
418 DATA18,195,032,018,203,176,171,165,0973
419 DATA200,106,106,106,106,106,133,002,0605
420 DATA032,018,195,032,013,203,176,154,0023
421 DATA172,153,201,200,200,200,200,200,1526
422 DATA200,165,020,101,002,153,160,194,0995
423 DATA153,000,212,096,000,032,018,195,0706
424 DATA032,231,202,144,005,162,014,100,0098
425 DATA000,000,032,250,202,032,018,100,0034
426 DATA056,233,005,160,192,001,200,005,0928
427 DATA168,012,076,120,020,152,004,200,0974
428 DATA005,160,005,076,120,020,152,000,0760
429 DATA200,005,160,010,076,120,020,192,0973
430 DATA002,200,005,160,001,076,120,020,0774
431 DATA192,000,200,005,160,003,076,120,0767
432 DATA032,192,000,200,005,160,006,076,0054
433 DATA200,202,192,000,200,005,160,000,0901
434 DATA076,120,020,162,014,100,000,003,0625
435 DATA032,115,000,201,035,200,000,200,0000
436 DATA032,115,000,076,136,202,234,1029
437 DATA165,202,162,133,032,185,215,202,1356
438 DATA133,033,032,018,195,165,021,200,0005
439 DATA18,165,020,240,018,241,009,176,1243
440 DATA18,169,120,190,020,240,004,106,1075
441 DATA076,162,020,133,036,032,026,203,0071
442 DATA165,039,172,153,201,153,160,194,1237
443 DATA153,000,212,096,000,032,018,195,1001
444 DATA153,153,000,212,096,000,016,032,0703
445 DATA032,120,000,134,142,150,150,160,0045
446 DATA179,169,200,212,112,119,126,000,1137
447 DATA030,024,131,126,250,006,172,243,0932
448 DATA230,129,124,151,000,000,000,165,0069
449 DATA021,200,012,165,020,240,000,201,0075
450 DATA032,176,005,190,020,096,234,056,0709
451 DATA006,000,164,020,162,006,230,020,0698
452 DATA082,200,251,136,200,246,165,020,1436
453 DATA141,153,201,096,000,165,021,200,0905
454 DATA230,165,020,201,016,176,225,096,1129
```

```
455 DATA000,000,166,032,134,034,032,049,0447
456 DATA203,166,035,134,039,166,033,134,0909
457 DATA034,032,051,203,039,035,134,039,0634
458 DATA096,169,000,162,000,134,035,160,0736
459 DATA000,056,229,036,000,030,035,006,0416
460 DATA034,042,040,144,005,229,036,176,0606
461 DATA076,203,101,036,136,200,237,176,1713
462 DATA003,101,036,024,030,035,096,000,0333
463 DATA165,021,200,011,165,020,240,007,0037
464 DATA201,005,176,004,190,020,096,056,0756
465 DATA096,000,032,018,195,032,231,202,0006
466 DATA032,250,202,032,018,195,165,021,0915
467 DATA144,005,162,014,100,000,003,160,0004
468 DATA000,172,153,201,153,160,194,153,1186
469 DATA000,212,165,020,200,153,160,194,1184
470 DATA153,000,212,096,000,032,018,195,0706
471 DATA032,231,202,176,221,032,250,202,1346
472 DATA172,153,201,200,200,200,200,105,1511
473 DATA160,194,009,001,153,160,194,153,1024
474 DATA000,212,096,000,032,018,195,032,0955
475 DATA231,202,176,190,032,250,202,172,1455
476 DATA153,201,200,200,200,200,165,160,1459
477 DATA194,041,254,153,160,194,153,000,1149
478 DATA212,096,000,032,018,195,032,013,0598
479 DATA000,032,018,195,032,231,202,176,0086
480 DATA141,164,194,141,024,212,096,000,0992
481 DATA032,018,195,032,231,202,176,130,1024
482 DATA032,250,202,032,018,195,032,013,0774
483 DATA003,176,127,165,020,010,010,010,0771
484 DATA18,172,153,201,200,200,153,160,1249
485 DATA194,153,000,212,032,018,195,032,0036
486 DATA032,144,005,162,014,100,000,0049
487 DATA003,165,020,172,153,201,200,200,1114
488 DATA200,153,160,194,153,000,212,096,1160
489 DATA000,032,018,195,032,231,202,176,0086
490 DATA227,032,250,202,032,018,195,172,1128
491 DATA153,201,200,200,200,200,165,020,1339
492 DATA040,012,165,160,194,000,004,153,0957
493 DATA160,194,153,000,212,096,165,160,1160
494 DATA194,041,251,153,160,194,153,000,1146
495 DATA212,096,000,032,018,195,032,231,0016
496 DATA202,176,177,032,250,202,032,018,1009
497 DATA192,172,153,201,200,200,200,200,1521
498 DATA165,020,240,012,195,160,194,002,0995
499 DATA000,153,160,194,153,000,212,096,0700
500 DATA185,160,194,041,251,153,160,194,1340
501 DATA153,000,212,096,000,032,018,195,0706
502 DATA000,032,018,195,032,231,202,176,0086
503 DATA201,000,144,005,162,014,100,000,0622
504 DATA003,141,023,212,032,115,000,201,0727
505 DATA072,200,029,173,184,194,041,015,0916
506 DATA009,064,141,194,141,024,212,0969
```

```
507 DATA032,115,000,032,018,195,165,021,0578
508 DATA200,218,165,020,141,022,212,096,1002
509 DATA021,066,200,016,173,184,194,041,1003
510 DATA015,009,032,141,104,194,141,024,0740
511 DATA212,076,184,204,201,076,200,100,1349
512 DATA173,184,194,041,015,009,016,141,0773
513 DATA184,194,141,024,212,076,184,204,1219
514 DATA173,184,194,041,015,141,104,194,1126
515 DATA141,024,212,169,000,141,022,212,0921
516 DATA141,023,212,096,000,169,000,160,0001
517 DATA021,100,127,165,020,240,012,173,0906
518 DATA16,247,096,000,253,032,099,206,0949
519 DATA144,005,162,014,100,000,003,160,0004
520 DATA185,223,205,141,019,205,105,231,1394
521 DATA035,141,020,205,032,018,195,165,0001
522 DATA020,223,165,020,240,012,173,1002
523 DATA019,205,173,020,200,141,022,200,0040
524 DATA076,076,205,173,020,205,045,027,0027
525 DATA200,141,027,200,032,018,195,165,0994
526 DATA021,100,127,165,020,240,012,173,0906
527 DATA195,205,013,020,200,141,020,200,0050
528 DATA076,160,205,173,020,205,045,020,0060
529 DATA200,141,020,200,032,018,195,165,0995
530 DATA021,100,127,165,020,240,012,173,0906
531 DATA195,205,013,020,200,141,022,200,0040
532 DATA076,140,205,173,020,205,045,023,0087
533 DATA200,141,023,200,032,018,195,165,0990
534 DATA020,141,020,205,032,018,195,000,0034
535 DATA195,205,013,020,200,141,022,200,0052
536 DATA076,172,205,173,020,205,045,023,0925
537 DATA200,141,020,200,096,000,032,099,0013
538 DATA020,165,162,014,100,000,003,0620
539 DATA141,019,205,032,018,195,165,020,0796
540 DATA200,231,165,020,172,019,205,153,1173
541 DATA247,007,096,000,032,099,206,176,0063
542 DATA226,096,030,001,010,141,019,205,0001
543 DATA032,018,195,076,240,205,234,234,1234
544 DATA001,002,000,000,016,032,064,120,0255
545 DATA254,253,251,247,239,220,191,127,1705
546 DATA162,021,200,191,165,020,172,019,0961
547 DATA000,200,096,173,019,205,106,160,0978
548 DATA165,020,240,023,173,019,205,106,0952
549 DATA160,185,224,025,016,016,200,141,1160
550 DATA160,160,160,160,172,019,205,153,0950
551 DATA000,160,160,160,172,019,205,153,0950
552 DATA005,232,205,045,016,200,141,016,1040
553 DATA200,165,020,172,019,205,153,000,0942
554 DATA000,000,032,018,195,165,021,0735
555 DATA000,000,032,018,195,165,021,0735
556 DATA020,234,234,234,234,141,021,200,1326
557 DATA096,000,032,099,206,176,235,072,0916
558 DATA032,018,195,165,021,200,227,104,0970
559 DATA160,136,165,020,153,039,200,096,0905
```

```
560 DATA000,000,000,032,018,195,165,021,0431
561 DATA000,000,165,020,240,005,201,000,0057
562 DATA176,002,006,056,006,000,032,099,0057
563 DATA006,176,191,160,105,247,007,141,1321
564 DATA004,194,162,006,142,241,194,234,1074
565 DATA234,234,032,192,194,032,018,195,1131
566 DATA165,021,200,231,165,020,240,227,1277
567 DATA021,022,176,223,170,282,240,015,1249
568 DATA160,003,230,242,194,200,003,230,1206
569 DATA2
```


Listing 1.

```

10 REM*****
15 REM*** SMOOTH SCROLLING ***
20 REM***
30 REM*** (C) 1985 NALIN SHARMA ***
40 REM***
50 REM*****
100 S=49152:F=49426:T=0:CHK=31144:
    BASE=51200
110 FORX=STOF:READA:T=T+A:POKEA,X:NEXT
130 IF T <> CHK THEN PRINT"DATA
    ERROR":END
200 FORX=0T0255:POKEBASE+X,X:NEXT
210 SYS49152
220 PRINT"*****"

```

SMOOTH SCROLLING BY NALIN SHARMA

```

230 GOTO 230
1000 DATA 169, 147, 32, 210, 255, 32
1010 DATA 164, 192, 32, 12, 192, 96
1020 DATA 120, 169, 58, 141, 20, 3
1030 DATA 169, 192, 141, 21, 3, 169
1040 DATA 0, 141, 62, 3, 169, 1
1050 DATA 141, 26, 208, 173, 17, 208
1060 DATA 41, 127, 141, 17, 208, 169
1070 DATA 36, 141, 18, 208, 169, 255
1080 DATA 141, 25, 208, 169, 0, 141
1090 DATA 14, 220, 88, 96, 174, 62
1100 DATA 3, 142, 63, 3, 142, 32
1110 DATA 208, 138, 73, 15, 141, 33
1120 DATA 208, 238, 63, 3, 189, 70
1130 DATA 3, 56, 237, 63, 3, 157

```

SMOOTH SCROLLING is probably the most widely used technique in commercially available software — mainly because it is very simple (once you know how) and the results are instantly impressive.

To do smooth scrolling on the CBM-64 you have to resort to machine code, and in particular raster interrupts, a subject whose importance I have tried very hard to stress when writing games of the CBM-64.

The program in this article will take a string of characters and smooth scroll them horizontally to the left. However, the string will appear on eight different lines from top to bottom of the screen, each string scrolling at a greater speed than the previous one. So the top line will scroll at one pixel per cycle, the next at two pixels per cycle and so on. This demolishes the myth that for smooth graphics you must move them one pixel at a time.

To help you understand the program, see figure 1 which shows what happens to characters at either end of a line when it is scrolled one pixel at a time from right to left. You can see that columns 0 and 39 are blanked out as the CBM-64 is in 38 column mode. This is so that when the characters move in and out of the screen, they do so smoothly and naturally.

If there was no 38 column mode the characters would just appear and disappear at either side of the screen, giving a very jerky appearance. Returning to the diagram, XFine is the name I

SMOOTH SCROLL

have given to the lowest three bits of the scrolling register in the Vic chip — XSCL = Vic + 22.

The process for scrolling to the left is to gradually decrease XFine from 7 to 0, then you must reset XFine to 7 and the line must be scrolled one whole character to the left. This last process must be done when the raster is not "falling in between" the line to be scrolled. Hence you must use raster interrupts — otherwise the scrolling will probably be smooth, but extremely jerky.

Listing 1 is the Basic loader for the smooth scrolling program which is actually quite short — 274 bytes — and should be relatively painless to key in. Line 200 pokes in the characters to be scrolled, therefore you can make the necessary

alterations to scroll a sentence of your own choice. Also, remember to save the program before running it.

Listing 2 is the assembler listing for the program. It is similar in structure to the 64 sprites article a couple of months ago because of the use of raster interrupts, and so should be fairly easy to comprehend.

One final point is that because scrolling takes up a lot of time, it makes sense to use multi colour mode — 14 colours — in commercial programs. The reason for this is that there is only so much you can do during the interrupt schedule, before the raster reaches the top of the screen, and by using multi-colour mode you don't have to bother scrolling the colour memory.

Listing 2.

```

10 C000 ***** SMOOTH SCROLLING COPYRIGHT 1985 NALIN SHARMA
40 C000 STRINGS = AC000
50 C000 VIC = 3248
51 C000 HRAST = VIC+17
52 C000 RAST = VIC+16
53 C000 RST = VIC+25
54 C000 ERST = VIC+20
55 C000 XSCL = VIC+22
56 C000 *****
57 C000 S HORIZONTAL SCROLLING
60 C000 SCREEN = 1024
70 C000 S1 = 251
80 C000 S2 = 252
90 C000 VB = 820
91 C000 XFINE = VB+2
92 C000 *****
93 C000 RASNUM = VB
94 C000 XDISP = VB+1
95 C000 *****
96 C000 ONTAL SCROLLING (1-8 PIXELS)
97 C000 COLUMN = VB+16
98 C000 SCREEN FROM 256 CHAR. STRING
99 C000 BORDER = 53200
100 C000 BACKGR = 53201
101 C000 *****
102 C000 *****
103 C000 *****
104 C000 *****
105 C000 *****
106 C000 *****
107 C000 *****
108 C000 *****
109 C000 *****
110 C000 *****
111 C000 *****
112 C000 *****
113 C000 *****
114 C000 *****
115 C000 *****
116 C000 *****
117 C000 *****
118 C000 *****
119 C000 *****
120 C000 *****
121 C000 *****
122 C000 *****
123 C000 *****
124 C000 *****
125 C000 *****
126 C000 *****
127 C000 *****
128 C000 *****
129 C000 *****
130 C000 *****
131 C000 *****
132 C000 *****
133 C000 *****
134 C000 *****
135 C000 *****
136 C000 *****
137 C000 *****
138 C000 *****
139 C000 *****
140 C000 *****
141 C000 *****
142 C000 *****
143 C000 *****
144 C000 *****
145 C000 *****
146 C000 *****
147 C000 *****
148 C000 *****
149 C000 *****
150 C000 *****
151 C000 *****
152 C000 *****
153 C000 *****
154 C000 *****
155 C000 *****
156 C000 *****
157 C000 *****
158 C000 *****
159 C000 *****
160 C000 *****
161 C000 *****
162 C000 *****
163 C000 *****
164 C000 *****
165 C000 *****
166 C000 *****
167 C000 *****
168 C000 *****
169 C000 *****
170 C000 *****
171 C000 *****
172 C000 *****
173 C000 *****
174 C000 *****
175 C000 *****
176 C000 *****
177 C000 *****
178 C000 *****
179 C000 *****
180 C000 *****
181 C000 *****
182 C000 *****
183 C000 *****
184 C000 *****
185 C000 *****
186 C000 *****
187 C000 *****
188 C000 *****
189 C000 *****
190 C000 *****
191 C000 *****
192 C000 *****
193 C000 *****
194 C000 *****
195 C000 *****
196 C000 *****
197 C000 *****
198 C000 *****
199 C000 *****
200 C000 *****
201 C000 *****
202 C000 *****
203 C000 *****
204 C000 *****
205 C000 *****
206 C000 *****
207 C000 *****
208 C000 *****
209 C000 *****
210 C000 *****
211 C000 *****
212 C000 *****
213 C000 *****
214 C000 *****
215 C000 *****
216 C000 *****
217 C000 *****
218 C000 *****
219 C000 *****
220 C000 *****
221 C000 *****
222 C000 *****
223 C000 *****
224 C000 *****
225 C000 *****
226 C000 *****
227 C000 *****
228 C000 *****
229 C000 *****
230 C000 *****
231 C000 *****
232 C000 *****
233 C000 *****
234 C000 *****
235 C000 *****
236 C000 *****
237 C000 *****
238 C000 *****
239 C000 *****
240 C000 *****
241 C000 *****
242 C000 *****
243 C000 *****
244 C000 *****
245 C000 *****
246 C000 *****
247 C000 *****
248 C000 *****
249 C000 *****
250 C000 *****
251 C000 *****
252 C000 *****
253 C000 *****
254 C000 *****
255 C000 *****
256 C000 *****
257 C000 *****
258 C000 *****
259 C000 *****
260 C000 *****
261 C000 *****
262 C000 *****
263 C000 *****
264 C000 *****
265 C000 *****
266 C000 *****
267 C000 *****
268 C000 *****
269 C000 *****
270 C000 *****
271 C000 *****
272 C000 *****
273 C000 *****
274 C000 *****

```



```

1140 DATA 70, 3, 41, 128, 201, 128
1150 DATA 208, 14, 254, 78, 3, 32
1160 DATA 216, 192, 189, 70, 3, 41
1170 DATA 7, 157, 70, 3, 173, 22
1180 DATA 208, 41, 248, 29, 70, 3
1190 DATA 141, 22, 208, 142, 62, 3
1200 DATA 169, 129, 141, 25, 208, 173
1210 DATA 17, 208, 41, 127, 141, 17
1220 DATA 208, 238, 62, 3, 173, 62
1230 DATA 3, 41, 7, 141, 62, 3
1240 DATA 170, 189, 250, 192, 141, 18
1250 DATA 208, 224, 0, 208, 3, 76
1260 DATA 49, 234, 104, 168, 104, 170
1270 DATA 104, 64, 162, 0, 169, 0
1280 DATA 157, 62, 3, 232, 224, 32
1290 DATA 208, 248, 169, 1, 141, 33

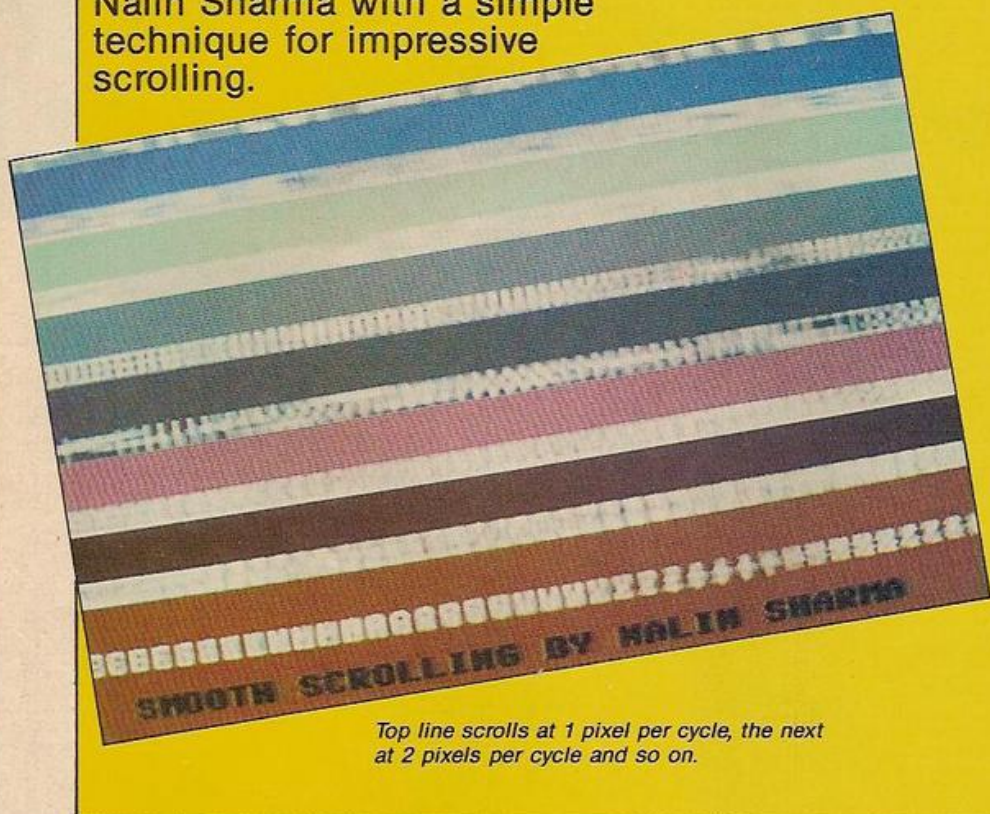
```

```

1300 DATA 208, 169, 3, 141, 32, 208
1310 DATA 162, 0, 169, 1, 157, 0
1320 DATA 216, 157, 0, 217, 157, 0
1330 DATA 218, 157, 0, 219, 232, 224
1340 DATA 0, 208, 239, 173, 22, 208
1350 DATA 41, 247, 141, 22, 208, 96
1360 DATA 138, 72, 10, 168, 185, 2
1370 DATA 193, 133, 251, 185, 3, 193
1380 DATA 133, 252, 160, 0, 189, 78
1390 DATA 3, 170, 189, 0, 200, 145
1400 DATA 251, 232, 200, 192, 40, 208
1410 DATA 245, 104, 170, 96, 5, 58
1420 DATA 82, 106, 130, 154, 178, 202
1430 DATA 0, 4, 120, 4, 240, 4
1440 DATA 104, 5, 224, 5, 88, 6
1450 DATA 208, 6, 72, 7, 255, 0

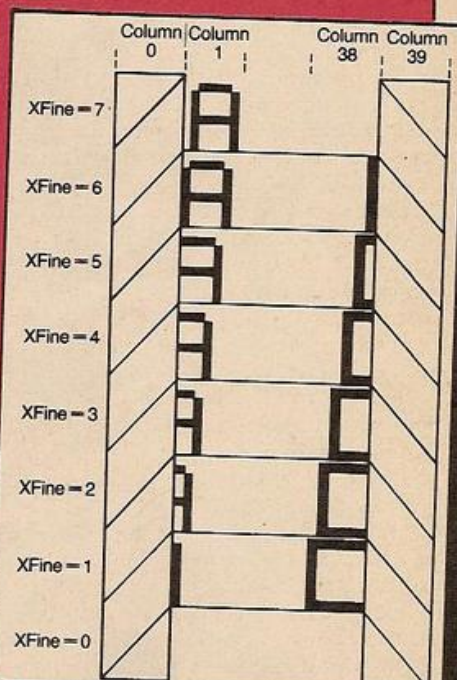
```

Nalin Sharma with a simple technique for impressive scrolling.



Top line scrolls at 1 pixel per cycle, the next at 2 pixels per cycle and so on.

Figure 1.



```

1690 C082 801100 STA HRST
1720 C085 EE3E03 INC RASNUM
1730 C088 AD3E03 LDA RASNUM
1740 C08B 2907 AND #7
1750 C08D 803E03 STA RASNUM
1751 C08E AA TAX
1752 C091 80FAC0 LDA RASLINE,X
RPT
1754 C094 801200 STA RAST
1760 C097 E000 CPX #0
1770 C099 D003 BNE RETFROMINT
1810 C09B 4C31EA GOSUB
EVERY EIGHTH INTERRUPT
2070 C09E 69 RETFROMINT PLA
0 FROM THE OTHER 7 INTERRUPTS
2080 C09F A0 TAY
2090 C0A0 69 PLA
2100 C0A1 AA TAX
2110 C0A2 69 PLA
2120 C0A3 40 RTI
3000 C0A4
3010 C0A4
3020 C0A4
4000 C0A4
4010 C0A4
4020 C0A4
5000 C0A4 A200 SETVARBS LDY #0
5010 C0A5 A900 LDA #0
5020 C0A6 903E03 SETLOOP STA VB,X
5030 C0A8 E8 INX
5040 C0AC E020 CPX #32
5050 C0AE D0F8 BNE SETLOOP
5060 C0B0 A901 LDA #1
5070 C0B2 802100 STA BACKOR
5080 C0B5 A903 LDA #3
5090 C0B7 802200 STA BORDER
5100 C0BA A200 LDY #0
5110 C0BC A901 LDA #1
5120 C0BE 900000 COLLOOP STA #0B00,X
5130 C0C1 806000 STA #0900,X
5140 C0C4 90000A STA #0A00,X
5150 C0C7 806000 STA #0B00,X
5160 C0CA E8 INX
5170 C0CB E000 CPX #0
5180 C0CD D0EF BNE COLLOOP

```

INEXT RASTER NUMBER
GET NEXT LINE TO INTER
SERVICE COM INTERRUPTS
PROCEDURE FOR RETURNIN

ICHAR COLOUR

```

5190 C0CF A01600 LDA XSCL
5200 C0D2 29F7 AND #X11110111 130 COLUMNS
5210 C0D4 801600 STA XSCL
5220 C0D7 50 RTS
5300 C0D8
5310 C0D8
5320 C0D8
5330 C0D8
5340 C0D8
5350 C0D8
5360 C0D8
5370 C0D8
5380 C0D8 BA PLOTLINE TXA
5390 C0D9 40 PHA
5400 C0DA BA ASL A
5410 C0DB AS TAY
5420 C0DC 8902C1 LDA SC0AT,Y
5430 C0DE 91F8 STA S1
5440 C0DF 93F8 LDA SC0AT+1,Y
5450 C0E1 8903C1 STA S2
5460 C0E4 93FC LDY #0
5470 C0E6 A000 LDA COLUMN,X
5480 C0E8 804E03 TAX
5490 C0EB AA LDA STRING0,X
5500 C0ED 91F8 STA (S1),Y
5510 C0EF E8 INX
5520 C0F1 E8 INY
5530 C0F3 C020 CPY #40
5540 C0F5 D0F5 BNE SCROLLP
5550 C0F7 60 PLA
5560 C0F9 AA TAX
5570 C0FB 60 RTS
5580 C0FD 83A52 RASLINE BYT 5,58,82,106,130,154,178,202
5590 C102 800478 SC0AT LDR SCREEN,SCREEN+120,SCREEN+240,SCREEN+360,SCREEN
+400
5600 C10C 500600 LDR SCREEN+600,SCREEN+720,SCREEN+840
5610 C10E 800000 C000 COLLOOP C034E COLUMN
5620 C110 800000 C000 HRST D019 IRST
5630 C112 800000 C000 NEXTLN C078 NEXTLN
5640 C114 800000 C000 RASNUM C03E RASNUM
5650 C116 800000 C000 S1 C102 SC0AT
5660 C118 800000 C000 SCROLLP C0A8 SETVARBS
5670 C11A 800000 C000 STINT C03E VB
5680 C11C 800000 C000 XDISP C046 XFINE
5690 C11E 800000 C000 XDISP C046 XFINE

```



```

00001 CLEAR "000000
00002 LOAD "000000"CODE
00003 LOAD "000000"CODE
00004 LET I=0
00005 BORDER 0 PAPER 0
00006 BRIGHT 1 PRINT #1
00007 AT 1,0 POWER=0000 LEVEL=1
00008 LIVES=8
00009 11 PLOT 91 1 DRAW 73 0 DRAW
00010 1000 DRAW 1 0 DRAW 0 25
00011 0 31 DRAW 700 0 DRAW 0 31
00012 20 FOR X=0 TO 1 FOR F=80 TO 1
00013 80 STEP 8 PLOT F+0 DRAW 0 20
00014 DRAW 16 1 DRAW 0 36 PLOT F+
00015 +16 105 DRAW 0 34 DRAW 16 16
00016 DRAW 0 20
00017 30 NEXT F NEXT X
00018 40 FOR X=0 TO 1 FOR F=147 TO
00019 75 STEP 8 PLOT F+X 0 DRAW 0 2
00020 DRAW 16 1 DRAW 0 36 PLOT
00021 +X-16 105 DRAW 0 34 DRAW 16 1
00022 DRAW 0 20
00023 50 NEXT F NEXT X
00024 51 FOR F=75 TO 90 STEP 8 PLOT

```

[illegible][illegible]

Each time you lose a life the "bugs" are

```

10 DEF FN h(h$)=16*(CODE h$(1)
-48-(17 AND h$(12)>"9"))+CODE h$(12)
1-48-(17 AND h$(2)>"9"))
11 REM h$hdad
20 INPUT "Start "s
30 INPUT "Finish "f
31 REM fd
40 FOR n$=0 TO f STEP 8
50 LET tot=0: PRINT n$; " "
60 INPUT h$: PRINT h$
70 LET x=0
80 FOR b=1 TO LEN h$ STEP 2
90 LET z=FN h(h$): LET tot=tot
+z
100 POKE n+x,z
110 LET h$=h$(3 TO ) : LET x=x+1
120 NEXT b
130 PRINT " = "; INPUT t: PRINT
T
140 IF tot<t THEN PRINT "input
error - try again": GO TO 50
150 NEXT n
160 REM enter STOP to stop

```

[illegible][illegible][illegible][illegible]

Up = any key on the top row
Down = any key on the bottom row
Right = any key on the right
Left = any key on the left

[illegible][illegible]

```

NK 3; PAPER 1, AT 4, 27; " "
410 PRINT AT 0, 1; INK 7; PAPER
0 "KLMNO"; INK 5; PAPER 1; PRINT
OVER 1; AT 2, 2; INK 0; PAPER 7;
EFGH; AT 3, 2; HIJ; AT 4, 2; INK 5;
PAPER 1;
415 INK 7; PRINT AT 21, 1; PAPER
0 "KLMNO"; AT 21, 28; "KLMNO"; AT 0
35 "KLMNO";
417 PRINT AT 10, 12; PAPER 0; "TU
TO TU";
419 PRINT AT 11, 12; PAPER 0; "TU
TO TU";
425 PAPER 0
450 RANDOMIZE USA 42144
460 RANDOMIZE USA 42100
470 RANDOMIZE USA 40000
SAVE "Impulse" LINE 0
000007 SAVE "ImpCode2" CODE 40000, 2
000000
000006 SAVE "ImpCode3" CODE 54000, 1
000000
000009 GO TO 9995

```

Enter listing 2 using the hex loader program, listing 4 then save the code straight away using the command:

SAVE "Impcode2" CODE 40000,2200

Enter listing 3 and then save the code straight away using the command:

SAVE "Impcode3" CODE 64000,1535

then type in the Basic program, listing 1. Do not run the Basic program until you have saved it to tape. Use the command:

SAVE "Impulse" LINE 0

Once this is done you may run the basic program.

This will load the two block of code — previously saved — into memory and, all being well, you should get a message saying “press any key to start”.

If you do not wish to type in the machine code I can supply a cassette copy of the program for just £3. (inc p.p.). Write to — Chris Handley, 22 Avon Square, Grove Hill, Hemel Hempstead HP2 6DZ.

OnTelsoft



Chris Handley
can't help acting on
Impulse for the Spectrum.

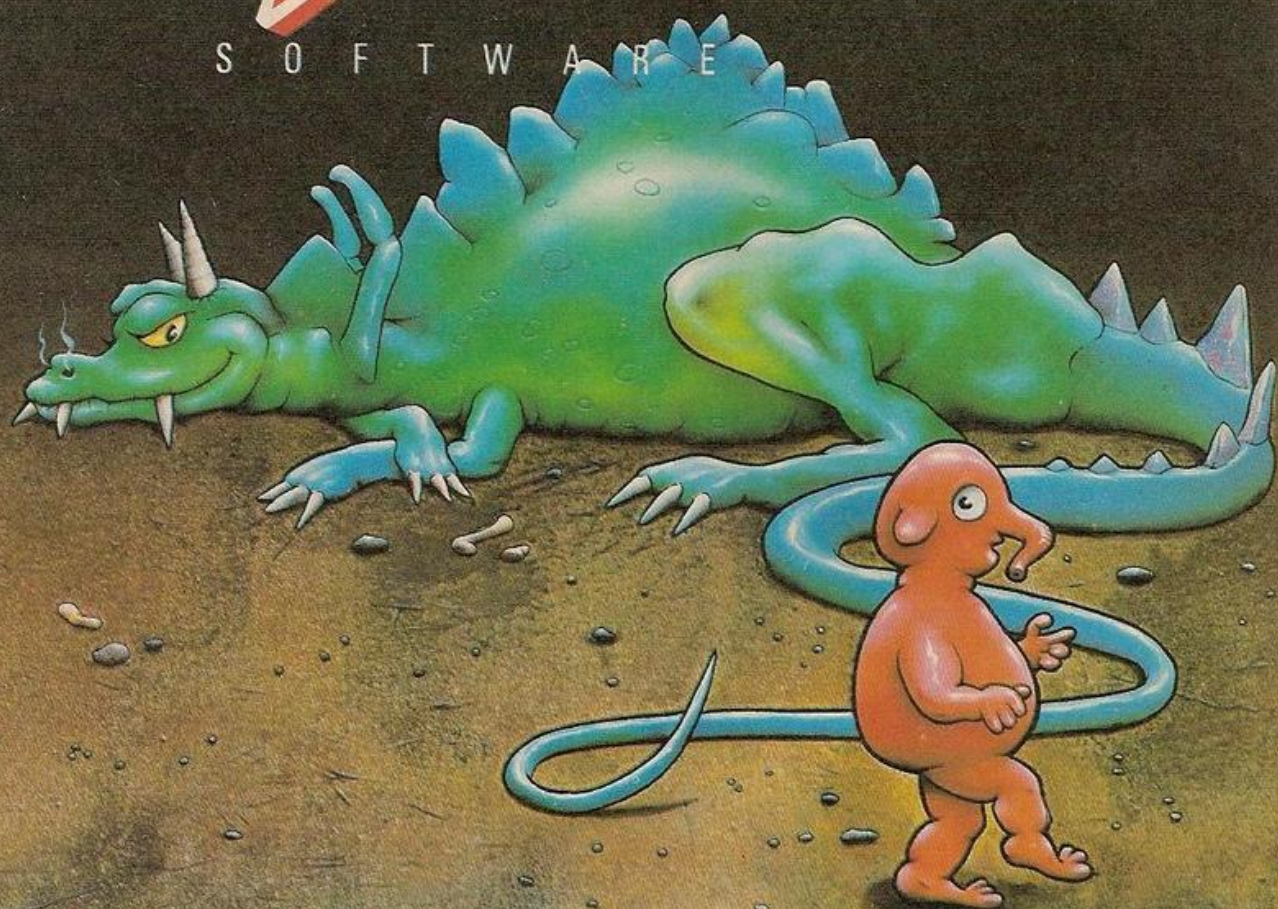
[illegible][illegible]

RIDDLERS DEN

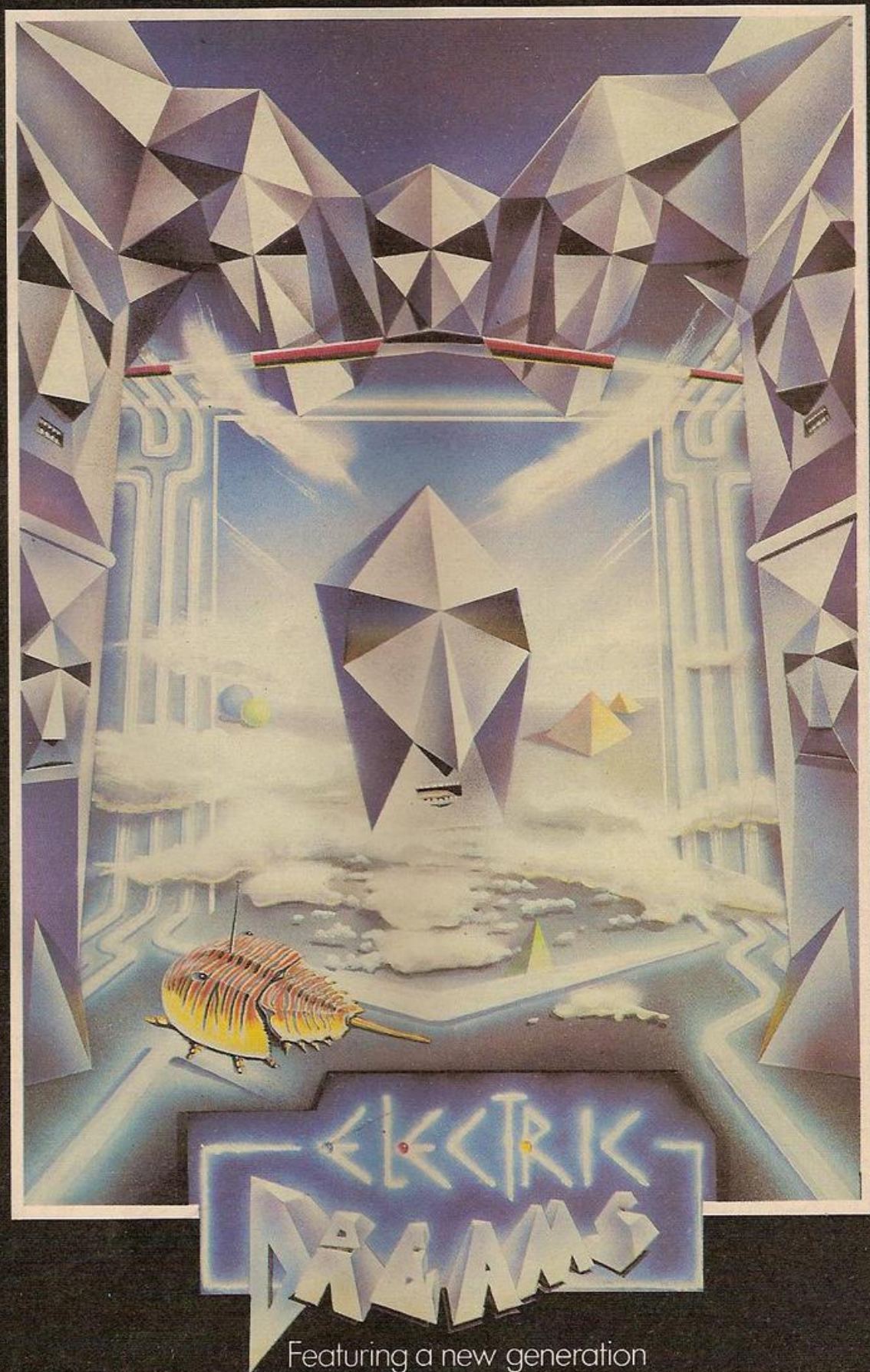
Available on the 48K Spectrum from Electric Dreams Software.
31 Carlton Crescent, Southampton. Tel: (0703) 225282

*Electric
Dreams*

S O F T W A R E



I, OF THE MASK



Featuring a new generation
of advanced 3D graphic techniques by Sandy White.
Available on the 48K Spectrum from Electric Dreams Software.
31 Carlton Crescent, Southampton. Tel: (0703) 225282



The next note is an E, so move the arrow up the keyboard to the E key (key 17 in diagram)

MELOD

When you've finished entering the notes in diagram 1, you should be on Note 34. If you're familiar with the tune, you may have noticed that Note 19 is wrong. This was deliberate to provide an example of the editing facilities. It should have been a D — key 15 in diagram. To correct this you must get Note to equal 19. This is done with

You can also delete and insert notes. If you

[illegible]

```

      INK 0
    140 POKE $5153,120 POKE $5158,
    150 POKE $5159,0 POKE $515E,12
    160 E=USR$9: LET USR=USR$5152
    170 RETURN
    180 POKE $3653,8 BORDER 0 PAP
    190 INK 0 LIGHT 1 FLASH 0
    200 GO TO 1190 IF CLEAR 49999
    210 GO TO 1190
    220 PAPER
    230 GO SUB 540 LET PI=PEEK ADD
    240 IF PI=255 THEN PRINT AT 14,15
    250 " GO TO 390
    300 LET N$="BEEP "
    310 LET DU=PEEK (ADDR+1)+256-P
    320 EEK (ADDR+2) IF DU<65535-PI
    330 LET N$="X" GO TO 360
    340 LET DU=DU/50/(PI+1)/2
    350 LET N$=STR$ DU
    360 IF LEN N$ > THEN LET N$=N$(
    370 TO 5)
    380 LET N$=N$+" "
    390 IF PI>9 THEN LET N$=N$+"O"
    400 LET M$=M$+N$+STR$ PI
    410 PRINT AT 14,15: INK 8 8$/PI
    420 +1) INK $ "AT
    430 GOTO M$ M$
    440 PAPER 0 RETURN
    450 LET POS=XINT ((A(OL+1)+1)
    460 /2) LET SH1=(A(OL+1)-POS)*INT
    470 ((A(OL+1)+1)/2) LET POS2=XINT ((
    480 A(OL+1)+1)/2)
    490 LET SH2=(A(RINO+1)+1)/
    500 /2) LET SH2=(A(RINO+1)/2)*XINT
    510 ((A(RINO+1)/2)) LET POS2=XINT ((
    520 A(RINO+1)+1)/2)
    530 LET P1=(PO2-(4+POS2)) LET
    540 SH1=SH2 AND POS1=POS2 THEN RETUR
    550 N
    560 RANDOMIZE 56 AND P1=(151+PO
    570 )+USR 53310
    580 IF SH1=1 THEN RANDOMIZE 48
    590 AND P1=(14+POS1)+USR 53310
    600 RANDOMIZE 56 AND P2=(151+P

```

```

52) +USR 53310
460 IF SH#1 THEN RANDOMIZE 48
AND P#=(148+POS#)+USR 53310
470 RETURN
480 LET PO=X(INT ((A(NO+1)+1)/2)
,Y,1) LET SH=(A(NO+1)/2)>INT (A
(NO+1)/2) LET POS=X(INT (A(IN
O+1)+1)/2),2)
490 RANDOMIZE S6 AND (PO-(4+POS)
)=(151+POS)+USR 53310
500 IF SH#1 THEN RANDOMIZE 48 A
ND (PO-(4+POS))=(148+POS)+USR 53
310
510 RETURN
520 PRINT AT 21,30: IF P#<10 T
HEN PRINT INK $;"0"
530 PRINT INK $;PS: RETURN
540 LET TUNE=1 LET P#=-1 LET S
TAU=0 GO SUB 1610 LET Z=33 LE
T CO=1 LET NO=12 LET OL=NO LE
T UD=1 LET OLCO=CO OUT 254,16:
GO SUB 630
550 PRINT AT 8,0, INK 0: RAND
OMIZE ((A(OL+1)+8)-3) AND 111+14
7+USR 53310
560 GO TO 650
570 LET Z=USR 53055
580 IF Z<1 THEN GO TO 600
590 FOR Y=1 TO 5 NEXT Y: PRINT
#0 AT 1,0 INK 6,K$(1 TO 32) LE
T N$="#12 TO LEN K$+K$(1): GO T
O 600
600 PRINT #1 AT 1,0, INK 3: "
COPRIGHT T.BAKER 1985
610 IF Z=254 OR Z=255 OR Z=39 O
R Z=24 THEN GO TO 570
620 RETURN
630 LET START=50000+(TUNE-1)+60
0: RETURN
640 LET ADDR=START+((CO-1)+3)
RETURN
650 IF CO/199 THEN LET CO=199
660 GO SUB 630 GO SUB 640
670 IF PEEK ADDR=255 AND Z=33 T
HEN GO TO 700

```


Y MASTER

press D, the current note will be deleted and all the other notes above it will be moved down. If you press I, then the note the arrow is pointing to will be inserted and become the current note.

For example, move Note to 12 using keys 6 and 7 and the arrow should be pointing at G. Now press D. The G will have been deleted and the arrow will be pointing at E which was the old Note 13. To get the G back, move the arrow to G and press I.

If you press 3, then Note will equal the last note in the current tune. If you press 9, then you will hear the note the arrow is pointing to. Pressing 4 will make Note equal 1. Pressing 2

will clear the current Tune and O will clear all the tunes — a safety prompt is included with 2 and 0 in case you press them by mistake. Pressing Q will increase Tune and A will decrease Tune.

If at any time you wish to save a tune to tape, just press 9 and follow the screen prompts. To load your saved tune, press L and start the tape.

The rhythm routine is begun by pressing R, but first press 4 to make Note equal 1 as the rhythm is entered from the current Note. At any time during the rhythm routine you may press space to exit.

When you press R you are asked — 'Y'/'N' —

Tom Baker makes beautiful music on a Spectrum!

if you wish to hear the notes as you enter the rhythm. However, listening to the tune slows the routine and is only recommended for practising.

Once you have press Y or N you will be asked to enter the rhythm. This is done by tapping the rhythm on any key — except space. The last note has to be held down for the right length of time.

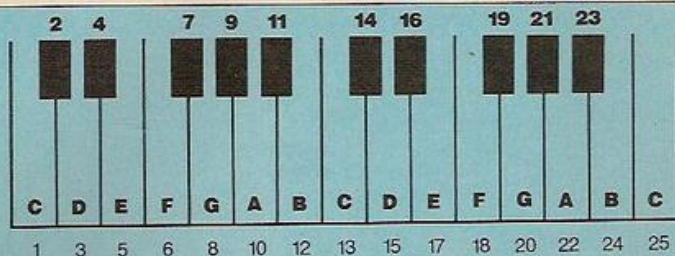
If you are entering the rhythm from the keyboard make sure you first disconnect the cassette lead and other peripherals like a printer.

There is another way of entering the rhythm that was intended mainly for fun but, as it uses a tape recorder and as not all makes of recorder are suitable, I can't guarantee its success with your equipment. Set up your tape recorder as follows: connect a lead from the ear socket of the computer to the ear socket of your tape recorder, insert a blank tape and set it to record.

Some tape recorders output what they are recording through their 'ear' socket so, when set up like this, your tape recorder can effectively listen to any noise in the room and pass information about it to your Spectrum. Now you can clap or whistle the rhythm into the computer.

When you've entered the rhythm, you can hear the complete tune by pressing P. At the bottom right of the screen is a message "Playback speed 01", this is the speed at which the tune is played back and can be altered with keys T and G. Speed 1 is the slowest; 10 the fastest.

If you find that the rhythm routine is not as responsive as it should be, change line 2140 to read: 2140 GOTO 2130.



Note	Key				
1	13C	12	20G	23	20G
2	17E	13	17E	24	20G
3	18F	14	13C	25	18F
4	20G	15	17E	26	18F
5	13C	16	15D	27	17E
6	17E	17	17E	28	18F
7	18F	18	17E	29	20G
8	20G	19	12B	30	17E
9	13C	20	13C	31	13C
10	17E	21	13C	32	15D
11	18F	22	17E	33	13C

```

650 IF PEEK ADDR=255 THEN LET C
O=CO-1*(CO<1) GO TO 650
660 LET NO=PEEK ADDR
700 LET C$="" IF CO=100 THEN L
ET C$="0" IF CO=10 THEN LET C$=
"00"
710 LET C$=C$+STR$ CO
720 PRINT AT 10,13: INK 7,0$AT
730 PRINT TUNE
740 IF STR$=1 THEN GO SUB 400
750 IF OL=0 AND THEN RANDOMIZE (I
R(OL+1)*81-3) AND 111=147+USR 53
310 RANDOMIZE (IR(OL+1)*81-3) A
ND 111=147+USR 53310
760 IF UD=1 THEN GO SUB 260
770 LET UD=0
780 PRINT AT 8,0: INK 2: OVER 1
790 LET OL=CO
800 GO SUB 570
810 LET OL=NO
820 IF Z=19 AND Z=14 THEN GO T
O 840
830 LET NO=NO: Z=19 AND NO=24)
-1234 AND NO=70
840 IF NO=100 THEN BEEP .02,0
850 IF Z=3 THEN LET CO=CO-1-100
860 IF OL=0 THEN LET UD=1
870 IF Z=30 THEN PRINT #1: INK
880 IF Z=30 THEN START TAP THEN PRE
890 ENTER GO TO 1930
900 IF Z=25 THEN PRINT #1: INK
910 AT 1,0: PLEASE WAIT
920 GO TO 1950
930 LET OPS=P$ LET P$=P$+Z=16
AND P$=101-1236 AND P$=11-116
OPS=P$ THEN LET UD=1 BEEP .02,
20 GO SUB 520 GO TO 780
940 IF Z=20 AND PEEK START
950 THEN LET P$=P$ LET UD=1
960 IF Z=20 LET AD=53409 GO SUB
970 LET CO=USR 53455-1 GO TO
980
990 IF Z=13 THEN GO TO 2260
1000 IF Z=19 AND CO=1 THEN LET

```

```

UD=1 BEEP .02,20: LET CO=1 GO
TO 650
1010 IF Z=11 AND PEEK ADDR=255
THEN LET CO=CO+1 GO SUB 5340 SE
BEEP .05,NO LET UD=1 GO TO 850
1020 IF Z=13 THEN BEEP .05,NO
1030 IF Z=15 THEN GO TO 970
1040 BEEP .5,10
1050 PRINT #1: INK 5: AT 1,0: "DO
YOU WANT TO CLEAR ALL TUNES?"
1060 LET NS=INKEY$ IF NS="" THEN GO
TO 950
1070 IF NS="Y" THEN GO TO 1360
1080 IF Z=30 OR Z=18 THEN LET UD
=1 POKE 53153,30+(16+(Z=18)): P
OKE 53156,0 POKE 53155,1 POKE
53158,30 POKE 53159,6 LET US=U
SR 53152 BEEP .05,NO
1090 IF Z=30 OR Z=18 THEN POKE 5
3153,120 POKE 53156,0 POKE 531
58,1 POKE 53159,120 POKE 53159,
10 LET US=USR 53152
1100 IF Z=33 THEN GO SUB 540 PO
ADDR,NO: LET CO=CO+1 GO TO 8
40
1110 IF Z=18 THEN LET A=CO LET
CO=193 GO SUB 540 LET CO=A LE
T P=ADDR LET AD=53029 GO SUB 1
500 LET P=1200-CO+3 LET AD=53
037 GO SUB 1600 LET US=USR 530
25 GO SUB 540 POKE ADDR,NO PO
KE ADDR+1,255 POKE ADDR+2,255
LET CO=200 GO SUB 540 POKE AD
D,255 POKE ADDR+2,255 POKE AD
D+1,255 LET CO=A GO TO 850
1120 LET OL=TUNE LET TUNE=TUNE
+Z=37 AND TUNE=51-(Z=38 AND TU
NE=1) IF OL=TUNE THEN LET Z=
31 GO TO 150
1130 IF Z=30 THEN BEEP .02,20: LET C
O=1 GO TO 650
1140 IF Z=30 THEN BEEP .02,20 L
ET STR$=1-STR$ GO SUB 480
1150 IF Z=28 THEN GO TO 1070
1160 BEEP .5,10
1170 PRINT #1: AT 1,0: INK 5: "DO
YOU WANT TO CLEAR THIS TUNE?"

```

```

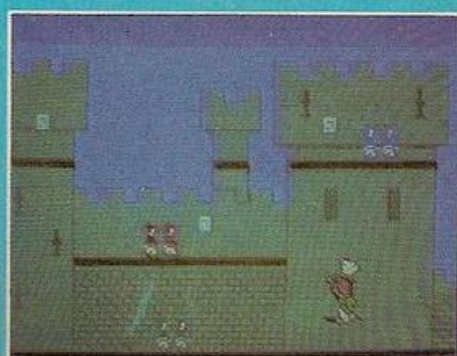
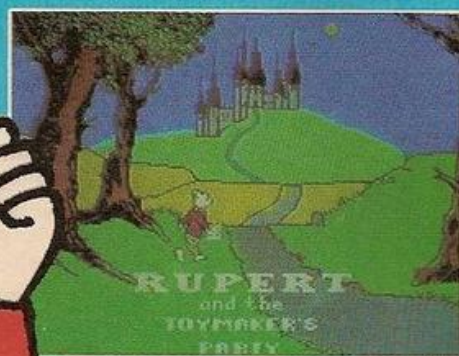
LET NS=INKEY$ IF NS="" THEN GO
TO 1050
1180 IF NS="Y" THEN BEEP .5,0 L
ET UD=1 GO SUB 1590 LET CO=1
GO TO 650
1190 IF Z=22 THEN BEEP .03,-20
GO SUB 540 LET UD=1 LET P=(200
-CO)+3 LET AD=53023 GO SUB 160
0 LET P=ADDR+3 LET AD=53015 L
0 SUB 1600 LET US=USR 53014 LE
T Z=33 GO TO 650
1200 IF Z=34 THEN BEEP .02,20: G
O SUB 100: GO TO 650
1210 GO TO 780
1220 IF USR 53056=32 THEN GO TO
2240
1230 GO SUB 2230 LET AD=ADDR+1:
POKE 23672,0: POKE 23673,0: POK
E 23674,0
1240 POKE 53225,(PEEK (AD-1)+1)
1250 GO SUB 50
1260 IF INK=USR 53056
1270 IF INK=32 THEN GO TO 2240
1280 GO SUB 2230 POKE AD+1,PEEK
(23673) POKE AD,PEEK 23672 LET
AD=AD+3 POKE 53225,(PEEK (AD-1)
+1) POKE 23672,0: POKE 23673,0
POKE 23674,0 GO TO 1130
1290 PRINT #1: INK 5: AT 1,11: "PL
EASE WAIT"
1300 LET IN=0 LET AD=59000: RES
TORE 1750 FOR A=1 TO 25 READ P
GO SUB 1600 LET AD=AD+2 NEXT A
1310 RES C: UDG 5
1320 DATA "C","CC","D","DC","E
","F","FC","G","GC","A","AC"
"","B","BC"

```

(listing continued on page 63)

RUPERT

and the
TOYMAKER'S PARTY



Jolly old Rupert can walk, jump, leap, climb stairs – and even fly – but can you get him to the party?

32 challenging screens of animation and fun.

QUICKSILVA

The most powerful games in the Universe

Quicksilva Ltd, Liberty House,
222 Regent Street, London W1R 7DB.
Telephone 01-439 0666



Rupert Bear © Express Newspapers PLC

Spectrum 48K
CBM64


```

1240 DIM A(25,2): RESTORE 1220
FOR A=1 TO 25: READ S$(A): NEXT
A
1250 LET EC=53067: LET K$="...."
TO TAPE: L LOAD TUNE FROM TUN
R ENTER RHYTHM: T TUNE DOWN:
E 0 TUNE UP: A DELETE CURRE
I INSERT NOTE: A MOVE ARROW LEFT:
NT NOTE: S MOVE ARROW RIGHT: 1 STRAVE ON
MOVE ARROW RIGHT: 1 STRAVE ON
/OFF: 2 CLEAR CURRENT TUNE: 7
FORWARD STEAR THROUGH TUNE: 6
BACKSTEP THROUGH TUNE: 3 JUMP
TO END OF TUNE: 4 JUMP TO STA
RT OF TUNE: T 2 3 PLAYBACK 3
PEED UP/DOWN: C CLEAR ALL TUNE
S: 2 HEAR CURRENT NOTE: ENTER
ENTER NOTE
1260 DATA VAL "15" VAL "1" VAL "
1260 DATA VAL "0" VAL "23" VAL "PI PI VAL
1260 DATA VAL "0" VAL "31" VAL "1" VAL
"31" VAL "0" VAL "39" VAL "PI PI VAL
"39" VAL "0" VAL "47" VAL "PI PI VAL
"47" VAL "0" VAL "55" VAL "PI PI VAL
"55" VAL "0" VAL "63" VAL "1" VAL "U
AL "63" VAL "0" VAL "71" VAL "PI PI
AL X(15,2): RESTORE 1260: FOR A
=1 TO 15: READ X(A,1) X(A,2): NE
XT A
1270 DIM A(25) DATA VAL "2" VAL
"3" VAL "4" VAL "5" VAL "11" VAL
"8" VAL "9" VAL "10" VAL "14" VAL "1
AL "12" VAL "13" VAL "18" VAL "19" VA
6" VAL "17" VAL "20" VAL "23" VAL "24
L "20" VAL "25" VAL "26" VAL "27" VAL
VAL "28" VAL "30" RESTORE 1270: FO
R "28" TO 25: READ A(A): NEXT A
1290 LET C=0: RESTORE 1770: FOR
A=53000 TO 53473: READ B: LET C=
C+B: POKE A,B: NEXT A: IF C=480
38 THEN PRINT AT 0,0: INK 9
OU HAVE MADE A TYPING ERROR:
IN LINES 1910 TO 2060: BEEP 5
-10: GO TO 2440
1300 LET US=USR 53430: RESTORE 1
390: FOR A=55039 TO 55199: READ
B: POKE A,B: NEXT A
1310 DATA VAL "15" VAL "15" VAL "15"
VAL "15" VAL "15" VAL "248" VAL
VAL "15" VAL "15" VAL "248" VAL "2
"248" VAL "248" VAL "248" VAL "248"
48 VAL "2" VAL "40" VAL "124" VAL
VAL "0" VAL "124" VAL "40" VAL "0"
VAL "0" VAL "15" VAL "56" VAL "
84" VAL "146" VAL "16" VAL "16"
VAL "16" VAL "16" VAL "0" VAL "0
0" VAL "248" VAL "60" VAL "80" VAL
AL "80" VAL "248" VAL "80" VAL "
1320 DATA VAL "0" VAL "80" VAL "
248" VAL "80" VAL "0" VAL "80" VAL
AL "248" VAL "80" VAL "255" VAL
"0" VAL "0" VAL "0" VAL "0" VAL
"0" VAL "0" VAL "0" VAL "0" VAL
1330 DATA VAL "0" VAL "62" VAL "
127" VAL "255" VAL "124" VAL "0" VAL
5" VAL "254" VAL "124" VAL "255" VAL
AL "62" VAL "127" VAL "255" VAL
"0" VAL "255" VAL "254" VAL "124
" VAL "0"
1350 RESTORE 1310: LET T=0: FOR
A=USR "A" TO USR "I": 7: READ B:
LET T=T+B: POKE A,B: NEXT A: IF
T=7214 THEN PRINT AT 0,0: INK 9
YOU HAVE MADE A TYPING ERROR:
N LINES 1310-1350: BEE
P 5 -10: GO TO 2440
1360 LET US=USR 53000
1370 IF IN=0 THEN GO SUB 2370
1380 GO TO 540
1390 DATA 0,0,0,0,1,3,5,4
1400 DATA 0,0,0,0,0,192,32,16,8
1410 DATA 255,4,4,4,4,4,2,2,2
1420 DATA 255,8,16,16,16,32,32,6
4
1430 DATA 255,1,3,5,5,9,17,33
1440 DATA 255,128,0,0,0,0,0,0
1450 DATA 255,65,128,129,131,134
1460 DATA 140,136
1470 DATA 255,128,128,240,252,14
2,130,195
1470 DATA 255,136,136,132,64,64,
46,15
1480 DATA 255,65,65,66,66,66,75,
240
1490 DATA 255,0,0,0,0,12,14,7
1500 DATA 255,32,32,32,32,32,96,
192
1510 REM G UDG "G"
1520 FOR A=16 TO 20: PRINT AT A,
1: INK 0: "GGGGGGGGGG" NEXT A
1530 PRINT AT 21,6: "GGG"
AT 15,6: "GGG" AT 14,6: "GGG"
1540 REM LOWER CASE LETTERS
1550 PRINT AT 15,1: "a" AT 16,1
T 16,1: "cd" AT 17,1: "e" AT 18,1
"gh" AT 19,1: "i" POKE 53155,1
1560 POKE 53153,14: POKE 53155,18:
3: POKE 53153,11: LET US=USR 53152
POKE 53153,120: POKE 53156,
1570 POKE 53153,0: POKE 53158,12:
13: POKE 53159,9: LET US=USR 53152
POKE 53159,9:
1580 RETURN
1590 LET Z=33: LET NO=12: GO SUB
530: LET P=START: LET AD=53043:
GO SUB 1600: LET US=USR 53042:
RETURN
1600 LET P1=INT (P/256): LET P2=
P-(P1*256): POKE AD,P2: POKE (AD
+1),P1: RETURN
1610 INK 0: CLS: IF PEEK 55808<
0 THEN POKE 53266,235: LET US=U
SR 53260: GO TO 1720

```

```

DRAW 219,0: PLOT 13,154: DRAW 2
19,0: PLOT 18,122: DRAW 219,0: P
LOT 18,121: DRAW 219,0: INK 7:
2030 PRINT AT 0,12:INK 2: " "
INK 5: "SPACE" EXIT: PRINT AT
11,6: INK 6: "STARTING AT NOTE "
:05: GO SUB 190: PRINT AT 2,2: "D
O YOU WANT TO HEAR THE TUNE?"
3,3: "AS YOU ENTER THE RHYTHM ?"
AT 5,11: INK 5: "YES OR NO" BEE
P 1,5
2040 PRINT AT 7,3: INK 5: "PRESS
FOR INSTRUCTIONS"
2050 LET US=USR 53273: LET Z$=IN
KEY$
2060 IF Z$="I" THEN GO TO 2270
2070 IF Z$=" " THEN GO TO 2240
2080 IF Z$="Y" AND Z$<>"N" THEN
GO TO 2050
2090 PRINT AT 11,0: POKE 53223
201: IF Z$="Y" THEN POKE 53223,
0
2100 LET US=USR 53273: IF INKEY$
<>" " THEN GO TO 2100
2110 POKE 53153,64: POKE 53156,2:
POKE 53158,32: POKE 53158,32: P
OKE 53159,8: LET US=USR 53152
2120 PRINT AT 7,0: PRINT AT 3,
0: INK 7: "NOW ENTER THE RHYTHM"
2130 LET US=USR 53273: IF USR 53
53<255 THEN GO TO 1100
2140 IF USR 53<50 THEN GO TO 213
0
2150 GO SUB 2230
2160 LET AD=ADDR+1: POKE 53225,(
PEEK (AD-1)+1): POKE 23672,0: PO
KE 23673,0: POKE 23674,0
2170 GO SUB 20
2180 IF PEEK (AD+2)=255 THEN POK
E AD+1,PEEK 23673: POKE AD,PEEK
23672: GO TO 2220
2190 GO SUB 4
2200 IF USR 53056=32 THEN GO TO
2240
2210 GO SUB 2230: POKE AD+1,PEEK
23673: POKE AD,PEEK 23672: LET
AD=AD+3: POKE 53225,(PEEK (AD-1)
+1): POKE 23672,0: POKE 23673,0:
POKE 23674,0: GO TO 2170
2220 GO TO 2240
2230 PRINT AT 0,0: LET US=USR 5
3085: LET US=USR 53273: LET US=U
SR 53085: RETURN
2240 POKE 53153,120: POKE 53155,
0: POKE 53155,0: POKE 53158,32: P
OKE 53159,8: LET US=USR 53152
2250 PRINT AT 11,0: PRINT AT 1
0,0: OVER 1: INK 7: POKE 53266
2260 LET US=1: LET US=USR 53266
GO SUB 230: RETURN
2260 GO SUB 1960: GO TO 550
2270 POKE 53250,0: LET US=USR 53
245
2280 POKE 53153,68: POKE 53156,0
POKE 53155,0: POKE 53158,32: P
OKE 53159,8: LET US=USR 53152
2290 LET X=0: LET Y=0: LET Y$=""
TO enter the rhythm, tap it out
on any key. Alternatively (FOR F
UN), connect a lead from the e
ar socket of the computer to th
ear socket of a cassette record
er, insert a blank tape and set
it to record. Now tapping
or humming the rhythm: GO SUB
2330: POKE 23605,57: POKE 23607,
251: PRINT AT 9,0: INK 5: "PRE
SS ANY KEY TO CONTINUE"
2300 IF INKEY$<>" " THEN GO TO 23
00
2310 IF INKEY$="" THEN GO TO 231
0
2320 PRINT AT 9,0: GO TO 1960
2330 LET X1=Y+7: LET Y1=175-(X*8
) POKE 23606,0: POKE 23607,60
2340 FOR L=1 TO LEN Y$: RANDOMIZ
E X1 AND Y1=CODE Y$(L)+USR 53310
2350 LET X1=X1+7: IF X1>248 THEN
LET Y1=Y1-8: LET X1=0
2360 BEEP .01,40: NEXT L: RETURN
2370 LET IN=1: CLS: PRINT AT 0,
0: "TUNES ARE ENTERED IN TWO PAR
TS: 1. THE NOTES"
2. THE RHYTHM"
THE
N PRESS 'P' TO HEAR YOUR TUNE" A
T 21,0: " ANY KEY TO CONTINU
E"
2380 OVER 1: INK 6: LET 0=0: GO
SUB 2420: PRINT AT 0,0: LET 0
=1: PAUSE 2: GO SUB 2420: PRINT
AT 2,0: LET 0=0: GO SUB 2430: PRIN
T AT 7,0: INK 4: PAUSE 25: PRIN
T AT 21,0: INK 5: BEEP .1,14
2390 LET A=0: OVER 0: INK 7:
2391 LET A=A+1: IF INKEY$="" AND
A<500 THEN GO TO 2391
2395 IF A=500 THEN INK 0: GO TO
2370
2400 RETURN
2410 OVER 0: INK 7: STOP
2420 LET M=0*12: BEEP .265,21-M:
BEEP .24,23-M: BEEP .253,19-M:
BEEP .52,16-M: BEEP .24,18-M: BE
EP .346,14-M: RETURN
2430 BEEP .266,3: BEEP .24,-1:
BEEP .253,3: BEEP .52,-8: BEEP
.28,-8: BEEP .25,-8: BEEP .26,-9
.28,-8: BEEP .5,-10: RETURN
2440 BEEP 1,0: PAPER 7: INK 0: B
ORDER BRIGHT 0: CLS: STOP
9999 REM TYPE 'RUN 9999'
TO SAVE+VERIFY
9999 PRINT #1: AT 1,0: INK 9: "S
TART TAPE THEN PRESS ANY KEY "
PAUSE 0: POKE 23736,181: SAVE "M
USIC" LNE 10: BEEP 1,0: INK 0:
VERIFY " " INK 7: BEEP 1,20

```


ALTHOUGH THE Microdrive has been in widespread use with the Spectrum for well over a year now, very little software utilising the Microdrive has been published. The one kind of routine which has received exposure is the extended Cat, which gives information on the length and type of the files on a cartridge. The programs in this article deal with the Microdrive in a more sophisticated way.

The first two programs make up a secure saving system. Files which are saved from the first program can only be loaded using the second. Protected files cannot be seen on a normal Cat, extended Cat programs reveal no valid information, and the files cannot even be erased normally. The third program is of more widespread application — it eliminates the tortuous syntax of the normal Microdrive commands, enabling you to load a file with an expression as simple as

*LOAD "FILENAME"

All of the new functions are implemented in the form of new Basic commands so there are no Pokes required in operation. All of the commands are made up of a command word preceded by a star, and followed by various parameters. None of the new commands are keywords, and so they must be typed out letter by letter.

Before you can enter a line containing one of the new commands you will have to make one USR call to insert the new command interpreter. The address to call is different for each program and is given in the paragraph describing the program. This USR call will have to be placed at the start of any program which uses the new Basic, and will need to be re-executed after any

MICRODRIVE UTILITIES SPECTRUM

Listing 1.

```
10 REM *****
20 REM ** HEX LOADER **
30 REM ** by Jon Ellis 1985 **
40 REM *****
50 INPUT "Start: "; S, "Finish: "; F
E
60 FOR F=5 TO E STEP 8
70 PRINT F;
80 LET CHECK=0
90 INPUT "Enter bytes: "; LINE
H$
100 IF LEN H$ < 16 THEN PRINT "Error in length: BEEP .2,0: GO TO 70"
110 PRINT TAB 8; H$;
120 FOR G=1 TO 8
130 LET BYTE=16*(CODE H$(1)-48-(7 AND H$(1)>"9"))+(CODE H$(2)-48-(7 AND H$(2)>"9"))
140 POKE F-1+G,BYTE
150 LET CHECK=CHECK+BYTE*G
160 LET H$=H$(3 TO )
170 NEXT G
180 INPUT "Enter check digit: "; C$
LINE C$
190 IF LEN C$ < 1 THEN GO TO 180
200 PRINT TAB 27; " "; C$
210 LET DIGIT=CHECK-9*INT (CHECK/9)
220 IF DIGIT < 0 THEN PRINT "Error in string - input again"
BEEP .2,12: GO TO 70
230 NEXT F
```

New. All of the major listings are given in the form of a hex dump which is designed for use with the hex loader given in listing 1.

The task of programming was complicated by the fact that there are at least two different shadow Rom programs in existence. I have therefore given two listings for each of the major programs. To find out which version of the shadow Rom you have in your Interface 1, type in the bytes from listing 2 using the hex loader. When you have finished type

Listing 2.

```
400000 CF31214A9C22ED5C
400008 CF32E1E113A3A00FE
400016 FB28117F7F32818C
400024 7A9C11079C010B80
400032 003C02000C07A9C1
400040 A29C010B0018F10D
400048 7A9C11AD3C010B00
400056 18E6C00007010C00
400064 F0C002000118B9C0
400072 3C0200000018B9C0
400080 817800000016E2068
400088 6E6B6E6E776E2058
400096 4F4D697373735820
401004 3120524F4D697373
401012 7555203220524F4D
```

Listing 3A.

```
64455 CF31214A9C22ED5C
64456 C9D71800FE2A2803
64457 C9F0010804D02141
64458 FFD72000DDRE0020
64459 04EE2020E8D0230F
64460 200010F0D02122FD
64461 C036000014DDCB03
64462 CB1F7823C0B07200
64463 D7FB24FDCB017620
64464 BFC0E705D7F12BED
64465 433BFFED0533DFFD
64466 C800462808D7941F
64467 323FFF18045C0118
64468 F73A3FFF32D65C0F
64469 09380E704DDCB000
64470 42R3DFFED04B3BFF
64471 79D60938060E09ED
64472 433BFF1146FFAF18
64473 1213ED02145FF13D
64474 D5C02038BFF2322D
64475 52A7B5C5E21CAFE1
64476 227B5C3A485CE633
64477 F8193904F6021800
64478 F644FD7755FD0B06
64479 C8011800111AF0F0
64480 3020D74D00E22273
64481 50FFD78285FDCB73
64482 CFFDCB7CE6CD23FE
```

```
64544 37E8ED52232FF2A
64545 485CED52232FF2A
64546 30FF110A00A7E052
64547 3802E70321E65C3A
64548 2FFF77E05832FFC0
64549 FAF0E05832FFC0E0
64550 F0D5E538FFC0E0E0
64551 E05B36FFC0E0E0E0
64552 C0FE3A0D55C0DF71
64553 D8FEF5012002E70E
64554 5C018900D0710B0E
64555 F0D5E538FFC0E0E0
64556 F0D5E538FFC0E0E0
64557 A912E70CDDC40D08
64558 D07E19C0F717D0E5
64559 E111530019E521E5
64560 5C018900D0710B0E
64561 F0D5E538FFC0E0E0
64562 F0D5E538FFC0E0E0
64563 F0D5E538FFC0E0E0
64564 10E17B8C3002E70F
64565 12A2A45CDD4B32FF
64566 43CE0F30D0E0E0E0
64567 02200FE5C3DFF0F0
64568 C1DDE5E111520019
64569 E8E1ED0A0340B20D
64570 FDD034820A0A0C0B
64571 02200FE5C3DFF0F0
64572 17C0C41009215827
64573 D9C3C105CDB705CD
64574 0FFFCDD0FCEDC80F
64575 E0E19C0F717D0E5
64576 E6812002E70D0E5
64577 E111530019E521E5
64578 011F0300E0E0B030
64579 FFD0770D01F04ED0
```

```
65056 CD7512110000DD73
65057 08D07200DD340C09
65058 E51E0078E230B5F
65059 785120F77B8E77E1
65060 C9CDE80FE50D7E10
65061 0F71391F00ED43
65062 C95CC0A0FE31A28
65063 15D0C81865DDE5E1
65064 11520019010002C0
65065 08FE2812E711C0FE
65066 1301213200C0C0C
65067 438EDD0C439E1C9
65068 CDF1FE11180019C0
65069 A91800C843462018
65070 C07E43D0B46E60B
65071 080800E11479010
65072 0FBC0A1F1320043E
65073 F7C9C7C90600A21
65074 44FF5E220C5C3226
65075 2310FBFE32000A3E
65076 83A0FFFE043838F0
65077 E0B0210A0022D45C
65078 C9D00E111220019
65079 C0A318C044113208
65080 080800E11479010
65081 D0B2846283C0D01
65082 F12B8D4338FFED53
65083 3AFFDDC0C046E208
65084 07941E32055CF009
65085 0F45220C5C3226
65086 0900000000000000
65087 0900000000000000
65088 07450044554050
65089 5749504520202020
65090 2020202020200000
```

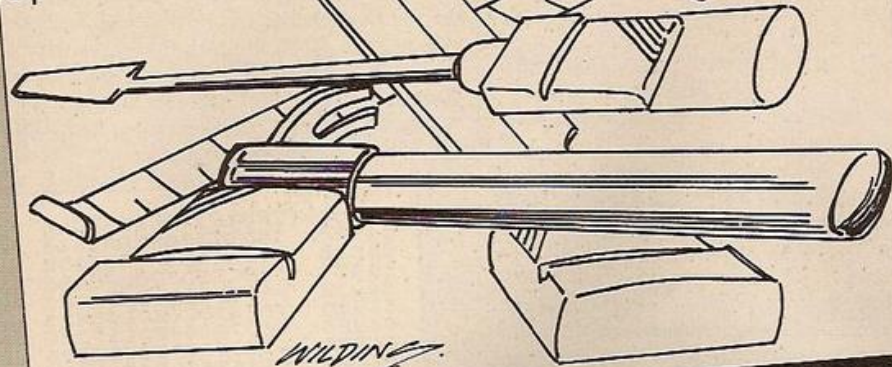
Listing 4A.

```
64455 CF31214A9C22ED5C
64456 C9D71800FE2A2803
64457 C9F0010804D02141
64458 FFD72000DDRE0020
64459 04EE2020E8D0230F
64460 200010F0D02122FD
64461 C036000014DDCB03
64462 CB1F7823C0B07200
64463 D7FB24FDCB017620
64464 BFC0E705D7F12BED
64465 433BFFED0533DFFD
64466 C800462808D7941F
64467 323FFF18045C0118
64468 F73A3FFF32D65C0F
64469 09380E704DDCB000
64470 42R3DFFED04B3BFF
64471 79D60938060E09ED
64472 433BFF1146FFAF18
64473 1213ED02145FF13D
64474 D5C02038BFF2322D
64475 52A7B5C5E21CAFE1
64476 227B5C3A485CE633
64477 F8193904F6021800
64478 F644FD7755FD0B06
64479 C8011800111AF0F0
64480 3020D74D00E22273
64481 50FFD78285FDCB73
64482 CFFDCB7CE6CD23FE
```

```
64544 DDCB16452602E711
64545 DDE5E11152001911
64546 FE5C010900EDB0ED
64547 SBE75C2133FFC0D0
64548 FEED58E55CCD097F
64549 EDE5B55CCD097F0F
64550 SEED5C0C097F30F0
64551 CB5F238F0B4F2088
64552 B8F5238F0B4F2088
64553 39FFEB77ED0E3308
64554 1105001444D70808
64555 1FED5833C28550F0
64556 2BD7E559ED0453FE
64557 2A53D077551833FE
64558 4B39FF0922455C0F
64559 32FFC8B7280A2A37
64560 FF22425C0F306A00
64561 2A53D077551833FE
64562 FEED5833FFC07AF0
64563 C0A912ED7B350F0D
64564 3600FF2F141BDF0F
64565 03217D18C00077FC
64566 3677C003832FFCB4
64567 2802E5F5C8B5728F
64568 4B39FF0922455C0F
64569 08095C0E0B33FF0B
64570 080019C03C247C0B
```

```
65056 E75CCD1318110900
65057 D06E45D06645DDE5
65058 E1115B0019E058E9
65059 5C1131ACDE1FDD07E
65060 448228F71730571E
65061 F72HE95C19E8D0E0
65062 E101520009D9C0D0
65063 1220E07EB077D9D0
65064 E4E5D04546E0C033
65065 D074400E5E111433
65066 C02018355E1F04C0
65067 43C05C000E5E3815
65068 2813C0D0122000E0
65069 E5E1115200190100
65070 02C012FFC0C01213
65071 20E1E711C0B08CB0
65072 7282732C09E51E00
65073 7BA2230B5F78B1D0
65074 F77B8E77E10C0DE8
65075 0FEEDD7E19C0F717
65076 01FF00ED43C95C0D
65077 68FE368281E0C0E8
65078 1868D07E44672007
65079 DDE5E11152001901
65080 0002C012FE2815C0
65081 9FE1810C0FE12C0C
65082 1213200C0C0C0C0E
65083 C0B439E11C0C0C0E
65084 E111800019C0A310
65085 11180019C0A918D0
65086 CB43462018D07E43
65087 D0B646E0208D0C0
65088 E1114700190E0ACD
65089 1E1320040CFFB7C0
65090 0C0901FB04ED430C
65091 5C0C0E4F38182818
65092 D07E44D0B020B0E
65093 005E111320019010
65094 0002C012FE2815C0
65095 0000000000000000
65096 0000000000000000
65097 0000000000000000
65098 0000000000000000
65099 0000000000000000
65100 0000000000000000
```


John Ellis with a Microdrive toolkit for the Spectrum.



RANDOMIZE USR 40000

and the program will tell you which Rom you have. If you have a version 1 Rom you should use listings 3a, 4a and 5a, version 2 owners should use listings 3b, 4b and 5b. If you have an unknown Rom then you will be unable to use the programs.

The first programs, given in listing 3 enables you to save and erase files in the special protected format. The new commands are *Dump to save a file, and *Wipe to erase one. The USR call to invoke the two commands is

RANDOMIZE USR 64280

Before beginning to type in the bytes from listing 3a or 3b you must

CLEAR 64279

to move Ramtop out of the way. This also applies when you want to load the completed code for use in a program. When you have finished entering the bytes, the code should be saved:

SAVE "M";1;"SAFE = SAVE" CODE
64280,1080 <ENTER>

The required syntax for the *Dump command is very similar to that of the Save command referred to the tape system. For example the expression

*DUMP "FILE 1"

would save the current Basic program onto drive 1 in the protected format. You may save to drives other than 1 by the inclusion of a valid drive number and a semicolon before the filename — the line

*DUMP 3;"FILE 1"

would have saved the program to drive 3. Note that all filenames for use with the protected save system may be a maximum of nine characters in length.

The forms

*DUMP "filename"LINE, *DUMP
"filename" SCREEN \$

and

*DUMP "filename" CODE

are supported, but *DUMP "filename" DATA is not. When saving code you can include an optional third parameter as an autorun address for the code block — eg.

*DUMP "GAME"CODE 30000,5000,31000
will save 5000 bytes of code starting at 30000. Immediately on loading the code will be executed from 31000. The other command provided by this listing, *Wipe, requires no parameters apart from the filename and an optional drive number — the only allowed syntax forms being *WIPE "filename" and

*WIPE 5;"filename"

Listings 4a and 4b contain the bytes for the other half of this utility — the program which allows you to reload protected files. Before beginning to type the bytes in you must

CLEAR 64444

and likewise on any subsequent loading. When you have finished, you should save the object code:

SAVE "M";1;"SAFE = LOAD" CODE
64445,920 <ENTER>

This program provides only one new command, *Take, and the required address that must be called to insert it is 64445. The only

(continued on next page)

Listing 3B.

```

64280 CF312105F822B75C
64281 C9D71800F2E2B803
64282 3F0012B0502E0C03
64283 C3F0010504D02141
64284 CDD02130F0E04077
64285 C9C022505C0504D7
64286 D00000DAE00230EEE
64287 0220B5516000D158
64288 Q020E418302110
64289 E579F00200521911
64290 F855100412FCFEDD
64291 35003007F824F0D0
64292 D72000D0212FFDD0
64293 05003007F824F0D0
64294 05003007F824F0D0
64295 FE3B20A4D72000D7
64296 FE3B20A4D72000D7
64297 FE3B20A4D72000D7
64298 FE3B20A4D72000D7
64299 FE3B20A4D72000D7
64300 FE3B20A4D72000D7
64301 FE3B20A4D72000D7
64302 FE3B20A4D72000D7
64303 FE3B20A4D72000D7
64304 FE3B20A4D72000D7
64305 FE3B20A4D72000D7
64306 FE3B20A4D72000D7
64307 FE3B20A4D72000D7
64308 FE3B20A4D72000D7
64309 FE3B20A4D72000D7
64310 FE3B20A4D72000D7
64311 FE3B20A4D72000D7
64312 FE3B20A4D72000D7
64313 FE3B20A4D72000D7
64314 FE3B20A4D72000D7
64315 FE3B20A4D72000D7
64316 FE3B20A4D72000D7
64317 FE3B20A4D72000D7
64318 FE3B20A4D72000D7
64319 FE3B20A4D72000D7
64320 FE3B20A4D72000D7
64321 FE3B20A4D72000D7
64322 FE3B20A4D72000D7
64323 FE3B20A4D72000D7
64324 FE3B20A4D72000D7
64325 FE3B20A4D72000D7
64326 FE3B20A4D72000D7
64327 FE3B20A4D72000D7
64328 FE3B20A4D72000D7
64329 FE3B20A4D72000D7
64330 FE3B20A4D72000D7
64331 FE3B20A4D72000D7
64332 FE3B20A4D72000D7
64333 FE3B20A4D72000D7
64334 FE3B20A4D72000D7
64335 FE3B20A4D72000D7
64336 FE3B20A4D72000D7
64337 FE3B20A4D72000D7
64338 FE3B20A4D72000D7
64339 FE3B20A4D72000D7
64340 FE3B20A4D72000D7
64341 FE3B20A4D72000D7
64342 FE3B20A4D72000D7
64343 FE3B20A4D72000D7
64344 FE3B20A4D72000D7
64345 FE3B20A4D72000D7
64346 FE3B20A4D72000D7
64347 FE3B20A4D72000D7
64348 FE3B20A4D72000D7
64349 FE3B20A4D72000D7
64350 FE3B20A4D72000D7
64351 FE3B20A4D72000D7
64352 FE3B20A4D72000D7
64353 FE3B20A4D72000D7
64354 FE3B20A4D72000D7
64355 FE3B20A4D72000D7
64356 FE3B20A4D72000D7
64357 FE3B20A4D72000D7
64358 FE3B20A4D72000D7
64359 FE3B20A4D72000D7
64360 FE3B20A4D72000D7
64361 FE3B20A4D72000D7
64362 FE3B20A4D72000D7
64363 FE3B20A4D72000D7
64364 FE3B20A4D72000D7
64365 FE3B20A4D72000D7
64366 FE3B20A4D72000D7
64367 FE3B20A4D72000D7
64368 FE3B20A4D72000D7
64369 FE3B20A4D72000D7
64370 FE3B20A4D72000D7
64371 FE3B20A4D72000D7
64372 FE3B20A4D72000D7
64373 FE3B20A4D72000D7
64374 FE3B20A4D72000D7
64375 FE3B20A4D72000D7
64376 FE3B20A4D72000D7
64377 FE3B20A4D72000D7
64378 FE3B20A4D72000D7
64379 FE3B20A4D72000D7
64380 FE3B20A4D72000D7
64381 FE3B20A4D72000D7
64382 FE3B20A4D72000D7
64383 FE3B20A4D72000D7
64384 FE3B20A4D72000D7
64385 FE3B20A4D72000D7
64386 FE3B20A4D72000D7
64387 FE3B20A4D72000D7
64388 FE3B20A4D72000D7
64389 FE3B20A4D72000D7
64390 FE3B20A4D72000D7
64391 FE3B20A4D72000D7
64392 FE3B20A4D72000D7
64393 FE3B20A4D72000D7
64394 FE3B20A4D72000D7
64395 FE3B20A4D72000D7
64396 FE3B20A4D72000D7
64397 FE3B20A4D72000D7
64398 FE3B20A4D72000D7
64399 FE3B20A4D72000D7
64400 FE3B20A4D72000D7
64401 FE3B20A4D72000D7
64402 FE3B20A4D72000D7
64403 FE3B20A4D72000D7
64404 FE3B20A4D72000D7
64405 FE3B20A4D72000D7
64406 FE3B20A4D72000D7
64407 FE3B20A4D72000D7
64408 FE3B20A4D72000D7
64409 FE3B20A4D72000D7
64410 FE3B20A4D72000D7
64411 FE3B20A4D72000D7
64412 FE3B20A4D72000D7
64413 FE3B20A4D72000D7
64414 FE3B20A4D72000D7
64415 FE3B20A4D72000D7
64416 FE3B20A4D72000D7
64417 FE3B20A4D72000D7
64418 FE3B20A4D72000D7
64419 FE3B20A4D72000D7
64420 FE3B20A4D72000D7
64421 FE3B20A4D72000D7
64422 FE3B20A4D72000D7
64423 FE3B20A4D72000D7
64424 FE3B20A4D72000D7
64425 FE3B20A4D72000D7
64426 FE3B20A4D72000D7
64427 FE3B20A4D72000D7
64428 FE3B20A4D72000D7
64429 FE3B20A4D72000D7
64430 FE3B20A4D72000D7
64431 FE3B20A4D72000D7
64432 FE3B20A4D72000D7
64433 FE3B20A4D72000D7
64434 FE3B20A4D72000D7
64435 FE3B20A4D72000D7
64436 FE3B20A4D72000D7
64437 FE3B20A4D72000D7
64438 FE3B20A4D72000D7
64439 FE3B20A4D72000D7
64440 FE3B20A4D72000D7
64441 FE3B20A4D72000D7
64442 FE3B20A4D72000D7
64443 FE3B20A4D72000D7
64444 FE3B20A4D72000D7
64445 FE3B20A4D72000D7
64446 FE3B20A4D72000D7
64447 FE3B20A4D72000D7
64448 FE3B20A4D72000D7
64449 FE3B20A4D72000D7
64450 FE3B20A4D72000D7
64451 FE3B20A4D72000D7
64452 FE3B20A4D72000D7
64453 FE3B20A4D72000D7
64454 FE3B20A4D72000D7
64455 FE3B20A4D72000D7
64456 FE3B20A4D72000D7
64457 FE3B20A4D72000D7
64458 FE3B20A4D72000D7
64459 FE3B20A4D72000D7
64460 FE3B20A4D72000D7
64461 FE3B20A4D72000D7
64462 FE3B20A4D72000D7
64463 FE3B20A4D72000D7
64464 FE3B20A4D72000D7
64465 FE3B20A4D72000D7
64466 FE3B20A4D72000D7
64467 FE3B20A4D72000D7
64468 FE3B20A4D72000D7
64469 FE3B20A4D72000D7
64470 FE3B20A4D72000D7
64471 FE3B20A4D72000D7
64472 FE3B20A4D72000D7
64473 FE3B20A4D72000D7
64474 FE3B20A4D72000D7
64475 FE3B20A4D72000D7
64476 FE3B20A4D72000D7
64477 FE3B20A4D72000D7
64478 FE3B20A4D72000D7
64479 FE3B20A4D72000D7
64480 FE3B20A4D72000D7
64481 FE3B20A4D72000D7
64482 FE3B20A4D72000D7
64483 FE3B20A4D72000D7
64484 FE3B20A4D72000D7
64485 FE3B20A4D72000D7
64486 FE3B20A4D72000D7
64487 FE3B20A4D72000D7
64488 FE3B20A4D72000D7
64489 FE3B20A4D72000D7
64490 FE3B20A4D72000D7
64491 FE3B20A4D72000D7
64492 FE3B20A4D72000D7
64493 FE3B20A4D72000D7
64494 FE3B20A4D72000D7
64495 FE3B20A4D72000D7
64496 FE3B20A4D72000D7
64497 FE3B20A4D72000D7
64498 FE3B20A4D72000D7
64499 FE3B20A4D72000D7
64500 FE3B20A4D72000D7
64501 FE3B20A4D72000D7
64502 FE3B20A4D72000D7
64503 FE3B20A4D72000D7
64504 FE3B20A4D72000D7
64505 FE3B20A4D72000D7
64506 FE3B20A4D72000D7
64507 FE3B20A4D72000D7
64508 FE3B20A4D72000D7
64509 FE3B20A4D72000D7
64510 FE3B20A4D72000D7
64511 FE3B20A4D72000D7
64512 FE3B20A4D72000D7
64513 FE3B20A4D72000D7
64514 FE3B20A4D72000D7
64515 FE3B20A4D72000D7
64516 FE3B20A4D72000D7
64517 FE3B20A4D72000D7
64518 FE3B20A4D72000D7
64519 FE3B20A4D72000D7
64520 FE3B20A4D72000D7
64521 FE3B20A4D72000D7
64522 FE3B20A4D72000D7
64523 FE3B20A4D72000D7
64524 FE3B20A4D72000D7
64525 FE3B20A4D72000D7
64526 FE3B20A4D72000D7
64527 FE3B20A4D72000D7
64528 FE3B20A4D72000D7
64529 FE3B20A4D72000D7
64530 FE3B20A4D72000D7
64531 FE3B20A4D72000D7
64532 FE3B20A4D72000D7
64533 FE3B20A4D72000D7
64534 FE3B20A4D72000D7
64535 FE3B20A4D72000D7
64536 FE3B20A4D72000D7
64537 FE3B20A4D72000D7
64538 FE3B20A4D72000D7
64539 FE3B20A4D72000D7
64540 FE3B20A4D72000D7
64541 FE3B20A4D72000D7
64542 FE3B20A4D72000D7
64543 FE3B20A4D72000D7
64544 FE3B20A4D72000D7
64545 FE3B20A4D72000D7
64546 FE3B20A4D72000D7
64547 FE3B20A4D72000D7
64548 FE3B20A4D72000D7
64549 FE3B20A4D72000D7
64550 FE3B20A4D72000D7
64551 FE3B20A4D72000D7
64552 FE3B20A4D72000D7
64553 FE3B20A4D72000D7
64554 FE3B20A4D72000D7
64555 FE3B20A4D72000D7
64556 FE3B20A4D72000D7
64557 FE3B20A4D72000D7
64558 FE3B20A4D72000D7
64559 FE3B20A4D72000D7
64560 FE3B20A4D72000D7
64561 FE3B20A4D72000D7
64562 FE3B20A4D72000D7
64563 FE3B20A4D72000D7
64564 FE3B20A4D72000D7
64565 FE3B20A4D72000D7
64566 FE3B20A4D72000D7
64567 FE3B20A4D72000D7
64568 FE3B20A4D72000D7
64569 FE3B20A4D72000D7
64570 FE3B20A4D72000D7
64571 FE3B20A4D72000D7
64572 FE3B20A4D72000D7
64573 FE3B20A4D72000D7
64574 FE3B20A4D72000D7
64575 FE3B20A4D72000D7
64576 FE3B20A4D72000D7
64577 FE3B20A4D72000D7
64578 FE3B20A4D72000D7
64579 FE3B20A4D72000D7
64580 FE3B20A4D72000D7
64581 FE3B20A4D72000D7
64582 FE3B20A4D72000D7
64583 FE3B20A4D72000D7
64584 FE3B20A4D72000D7
64585 FE3B20A4D72000D7
64586 FE3B20A4D72000D7
64587 FE3B20A4D72000D7
64588 FE3B20A4D72000D7
64589 FE3B20A4D72000D7
64590 FE3B20A4D72000D7
64591 FE3B20A4D72000D7
64592 FE3B20A4D72000D7
64593 FE3B20A4D72000D7
64594 FE3B20A4D72000D7
64595 FE3B20A4D72000D7
64596 FE3B20A4D72000D7
64597 FE3B20A4D72000D7
64598 FE3B20A4D72000D7
64599 FE3B20A4D72000D7
64600 FE3B20A4D72000D7
64601 FE3B20A4D72000D7
64602 FE3B20A4D72000D7
64603 FE3B20A4D72000D7
64604 FE3B20A4D72000D7
64605 FE3B20A4D72000D7
64606 FE3B20A4D72000D7
64607 FE3B20A4D72000D7
64608 FE3B20A4D72000D7
64609 FE3B20A4D72000D7
64610 FE3B20A4D72000D7
64611 FE3B20A4D72000D7
64612 FE3B20A4D72000D7
64613 FE3B20A4D72000D7
64614 FE3B20A4D72000D7
64615 FE3B20A4D72000D7
64616 FE3B20A4D72000D7
64617 FE3B20A4D72000D7
64618 FE3B20A4D72000D7
64619 FE3B20A4D72000D7
64620 FE3B20A4D72000D7
64621 FE3B20A4D72000D7
64622 FE3B20A4D72000D7
64623 FE3B20A4D72000D7
64624 FE3B20A4D72000D7
64625 FE3B20A4D72000D7
64626 FE3B20A4D72000D7
64627 FE3B20A4D72000D7
64628 FE3B20A4D72000D7
64629 FE3B20A4D72000D7
64630 FE3B20A4D72000D7
64631 FE3B20A4D72000D7
64632 FE3B20A4D72000D7
64633 FE3B20A4D72000D7
64634 FE3B20A4D72000D7
64635 FE3B20A4D72000D7
64636 FE3B20A4D72000D7
64637 FE3B20A4D72000D7
64638 FE3B20A4D72000D7
64639 FE3B20A4D72000D7
64640 FE3B20A4D72000D7
64641 FE3B20A4D72000D7
64642 FE3B20A4D72000D7
64643 FE3B20A4D72000D7
64644 FE3B20A4D72000D7
64645 FE3B20A4D72000D7
64646 FE3B20A4D72000D7
64647 FE3B20A4D72000D7
64648 FE3B20A4D72000D7
64649 FE3B20A4D72000D7
64650 FE3B20A4D72000D7
64651 FE3B20A4D72000D7
64652 FE3B20A4D72000D7
64653 FE3B20A4D72000D7
64654 FE3B20A4D72000D7
64655 FE3B20A4D72000D7
64656 FE3B20A4D72000D7
64657 FE3B20A4D72000D7
64658 FE3B20A4D72000D7
64659 FE3B20A4D72000D7
64660 FE3B20A4D72000D7
64661 FE3B20A4D72000D7
64662 FE3B20A4D72000D7
64663 FE3B20A4D72000D7
64664 FE3B20A4D72000D7
64665 FE3B20A4D72000D7
64666 FE3B20A4D72000D7
64667 FE3B20A4D72000D7
64668 FE3B20A4D72000D7
64669 FE3B20A4D72000D7
64670 FE3B20A4D72000D7
64671 FE3B20A4D72000D7
64672 FE3B20A4D72000D7
64673 FE3B20A4D72000D7
64674 FE3B20A4D72000D7
64675 FE3B20A4D72000D7
64676 FE3B20A4D72000D7
64677 FE3B20A4D72000D7
64678 FE3B20A4D72000D7
64679 FE3B20A4D72000D7
64680 FE3B20A4D72000D7
64681 FE3B20A4D72000D7
64682 FE3B20A4D72000D7
64683 FE3B20A4D72000D7
64684 FE3B20A4D72000D7
64685 FE3B20A4D72000D7
64686 FE3B20A4D72000D7
64687 FE3B20A4D72000D7
64688 FE3B20A4D72000D7
64689 FE3B20A4D72000D7
64690 FE3B20A4D72000D7
64691 FE3B20A4D72000D7
64692 FE3B20A4D72000D7
64693 FE3B20A4D72000D7
64694 FE3B20A4D72000D7
64695 FE3B20A4D72000D7
64696 FE3B20A4D72000D7
64697 FE3B20A4D72000D7
64698 FE3B20A4D72000D7
64699 FE3B20A4D72000D7
64700 FE3B20A4D72000D7
64701 FE3B20A4D72000D7
64702 FE3B20A4D72000D7
64703 FE3B20A4D72000D7
64704 FE3B20A4D72000D7
64705 FE3B20A4D72000D7
64706 FE3B20A4D72000D7
64707 FE3B20A4D72000D7
64708 FE3B20A4D72000D7
64709 FE3B20A4D72000D7
64710 FE3B20A4D72000D7
64711 FE3B20A4D72000D7
64712 FE3B20A4D72000D7
64713 FE3B20A4D72000D7
64714 FE3B20A4D72000D7
64715 FE3B20A4D72000D7
64716 FE3B20A4D72000D7
64717 FE3B20A4D72000D7
64718 FE3B20A4D72000D7
64719 FE3B20A4D72000D7
64720 FE3B20A4D72000D7
64721 FE3B20A4D72000D7
64722 FE3B20A4D72000D7
64723 FE3B20A4D72000D7
64724 FE3B20A4D72000D7
64725 FE3B20A4D72000D7
64726 FE3B20A4D72000D7
64727 FE3B20A4D72000D7
64728 FE3B20A4D72000D7
64729 FE3B20A4D72000D7
64730 FE3B20A4D72000D7
64731 FE3B20A4D72000D7
64732 FE3B20A4D72000D7
64733 FE3B20A4D72000D7
64734 FE3B20A4D72000D7
64735 FE3B20A4D72000D7
64736 FE3B20A4D72000D7
64737 FE3B20A4D72000D7
64738 FE3B20A4D72000D7
64739 FE3B20A4D72000D7
64740 FE3B20A4D72000D7
64741 FE3B20A4D72000D7
64742 FE3B20A4D72000D7
64743 FE3B20A4D72000D7
64744 FE3B20A4D72000D7
64745 FE3B20A4D72000D7
64746 FE3B20A4D72000D7
64747 FE3B20A4D72000D7
64748 FE3B20A4D72000D7
64749 FE3B20A4D72000D7
64750 FE3B20A4D72000D7
64751 FE3B20A4D72000D7
64752 FE3B20A4D72000D7
64753 FE3B20A4D72000D7
64754 FE3B20A4D72000D7
64755 FE3B20A4D72000D7
64756 FE3B20A4D72000D7
64757 FE3B20A4D72000D7
64758 FE3B20A4D72000D7
64759 FE3B20A4D72000D7
64760 FE3B20A4D72000D7
64761 FE3B20A4D72000D7
64762 FE3B20A4D72000D7
64763 FE3B20A4D72000D7
64764 FE3B20A4D72000D7
64765 FE3B20A4D72000D7
64766 FE3B20A4D72000D7
64767 FE3B20A4D72000D7
64768 FE3B20A4D72000D7
64769 FE3B20A4D72000D7
64770 FE3B20A4D72000D7
64771 FE3B20A4D72000D7
64772 FE3B20A4D72000D7
64773 FE3B20A4D72000D7
64774 FE3B20A4D72000D7
64775 FE3B20A4D72000D7
64776 FE3B20A4D72000D7
64777 FE3B20A4D72000D7
64778 FE3B20A4D72000D7
64779 FE3B20A4D72000D7
64780 FE3B20A4D72000D7
64781 FE3B20A4D72000D7
64782
```


(continued from previous page)

permissible syntax is

*TAKE "filename"

or

*TAKE 4; "filename"

If the Break key is pressed whilst the program is loading a file then the machine will be reset.

I suggest that you experiment with the safe loading system on a blank cartridge until you are sure that it is working properly. Note that when a Basic program is *Taken from cartridge, all its

variables are loaded as well.

The final major program is the syntax simplifier. The bytes are given in listing 5. Before typing in or loading the object code you must
CLEAR 64879

When you have finished entering, the code should be saved:

SAVE "SHORT SYN" CODE 64880,480
<ENTER>

This program provides six new commands which are inserted with the line

RANDOMIZE USR 64880

The six commands are *Save, *Load, *Verify, *Merge, *Erase and *Format. These commands perform exactly the same functions — with one exception — as their normal counterparts. However, the clumsy "M"; syntax has been abandoned. All six commands have the drive number as an optional parameter as in *Dump etc.

All the commands except *Save take exactly the same syntax form as *Take and *Wipe. Note that, contrary to the normal requirement you do not need to state in a Load-type command the kind of file you want to load, the program automatically determines the nature of the incoming file, and treats it accordingly. All the usual options for saving screens, arrays and code are available with the *Save command.

The *Erase command has an extra function — a wild card facility in the filename.

As an example — if you had three files on a cartridge called Block 1, Block 2 and Block 3 you could erase all three in a single *Erase line:

*ERASE "BLOCK ?"

The '?' character in the filename indicates that that particular character position need not be checked for a match when searching the cartridge for records of the file to be erased. Note that the line

*ERASE "?????????"

will erase all files on the cartridge.

Listing 6 is a sub-routine which enables you to have your new commands give their own unique error messages. Each error message should be added to the table with 80hex added to the last character.

The messages are printed with a black square instead of an error letter or number to indicate that they are non-standard errors. The routine is activated from your program by loading the location Error with the number of the message in the table minus one, and then calling NewRR. The new Rom must be paged in when this routine is called otherwise a crash will occur — line 90.

Listing 7 is a command interpreter for building

a library of new Basic statements. It scans the table CMTAB for a command, giving a syntax error if it is not found, and jumping to the appropriate address if it is.

Tapes containing the Safe=Load system and the syntax shortener can be obtained from the author price £2.50 inc p&p. Quote v1.1 for a version 1 Rom and v1.2 for a version 2 Rom. Write to Jon Ellis at 29 Ashridge Drive, Bricket Wood, St. Albans, Hertfordshire, AL2 3SR enclosing a cheque or postal order.

Listing 5A.

```
000000 CF312179FD22B75C 000000
000001 09D71800FE2A2038 000001
000002 0806210BFFC5ED5B 000002
000003 5D05CE5D72000E1B 000003
000004 2805EE20BEE20142 000004
000005 7EFE3D20E0D35E23 000005
000006 55D72000EBC1FD33 000006
000007 4700E39D3C35D5C0 000007
000008 FF3E99E0B1C110CD 000008
000009 03F001F0CB7CE618 000009
000010 1CFD0CB7CEE1816F 000010
000011 0B70CF61810FDCB7 000011
000012 FE180AF00B47CE18 000012
000013 04FDCB47083E4D32 000013
000014 D95CDD2A5D5C07FB 000014
000015 24FDCB0176280DFD 000015
000016 0B4708FE3B2C01D7 000016
000017 2000180400225D5C 000017
000018 DF2812FDCB474628 000018
000019 05D7991E18030101 000019
000020 00ED43D080C03206 000020
000021 FDCB70C8E2806C16 000021
000022 07C336080DB705FD 000022
000023 0B474EC2E704FDCB 000023
000024 4756201421E65C11 000024
000025 DE5C010700E0B0C0 000025
000026 8506C08015C3AF08 000026
000027 2141FFE5D1010A00 000027
000028 362013EDB02ADC5C 000028
000029 0046D85C1141FFED 000029
000030 B00C8510D07E19CD 000030
000031 3215D0E8F8012002 000031
000032 E70ED085E1115200 000032
000033 19E5D113011F00AF 000033
000034 77FDCB03E0FFD770 000034
000035 FDCB479E01FF00ED 000035
000036 43C95C0F7132866 000036
000037 CDA913C05E1E2040 000037
000038 007E43D0B64E602 000038
000039 0050CDE3131831D 000039
000040 E5E111470019060H 000040
000041 1141FF1AF3F2002 000041
000042 180301B231310 000042
000043 F2FDCB47DE0CEB13 000043
000044 78567700CB434E28 000044
000045 07DD7E443CDD770 000045
000046 00E5E1115200191E 000046
000047 000E207E2306081F 000047
000048 30011C10FA0020F3 000048
000049 007E00B8209CDD03 000049
000050 1EFD0CB473E261FE 000050
000051 03C10553415645D 000051
000052 01F05E04C4F41443 000052
000053 B8F05E045E24946 000053
000054 593D00FDE4D4552 000054
000055 47453DC7FDE464F 000055
000056 524D41543D03FDE 000056
000057 45524153453D09F 000057
000058 5E31023334353637 000058
000059 3839300000000000 000059
```

Listing 5B.

```
000000 CF312179FD22B75C 000000
000001 09D71800FE2A2038 000001
000002 0806210BFFC5ED5B 000002
000003 5D05CE5D72000E1B 000003
000004 2805EE20BEE20142 000004
000005 7EFE3D20E0D35E23 000005
000006 55D72000EBC1FD33 000006
000007 4700E39D3C35D5C0 000007
000008 FF3E99E0B1C110CD 000008
000009 03F001F0CB7CE618 000009
000010 1CFD0CB7CEE1816F 000010
000011 0B70CF61810FDCB7 000011
000012 FE180AF00B47CE18 000012
000013 04FDCB47083E4D32 000013
000014 D95CDD2A5D5C07FB 000014
000015 24FDCB0176280DFD 000015
000016 0B4708FE3B2C01D7 000016
000017 2000180400225D5C 000017
000018 DF2812FDCB474628 000018
000019 05D7991E18030101 000019
000020 00ED43D080C03206 000020
000021 FDCB70C8E2806C16 000021
000022 07C336080DB705FD 000022
000023 0B474EC2E704FDCB 000023
000024 4756201421E65C11 000024
000025 DE5C010700E0B0C0 000025
000026 8506C08015C3AF08 000026
000027 2141FFE5D1010A00 000027
000028 362013EDB02ADC5C 000028
000029 0046D85C1141FFED 000029
000030 B00C8510D07E19CD 000030
000031 3215D0E8F8012002 000031
000032 E70ED085E1115200 000032
000033 19E5D113011F00AF 000033
000034 77FDCB03E0FFD770 000034
000035 FDCB479E01FF00ED 000035
000036 43C95C0F7132866 000036
000037 CDA913C05E1E2040 000037
000038 007E43D0B64E602 000038
000039 0050CDE3131831D 000039
000040 E5E111470019060H 000040
000041 1141FF1AF3F2002 000041
000042 180301B231310 000042
000043 F2FDCB47DE0CEB13 000043
000044 78567700CB434E28 000044
000045 07DD7E443CDD770 000045
000046 00E5E1115200191E 000046
000047 000E207E2306081F 000047
000048 30011C10FA0020F3 000048
000049 007E00B8209CDD03 000049
000050 1EFD0CB473E261FE 000050
000051 03C10553415645D 000051
000052 01F05E04C4F41443 000052
000053 B8F05E045E24946 000053
000054 593D00FDE4D4552 000054
000055 47453DC7FDE464F 000055
000056 524D41543D03FDE 000056
000057 45524153453D09F 000057
000058 5E31023334353637 000058
000059 3839300000000000 000059
```

Listing 6.

```
000000 *****
000001 ** NEW ERROR SYSTEM **
000002 ** by Jon Ellis 1985 **
000003 *****
000004 ORG address
000005 NEUR LD SP, (23613)
000006 LD HL, HANDL
000007 REX (SP), HL
000008 RST 0
000009 HANDL LD HL, (23755)
000010 LD HL, (23645), HL
000011 RES 5, (IY+1)
000012
```

```
00130 LD HL, 0
00140 LD (IY+55), HL
00150 LD (23563), HL
00160 INC HL
00170 LD (23574), HL
00180 CALL 5308
00190 CALL 3438
00200 SET 5, (IY+2)
00210 LD A, 143
00220 RTD HL
00230 LD A, 32
00240 RST 16
```

```
00250 LD A, (ERROR)
00260 LD DE, (RTAB)
00270 JP 4934
00280 *****
00290 ** ERROR MESSAGES **
00300 *****
00310 ERROR DEFB 0
00320 RTAB DEFB 128
00330 DEFB /Example /
00340 DEFB /messag /
00350 DEFB /e+128
00360
```

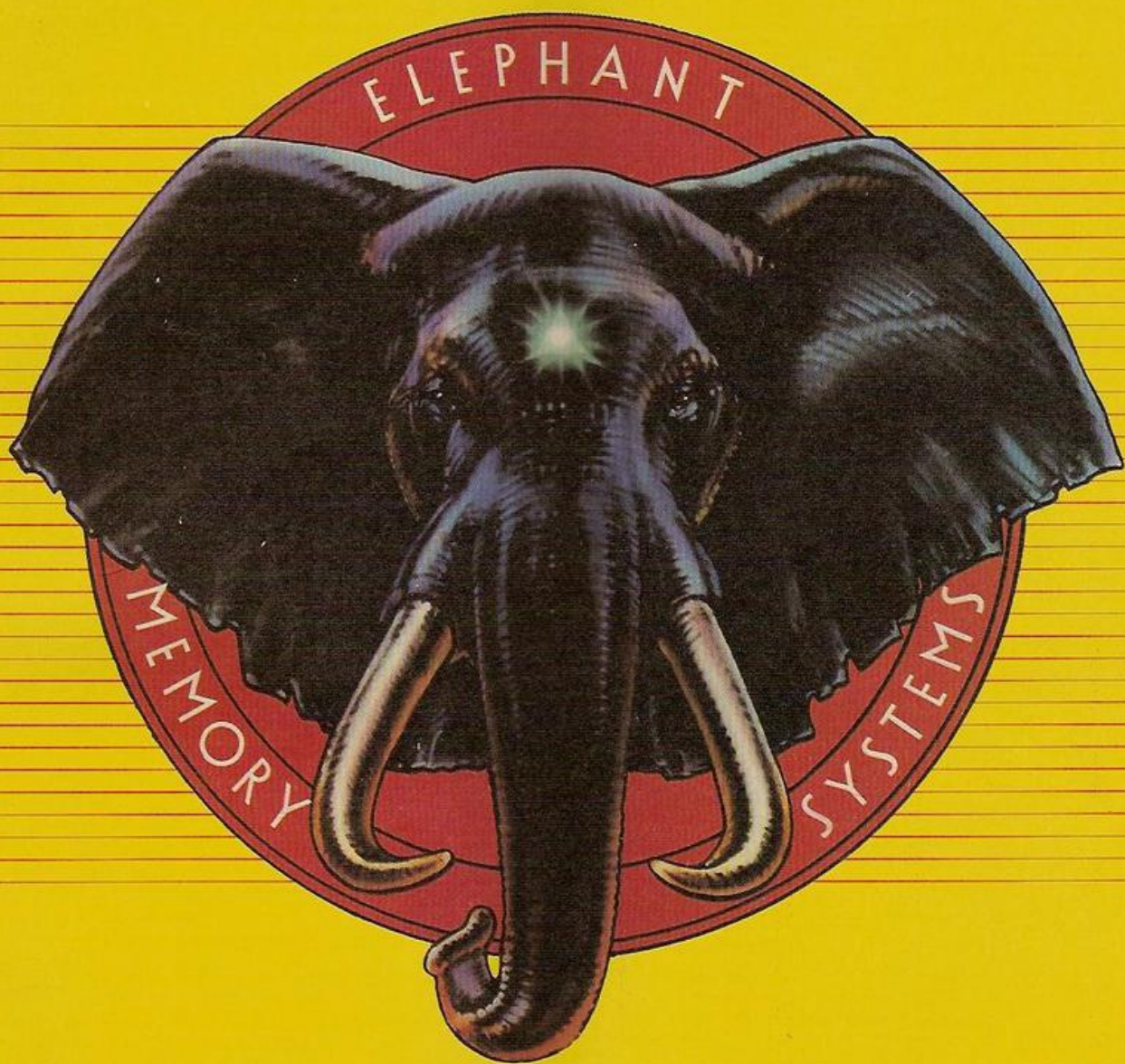
Listing 7.

```
000000 *****
000001 ** COMMAND SEARCHER **
000002 ** by Jon Ellis 1985 **
000003 *****
000004 ORG address
000005 VECTA RST 0
000006 DEFB 49
000007 LD HL, NUCOM
000008 LD (23735), HL
000009 RET
000100 NUCOM RST 16
000110 DEFU 24
000120 CP "Z"
000130 LD NZ, NFIN
000140 LOOK LD B, NFIN
000150 LD HL, CMTAB
000160 PUSH BC
000170 LOOP1 LD DE, (23645)
000180
```

```
00190 NXLET PUSH HL
00200 RST 16
00210 DEFU 32
00220 POP HL
00230 XOR (HL)
00240 JR Z, LETOK
00250 XOR 32
00260 JR NZ, WRONG
00270 INC HL
00280 LD A, (HL)
00290 CP "Z"
00300 INC HL, NXLET
00310 INC HL
00320 LD E, (HL)
00330 INC HL
00340 LD D, (HL)
00350 RST 16
00360 DEF 32
```

```
00370 EX DE, HL
00380 POP BC
00390 JP (HL)
00400 WRONG LD (23645), DE
00410 LD B, 255
00420 LD A, "Z"
00430 POP BC
00440 DJNZ LOOP1
00450 NFIN JP 496
00460 *****
00470 ** COMMAND TABLE **
00480 *****
00490 CMTAB DEFB /EXAMPLE /
00500 DEFB EGRUN
00510 DEFB "Z"
00520
```


MORE ELEPHANTS TO TRUST



ELEPHANT printer ribbons, head cleaning disks and computer cleaning kits are now added to the ELEPHANT family to provide you with a total computer supplies package. Together with ELEPHANT MEMORY SYSTEMS disks – certified 100% error free and problem free and guaranteed to meet or exceed every industry standard – ELEPHANT is now more than ever the trusted brand that gives you the best from your computer.

Dennison

ELEPHANT NEVER FORGETS

Dennison Manufacturing Co. Ltd.

Colonial Way, Watford, Herts WD2 4JY, Tel: Watford (0923) 41244, Telex: 923321

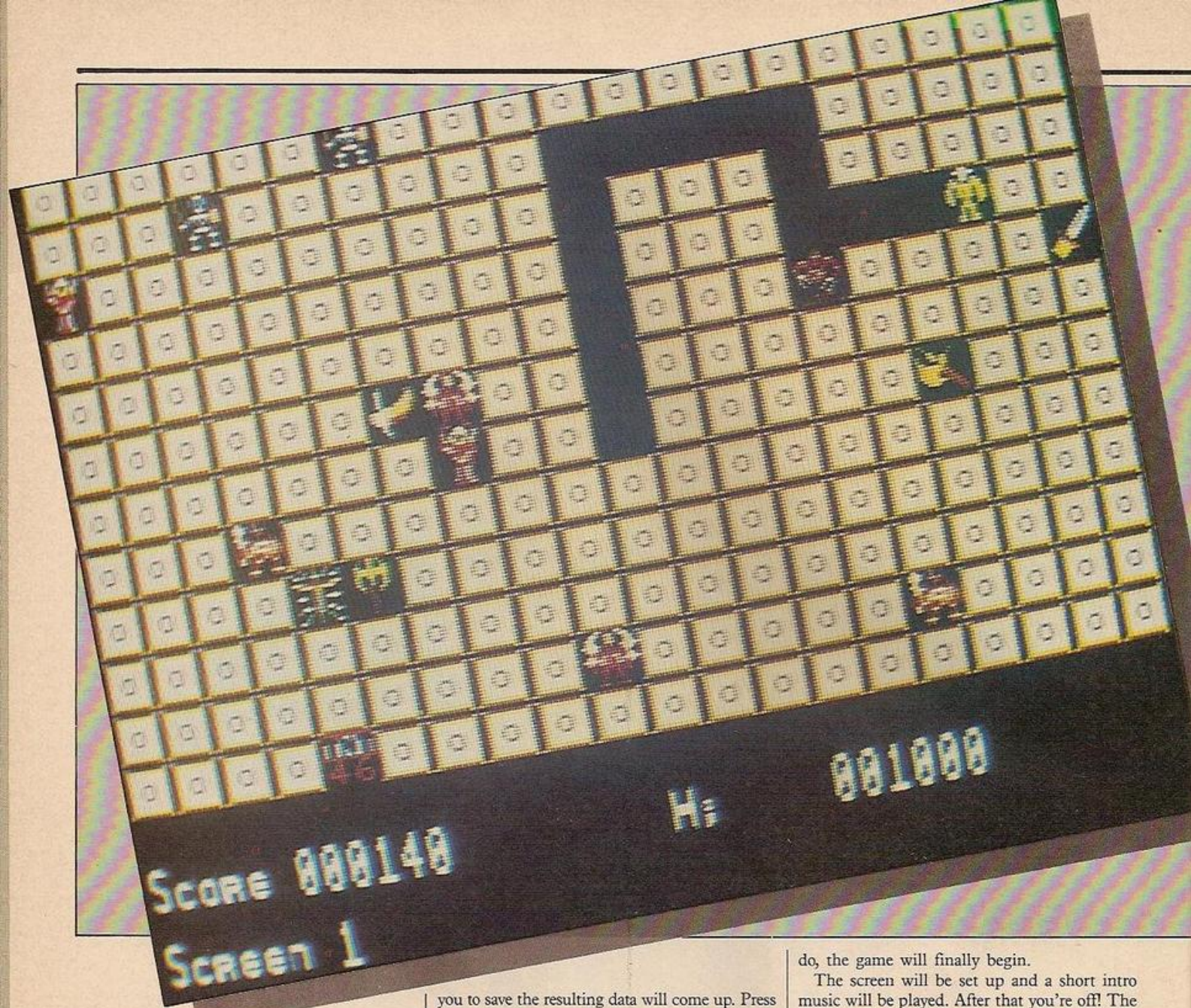
France: Soroclass, 45, rue de l'Est - 92100, Boulogne.

Tel. Réseau de Distribution: 606.98.99, Administration des Ventes: 606.70.78, Telex: EMS 206 436 F

Germany: Marcom Computerzubehör GmbH, Podbielskistr. 321, 3000 Hannover 51, Tel: (0511) 647420, Telex: 923818

Italy: King Mec SPA, Via Regio Parco 108 BIS, 10036 Settimo Torinese, Tel: (011) 800.93.93, Telex: 211467 KIN MEC-I

Other Countries: Dennison International Company, 4006 Erkrath 1, Matthias-Claudius-Strasse 9, Telex: 858 6600



ONE DAY, HERMANN is out in the woods collecting acorns when he suddenly realises he has accidentally wandered into the courtyard of the evil Dr. Sinclive's castle. Soon he is surrounded by hideous creations. To make matters worse, a bomb is slowly ticking away. His only hope is to collect the weapons and defuse the bomb...

Type in listing 1 carefully and save it to tape. Now type in listing 2 and save it on another tape. Run listing 2 and if all goes well, a prompt for

you to save the resulting data will come up. Press Y so that the data will be saved after listing 1 — it will be saved under filename "DATA". Now type in listing 3 and save it under "M.CODE" after "DATA" and type in listing 4 and save it under "ESCAPE" after listing 3.

Now you're in a position to run the game. Chain in the first program. It should proceed to load in the data and the main programs. When all the parts have been loaded, the cast of the game should be printed and the program will wait for you to press the space bar. When you

do, the game will finally begin.

The screen will be set up and a short intro music will be played. After that you're off! The point of the game is to collect the five weapons which are littered about the screen and defuse the bomb by sitting on it! Note that all the weapons must be collected before the bomb is defused. By collecting the weapons in a certain order, big bonus points will be gained. I will leave it to you to investigate the order in which to collect the weapons.

Control Hermann with Z, X, * and ? to move left, right, up and down respectively. Every time

(continued on page 70)

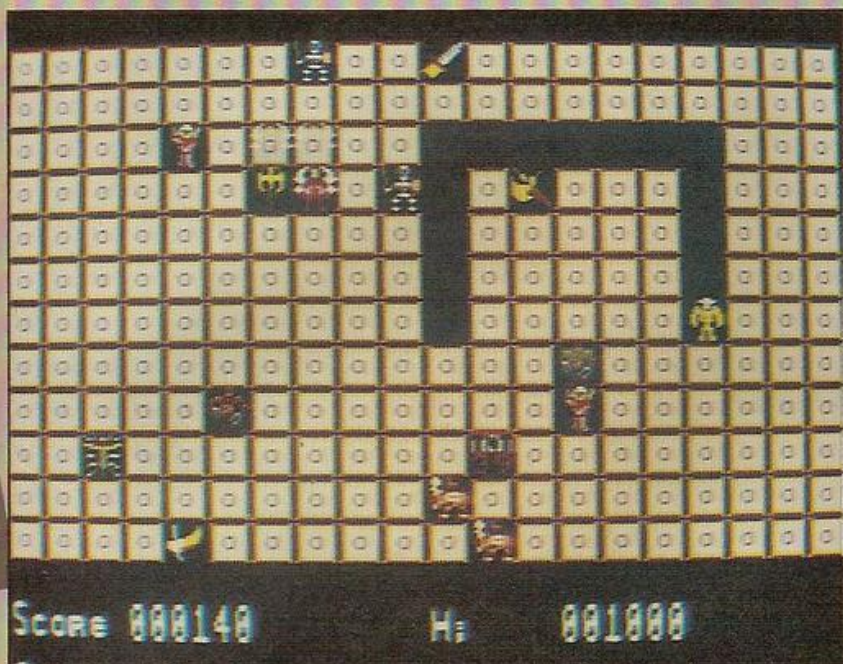
Listing 2.

```
10REM Data for Hermann's great escape
20REM By Shingo Sugura
30REM (C) July 1985
40
50MODE7:HIMEM=&2A30
60def=&2C50
70PROCgfx
80PROCdata
90PROCchall
100PRINT "Save data?":AS=GET$:PRINT$
110IF AS="Y" THEN *SAVE"DATA"2A30 3000
120END
130DEFPROCgfx
140TX=def
150FORAX=0TO12
160FORX=1TO16
170READ AS:TX=EVAL("&"+AS):TX=TX+4
180NEXT
190ENDPROC
200REM Monster 1
210DATA 40404040,06202020,11222211,AA770011
220DATA 44AAACC,ABEF89CD,00000000,C2C2C20E
230DATA 00002237,00000000,44330011,EE4444EE
240DATA 11EE8945,33111133,000000C2,88000088
250REM Monster 2
260DATA 33777733,07333377,028B8A02,B51F8F06
```

```
270DATA 0E878181,1FFF0F04,00000000,4B4A0E0C
280DATA 33330707,00000000,1607C3B5,0FF00F07
290DATA 802D2DFF,01100108,C00E874B,0FE10E0E
300REM Monster 3
310DATA 12000000,37064007,0D120301,0725060D
320DATA 1A0C0C08,840C060B,00000000,0642060C
330DATA 00112222,03000000,020145A9,05090702
340DATA 99443B0C,05040726,0088000C,06080000
350REM Monster 4
360DATA 03111101,00011103,BC2E3B19,074F8F1E
370DATA 61A3E6CC,2F0F0FC3,884C4C0C,08080888
380DATA 00000000,00000000,23031327,07472323
390DATA 4E0F8F4F,2F4F4E4E,00000000,00000000
400REM Monster 5
410DATA 77773300,672377FF,12129ACD,2F0F0D8B
420DATA 8484953B,4F0F0B1D,EEEECC00,6E4CEFF
430DATA 030347FF,01000202,06074F4F,0E0C0606
440DATA 060E2F2F,07030606,0C0C2EFF,08000404
450DATA 10100000,10101010,F0909050,818191F0
460DATA F09090A0,989898F0,00800000,80808080
470DATA 00000000,00000000,010141C1,01010101
480DATA 88802838,08080808,00000000,00000000
490REM Weapon 1
500DATA 10204000,F0C00090,80000000,E116D2D0
510DATA 40200000,08800080,00000000,00000000
520DATA 70F0F0F0,00000030,F0C0C1E1,000000C0
530DATA 070F0E0C,00000103,08000000,040E0E0C
```

```
540REM Weapon 2
550DATA 00668811,000030E1,03B89810,2121E10F
560DATA 08A22211,0808F00F,00CC2200,000080E0
570DATA 33000077,66110044,A9212121,10109821
580DATA B38080B3,00112280,000000CC,CC0000CC
590REM Weapon 3
600DATA 00000000,03010000,00000000,3B110000
610DATA 33110000,EEBDF67,4CAE6611,000088CC
620DATA 70301001,103070F0,C3871F3F,0080C0E1
630DATA 080088CC,000088CC,00000000,00000000
640REM Weapon 4
650DATA 33331100,11333333,00000000,F8100000
660DATA 10100000,F0F07030,840C0808,080C8484
670DATA 77FFFFFF,00001111,8F8F8F8F,44CC8888
680DATA 00000FE1,00000000,00000008,00000000
690REM Weapon 5
700REM Hermann
710DATA 00000000,30301010,D1117711,B0B0F0E0
720DATA DCCCF0C0,68E0F8B8,80000000,E0E0C0C0
730DATA 00103030,00000000,305090B0,70703030
740DATA E0C048E0,70706060,00C0E0E0,00000000
750REM TNT
760DATA 4C08080F,0F4C4C4C,CC44550F,0FDDDDCC
770DATA 33AAAA0F,0FBB3333,2301010F,0F232323
780DATA 00000000,00000000,00000000,00000000
790DATA 00000000,00000000,00000000,00000000
800REM Title
```


HERMANN AND THE GREAT ESCAPE



Listing 1.

```
10MODE7:TV0.1
20PROCdefine
30*L.DATA
40CHAIN"CODE"
50END
60:
70DEFPROCdefine
80VDU23,224,&3C,&7E,&62,&60,&60,&70,&3C,&E
90VDU23,226,&6,&6,&6,&6,&6,&6,&6,&6,&6,&6
100VDU23,226,&6,&6,&6,&6,&6,&6,&6,&6,&6,&6
110VDU23,227,&60,&60,&62,&7E,&3C,&7E,&62
120VDU23,228,&60,&60,&60,&60,&60,&60,&60
130VDU23,229,&66,&66,&66,&66,&66,&66,&66
140VDU23,230,&60,&60,&60,&60,&60,&60,&60
150VDU23,231,&6E,&6E,&6E,&6E,&6E,&6E,&6E
160VDU23,232,&60,&60,&60,&60,&60,&60,&60
170VDU23,233,&7E,&7E,&7E,&7E,&7E,&7E,&7E
180VDU23,234,&60,&60,&60,&60,&60,&60,&60
190VDU23,235,&7E,&7E,&7E,&7E,&7E,&7E,&7E
200VDU23,236,&60,&60,&60,&60,&60,&60,&60
210VDU23,237,&63,&63,&63,&63,&63,&63,&63
220VDU23,238,&60,&60,&60,&60,&60,&60,&60
230VDU23,239,&66,&66,&66,&66,&66,&66,&66
240VDU23,240,&6E,&6E,&6E,&6E,&6E,&6E,&6E
250VDU23,241,&6C,&6C,&6C,&6C,&6C,&6C,&6C
260VDU23,242,&7E,&7E,&7E,&7E,&7E,&7E,&7E
270VDU23,243,&6C,&6C,&6C,&6C,&6C,&6C,&6C
280VDU23,244,&6C,&6C,&6C,&6C,&6C,&6C,&6C
290VDU23,245,&6C,&6C,&6C,&6C,&6C,&6C,&6C
300VDU23,246,&6C,&6C,&6C,&6C,&6C,&6C,&6C
310VDU23,247,&6C,&6C,&6C,&6C,&6C,&6C,&6C
320VDU23,248,&6C,&6C,&6C,&6C,&6C,&6C,&6C
330VDU23,249,&6C,&6C,&6C,&6C,&6C,&6C,&6C
340VDU23,250,&6C,&6C,&6C,&6C,&6C,&6C,&6C
350VDU23,251,&6C,&6C,&6C,&6C,&6C,&6C,&6C
360VDU23,252,&6C,&6C,&6C,&6C,&6C,&6C,&6C
370VDU23,253,&6C,&6C,&6C,&6C,&6C,&6C,&6C
380ENVELOPE1,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0
390ENVELOPE2,0,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4
400ENVELOPE3,1,1,0,0,10,10,127,0,0,-127,126,0
410ENDPROC
```



This article is available
on the Telsoft service.

Collect the weapons,
defuse the bomb, avoid
Dr. Sinclive's hideous
creations and escape
his castle. Shingo
Sugiura shows you how
to help Hermann collect
the weapons littered
about the screen using a
BBC micro.



```
810DATA 7B786F00,7B7B7B7B,FFF00F00,BFCFFFFF
820DATA FFF00F00,BF7FFFFF,CAC22E00,CACACACA
830DATA 7B7B7B7B,8F787B7B,FFCFBFBF,0FF0FFFF
840DATA FF7FBFBF,0FF0FFFF,CACACACA,2EC2CACA
850DEFPROCchall
860P=2B53
870OPT0
880OPT FNTab(6,2)
890OPT FNequb(134):OPT FNequb(141)
900OPT FNequb("Congratulations!")
910OPT FNTab(6,3)
920OPT FNequb(134):OPT FNequb(141)
930OPT FNequb("Congratulations!")
940OPT FNTab(6,8):OPT FNequb(129)
950OPT FNequb("Your great score")
960OPT FNTab(0,10):OPT FNequb(129)
970OPT FNequb("qualifies for the Hall of Fame.")
980OPT FNTab(4,13):OPT FNequb(131)
990OPT FNequb("Please enter your name.")
1000OPT FNTab(3,15)
1010OPT FNequb(134):OPT FNequb(157):OPT FNequb(129):O
PT FNTab(29,15)
1020OPT FNequb(156)
1030OPT FNTab(7,15)
1040OPT FNequb(255)
1050:
1060FORAX=0TO7:READA:*(2A30+AX*20)=A: NEXT
1070ENDPROC
```

```
1000DEFPROCdata
1090FOREN=0TO111
1100READAN:EN?2F90=AN
1110NEXT
1120FORAX=0TO101STEP3
1130READBN,CN,DN:AN?2BE0=BN:AN?2BE1=CN:AN?2BE2=DN
1140NEXT
1150FORAN=0TO46:READBN,CN:AN?2AF0=BN:AN?2BF1=CN:NEX
T
1160ENDPROC
1170DEFPROC(N)
1180?P=CN:P=PA+1
1190:
1200DEFPROC(A)
1210?P=AN:P=PA+LENA
1220:
1230DEFPROC(X,Y)
1240?P=31:P=PA+1
1250?P=KN:P=PA+1
1260?P=YN:P=PA+1
1270:
1280DATA17,3,31,0,26,128,130,132,134,136,10,13,129,13
1,133,135,137
1290DATA31,20,26,138,140,10,8,139,141
1300DATA10,10,13,224,226,230,232,232,238
1310DATA10,13,225,227,231,233,233,239
1320REM data for intro music
1330DATA 165,3,169,3,169,3,169,3,117,3,121,3,121,3,12
1,3
1340DATA 69,3,73,3,73,3,73,7
1350DATA 157,3,161,3,165,3,169,6,157,6,169,3,157,6
```

```
1360DATA 169,3,177,3,157,3,157,3,157,5
1370DATA 149,3,141,6,149,6,129,6,149,3,129,6
1380DATA 149,7,153,3,153,3,153,3
1390REM Data for end of game music
1400DATA1,101,8,2,69,16,3,53,16,1,117,4
1410DATA2,81,16,3,49,16,1,101,4,2,69,16
1420DATA3,45,16,1,109,8,2,73,16,3,41,16
1430DATA1,117,4,2,69,16,3,33,16,1,121,4
1440DATA2,61,16,3,25,16,1,129,8,1,121,4
1450DATA1,117,4,2,53,16,3,21,16,1,89,6
1460DATA1,109,4,1,121,4,1,117,8,1,109,4
1470DATA1,101,4,1,97,4,1,101,4,1,109,4
1480DATA1,97,4,1,101,32
1490REM Data for Music
1500DATA 125,3,129,3,129,3,129,3,125,3,129,3,129,3,12
9,3
1510DATA 125,3,129,3,129,3,129,3,125,3,129,3,129,3,12
9,3
1520DATA 117,6,109,3,117,6,109,3,117,3,109,3,117,13,1
09,13
1530DATA 113,3,117,3,117,3,117,3,113,3,117,3,117,3,11
7,3
1540DATA 113,3,117,3,117,3,117,3,113,3,117,3,117,3,11
7,3
1550DATA 117,6,109,3,117,6,109,3,117,3,109,3,129,25
1560DATA SHINGOSOF,HERMANN THE GREAT,EVIL DR SINCLIV
E,MADONNA
1570DATA RONNY REAGAN,BORN IN THE U.S.A.,MAX THROTTLE
,MR. USELESS
```


(continued from page 68)

movement. So you must not move around the screen wildly disposing of all the blocks because you will soon find that you are totally stuck!

However, seemingly impossible situations may be got out of by using the scroll feature. By pressing A and J, the row Hermann is in will move left or right. Of course, the bomb must be defused before it goes off — indicated by the time on the bottom half of the bomb — and there are 10 monsters roving about the screen intent on capturing Hermann! As you progress, pot holes will appear further restricting your movement.

Screens may be cleared quite easily if you

ignore the bonus feature but in order to obtain any decent score, you must go for the bonus points.

The game ends if Hermann is eaten by a monster, you run out of time or you try to defuse the bomb before you have collected all the weapons. If you have achieved a good score, you will be asked to enter your name in the hall of fame for posterity.

During the game, sound output may be disabled by pressing Q and enabled by pressing S. Remember, that if you disable the sound, nothing will happen while the micro is playing the intro music. So there will be a slight delay before the game starts. Don't press Break thinking the

machine has crashed!

It is because of the Beeb's ridiculously small memory capacity that I split up the program into so many small sections.

However, the graphics and sound effects are rather special for a magazine listing and the game itself is very good fun. So please have a go at typing it in.

If you do not have the time to type in the listings, I can supply cassette copies of the game for £2.50. Please send cheques or postal orders made payable to Shingo Sugiura to the following address: 20 Oakfield Gardens, Dulwich Wood Avenue, London SE19 1HF.

Listing 3.

```
10REM Machine code
20REM By Shingo Sugiura
30REM (C) July 1985
40
50HIMEM:=$A30:DEF:82050
60DATA:6253
70PROC:ASC
80CHAIN ESCAPE
90END
100DEFPROC:ASC
110CALL:870:AD:=$72:TEMP:=$A:TEMP:=$2C:WORK:=$60:SCORE
120AD:=$2F90
130ASC:=$FFEE:ASC:=$FF1F:OBYTE:=$FF4
140FOR:PASS:=$0252:STEP:1:PA:=$B00
150IF:PASS
160PHA:JSR:ADDRESS:PLA
170JSR:CALL:JSR:SPRINT
180CALL:LD:AD:AD:=$A0:STA:AD1
190LD:AD1:AD:=$2:STA:AD1+1
200CALL:LD:AD2:AD:=$2:STA:AD2
210LD:AD2:AD:=$0:STA:AD2+1
220JMP:SPRINT
230SPRINT:LD:=$31
240LOOP
250LD:AD2:Y:STA:AD1:Y:DEV:BPL:LOOP
260RTS
270BLANK
280JSR:ADDRESS:JSR:ASC
290CALL:LD:AD1:AD:=$A0:STA:AD1:LD:AD1:AD:=$2:STA:AD1+1
300JMP:ASC
310ERASE:LD:AD:=$31:LOOP:STA:AD1:Y:DEV:BPL:LOOP
320RTS
330ADDRESS
340TVA:STA:AD1+1:ASL:A:ASL:A
350CALL:ADC:AD1:STA:AD1+1:LD:AD:=$A0:STA:AD1
360RTS
370STA:TEMP+1
380LD:AD:=$0:STA:TEMP
390LSR:TEMP+1:ROR:TEMP:LSR:TEMP+1
```

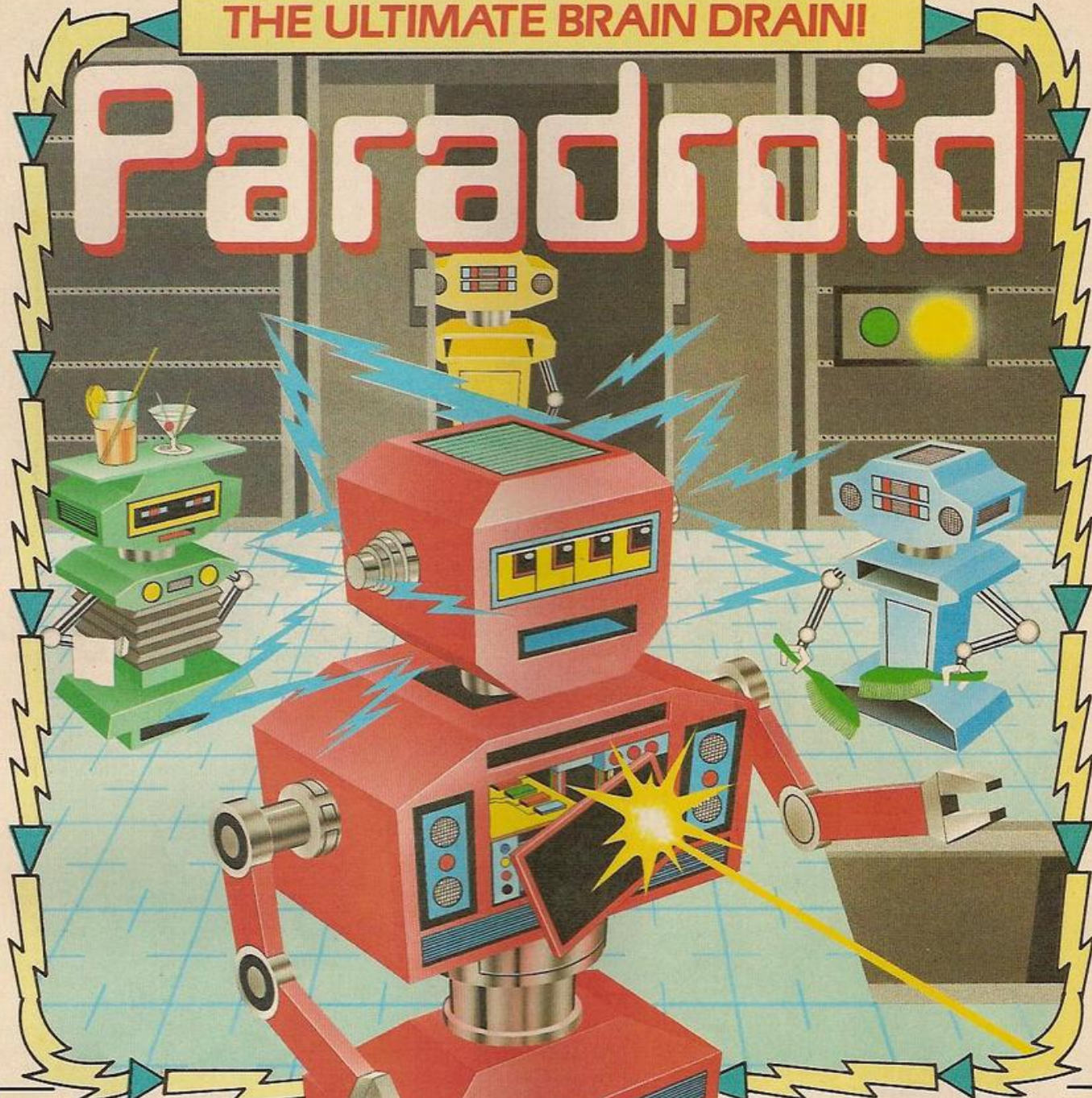
Listing 4.

```
10REM Hermann in the Great Escape
20REM (C) July 1985
30
40HIMEM:=$A30
50HIMEM:=$A30:DEF:82050
60DATA:6253
70PROC:ASC
80CHAIN ESCAPE
90END
100DEFPROC:ASC
110CALL:870:AD:=$72:TEMP:=$A:TEMP:=$2C:WORK:=$60:SCORE
120AD:=$2F90
130ASC:=$FFEE:ASC:=$FF1F:OBYTE:=$FF4
140FOR:PASS:=$0252:STEP:1:PA:=$B00
150IF:PASS
160PHA:JSR:ADDRESS:PLA
170JSR:CALL:JSR:SPRINT
180CALL:LD:AD:AD:=$A0:STA:AD1
190LD:AD1:AD:=$2:STA:AD1+1
200CALL:LD:AD2:AD:=$2:STA:AD2
210LD:AD2:AD:=$0:STA:AD2+1
220JMP:SPRINT
230SPRINT:LD:=$31
240LOOP
250LD:AD2:Y:STA:AD1:Y:DEV:BPL:LOOP
260RTS
270BLANK
280JSR:ADDRESS:JSR:ASC
290CALL:LD:AD1:AD:=$A0:STA:AD1:LD:AD1:AD:=$2:STA:AD1+1
300JMP:ASC
310ERASE:LD:AD:=$31:LOOP:STA:AD1:Y:DEV:BPL:LOOP
320RTS
330ADDRESS
340TVA:STA:AD1+1:ASL:A:ASL:A
350CALL:ADC:AD1:STA:AD1+1:LD:AD:=$A0:STA:AD1
360RTS
370STA:TEMP+1
380LD:AD:=$0:STA:TEMP
390LSR:TEMP+1:ROR:TEMP:LSR:TEMP+1
```

```
1:ROR:TEMP
2:CALL:LD:AD1:ADC:TEMP:STA:AD1
3:LD:AD1:AD:=$1:ADC:TEMP:STA:AD1+1
4:ROR:TEMP
5:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
6:ROR:TEMP
7:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
8:ROR:TEMP
9:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
10:ROR:TEMP
11:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
12:ROR:TEMP
13:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
14:ROR:TEMP
15:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
16:ROR:TEMP
17:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
18:ROR:TEMP
19:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
20:ROR:TEMP
21:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
22:ROR:TEMP
23:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
24:ROR:TEMP
25:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
26:ROR:TEMP
27:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
28:ROR:TEMP
29:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
30:ROR:TEMP
31:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
32:ROR:TEMP
33:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
34:ROR:TEMP
35:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
36:ROR:TEMP
37:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
38:ROR:TEMP
39:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
40:ROR:TEMP
41:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
42:ROR:TEMP
43:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
44:ROR:TEMP
45:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
46:ROR:TEMP
47:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
48:ROR:TEMP
49:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
50:ROR:TEMP
51:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
52:ROR:TEMP
53:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
54:ROR:TEMP
55:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
56:ROR:TEMP
57:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
58:ROR:TEMP
59:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
60:ROR:TEMP
61:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
62:ROR:TEMP
63:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
64:ROR:TEMP
65:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
66:ROR:TEMP
67:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
68:ROR:TEMP
69:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
70:ROR:TEMP
71:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
72:ROR:TEMP
73:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
74:ROR:TEMP
75:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
76:ROR:TEMP
77:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
78:ROR:TEMP
79:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
80:ROR:TEMP
81:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
82:ROR:TEMP
83:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
84:ROR:TEMP
85:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
86:ROR:TEMP
87:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
88:ROR:TEMP
89:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
90:ROR:TEMP
91:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
92:ROR:TEMP
93:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
94:ROR:TEMP
95:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
96:ROR:TEMP
97:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
98:ROR:TEMP
99:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
100:ROR:TEMP
101:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
102:ROR:TEMP
103:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
104:ROR:TEMP
105:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
106:ROR:TEMP
107:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
108:ROR:TEMP
109:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
110:ROR:TEMP
111:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
112:ROR:TEMP
113:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
114:ROR:TEMP
115:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
116:ROR:TEMP
117:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
118:ROR:TEMP
119:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
120:ROR:TEMP
121:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
122:ROR:TEMP
123:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
124:ROR:TEMP
125:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
126:ROR:TEMP
127:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
128:ROR:TEMP
129:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
130:ROR:TEMP
131:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
132:ROR:TEMP
133:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
134:ROR:TEMP
135:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
136:ROR:TEMP
137:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
138:ROR:TEMP
139:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
140:ROR:TEMP
141:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
142:ROR:TEMP
143:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
144:ROR:TEMP
145:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
146:ROR:TEMP
147:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
148:ROR:TEMP
149:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
150:ROR:TEMP
151:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
152:ROR:TEMP
153:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
154:ROR:TEMP
155:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
156:ROR:TEMP
157:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
158:ROR:TEMP
159:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
160:ROR:TEMP
161:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
162:ROR:TEMP
163:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
164:ROR:TEMP
165:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
166:ROR:TEMP
167:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
168:ROR:TEMP
169:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
170:ROR:TEMP
171:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
172:ROR:TEMP
173:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
174:ROR:TEMP
175:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
176:ROR:TEMP
177:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
178:ROR:TEMP
179:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
180:ROR:TEMP
181:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
182:ROR:TEMP
183:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
184:ROR:TEMP
185:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
186:ROR:TEMP
187:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
188:ROR:TEMP
189:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
190:ROR:TEMP
191:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
192:ROR:TEMP
193:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
194:ROR:TEMP
195:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
196:ROR:TEMP
197:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
198:ROR:TEMP
199:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
200:ROR:TEMP
201:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
202:ROR:TEMP
203:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
204:ROR:TEMP
205:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
206:ROR:TEMP
207:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
208:ROR:TEMP
209:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
210:ROR:TEMP
211:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
212:ROR:TEMP
213:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
214:ROR:TEMP
215:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
216:ROR:TEMP
217:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
218:ROR:TEMP
219:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
220:ROR:TEMP
221:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
222:ROR:TEMP
223:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
224:ROR:TEMP
225:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
226:ROR:TEMP
227:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
228:ROR:TEMP
229:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
230:ROR:TEMP
231:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
232:ROR:TEMP
233:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
234:ROR:TEMP
235:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
236:ROR:TEMP
237:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
238:ROR:TEMP
239:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
240:ROR:TEMP
241:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
242:ROR:TEMP
243:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
244:ROR:TEMP
245:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
246:ROR:TEMP
247:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
248:ROR:TEMP
249:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
250:ROR:TEMP
251:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
252:ROR:TEMP
253:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
254:ROR:TEMP
255:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
256:ROR:TEMP
257:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
258:ROR:TEMP
259:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
260:ROR:TEMP
261:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
262:ROR:TEMP
263:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
264:ROR:TEMP
265:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
266:ROR:TEMP
267:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
268:ROR:TEMP
269:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
270:ROR:TEMP
271:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
272:ROR:TEMP
273:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
274:ROR:TEMP
275:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
276:ROR:TEMP
277:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
278:ROR:TEMP
279:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
280:ROR:TEMP
281:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
282:ROR:TEMP
283:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
284:ROR:TEMP
285:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
286:ROR:TEMP
287:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
288:ROR:TEMP
289:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
290:ROR:TEMP
291:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
292:ROR:TEMP
293:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
294:ROR:TEMP
295:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
296:ROR:TEMP
297:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
298:ROR:TEMP
299:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
300:ROR:TEMP
301:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
302:ROR:TEMP
303:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
304:ROR:TEMP
305:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
306:ROR:TEMP
307:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
308:ROR:TEMP
309:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
310:ROR:TEMP
311:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
312:ROR:TEMP
313:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
314:ROR:TEMP
315:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
316:ROR:TEMP
317:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
318:ROR:TEMP
319:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
320:ROR:TEMP
321:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
322:ROR:TEMP
323:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
324:ROR:TEMP
325:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
326:ROR:TEMP
327:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
328:ROR:TEMP
329:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
330:ROR:TEMP
331:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
332:ROR:TEMP
333:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
334:ROR:TEMP
335:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
336:ROR:TEMP
337:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
338:ROR:TEMP
339:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
340:ROR:TEMP
341:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
342:ROR:TEMP
343:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
344:ROR:TEMP
345:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
346:ROR:TEMP
347:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
348:ROR:TEMP
349:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
350:ROR:TEMP
351:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
352:ROR:TEMP
353:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
354:ROR:TEMP
355:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
356:ROR:TEMP
357:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
358:ROR:TEMP
359:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
360:ROR:TEMP
361:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
362:ROR:TEMP
363:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
364:ROR:TEMP
365:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
366:ROR:TEMP
367:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
368:ROR:TEMP
369:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
370:ROR:TEMP
371:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
372:ROR:TEMP
373:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
374:ROR:TEMP
375:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
376:ROR:TEMP
377:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
378:ROR:TEMP
379:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
380:ROR:TEMP
381:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
382:ROR:TEMP
383:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
384:ROR:TEMP
385:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
386:ROR:TEMP
387:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
388:ROR:TEMP
389:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
390:ROR:TEMP
391:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
392:ROR:TEMP
393:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
394:ROR:TEMP
395:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
396:ROR:TEMP
397:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
398:ROR:TEMP
399:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
400:ROR:TEMP
401:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
402:ROR:TEMP
403:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
404:ROR:TEMP
405:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
406:ROR:TEMP
407:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
408:ROR:TEMP
409:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
410:ROR:TEMP
411:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
412:ROR:TEMP
413:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
414:ROR:TEMP
415:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
416:ROR:TEMP
417:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
418:ROR:TEMP
419:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
420:ROR:TEMP
421:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
422:ROR:TEMP
423:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
424:ROR:TEMP
425:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
426:ROR:TEMP
427:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
428:ROR:TEMP
429:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
430:ROR:TEMP
431:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
432:ROR:TEMP
433:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
434:ROR:TEMP
435:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
436:ROR:TEMP
437:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
438:ROR:TEMP
439:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
440:ROR:TEMP
441:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
442:ROR:TEMP
443:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
444:ROR:TEMP
445:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
446:ROR:TEMP
447:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
448:ROR:TEMP
449:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
450:ROR:TEMP
451:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
452:ROR:TEMP
453:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
454:ROR:TEMP
455:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
456:ROR:TEMP
457:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
458:ROR:TEMP
459:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
460:ROR:TEMP
461:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
462:ROR:TEMP
463:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
464:ROR:TEMP
465:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
466:ROR:TEMP
467:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
468:ROR:TEMP
469:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
470:ROR:TEMP
471:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
472:ROR:TEMP
473:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
474:ROR:TEMP
475:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
476:ROR:TEMP
477:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
478:ROR:TEMP
479:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
480:ROR:TEMP
481:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
482:ROR:TEMP
483:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
484:ROR:TEMP
485:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
486:ROR:TEMP
487:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
488:ROR:TEMP
489:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
490:ROR:TEMP
491:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
492:ROR:TEMP
493:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
494:ROR:TEMP
495:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
496:ROR:TEMP
497:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
498:ROR:TEMP
499:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
500:ROR:TEMP
501:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
502:ROR:TEMP
503:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
504:ROR:TEMP
505:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
506:ROR:TEMP
507:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
508:ROR:TEMP
509:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
510:ROR:TEMP
511:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
512:ROR:TEMP
513:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
514:ROR:TEMP
515:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
516:ROR:TEMP
517:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
518:ROR:TEMP
519:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
520:ROR:TEMP
521:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
522:ROR:TEMP
523:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
524:ROR:TEMP
525:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
526:ROR:TEMP
527:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
528:ROR:TEMP
529:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
530:ROR:TEMP
531:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
532:ROR:TEMP
533:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
534:ROR:TEMP
535:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
536:ROR:TEMP
537:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
538:ROR:TEMP
539:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
540:ROR:TEMP
541:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
542:ROR:TEMP
543:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
544:ROR:TEMP
545:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
546:ROR:TEMP
547:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
548:ROR:TEMP
549:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
550:ROR:TEMP
551:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
552:ROR:TEMP
553:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
554:ROR:TEMP
555:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
556:ROR:TEMP
557:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
558:ROR:TEMP
559:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
560:ROR:TEMP
561:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
562:ROR:TEMP
563:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
564:ROR:TEMP
565:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
566:ROR:TEMP
567:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
568:ROR:TEMP
569:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
570:ROR:TEMP
571:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
572:ROR:TEMP
573:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
574:ROR:TEMP
575:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
576:ROR:TEMP
577:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
578:ROR:TEMP
579:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
580:ROR:TEMP
581:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
582:ROR:TEMP
583:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
584:ROR:TEMP
585:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
586:ROR:TEMP
587:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
588:ROR:TEMP
589:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
590:ROR:TEMP
591:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
592:ROR:TEMP
593:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
594:ROR:TEMP
595:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
596:ROR:TEMP
597:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
598:ROR:TEMP
599:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
600:ROR:TEMP
601:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
602:ROR:TEMP
603:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
604:ROR:TEMP
605:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
606:ROR:TEMP
607:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
608:ROR:TEMP
609:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
610:ROR:TEMP
611:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
612:ROR:TEMP
613:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
614:ROR:TEMP
615:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
616:ROR:TEMP
617:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
618:ROR:TEMP
619:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
620:ROR:TEMP
621:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
622:ROR:TEMP
623:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
624:ROR:TEMP
625:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
626:ROR:TEMP
627:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
628:ROR:TEMP
629:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
630:ROR:TEMP
631:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
632:ROR:TEMP
633:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
634:ROR:TEMP
635:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
636:ROR:TEMP
637:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
638:ROR:TEMP
639:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
640:ROR:TEMP
641:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
642:ROR:TEMP
643:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
644:ROR:TEMP
645:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
646:ROR:TEMP
647:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
648:ROR:TEMP
649:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
650:ROR:TEMP
651:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
652:ROR:TEMP
653:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
654:ROR:TEMP
655:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
656:ROR:TEMP
657:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
658:ROR:TEMP
659:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
660:ROR:TEMP
661:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
662:ROR:TEMP
663:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
664:ROR:TEMP
665:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
666:ROR:TEMP
667:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
668:ROR:TEMP
669:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
670:ROR:TEMP
671:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
672:ROR:TEMP
673:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
674:ROR:TEMP
675:CALL:LD:AD1:ADC:TEMP:STA:AD1+1
676:ROR:TEMP
6
```


THE ULTIMATE BRAIN DRAIN!

Paradroid



Beam aboard our giant space freighter for galactic action that'll leave you breathless! Your mission is to clear the ship of crazed droids using a new gadget called an Influence Device. You are weak so you must trap a droid and take control through mental fusion. Blast other droids to clear the ship. Be warned, your droid will soon become exhausted so you have to keep transferring. What's more, droids are graded in strength. You have to decide in a few milli-seconds whether you can

tackle the next approaching droid: any mistake could crush you utterly!

There's a consul for checking droid status, but you'll have to chase them from the engine room to the bridge—it's a tough mission! Spectacular graphics spread over 18 decks with constantly updated status menus and exciting sound make Paradroid compulsive playing. Find out how your brain power compares with a droid today!

For the Commodore 64 £7.95



Heathrow ATC
Simulation
For BBC/Electron & C64 £7.95



HEWSON CONSULTANTS

56b Milton Trading Estate, Milton, Abingdon, Oxon, OX14 4RX.

For mail order send cheque/postal order made payable to Hewson Consultants. For credit card sales state your Access/Barclaycard number and enclose a specimen signature. Don't forget to enclose your own name and address.



Gribbly's Day Out
Arcade Adventure
For Commodore 64 £7.95

As part of our continuing development of innovative software we are always happy to evaluate software sent to us with a view to publication.

Code dump.

```

28672: CD987921B876CD3D7501 = 1197
28682: DC05CDB1711808CD1D74 = 1102
28692: CD0F7338183E01CDB4BB = 1050
28702: CD6CBB3E00CDB4BB2181 = 1296
28712: 75CD3D75CD0F7330E021 = 1140
28722: 5E72CD2B71CD59703E42 = 1103
28732: CD1EBB280E212271CDF7 = 1108
28742: 703E10CD1EBBC018CAED = 1267
28752: 5B917FCD327318C1C9CD = 1356
28762: 4A79CD7079CD89793E42 = 1224
28772: CD1EBBC0DA477CD267D = 1470
28782: 300FCDF4743A937F3D32 = 1071
28792: 937FFE00C818DDCDF777 = 1544
28802: 300FCDF4743A937F3D32 = 1071
28812: 937FFE00C818C9CD447F = 1353
28822: 30C7211972CD2B71CD15 = 1006
28832: 753AA97F3C32A97F3A90 = 1079
28842: 7F3C32907FFE0620A93E = 1031
28852: 0132907F3AA87F3C32A8 = 953
28862: 7F189BF5C5D5E5ED4BC6 = 1700
28872: 7FED5BC47F151DCB23CB = 1269
28882: 237B825F16007C21E770 = 905
28892: 195682CD027BE1D1C1F1 = 1439
28902: C9030600050804050000 = 232
28912: 07030807000604F5C5D5 = 690
28922: E5DDE5CDAABCDE1E1D1 = 2122
28932: C1F1C9820001C800000F = 981
28942: E803820002E803000FFF = 872
28952: 7F820002F401000FFF7F = 901
28962: 87000000000000000000 = 381
28972: C5D5E5DDE57E32BB7F23 = 1614
28982: 7E32BC7F237E32C07F23 = 1056
28992: 4E234623ED43C17F4E23 = 955
29002: 462378A1FEFF200F4E23 = 1055
29012: 462378B1FE00284ECDB1 = 1156
29022: 7118E73EB132BA7FED43 = 1274
29032: BD7FC5E521BA7FCDAAAB = 1651
29042: E1C13EAA32BA7FE56069 = 1443
29052: 09444DE1ED43BD7FC5E5 = 1425
29062: 21BA7FCDAAABCE1C13E9C = 1545
29072: 32BA7FE5606909444DE1 = 1172
29082: ED43BD7FC5E521BA7FCD = 1597
29092: AABCE1C1189EDDE1E1D1 = 1838
29102: C1F1C9F5C5E5D5210000 = 1552
29112: 110000CD10BDCD0BD7C = 958
29122: B820F97DB920F5D1E1C1 = 1679
29132: F1C901000F00009201FF = 860
29142: FF2D00AA01FFFF2D00DE = 1248
29152: 01FFFF2D009201FFFF2D = 1258
29162: 00AA01FFFF2D00DE01FF = 1204
29172: FF2D00FA01FFFF2D00AA = 1276
29182: 01FFFF2D00DE01FFFF5A = 1379
29192: 007E02FFFF5A00BC03FF = 1174
29202: FF0E01FFFF00000200FF = 797
29212: 00003C00FFFF5A005000 = 740
29222: FFFF3C005000FFFF1E00 = 1190
29232: 3C00FFFF5A003500FFFF = 1223
29242: 5A002F00FFFF5A003500 = 790
29252: FFFF1E002F00FFFF1E00 = 1127
29262: 3500FFFF1E003C00FFFF = 616
29272: 5A00FFFF000001000FFF = 1033
29282: 005F00FFFF43006A00FF = 1079
29292: FF21007700FFFF43005F = 1209
29302: 00FFFF21005900FFFF43 = 999
29312: 005F00FFFF21006A00FF = 1049
29322: FF43005900FFFF21005F = 1226
29332: 00FFFF43006A00FFFF21 = 1046
29342: 007700FFFF43005F00FF = 1163
29352: FF21006A00FFFF64009F = 1282
29362: 00FFFF64005F00FFFF43 = 1023
29372: 006A00FFFF21007700FF = 1049
29382: FF43005F00FFFF21005F = 1215
29392: 00FFFF43005F00FFFF21 = 1027
29402: 006A00FFFF43005900FF = 1066
29412: FF21005F00FFFF43006A = 1239
29422: 00FFFF21007700FFFF43 = 1044
29432: 007F00FFFF21007700FF = 1494
29442: FF6400E00FFFF8700FF = 998
29452: FF0000C5E5D500011150 = 1035
29462: C33E2FCD1EBB280537D1 = 1470
29472: E1C1C91B7AB3FE0020ED = 1636
29482: 10E8373FD1E1C19F5C5 = 1391
29492: D5E5DDE5DD2173740608 = 1092
29502: DD6E00DD6601373FED52 = 784
29512: 380BD511100DD19D110 = 1278
29522: EB1875C5CB20CB20CB20 = 934
29532: CB20480600D511F27421 = 1643
29542: E274EDB8D1DD7300DD72 = 841
29552: 01DD360220DD360320DD = 683
29562: 360420DD360520DD3606 = 882
29572: 20DD360720DD360820DD = 698
29582: 360920DD360A20DD360B = 892
29592: 20DD360C20DD360D20DD = 772
29602: 360E20DD360F20CD1D74 = 1104
29612: 21A376CD3D75C13E0890 = 1120
29622: CB27C6056F2611CD75BB = 1294
29632: DDE5E12323060ECD173 = 1294

```

BLOKKER

BLOKKER consists of a number of moving objects leaving trails. The player controls one of these and must avoid all the trails, including his own, and the sides of the screen, whilst trying to force his opponents to hit something and hence die. If all the enemy are killed, the player reaches a new sheet. As the sheets progress the enemy become faster and more plentiful. If the player runs out of fuel he dies, but fuel remaining at the end of a sheet earns a points bonus. The game includes, of course, a high score table.

As the game is all in machine code typing it in is simple but boring. First you should make sure you have a tape or disc with space on it. When you are ready, type in the Basic listing. This is a loader for the machine code. On running — it may be a good idea to save it first — you will see a number on the screen. This should correspond to the first number in the code dump. You should now input the next 20 digits in one string.

When you have done so there should be an equals sign displayed. Now type in and enter the last number in the first line of the dump. If all is well you should get a number 10 bigger than the first on the next line and you can repeat the process as before.

Eventually the computer will tell you you have

finished. Hopefully this will be at the end of the dump. You can now save the machine code. First make a copy saved ordinarily i.e.:

SAVE "BLOCKCODE",b,&7000,3980

or the equivalent disc command. This copy can be run by loading it and calling &7000. You may like to use a Basic loader for the form:

10 MEMORY &6FF0

20 load""

30 call &7000

The loader would need to precede the code on tape. If on disc a file name would need to be put in line 20.

Saved to autorun

Alternatively the code can be saved so as to autorun by saving it with the line SAVE "BLOKKER",b,&7000,3980,&7000.

Please note that if this is done it is impossible to return from the game to Basic and the game must be run and not loaded.

The keys used for playing the game are given when the game is run, but there are other keys which can be used to control the program

TAB pauses the game

ESC aborts a game

CLR and ESC return to Basic if possible.

```

29642: DDE1E1D1C1F1C9F5C5E5 = 2186
29652: D5F5C5D5E5CD03BBE1D1 = 1926
29662: C1F10E00CD06BBFE0D28 = 1153
29672: 2FFE7F20153E00B928F0 = 1008
29682: 2B36200D3E08CD5ABB3E = 756
29692: 10CD5ABB18E0FE2038DC = 1308
29702: FE8030D85779B28D372 = 1403
29712: 230C7ACD5ABB18CAD1E1 = 1311
29722: C1F1C9F5C5D5E53E01CD = 1787
29732: B4BBD6C6BB3E00CDB4BB = 1501
29742: 217175CD3D7511737406 = 900
29752: 083E0890CB27C6056F26 = 816
29762: 0BCD75BB051A4F131A47 = 938
29772: 13CD6278CD17793E20CD = 1090
29782: 5ABB060E21AA7F1A7713 = 791
29792: 2310FA36FF21AA7FCD3D = 1206
29802: 75C110CBED1D1C1F1C934 = 1650
29812: 08536F61707920746865 = 885
29822: 20317374200807546865 = 648
29832: 205365636F6E64202020 = 732
29842: 20DC0554686520546869 = 871
29852: 7264202020202020B0044E = 632
29862: 756D62657220466F7572 = 983
29872: 20202084034E616D6520 = 648
29882: 46697665202020202058 = 642
29892: 02536978746820506572 = 857
29902: 736F6E202020C01377468 = 720
29912: 20537472616E67657220 = 902
29922: 20200000427574206E6F = 616
29932: 74206C6561737420F5C5 = 1159
29942: D5E53E01061A0E0FCD32 = 821
29952: BC21CE71CD2B713E0106 = 970
29962: 180E18CD32BCE1D1C1F1 = 1373
29972: C9C5E5210771CDF7703E = 1406
29982: 01328D7FCD0F777380DCD = 1164
29992: F7773808010100CD3978 = 814
30002: 18EE212271CDF770E1C1 = 1424
30012: C9F5E57EFFF8206CD5A = 1651
30022: BB2318F5E1F1C91F0102 = 1192
30032: 4C697665731F10025363 = 746
30042: 6F72651F200253686565 = 780
30052: 74FF1F070220201F2602 = 546
30062: 2020FF1F0F02546F7020 = 706
30072: 42C6F6B6B657273FF1F = 1115
30082: 0E020F0142204C204F20 = 349
30092: 4B204B204520521F0E04 = 446
30102: 0F03427920435420696E = 635
30112: 20313938351F03070F01 = 304
30122: 546865204F626A56374 = 920
30132: 206F6620746865204761 = 798

```

```

30142: 6D6520697320746F2053 = 836
30152: 7572766976650A0D546F = 891
30162: 2068697420736F6D6574 = 941
30172: 68696E672C6576656E20 = 928
30182: 796F757273656C662C69 = 1038
30192: 7320746F204469655468 = 868
30202: 65206561736965737420 = 915
30212: 77617920746F20556E64 = 923
30222: 65727374616E64206973 = 1005
30232: 20746F20506C61791F11 = 745
30242: 0A486F6E6573746C791F = 895
30252: 0B0D4B4559533A1F140E = 463
30262: 5D2055701F140F5C2044 = 580
30272: 6F776E1F14105A204C65 = 706
30282: 66741F14115820526967 = 696
30292: 68741F10125368696674 = 795
30302: 20666F72205370656564 = 888
30312: 1F0514596F75206D6179 = 732
30322: 2C6F6620636F75727365 = 946
30332: 2C757365206120486F79 = 844
30342: 737469636B1F0C161853 = 714
30352: 50414345204241522054 = 642
30362: 4F20535441525418FF1F = 819
30372: 0D1618456E7465722059 = 690
30382: 6F7572204E616D6518FF = 1038
30392: 1F0E0242204C204F204B = 439
30402: 204B204520521F080941 = 435
30412: 6C6C2042797465732050 = 879
30422: 726F6772616D65656420 = 990
30432: 62792043541F060A496E = 632
30442: 20746865207365636F6E = 921
30452: 64207765656B206F6620 = 837
30462: 4A756C79202738351F08 = 639
30472: 0B466F7220596F757220 = 801
30482: 436F6D7075746572206D = 988
30492: 6167617A696E651F0710 = 789
30502: 5468616E6B7320746F20 = 908
30512: 4D722053746576656E20 = 884
30522: 436F70656C616E641F0A = 847
30532: 11466F72204A696E676C = 844
30542: 657320616E6420546869 = 880
30552: 6E6773FFF5C5E53E02CD = 1523
30562: B4BB26262E02CD75BB3A = 1058
30572: A97F4F0600CD6278B2C = 1053
30582: 793E00CDB4BBE1C1F1C9 = 1615
30592: F5C5E53A937F4F0600CD = 1293
30602: 62783E02CDB4BB26072E = 945
30612: 02CD75BBDC2C793E00CD = 1148
30622: B4BBE1C1F1C9F5E5C5DD = 2119
30632: E53E44CD1EBB281BCDB6 = 1235

```


Colin Turner
makes life
difficult on
the Amstrad.

Score 00410

Basic program.

```
10 REM Basic code loader
15 MEMORY 28670
40 FOR a=0 TO 3970 STEP 10
50 PRINT a+28672;" ";
70 INPUT a$:x=0:t=0
75 FOR n=1 TO LEN(a$) STEP 2
80 p=VAL("&"+MID$(a$,n,2))
90 POKE (a+x+28672),p
100 t=t+p:x=x+1
110 NEXT
115 PRINT "=";
120 INPUT c
130 IF c<>t THEN PRINT CHR$(7)
; "Error in Data":GOTO 50
140 NEXT
150 PRINT "Data Entered Correct
ly"
```

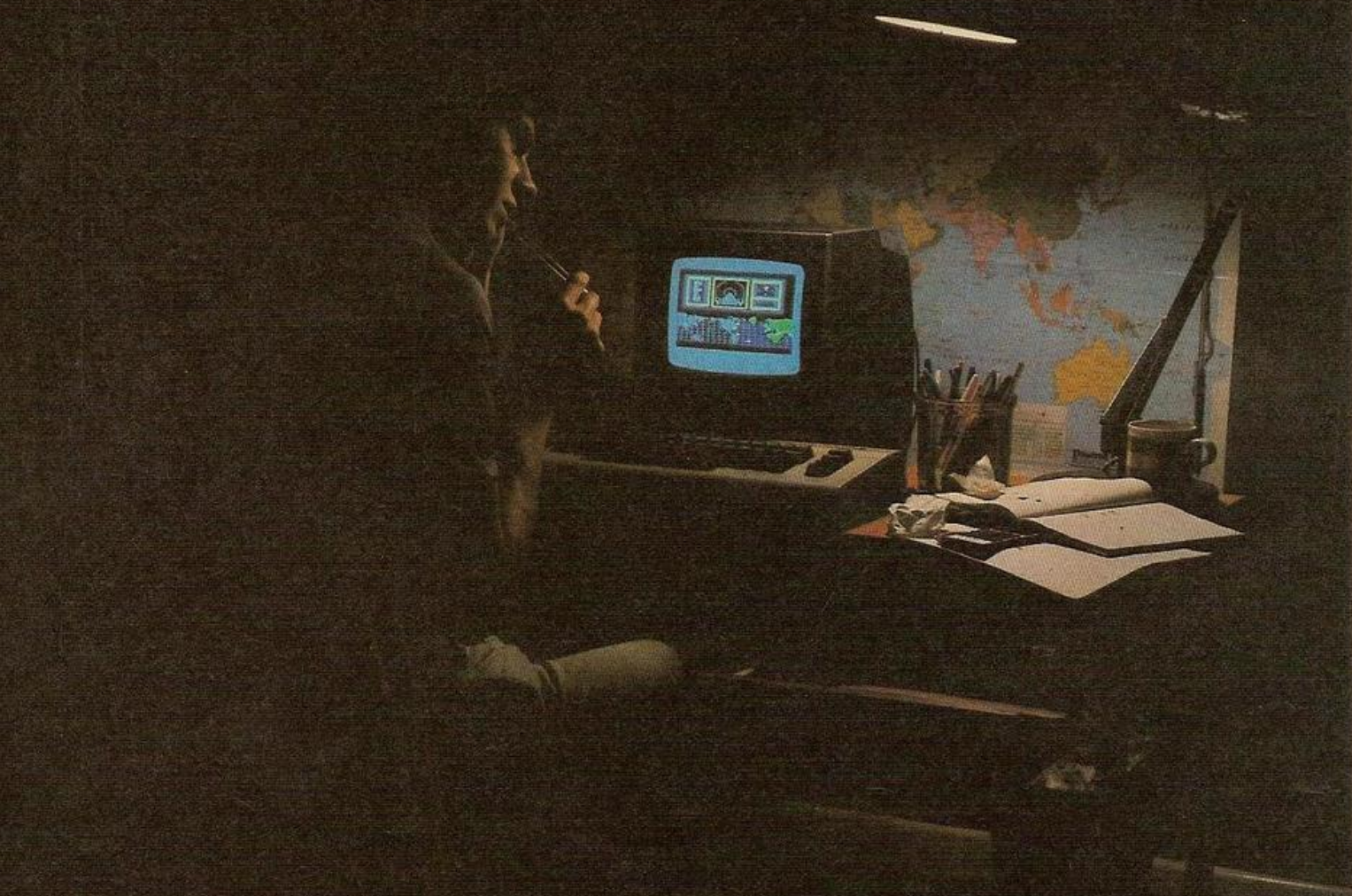
```
30642: BC3E44CD1EBB20F93E44 = 1151
30652: CD1EBB20F93E44CD1EBB = 1263
30662: 20F9CDB9BCDD1C1E1F1 = 1964
30672: C9F5C5D5E5213F0122A6 = 1382
30682: 7F3E00CDD1EBB1100021 = 853
30692: 1600CDEABB1180022116 = 850
30702: 00CDF6BBE1D1C1F1C9F5 = 1952
30712: C5D5E53E03CDD1EBB3A8D = 1517
30722: 7FFE01200406011800206 = 457
30732: 03C5E5D5BA67FEB29EB21 = 1365
30742: 1600CDEABB2AA67F7CB5 = 1288
30752: FE002007C1E1D1C1F137 = 1409
30762: C92B22A67FC110DBE1D1 = 1433
30772: C1F1373FC9F5E5C52A91 = 1611
30782: 7F0922917F3E02CDB4BB = 1078
30792: 26162E02CD75BBED4B91 = 1074
30802: 7FCD6278CD17793E00CD = 1166
30812: B4BBCE1E1F1C9F5C5E5D5 = 2111
30822: 219C7F229A7FED43947F = 1210
30832: 060421C97822987F2A98 = 871
30842: 7F4E2322987F2A987F5E = 968
30852: 23562322987F2A987F37 = 841
30862: 3FED5222967F30070D79 = 882
30872: FEFF20E40C2A9A7F7123 = 1252
30882: 229A7F2A967F22947F2A = 985
30892: 987F79FE0280523230D = 782
30902: 18F622987F10BB2A9A7F = 1109
30912: 3A947F77D1E1C1F1C906 = 1527
30922: 60EA50C3409C3075204E = 1100
30932: 10270000092823401F58 = 322
30942: 1B70178813A00FB80BD0 = 895
30952: 07E80300000984032003 = 421
30962: BC025802F40190012C01 = 715
30972: C80640000000095A0050 = 479
30982: 0046003C00320028001E = 250
30992: 0014000A000000F5C5E5 = 701
31002: 219C7F06057EC630CD5A = 994
31012: BB2310F7E1C1F1C9C5E5 = 1771
31022: F5219C7F06047FEF0020 = 983
31032: 032310F8047EC630CD5A = 973
31042: BB2310F7F1E1C1C90100 = 1346
31052: 00ED43917F3E0332937F = 965
31062: 3E0132907F32A97F0100 = 731
31072: 00CD39783E0032A87F21 = 822
31082: 6675CD3D75C9CDD17ACD = 1528
31092: 9C7DCD417ACD177CD5C = 1503
31102: 77CD8077211071CDF770 = 1297
31112: C9C5F501983A0B78B1FE = 1416
31122: 0020F9F1C1C93E01CD0E = 1198
31132: BC3E00010000CD32BC3E = 756
```

```
31142: 0106180E18CD32BC3E02 = 576
31152: 06060E06CD32BC3E0306 = 546
31162: 0E0E0ECD32BC060E0E0E = 533
31172: CD38BC3E01CDB4BB2100 = 1117
31182: 0016271E16CD66BB3E00 = 669
31192: CDB4BB3E02CDB4BB2600 = 1246
31202: 16271E172E18CD66BB3E = 740
31212: 00CD90BB3E03CD96BB3D = 1348
31222: 6CBB214D75CD3D753E00 = 967
31232: CDB4BB26022E02CD3EBC = 1115
31242: 3E01212B7ACDDBCB3E02 = 906
31252: 212F7ACDDBCB3E012133 = 930
31262: 7ACDDBCB3E02213A7ACD = 1188
31272: BFBCC9010FFF03010FFF = 1125
31282: 02820A010105F018206 = 541
31292: 040106FC010E0C0615ED = 554
31302: 438B7F3E01328E7F328D = 906
31312: 7F0E0C06153E01CD5E7A = 664
31322: CD027BC9C5E5D521C87F = 1530
31332: 58160019F579FE002807 = 802
31342: 47112A001910FDF177D1 = 993
31352: E1C1C9C5E5D521C87F58 = 1706
31362: 16001979FE0028074711 = 557
31372: 2A001910FDF177D1E1C9 = 1290
31382: FE01280DFE02280BFE03 = 872
31392: 2809FE042807C90DC904 = 773
31402: C90CC905C9E5D521BD7A = 1406
31412: 3D5F1600197ED1E1C903 = 967
31422: 040102F5C53E01CDB4BB = 1084
31432: CD6CBB3E00CDB4BB0100 = 1135
31442: 0078FE002814FE292810 = 785
31452: 79FE00280BFE1828073E = 813
31462: 00CD5E7A18053E02CD5E = 813
31472: 7A0478FE2A20DC0600C = 812
31482: 79FE1920D4C1F1C9DDE5 = 1729
31492: FDE5C5D5E5F5CB27CB27 = 1850
31502: CB27CB275F1600FD2148 = 959
31512: 7BFD19050D6069CD1ABC = 1039
31522: E5DDE10606FD7E00DD77 = 1408
31532: 00FD7E01DD7701110008 = 746
31542: DD19110200FD1910E8F1 = 1032
31552: E1D1C1FDE1DDE1C90000 = 1752
31562: 00000000000000000000 = 0
31572: 0000000030C070E0F0F0 = 1056
31582: B0F0B0F090F040E030C0 = 1744
31592: 070E0F0B0F0B0F0B0F0B = 129
31602: 090F0C0F070E30403040 = 296
31612: 30403040304030403040 = 560
31622: 3040000000000F0F0F0F = 1072
31632: 0000F0F0000000003040 = 592
```

```
31642: 304030703070300030F0 = 768
31652: 0000000030403040F040 = 528
31662: F0400040F0C000000000 = 800
31672: 00000000F0C0F0C00040 = 928
31682: F0403040304000000000 = 528
31692: 30F030F0300030703040 = 896
31702: 30403040304030403040 = 140
31712: 03040304030403040304 = 28
31722: 00000F0F0F0F00000F0F = 90
31732: 0000000030403040307 = 24
31742: 03070300030F00000000 = 31
31752: 030403040F040F040004 = 56
31762: 0F0C0000000000000000 = 27
31772: 0F0C0F0C00040F040304 = 84
31782: 03040000000030F030F = 43
31792: 03000307030403040304 = 469
31802: 21677C060816007E23E5 = 686
31812: CD1EBBE12801562310F3 = 1068
31822: 1E013E15CD1EBB20093E = 639
31832: 4CCD1EBB200218021E02 = 590
31842: 7A43D1E1C9130148013F = 980
31852: 024B021603490347044A = 329
31862: 04E52A8E7C7EFFF2008 = 1216
31872: 21907C228E7C18F32322 = 937
31882: 8E7CE1C9907C00000001 = 961
31892: 01010101010100000100 = 7
31902: 00010100000101010001 = 6
31912: 01000101000100010000 = 5
31922: 010101000101010001 = 8
31932: 01000100000000000000 = 2
31942: 01010001010101000001 = 7
31952: 00000100000101000000 = 3
31962: 01010101010100010101 = 9
31972: 00000100010001010001 = 5
31982: 01010000000000000000 = 2
31992: 01000001000101000101 = 6
32002: 000001000101FFE5D521 = 733
32012: 1E7D3DCB275F160019CD = 805
32022: 777C5F197ED1E1C90204 = 1130
32032: 0103020401033A8D7F32 = 390
32042: 8F7F3A8E7F32C57FCD38 = 1232
32052: 7CFE002803328E7F7832 = 910
32062: 8D7FC5ED488B7F3A8E7F = 1370
32072: ED43C67F32C47FCD967A = 1479
32082: ED438B7FCD7B7AFE0020 = 1306
32092: 3C2600CDD1703A8E7F32 = 985
32102: C57F3E01CD5E7ACD027B = 1138
32112: C110CD3A8D7FFE01200F = 1042
32122: 3A8F7FE012815211071 = 806
32132: CDF770180D3A8F7FE02 = 1185
32142: 2806211971CDF770373F = 899
32152: C9C137C9F5C5D5E5D5E5 = 1984
32162: 3A907F3DCB27CB27CB27 = 1116
32172: 47808011087E6F260019 = 652
32182: DD2100840606C57E23DD = 977
32192: 77007E23DD77014F7E23 = 861
32202: DD702477E23DD7703DD = 1138
32212: 7E00FE0028083E02CD5E = 791
32222: 7ACD027BC1E5DDE5E111 = 1566
32232: 070019DD7504DD7405E1 = 941
32242: DD360600DD3607FF11EF = 1074
32252: 03DD1910BDDDE1E1D1C1 = 1525
32262: F1C9010C0D03010C10C1 = 513
32272: 00000000000000000000 = 0
32282: 00000000000001051803 = 33
32292: 010A0B02010E1E040113 = 93
32302: 11010000000000000000 = 18
32312: 02050503010A1904010B = 67
32322: 1002010D1002010E1904 = 94
32332: 02122401010910020209 = 96
32342: 1904020E0903020E2003 = 108
32352: 02131401011315010207 = 93
32362: 0A0202071F04020C301 = 74
32372: 020C260302110A020211 = 105
32382: 1F04C5D5E5DD7E00FE00 = 1275
32392: CA137F473AA87FCB2780 = 1142
32402: 47C5DD4E01DD4602DD7E = 1208
32412: 03ED43C67F32C57FCD96 = 1361
32422: 7ACD7B7AFE002836DD4E = 1219
32432: 01DD4602DD7E03CD097D = 983
32442: DD7703CD967ACD7B7AFE = 1524
32452: 00281DD4E01DD4602DD = 883
32462: 7E03CDAF7ADD7703CD96 = 1329
32472: 7ACD7B7AFE002804C137 = 1118
32482: 1831DD7101DD7002DD7E = 1090
32492: 0332C47F2606CDD1703E = 992
32502: 02CD5E7ACD027BDD6E04 = 1088
32512: DD6605DD7E03772336FF = 1141
32522: DD7504DD7405C1108037 = 1076
32532: 3FE1D1C1C9E5C5DD6E04 = 1652
32542: DD6605DD4E01DD46022E = 964
32552: 3E00CD5E7ACD027B7FE = 1193
32562: 002808CDAF7ACD967A18 = 1051
32572: EADD360000C1E1C9C5D5 = 1538
32582: DD2100840E000606CD80 = 745
32592: 7E301BC5DD7E00FE0120 = 1032
32602: 09014B00CD3978C11807 = 691
32612: 015A00CD3978C1CD197F = 1023
32622: DD7E00FE0020010C11EF = 902
32632: 03DD1910D79FE062805 = 900
32642: D1C1373FC9D1C137C90C = 1391
```


HACKER

You've stumbled into an
unknown computer system.
Now what?



- "Logon".
- One word appears on your screen.
- What do you do now?
- You don't know the password. You don't even know what computer system you've hacked into. But you do know that you must find out more.
- There are no instructions. No rules. No clues.
- You're completely on your own.
- You've found your way in. But is there a way out?

ACTIVISION
HOME COMPUTER SOFTWARE

Available on Commodore C64/128 Cassette & Disc, Atari 800, XE, XL Cassette & Disc, Sinclair ZX Spectrum Cassette, Amstrad 464 Cassette.
Activision UK Ltd, 15 Harley House, Marylebone Road, London NW1 Tel: 01-935 1428
From selected branches of Boots, WH Smith, John Menzies, Lasky's, Spectrum, Greens, Woolworth, Littlewoods and good computer software stores everywhere.

PLOTMATE PLOTTING PEN

LAST MONTH I looked at a range of peripherals for the BBC microcomputer. The Plotmate plotter was cheap, robust and clever, and it seemed worthwhile spending some more time with it so that I could tell you about it in greater detail. At the same time I'll start to describe a high level interpreter/compiler that I'm writing to work with any plotter that accepts commands as a series of ASCII characters.

The Plotmate plotter is comparatively cheap, especially when you keep in mind all that it can do. Basically, the hardware is a sturdy, mains powered single pen A4 flatbed plotter which interfaces to either the user or the printer ports of the BBC; but that is only part of the story.

The pen can be changed for one of a number of different colours and it is possible to use larger sheets of paper in the plotter (up to A2) by drawing one section of whatever it is you are plotting and then moving and realigning the paper. The pen holder and the cross arm on which the pen holder travels are both moved by toothed belts driven by a pair of solid looking stepper motors.

'The plotter is superb'

The resolution of the plotter is 0.1mm which is the same as the Epson HI-80. The massive construction of the Plotmate plotter pays off when a design requires the plotter to return to one point several times. While a plotter may have a high resolution, that's of very little use if it isn't repeatable.

Some of the recursive designs that I have produced using the Plotmate and the Acornsoft 'Creative Graphics' package cover the same line many times and the plotter is superb — after the sixth time, lines in the design were no thicker than a single line newly drawn.

The Plotmate plotter uses the BBC micro-

John Dawson takes a close look at the Plotmate and details a high level interpreter/compiler he's working on for the BBC.

Figure 3.

```
0 .LIBA
1 MA 1000,750
2 AR 0,30,350,200,0,2
3 .GREEN
4 MA 1400,550
5 AR 1,30,350,200,0,2
6 .RED
7 .ITALIC
8 SI 40,30
9 MA 500,10
10 LA July 85
11 MA 1000,10
12 LAEQUIPMENT
13 MR 30,20
14 AR 0,30,350,150,0,2
15 .GREEN
16 MR 100,-20
17 LAPERSONNEL
18 MR 30,20
19 AR 1,30,350,150,0,2
20
```

computer to provide its "intelligence". Unlike the Epson HI-80 or the Tandy plotters which have at least one microprocessor inside the plotter, the Plotmate requires a driver program to be loaded into the BBC.

The driver program is just over 9000 bytes (2400 hex bytes) long and is supplied in two versions. H.PLMATE is loaded into the Ram space normally used by the mode four screen

memory. When you use this driver it is not possible to plot on to the screen and the plotter at the same time. L.PLTmate sits below the mode 4 Ram and with this driver in place you can plot on the screen and the plotter simultaneously. This driver restricts the length of a Basic program quite severely.

The Plotmate software is very clever because it provides easy interfacing between the plotter and much, but not all, of the software that has been written to draw things on the screen of the BBC micro. You too could have had the same idea as it is all based on the warning on page 408 of the BBC micro User Guide:

"If the user intercepts the Operating System Write Character routine (OSWRCH) then all the VDU control codes must be dealt with. When a Basic program executes DRAW 10,10 a string of 6 bytes is sent to the VDU driver via OSWRCH. In this case the bytes would be 25,5,10,0,10,0, so beware!"

Plotmate actually uses this feature of the BBC operating system to get its data by rerouting commands in the OSWRCH channel. Normally a character to be printed on the VDU will be printed as text or ignored by the Plotmate driver, but if a "special" code — one of the VDU drivers — is detected by Plotmate, the numbers following the code will be trapped and used to generate a graphic output to the plotter.

Figure 6 shows the character set available for the Plotmate. In addition to the standard ASCII (continued on page 77)

Figure 1.

```
1960 DEF PROCMACRO
1970 K = INSTR(" .ITALIC.GREEN.RED.BLUE.BLACK.HISTOGRAM.PIE
.TITLE.BLOCK.SIZE.INCX.INCY.INCZ.SETX.SETY.REPEAT.UNTIL
.PLOT.EVALUATE.", A$(D%))
1980 IF K = 0 THEN PROC_ELEMENT
1990 IF K = 1 THEN PRINT "EM3": PRINT "SL95"
2000 IF K = 8 THEN PRINT "SP3"
2010 IF K = 14 THEN PRINT "SP4"
2020 IF K = 18 THEN PRINT "SP2"
2030 IF K = 23 THEN PRINT "SP1"
2040 IF K = 43 THEN PRINT "DIO": PRINT "SIB0,60": PRINT "EM1":
PRINT "MA300,1800"
2050 IF K = 49 THEN PRINT "EM0": PRINT "SLO"
2060 IF K = 55 THEN PRINT "SI70,90"
2070 IF K = 117 THEN PRINT "LQ": RIGHT$(A$(D%),LEN(A$(D%)-2)
2080 ENDP
```

Figure 2.

```
1380 DEF PROCPLLOT
1390 CLS
1400 FOR D% = 0 TO C%
1410 IF LEFT$(A$(D%),1)
= "." THEN PROCMACRO
ELSE PRINT A$(D%)
1420 NEXT D%
1430 PRINT "SP-1"
1440 VDU26
1450 CLS
1460 ENDP
```


It's a snip.

For only £14.00 you can have Your Computer delivered to your door, every month, for a whole year! It's the best way of making sure you get your own copy of Britain's biggest selling home computer magazine, and of keeping in touch with all the up-to-the-minute news, views, advice and information on the computer scene — without queuing at the newsagents. And if you don't want to snip at your favourite magazine with the scissors, just photo copy the page and send it to us instead. We won't feel cut up about it — and neither will you!



YOUR COMPUTER

Please send me YOUR COMPUTER each month for 12 months.

A. I enclose cheque/PO to the value of £14.00 (UK), £22.50 (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 _____

SUBSCRIPTION ORDER FORM

NAME: _____

ADDRESS: _____

Job Title (if any) _____

Type of Business (if any) _____

Do you own a computer? Yes ☐ No ☐

Do you have access to a computer? Yes ☐ No ☐

If so please state type _____

Please return to: Your Computer, Subscription Manager,
Business Press International Ltd., Oakfield House,
Perrymount Road, HAYWARDS HEATH, Sussex RH16 3DH.

YOUR COMPUTER

Figure 4.

```

3320 DEF PROCSPPOOL_TEXT
3330 *DELETE Y.DEFAULT
3340 PROCRH_WINDOW
3350 *SPOOL Y.DEFAULT
3360 PROCPLLOT
3370 *SPOOL
3380 ENDPROC
3390
3400 DEF PROC_ELEMENT

```

```

3410 F$ = ":" + Drive$ + ".
      T" + A$(D%)
3420 E = OPENUP(F$)
3430 REPEAT
3440   Char% = BGET£(E)
3450   Char$ = CHR$(Char%)
3460   PRINT Char$;
3470   UNTIL EOF£(E)
3480 CLOSE£ E
3490 ENDPROC

```

(continued from page 75)

alphanumerics there is a wide range of mathematical and Greek symbols which will be useful in many scientific and technical applications.

Figure 5 shows a few of the different block fill shades that can be set by altering the special VDU 23,255 command. This command is trapped like all the other VDU commands and is used to control the direction in which the text is printed, character size, density of shading, pattern of dotted lines, and so on.

Linear Graphics have tested a good number of graphics packages for the BBC and they can advise you — Linear Graphics Limited, 28 Purdeys Way, Rochford, Essex SS4 1NE — about interfacing and compatibility. Linear Graphics also offer a computer assisted design package, an electronic circuit diagram drawing program and a bar/pie chart program.

The design program, Lincad, is unusual in offering to draw isometric lines, which can be very useful. You may use a joystick or the cursor keys to move about the screen and Lincad will also zoom in up to 32 times, to permit you to place lines more accurately, draw dotted constructions lines, vary the size and slant of text on the diagram and keep labels for a diagram in a separate file. Generally the programs work satisfactorily and appear to be

well error-proofed.

Sadly, I have to return the Plotmate plotter at the completion of this review. Many other plotters accept a relatively limited set of commands and I have been writing a high level interpreted plotter language to draw diagrams, flow charts and graphs more easily.

Wychwood is written in Basic and the instructions that the program will execute are held in an array. Each instruction is interpreted in turn as the program works through the array. An interpreter is a computer program where an instruction is read from the source code — an element in the array — and translated into a series of lower level instructions — the object code — by the interpreter.

String of ASCII characters

Those low level instructions can do anything you like; it just so happens that I want to control a plotter at present, but I can rewrite some small parts of the interpreter Basic program and use it to control a robot, or a weather station, or to draw a knitting pattern on the BBC screen.

So, the purpose of Wychwood is to escape from all the low level single instructions needed to control most ordinary plotters. For example, the Oric MCP-40 plotter (equivalent to the

Tandy four colour plotter and others) will draw a line from the current pen position when this command is received by the dedicated micro-processor inside the plotter:

D 100,200

Many other plotters work on the same principle — a command is a string of ASCII characters terminated by a Return character. In particular, numbers are sent in simple text or string form rather than as binary coded decimal, BBC integer internal format or any other complicated, non-standard representation.

The Epson HI-80 is a sophisticated but fairly cheap, in commercial terms, plotter that will do marvellous things like writing text in circles, plotting filled circles and boxes when it is unleashed. In order to retain some compatibility with earlier designs, the Epson has a second mode of operation which provides a command set that is equivalent to the Watanabe (Graphtech Myplot II).

The second mode is only a pale shadow of the full Epson command range but still both are transmitted to the plotter as strings of ASCII characters.

There is some compatibility between the instructions of some plotters. Both the Tandy/Oric and the Watanabe plotters will rotate in 90 degree steps the direction in which text is

(continued on next page)

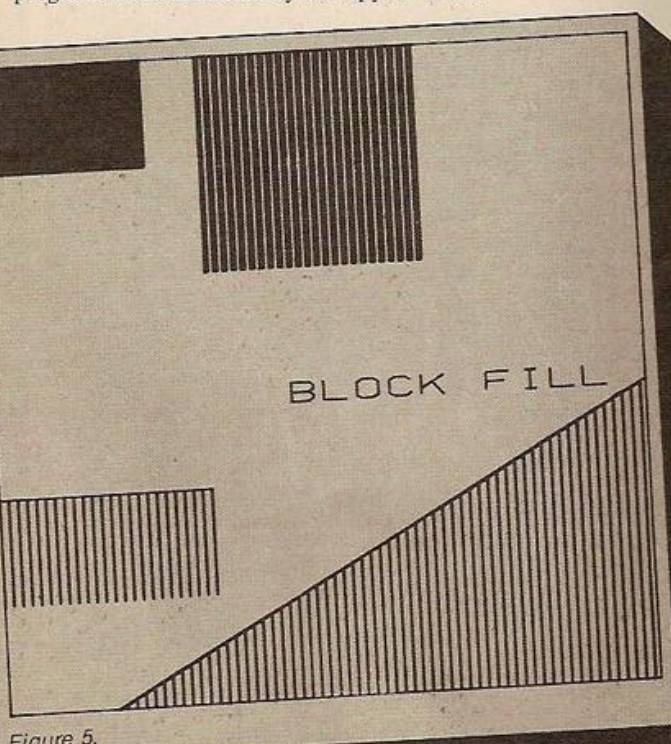


Figure 5.

THE PLOTMATE CHARACTER SET

Lower nybble

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
U	2	!	"	#	\$	%	&	'	()	*	+	,	-	.	/
P	3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>
P	4	•	A	B	C	D	E	F	G	H	I	J	K	L	M	N
P	5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^
P	6	£	a	b	c	d	e	f	g	h	i	j	k	l	m	n
P	7	p	q	r	s	t	u	v	w	x	y	z	{		}	~
n	8		α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ
y	9	ο	π	ρ	σ	τ	υ	φ	χ	ψ	ω	Γ	Δ	Ε	Θ	Λ
b	A	Π	Σ	Τ	Φ	Ψ	Ω	ς	φ	κ	δ	ι	θ	ο	ϕ	ρ
b	B	⊗	⊙	⊕	⊖	±	÷	≈	∞	√	×	≡	≤	≥	α	†
b	C	†	§	Б	Δ	Ж	И	Й	Ц	Ч	Ш	Щ	Ъ	ь	Ы	Э
b	D	Я	З	•	•	•	•	•	•	•	•	•	•	•	•	•
e	E	С	Д	Е	Э	х	о	о	у	х	о	•	•	•	•	•
	F	←	→									•	•	•	•	•

Figure 6.

(continued from previous page)

printed on to a design by the command:

Qn where n lies between 0 and 3

Other commands in all the instruction sets will take a series of numbers following the command identifier to indicate, for example, points through which a line should be drawn; the centre, radius and start and end points of a circle; and the length, subdivision and markings to be drawn on an X or Y axis.

The Wychwood program works well as a whole and has been used with an Epson HI-80 for a number of jobs. It is not necessarily complete and can be expanded as far as you need, or modified to suit your particular requirements. Wychwood does depend heavily on having one or more floppy disc drives attached to your micro although the fundamental ideas could be adapted quite easily to a cassette-based micro.

The only limitation on translating the program to other dialects of Basic is the need for an Instr — Instrng — instruction or its equivalent.

Figure 1 is the listing of the key procedure — Procmacro, lines 1960 to 2080 — to its present state of completion.

The Instr command (line 1970) "searches one string for the occurrence of another string ... the number returned is the ... position of the second string in the first string" — BBC User Guide, page 280.

If, for example, A\$(D%) contains the characters, .Red then K is set to 14 and a match will be detected by line 2010. Similarly, if an instruction in the Wychwood program is .Title then K is set to 43 and the interpreter will send

the following instructions to the printer:

DI 0 Direction of text 0 degrees
SI 80,60 Text size 80 by 60
EM 1 Set emphasis to 1
MA 300,1800 Move absolute to 300,1800

I've added spaces to the list above to make it easier to follow. Procmacro is called by Procplot — lines 1380 to 1460 — which is shown in figure 2. You'll see that Procplot is very simple; it's a For ... Next loop that starts at the beginning of the Wychwood program held in the A\$ array and works its way through to the last instruction which is pointed to by C%.

High level instructions, or macros, are always identified by a "full stop" or period as the first character in the instruction. If the first character is anything else it is taken to be a single low level instruction that can be printed, that is transmitted, directly to the plotter. Line 1430 sends the Epson HI-80 specific code to park and cap the plotter pens to prevent them drying out.

Figure 3 is part of a Wychwood program. Note that there are both single instructions and high level commands interspersed throughout the listing.

The two letter codes at the start of many of the lines (MA AR SI LA MR) are specific to the Epson HI-80. Line 0 is more interesting as this instruction is not included in the plotter 'language', the commands included in the Basic program line 1970, but is instead a high level compiled instruction which may contain several hundred low level commands.

"Liba" is, in fact, a disc file containing instructions in text form which can be edited using View or any other BBC wordprocessor. 'Liba' was written, tested and edited as an array

using the Wychwood facilities.

Wychwood is both an interpreter and a compiler. If an element of a design is contructed using relative draw and move commands, that is 'move relative' to the current pen position rather than 'move to an absolute location', it becomes possible to use the same compiled element repeatedly, preceded by low level commands to place it in the right position and set the scale at which it should be drawn.

CONCLUSIONS

- However high a density you set on a dot matrix printer, the output from a screen dump is never made up of clean, straight lines. I think that pen drawing is still essential for high quality artwork that is to be reproduced. Many of the graphics programs available for the BBC microcomputer include Epson compatible screen dump routines because plotters have been comparatively expensive until recently and because most people cannot afford a printer and a plotter. The Plotmate offers an excellent way round the problem of a lack of graphics software that will interface with the Epson HI-80, for example.
- If you have access to a Tandy four colour plotter, the Epson HI-80, or any other plotter that accepts commands as ASCII characters, Wychwood is the start of a high level plotter language. I'll describe the whole program next month with more emphasis on the disc routines and the editor.

HISOFT

High Quality Microcomputer Software

Product Price Table

Machine Product	Spectrum	Amstrad	MSX	CP/M	QL
Pascal	25.00	29.95	29.95	39.95	
Devpac	14.00	21.95	19.95	39.95	19.95
C	25.00	34.95		*	(MON QL)
Ultrakit	9.45				
Font64/MSX		7.95	9.95	(Font designer)	
The Knife		12.95		(CP/M disc editor)	
The Torch		12.95		(CP/M disc Tutorial)	
The Colt	12.95			(Fast integer BASIC compiler)	

All prices in £ sterling. *Coming soon!

Here's what other people say about HiSoft Software:

Our Customers:

- C "more addictive than any arcade game" R. Walker
Devpac80 "a brilliant piece of software" A. Brown
Ultrakit "a great acquisition" J. Le Page

The Press:

- Pascal "if you wish to teach yourself Pascal ... you won't go far wrong to buy HiSoft's Pascal" PCF 1/84
Devpac "it is impossible to recommend any other development package for the Spectrum" ECM 4/84
C "the most welcome addition to the Spectrum catalogue since Sinclair introduced the Microdrives" Sinc. User 12/84
Font64 "the manual is clear ... very simple to use" PCT 7/85

These are only a few of the glowing comments that we have on file showing that user and critic alike find HiSoft software offers a refreshing change of style.

We produce and market a wide range of high quality, professional and well-documented software packages for the popular home micros. Our type of software is becoming increasingly more popular as people get tired of zapping aliens and want to put their brains to work; learning new computer languages (Pascal, C, Devpac), investigating their computer's power (The Knife, The Torch) or being artistic (Font64), we have it all. Please feel free to write to us or phone for full technical details of any of our products. The above prices are fully inclusive and you can order directly from us or through your local computer shop.

COLT-A BRAND NEW ZX BASIC COMPILER

HiSoft Colt is an extremely fast and friendly compiler for ZX Spectrum BASIC. Fully supports ZX Microdrive, comes complete with sprite handler, window handler and toolkit, converts programs to run typically 100 times faster and is only £12.95.

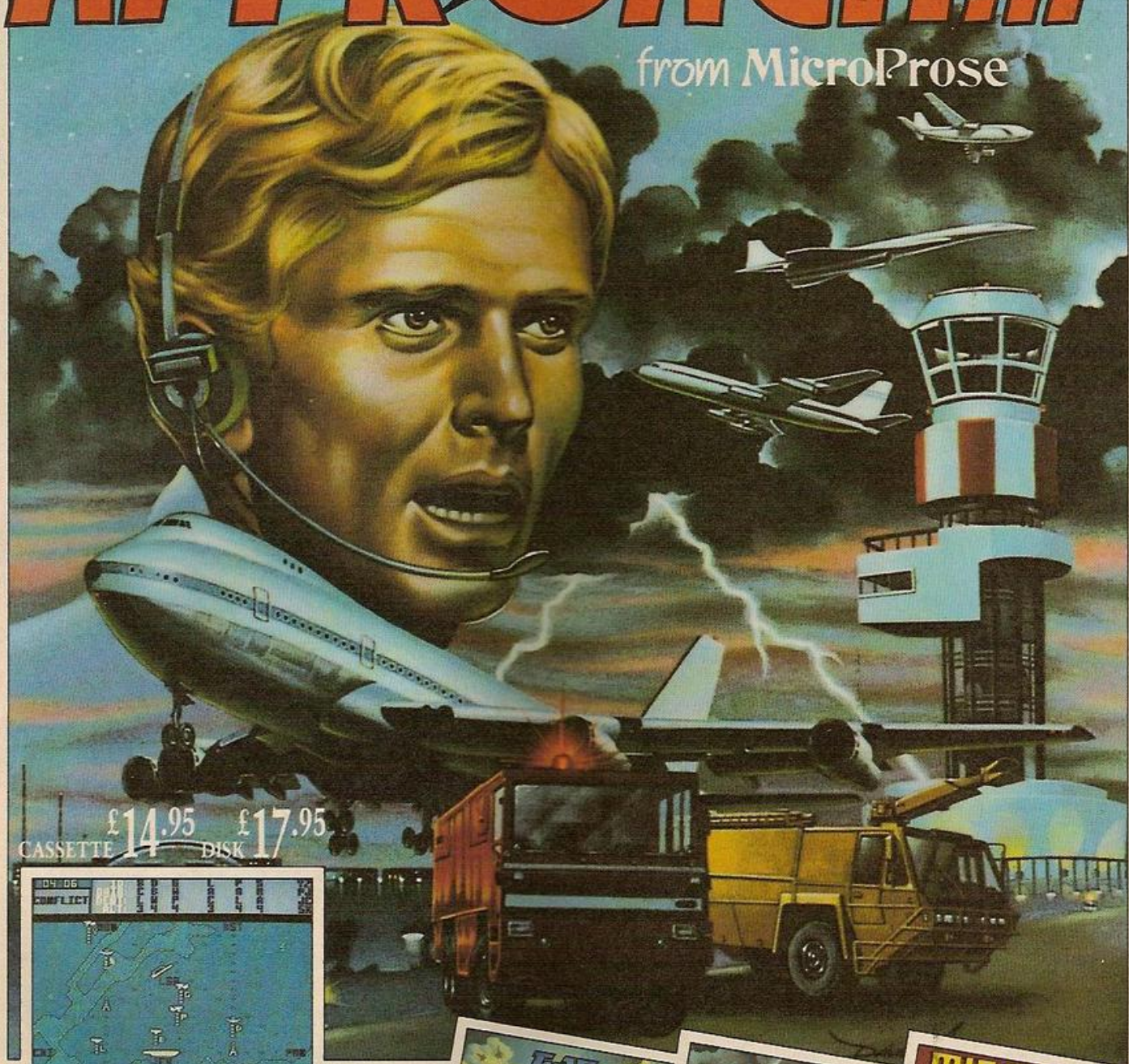
HiSoft, 180 High Street North, Dunstable, Beds. LU6 1AT Telephone (0582) 696421

Exciting Speech & Graphic Air Traffic Control Action



"KENNEDY APPROACH..."

from MicroProse



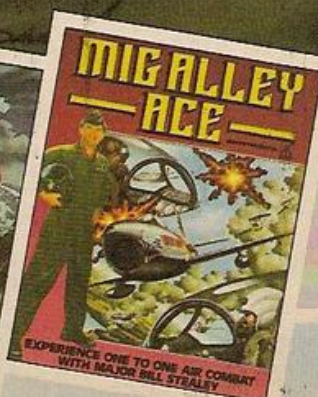
CASSETTE £14.95 DISK £17.95



Screen as seen on Commodore 64

See and hear all the action. Here is the first simulation to include realistic high quality speech from your computer. Bad weather, in-flight emergencies and instrument failures provide an ever-changing environment. Twenty aircraft could be calling you, all vying for one runway! Hear their radio calls and your broadcasts in high quality speech! The safety of passengers is in your hands as you guide jet airliners and Concorde to their destinations!

DON'T FORGET THESE OTHER SIMULATIONS FROM MICROPROSE:



U.S. Gold Limited, Unit 10, The Parkway
Industrial Centre, Henegate St, Birmingham B7 4LY.
Telephone: 021-359 8881. Telex: 337268.



This program is available on Telsoft.

Reg Fry chugs along on a CBM-64.

THIS GAME simulates a train running round a maze and, although the same basic screen pattern is used for all sectors, there are three different types of play. Whilst the screen display is written in Basic, all the action routines are in machine code.

The game runs for a maximum of six sectors, three in daylight and three at night. You can choose to play the three day or three night sectors separately — or all six in sequence. There are seven playing speeds available and if you are using a joystick it must be fitted to port 2.

Sector 1: The train starts with an engine and three carriages which are running round the track. Your man is the circular face at the middle; his movement is controlled by the joystick. As you guide your man round the track he picks up all the letters, parcels and packages that have been

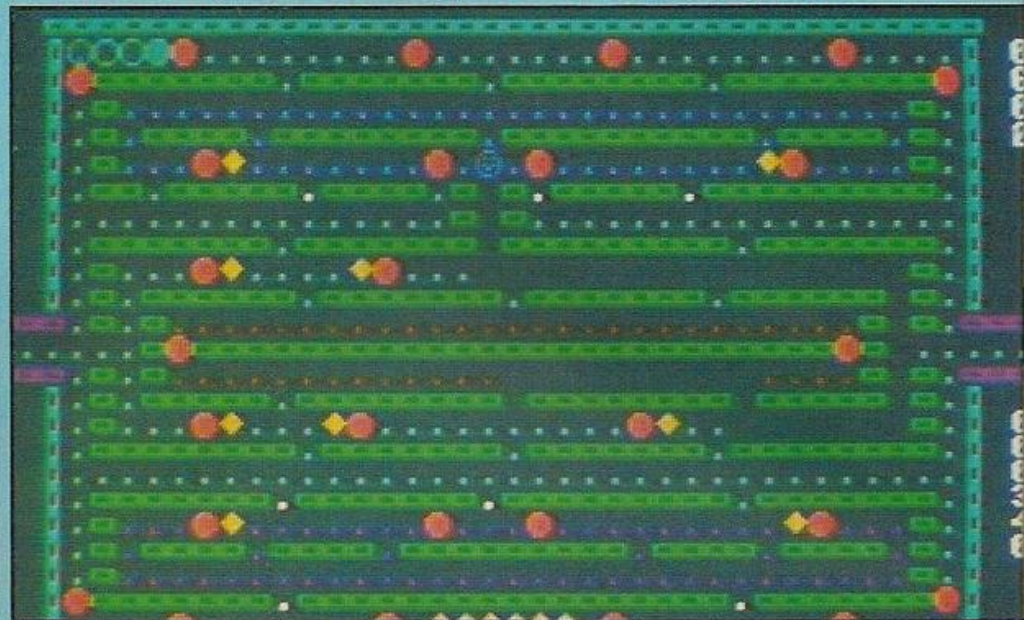
MIDNIGHT

dropped, for which you get bonus points.

If you enter the purple exits at either side, your man will be converted into a carriage — you can then run after the train and if you are careful you can add the carriage onto the end of the train. The bonus you get for doing this varies with time from a maximum of 1,000-points. The value of

this bonus is shown by the figures at the top right hand of the screen.

Take care you stop as soon as you add a carriage to the train — or the game will end! The game will also end if you run into any other part of the train. If the train hits one of its own carriages, or runs into you, the sector ends and the game



Listing 1.

```

10 C=0:1 IF C=1 THEN LOAD "MIDNIGHT",1
20 POKES 100,141
30 FOR L=54272 TO 54296:POKE L,0: NEXT L:POKE 54296,15:GOSUB 1640:RY (-) RI 1905
40 POKES 56,56:POKE 56,56:CLR POKES 56334,PEEK 56334:POKE 56334,PEEK 56334:POKE 56334,PEEK 56334
50 SYS 50704
60 POKES 100,141
70 POKES 56334,PEEK 56334:OR 1
80 HI=48:HI=48:HI=48:HI=48:HI=48:HI=48
90 GOSUB 1820:POKE 100,141:PRINT NEXT
100 PRINTCHR(14) "*****WRITTEN BY: A. RY (-) RI 1905*****"
110 PRINTTAB(9) "*****PLEASE SELECT *****"
120 PRINTTAB(9) "*****1. DAY*****"
130 PRINTTAB(9) "*****2. NIGHT*****"
140 PRINTTAB(9) "*****3. BOTH*****"
150 PRINTTAB(9) "*****4. IDICULOUS*****"
160 GET$
170 IF$="1" THEN P=40:SP=40:SS=40:SD=45:GOTO 260
180 IF$="2" THEN P=40:SP=40:SS=40:SD=40:GOTO 260
190 IF$="3" THEN P=40:SP=40:SS=40:SD=35:GOTO 260
200 IF$="4" THEN P=40:SP=40:SS=40:SD=30:GOTO 260
210 IF$="1" THEN P=40:SP=40:SS=40:SD=35:GOTO 260
220 IF$="2" THEN P=40:SP=40:SS=40:SD=30:GOTO 260
230 IF$="3" THEN P=40:SP=40:SS=40:SD=35:GOTO 260
240 IF$="4" THEN P=40:SP=40:SS=40:SD=30:GOTO 260
250 GOTO 160
260 POKES 1740,PP:POKES 1741,PS:POKES 1742,SP:POKES 1743,SS:POKES 1744,SD
270 PRINT "*****PLEASE SELECT *****"
280 PRINTTAB(16) "RY....."
290 PRINTTAB(16) "RI....."
300 TAB 0:POKES 1719,0
310 GET$
320 IF$="1" THEN GOSUB 470:GOTO 580
330 IF$="2" THEN GOSUB 470:GOTO 580
340 IF$="3" THEN GOSUB 470:GOTO 580
350 GOTO 580
360 REM NIGHT
370 I=1452:POKE 1,66:POKE 1,255:POKE 1,66:POKE 1,66
380 POKES 1,66:POKE 1,66:POKE 1,66:POKE 1,66:POKE 1,66:POKE 1,66
390 I=1456:POKE 1,66:POKE 1,126:POKE 1,255:POKE 1,66
400 POKES 1,255:POKE 1,66:POKE 1,126:POKE 1,255:POKE 1,66:POKE 1,255
410 I=1512:POKE 1,0:POKE 1,1:POKE 1,0:POKE 1,2:POKE 1,0
420 POKES 1,0:POKE 1,0:POKE 1,1:POKE 1,0:POKE 1,2:POKE 1,0
430 I=1514:POKE 1,0:POKE 1,1:POKE 1,0:POKE 1,2:POKE 1,0
440 POKES 1,0:POKE 1,0:POKE 1,1:POKE 1,2:POKE 1,0:POKE 1,0
450 SYS 52816
460 RETURN
470 REM DAY
480 I=1486:POKE 1,60:POKE 1,126:POKE 1,255:POKE 1,60:POKE 1,255:POKE 1,60
490 POKES 1,255:POKE 1,60:POKE 1,126:POKE 1,255:POKE 1,60:POKE 1,255
500 I=1512:POKE 1,0:POKE 1,1:POKE 1,0:POKE 1,2:POKE 1,0
510 POKES 1,0:POKE 1,0:POKE 1,1:POKE 1,2:POKE 1,0:POKE 1,0
520 I=1514:POKE 1,0:POKE 1,1:POKE 1,0:POKE 1,2:POKE 1,0
530 POKES 1,0:POKE 1,0:POKE 1,1:POKE 1,2:POKE 1,0:POKE 1,0
540 I=1482:POKE 1,0:POKE 1,1:POKE 1,0:POKE 1,2:POKE 1,0
550 POKES 1,0:POKE 1,0:POKE 1,1:POKE 1,2:POKE 1,0:POKE 1,0
560 SYS 52816
570 RETURN
580 GOSUB 3280:11:POKES 3281,11:PRINT "7":POKES 3272,30
590 PRINT "A....."
600 PRINT "A....."
610 PRINT "A....."
620 PRINT "A....."
630 PRINT "A....."
640 PRINT "A....."
650 PRINT "A....."
660 PRINT "A....."
670 PRINT "A....."
680 PRINT "A....."
690 PRINT "A....."
700 PRINT "A....."
710 PRINT "A....."
720 PRINT "A....."
730 PRINT "A....."
740 PRINT "A....."
750 PRINT "A....."
760 PRINT "A....."
770 PRINT "A....."
780 PRINT "A....."
790 PRINT "A....."
800 PRINT "A....."
810 PRINT "A....."
820 PRINT "A....."
830 PRINT "A....."
840 REM FOR I=1024 TO 2023:SCR=PEEK(I):POKE(I+29952),SCR:DOE BY SYS 58432
850 SYS 58432
860 HI=166:R=INT(HI/256):POKE 254,R:POKE 253,HI-R*256
870 TL=166:FOR I=HI+1 TO TL:POKE I,88:NEXT I:POKE 254,88
880 R=INT(TL/256):POKE 252,R:POKE 251,TL-R*256
890 FOR I=166 TO 1863:STEP 40:POKE I,48:POKE I+54272,1:NEXT I
900 S7=49:S8=48:S9=48:S2=1:POKE 51729,1
1000 FOR I=1103 TO 1223:STEP 40:POKE I,48:POKE I+54272,1:NEXT I
1010 FOR I=1663 TO 1863:STEP 40:POKE I,48:POKE I+54272,1:NEXT I
1020 FOR I=1663 TO 1863:STEP 40:POKE I,48:POKE I+54272,1:NEXT I
1030 FOR I=1663 TO 1863:STEP 40:POKE I,48:POKE I+54272,1:NEXT I
1040 FOR I=1663 TO 1863:STEP 40:POKE I,48:POKE I+54272,1:NEXT I
1050 SYS 58944
1060 IF PEEK(51717)=1 THEN 1140
1070 IF PEEK(51720)=1 THEN 1090
1080 GOTO 1050
1090 REM HIT TR
1100 GOSUB 1790:GOSUB 540
1110 POKES 3280,2:POKES 3281,2:POKES 3272,21
1120 PRINTCHR(14) "*****HIT LUCK! YOU HAVE HIT THE TRAIN*****"
1130 GOTO 1130 END
1140 SYS 50480:POKE 51739,POKES 540
1150 GOSUB 1790:POKES 3280,2:POKES 3281,2:POKES 3272,21
1160 PRINTCHR(14) "*****YOUR BONUS FOR CLEARING*****"
1170 IFND=0 THEN POKES 51725,44:PEEK(51725):POKES 5000:GOTO 1240
1180 IFND=1 THEN POKES 51725,44:PEEK(51725):POKES 4000:GOTO 1240
1190 IFND=2 THEN POKES 51725,44:PEEK(51725):POKES 3000:GOTO 1240
1200 IFND=3 THEN POKES 51725,44:PEEK(51725):POKES 2000:GOTO 1240
1210 IFND=4 THEN POKES 51725,44:PEEK(51725):POKES 1000:GOTO 1240
1220 IFND=5 THEN POKES 51725,44:PEEK(51725):POKES 500:GOTO 1240
1230 PRINT "*****"
1240 PRINT "*****"
1250 PRINT "*****"
1260 GOSUB 2510:POKES 3280,11:POKES 3281,11:PRINT "D":PRINT "D":POKES 3272,30
1270 IFND=1 THEN POKES 51719,44:PEEK(51719):POKES 51719,44
1280 TAB 0:POKE 51719,44:POKE 51719,44
1290 S7=49:S8=48:S9=48:S2=1
1300 POKES 51729,48:POKES 51730,48:POKES 51731,48:POKES 51732,48
1310 POKES 51733,48:POKES 51734,48:POKES 51735,48:POKES 51736,48
1320 POKES 51737,48:POKES 51738,48:POKES 51739,48:POKES 51740,48
1330 FOR I=1663 TO 1863:STEP 40:POKE I,1:NEXT I
1340 FOR I=1663 TO 1863:STEP 40:POKE I,1:NEXT I
1350 FOR I=1663 TO 1863:STEP 40:POKE I,1:NEXT I

```


EXPRESS

moves to the next sector.

To help get a high score on this sector you must therefore collect carriages and add them to the train as quickly as possible. When you have added 11 or more carriages to the train it will eventually crash into itself and the sector is ended. You get an additional bonus if you clear

all the letters, etc, from the track. The value of this bonus is 5,000 points for clearing every item, reducing to zero if you leave more than 20 items behind.

Sector 2: In this sector railway staff are trying to stop the service by continually adding carriages to the train as it runs along — sometimes it will

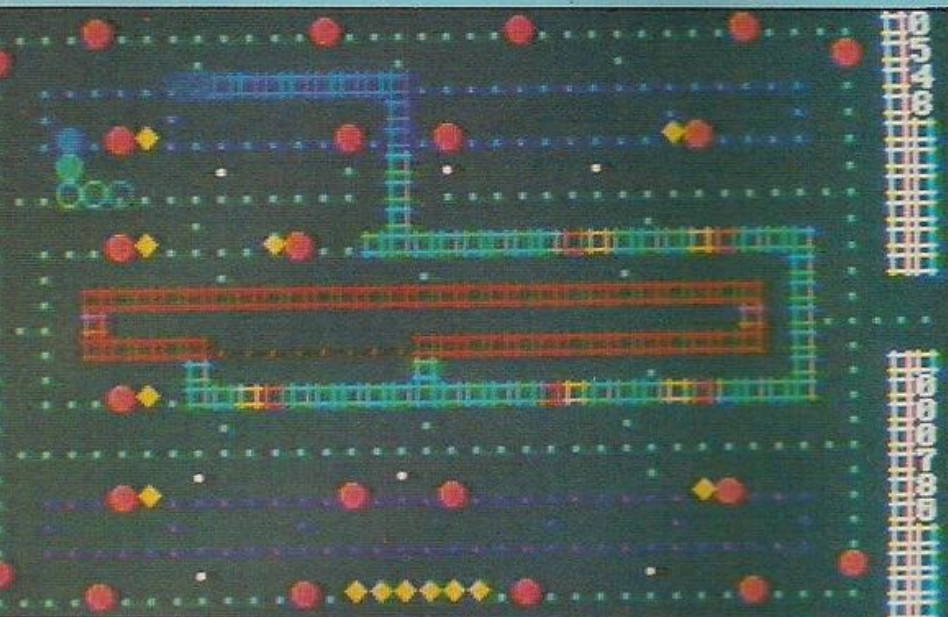
crash into itself very quickly so you need to act fast! Your job is to run after the train and pick up the additional carriages keeping the length of the train down to a few carriages so it does not crash into itself. You can touch any carriage — but, if you hit the engine the game will end.

You still get bonus points for picking up all the items on the track, and the same bonus for having cleared all or most items at the end of the sector. You can take a chance and leave the end of the train at any time to pick up the odd items left behind. You also get a time bonus in this sector which is again shown at the top right hand of the screen. This increases to a maximum of 3,000 points. It is difficult to get 3,000 in this sector — but you need to watch out — because if the bonus goes over 3,000 points it starts again at zero!

Sector 3: In this final sector a saboteur has set the train controls at full speed and jumped out — it just tears away and you have no chance of catching it. Your task is to pick up all the letters and parcels, etc, without being run over — not an easy task — and you will get many a fright! You are safe from the train in the purple exits and in two other spots close by — so you can take a rest if you need it. You get the same sets of bonus points as in the previous sector — both for clearing the tracks and for time.

The movement of the train in this sector is controlled by the pseudo random generator. This means that the train cannot sense where you are but just leaps around of its own accord. But beware because it will pounce on you as quick as a flash if you happen to get in its path.

If you can work out the character set for the (continued on next page)



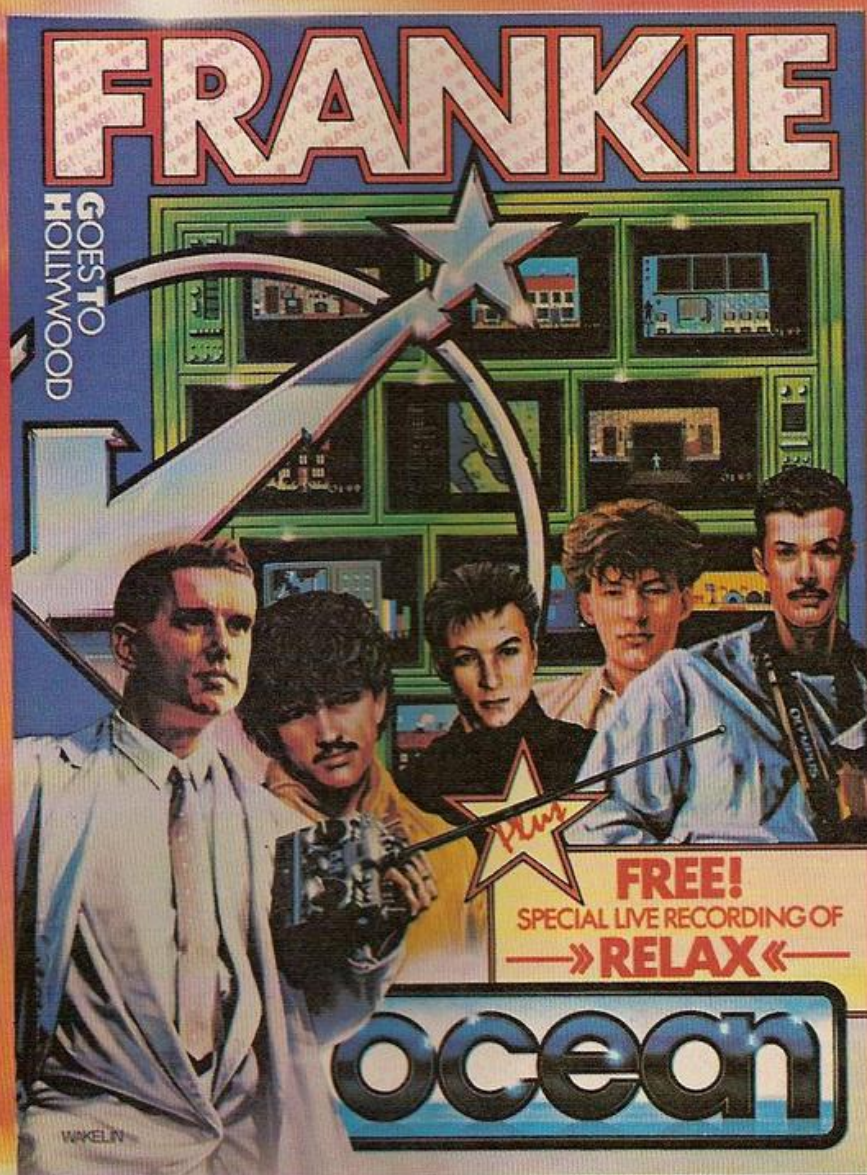
```
1360 IFH="N" THEN GOSUB 300
1370 GOTO 590
1380 IFH="D" THEN "N" THEN 1400
1390 IFH="B" THEN "N" THEN 1400
1400 FOR I=1 TO 1000 NEXT
1410 GOSUB 1200 POKES3280/2 POKES3281/2 POKES3282/2
1420 PRINT "*****OUR SCORE*****"
1430 PRINT "*****OUR SCORE*****"
1440 S1=PEEK(51723) S2=PEEK(51724) S3=PEEK(51725) S4=PEEK(51726)
1450 S5=PEEK(51727) S6=PEEK(51728)
1460 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
1470 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
1480 IF S1=H1 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1570
1490 IF S2=H2 THEN H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1570
1500 IF S3=H3 THEN H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1570
1510 IF S4=H4 THEN H4=S4 H5=S5 H6=S6 GOTO 1570
1520 IF S5=H5 THEN H5=S5 H6=S6 GOTO 1570
1530 IF S6=H6 THEN H6=S6
1540 IF S4=H4 THEN H4=S4 H5=S5 H6=S6 GOTO 1570
1550 IF S5=H5 THEN H5=S5 H6=S6
1560 IF S6=H6 THEN H6=S6
1570 PRINT "*****OUR SCORE*****"
1580 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
1590 POKI407/57 POKI408/58 POKI409/59 POKI410/60
1600 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
1610 PRINT "*****OUR SCORE*****"
1620 IF PEEK(197) < 60 THEN 1620
1630 PRINT "*****OUR SCORE*****"
1640 POKES3280/2 POKES3281/2 PRINT "THIS IS THE GAME OF MIDNIGHT EXPRESS"
1650 PRINT "*****OUR SCORE*****"
1660 PRINT "*****OUR SCORE*****"
1670 PRINT "*****OUR SCORE*****"
1680 PRINT "*****OUR SCORE*****"
1690 PRINT "*****OUR SCORE*****"
1700 PRINT "*****OUR SCORE*****"
1710 PRINT "*****OUR SCORE*****"
1720 PRINT "*****OUR SCORE*****"
1730 PRINT "*****OUR SCORE*****"
1740 PRINT "*****OUR SCORE*****"
1750 PRINT "*****OUR SCORE*****"
1760 PRINT "*****OUR SCORE*****"
1770 PRINT "*****OUR SCORE*****"
1780 PRINT "*****OUR SCORE*****"
1790 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
1800 POKI407/57 POKI408/58 POKI409/59 POKI410/60
1810 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
1820 PRINT "*****OUR SCORE*****"
1830 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
1840 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1850
1850 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1850
1860 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
1870 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
1880 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1890
1890 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1890
1900 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
1910 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
1920 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1930
1930 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1930
1940 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
1950 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
1960 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1970
1970 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 1970
1980 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
1990 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2000 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2010
2010 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2010
2020 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2030 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2040 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2050
2050 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2050
2060 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2070 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2080 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2090
2090 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2090
2100 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2110 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2120 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2130
2130 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2130
2140 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2150 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2160 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2170
2170 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2170
2180 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2190 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2200 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2210
2210 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2210
2220 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2230 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2240 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2250
2250 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2250
2260 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2270 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2280 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2290
2290 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2290
2300 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2310 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2320 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2330
2330 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2330
2340 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2350 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2360 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2370
2370 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2370
2380 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2390 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2400 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2410
2410 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2410
2420 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2430 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2440 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2450
2450 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2450
2460 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2470 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2480 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2490
2490 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2490
2500 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2510 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2520 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2530
2530 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2530
2540 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2550 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2560 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2570
2570 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2570
2580 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2590 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2600 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2610
2610 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2610
2620 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2630 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2640 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2650
2650 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2650
2660 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2670 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2680 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2690
2690 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2690
2700 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2710 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2720 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2730
2730 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2730
2740 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2750 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2760 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2770
2770 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2770
2780 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2790 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2800 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2810
2810 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2810
2820 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2830 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2840 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2850
2850 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2850
2860 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2870 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2880 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2890
2890 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2890
2900 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2910 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2920 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2930
2930 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2930
2940 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2950 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
2960 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2970
2970 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 2970
2980 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
2990 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3000 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3010
3010 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3010
3020 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3030 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3040 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3050
3050 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3050
3060 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3070 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3080 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3090
3090 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3090
3100 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3110 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3120 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3130
3130 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3130
3140 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3150 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3160 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3170
3170 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3170
3180 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3190 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3200 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3210
3210 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3210
3220 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3230 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3240 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3250
3250 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3250
3260 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3270 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3280 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3290
3290 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3290
3300 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3310 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3320 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3330
3330 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3330
3340 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3350 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3360 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3370
3370 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3370
3380 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3390 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3400 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3410
3410 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3410
3420 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3430 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3440 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3450
3450 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3450
3460 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3470 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3480 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3490
3490 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3490
3500 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3510 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3520 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3530
3530 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3530
3540 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3550 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3560 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3570
3570 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3570
3580 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3590 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3600 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3610
3610 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3610
3620 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3630 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3640 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3650
3650 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3650
3660 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3670 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3680 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3690
3690 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3690
3700 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3710 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3720 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3730
3730 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3730
3740 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3750 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3760 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3770
3770 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3770
3780 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3790 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3800 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3810
3810 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3810
3820 POKI401/51 POKI402/52 POKI403/53 POKI404/54 POKI405/55 POKI406/56
3830 FOR I=55/2 TO 55/2 POKI407/57 POKI408/58 POKI409/59 POKI410/60
3840 IF I=55/2 THEN H1=S1 H2=S2 H3=S3 H4=S4 H5=S5 H6=S6 GOTO 3850

```


To play the game, simply load listing 1 and Run it.



TAKE A TRIP INTO THE PLEASURE GAME



SOME ALREADY HAVE...

**YOUR
COMPUTER**

CRASH

CLASSIC



... innovative mix of ideas and excellent graphics ...

Variety is certainly the key word in this highly unusual game which has surely gone far beyond what anyone ever expected.

... a beautiful program, an adventure of great imagination, with some superb programming techniques ...

It's nice to see a game that can match the quality and the style of the group.

— action and strategy — and there are a number of slick touches that will keep you on your toes.

SPECTRUM 48K

9.95

COMMODORE 64

Ocean Software Limited
6 Central Street, Manchester M2 5NS
Telephone: 061-832 6633 Telex: 669977 Oceans G

Ocean Software is available from: WHSMITH,
John Menzies, **WOOLWORTH**, LASKYS, Rumbelows, Greens
Spectrum Shops and all good software dealers.

Simon Woolf with an excellent animation program for the BBC.

If YOU have ever wanted to try your hand at making cartoons, Pikchachanja can give you taste of it. In effect it is an instant animation kit. You simply draw two "key" frames, each with the same number of lines. The program works out the frames in between and stores them in memory. Then by rapidly displaying each in turn it creates a smooth 18-frame animation sequence, which cycles backwards and forwards until you press a key.

The program was inspired by Timothy Closs's Pikchachanja for the Spectrum which was published in *Your Computer* last April. In the same issue Nalin Sharma converted the program to run on the CBM-64. Translating it to the BBC, however, was more difficult.

For each frame both the earlier versions simply stored the relevant section of the screen in memory and then read it back during animation. But on the BBC there is not enough Ram to store 18 frames in this way. So this program has to compact the screen information.

The technique used is to store the bytes that represent pixels and to keep a count of zero bytes which represent spaces. Naturally, displaying a compact screen takes longer than reading in a continuous block of memory. But it is still fast enough to display 18 frames in less than a second.

Even after compacting the screen, memory limitations remain a problem. Only 768 bytes are available to store each frame. This means that it is not possible to fill much more than a fifth of the screen with pixels. Consequently, the program has to check that your picture does not exceed the limit.

When you draw your key frames it sounds a warning beep as you approach the limit. You must then make sure that your remaining lines

Listing 1.

```
10 REM ** Listing 1 **
20 *LOAD "MPIC" 1200
30 PAGE=&1400
40 CHAIN ""
```

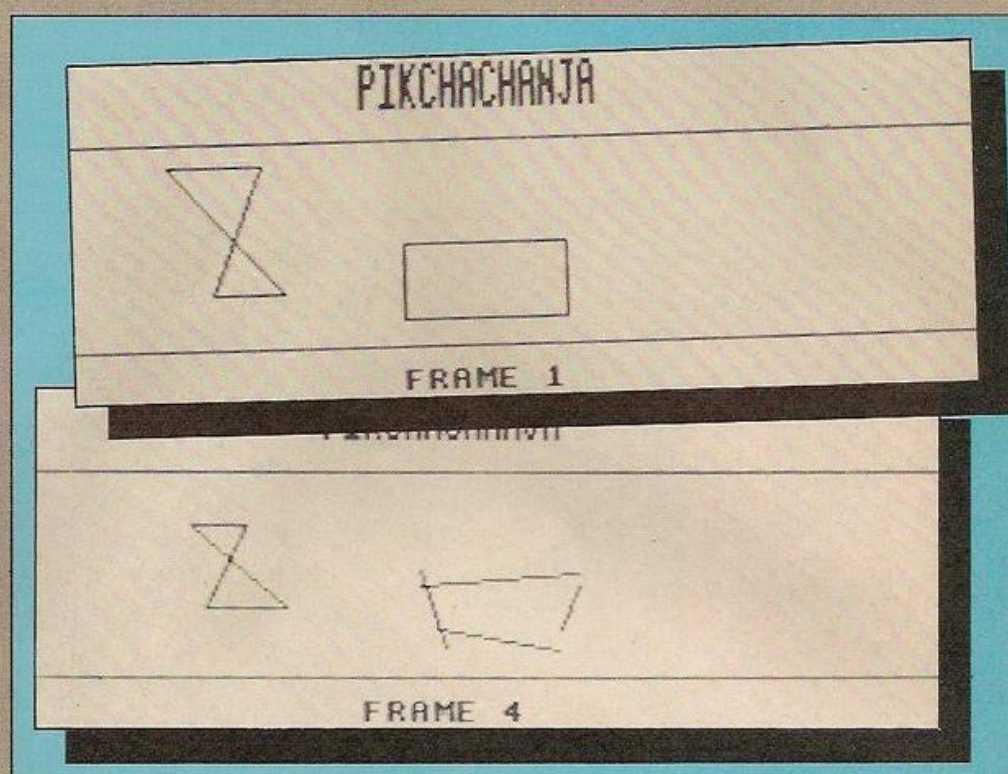
Listing 2.

```
10 REM ** LISTING 2 **
20 SCL=&72: SCH=&73
30 frmstlow=&74: frmsthigh=&75
40 ?frmstlow=&0: ?frmsthigh=&22
50 templow=&76: temphigh=&77
60 bcount=&78
70 FORN=&0 TO 3 STEP 3
80 P%=&1200
90 [OPT N
100 .display
110 LDA#255: STA SCL: LDA#&61: STA SCH
120 LDY #0: LDA(frmstlow),Y: INC frmstlow
130 CMP#0: BEQ dzero
140 .dbyte
150 LDY#0: LDA(frmstlow),Y: TAX: TAX
160 .SS
170 LDA(frmstlow),Y: STA(SCL),Y
180 DEY: BNE SS
190 TXA: CLC: ADC SCL: STA SCL
200 LDA#0: ADC SCH: STA SCH
210 CMP#&6B: BNE TT
220 LDA SCL: CMP#&FF: BNE TT
230 RTS
240 .TT
250 TXA: CLC: ADC frmstlow: STA frmstlow
260 LDA#0: ADC frmsthigh: STA frmsthigh
270 INC frmstlow: BNE ZZ: INC frmsthigh
```

```
280 .ZZ
290 LDA(frmstlow),Y: BNE dzero
300 INC frmstlow: BNE RR: INC frmsthigh
310 .RR
320 JMP dbyte
330 .dzero
340 LDY#0: LDA(frmstlow),Y: TAX
350 TAX: LDA#0
360 .UU
370 STA(SCL),Y
380 DEY: BNE UU
390 TXA: CLC: ADC SCL: STA SCL
400 LDA#0: ADC SCH: STA SCH
410 CMP#&6B: BNE VV: LDA#72
420 CMP#&FF: BNE VV
430 .RTS
440 .VV
450 INC frmstlow: BNE QQ: INC frmsthigh
460 .QQ
470 LDA(frmstlow),Y: BNE dbyte
480 INC frmstlow: BNE WW: INC frmsthigh
490 .WW
500 JMP dzero
510 .init
520 LDA #0: STA frmstlow
530 STA SCL: LDA#&62: STA SCH
540 .RTS
```

```
550 .del PHA: TXA: PHA: TYA: PHA
560 LDY#8: LDY#255
570 .kk DEY: BNE kk: DEX: BNE kk
580 PLA: TAX: PLA: TAX: PLA
590 .RTS
600 .store
610 JSR init
620 LDY #0: LDA (SCL),Y: BNE AA
630 STA (frmstlow),Y: INC frmstlow: JMP
zero
640 .AA STA (frmstlow),Y: INC frmstlow
650 .byte
660 STY bcount: LDA frmstlow: STA
templow
670 LDA frmsthigh: STA temphigh
680 INC frmstlow: BNE BB
690 INC frmsthigh
700 .BB
710 INC bcount: LDA (SCL),Y: STA
(frmstlow),Y
720 INC SCL: BNE CC
730 INC SCH
740 .CC
750 INC frmstlow: BNE DD
760 INC frmsthigh
770 .DD
```

PIKCHACH



are as short as possible. If you run out of memory the program asks you to enter the frame again.

Entering frames is one of the four options available from the opening menu. The others are for saving and loading picture data, and animating a completed picture sequence.

When you enter a frame there are two drawing modes. In one, you have to plot the points at each end of a line; in the other, plotting a point — by pressing Return — joins it up to the last point on the previous line. You can switch between the two modes at any time. The drawing controls are as follows:

Z — cursor right
X — cursor left
: — cursor up
/ — cursor down
! — toggle cursor jump between four and 32 points
D — toggle between the two drawing modes
F — finish frame
Return — finish line
Note that in Mode 4 a jump of four co-ordinate points is equal to one pixel.
After you have completed the opening frame the screen will clear, and you can enter the final

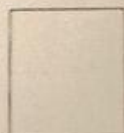
CHANJA

PIKCHACHANJA



FRAME 14

PIKCHACHANJA



FRAME 18

frame. Remember here that you must draw exactly the same number of lines as in the first frame. You can, of course, superimpose one line on another — for example, to transform a square into a triangle.

The program sets a limit of 30 to the number of lines per frame. By changing the value of NUMLN in line 10 you can increase this to a maximum of 42, but you are likely to run out of memory sooner. You can also run the program in Mode 5 and by inserting your own routines create colour animation.

To enter the program first type in and save list-

ing 1. Now set Page to &1400 by typing
PAGE=&1400:NEW

Key in listing 2 and save it on another tape. Run it and follow its instructions to save the machine code it creates, after listing 1. Finally save listing 3 after the machine code file. The program can be saved to disc as it stands.

Disc copies of the program together with 10 data files — demonstrating, among other things, pulsating circles and oscillating waves — are available for £5 from Simon Woolf, 8 Sterndale Road, London W14 0HS. State whether you want 40 or 80 track discs.

```

780 LDA #&6C: CMP SCH: BNE EE
790 LDA bcount: STA (templow),Y
800 RTS
810 .EE
820 LDA (SCL),Y: BNE FF
830 LDA bcount: STA (templow),Y: JMP zero
840 .FF
850 LDA #255: CMP bcount: BNE BB: STA
  (templow),Y
860 LDA #0: STA (frmstlow),Y: INC
  frmstlow
870 BNE GG: INC frmsthigh
880 .GG
890 JMP byte
900 .zero
910 STY bcount
920 .HH
930 INC bcount: INC SCL: BNE JJ
940 INC SCH
950 .JJ
960 LDA #&6C: CMP SCH: BNE KK
970 LDA bcount: STA (frmstlow),Y
980 RTS
990 .KK
1000 LDA (SCL),Y: BEQ MM
1010 LDA bcount: STA (frmstlow),Y

```

```

1020 INC frmstlow: BNE LL
1030 INC frmsthigh
1040 .LL
1050 JMP byte
1060 .MM
1070 LDA #255: CMP bcount: BNE HH
1080 STA (frmstlow),Y: INC frmstlow
1090 BNE NN: INC frmsthigh
1100 .NN
1110 LDA #0: STA (frmstlow),Y
1120 INC frmstlow: BNE PP: INC frmsthigh
1130 .PP
1140 JMP zero
1150 .del PHA: TXA: PHA: TYA: PHA
1160 LDX #8: LDY #255
1170 .kk DEY: BNE kk: DEX: BNE kk
1180 PLA: TAY: PLA: TAX: PLA
1190 RTS

```

```

1200 .NEXT
1210 T=0: FOR N=&1200 TO &1362: T=T+N: NEXT
1220 IF T>&47412 PRINT "Typing error -check listing"
1230 STOP
1230 PRINT "Now save the machine code after Listing 1"
1240 CLS: PRINT "PRINT 'Now save the machine code'"
1250 PRINT "after Listing 1 by typing:"
1260 PRINT TAB(7,6) "SAVE 'MPIC' 1200 1370"

```

Listing 3.

```

10 REM Pikchachanja by Simon Woolf
11 REM Do NOT enter any REM statements.
12 REM This program must be run at &1400.
13 REM If you wish to test the program
14 REM before completion, remove any CALL
15 REM statements. Do not press break.
16 REM Avoid typing in superfluous spaces.
17 REM eq. at the end of lines.
20 MODE4: HIMEM=&1200
22 REM or MODE 5
30 NUMLN=30: C1=&901: C2=C1+180
32 REM Change NUMLN for more lines (<43)
40 *FX15,1
50 VDU19,0,512.
60 VDU19,7,4,0,0,0,19,0,6,0,0,0
62 REM Change line 60 for different colours
70 VDU23,8202,0,0,0.
80 CLS: NUMLN=30: C1=&901: C2=C1+180
90 PRINT TAB(0,8): " 1 - ENTER FRAMES"
100 PRINT " 2 - ANIMATE"
110 PRINT " 3 - SAVE DATA"
120 PRINT " 4 - LOAD DATA"
130 AS=GET$: IF AS="4" OR AS="1" THEN 130
140 CLS
150 IF AS="1" THEN PROCframe
160 IF AS="2" THEN PROCanimate
170 IF AS="3" THEN PROCsave
180 IF AS="4" THEN PROCload
190 GOTO 80
200 DEFPROCframe
210 CLS: PROCdb: CS=C1: NL=NUMLN: SN=0
220 FOR N=1 TO 2
230 X=100: Y=100: X1=100: Y1=100: L=0: P=1: inc=32: D=5: PRO
  Cpoint
240 PROCdraw: IF SN=750 THEN PRINT TAB(1,3): "NOT ENOU
  GH RAM FOR FRAME. TRY AGAIN": TAB(1,5): "Press a key": AS=
  GET$: GOTO 210
250 IF N=1 NL=L: CS=C2: PROCclear: PRINT TAB(2,27): NL: "
  lines to draw:"
260 NEXT PROCbetween: ENDPROC
270 DEFPROCdraw
280 GCOL3,1: REPEAT: AS=INKEY$(0)
290 *FX15,1
300 IF AS="X" ANDX<=1279-inc THEN X=X+inc
310 IF AS="Z" ANDX>0+inc THEN X=X-inc
320 IF AS="Y" ANDY<=255-inc THEN Y=Y+inc
330 IF AS="/" ANDY>0+inc THEN Y=Y-inc
340 IF AS="I" THEN inc=4+(inc=4)*-20: PRINTTAB(14,21)
  :inc:
350 IF AS="D" THEN D=D+(D=5)*-64: PROCpoint
360 IF AS="CHR$(13)" THEN PROCplot: X1=X: Y1=Y: IF SN=750
  THEN ENDPROC
370 MOVE X1,Y1: PLOT D,X,Y
380 PRINT TAB(14,18): X: " ": PRINTTAB(14,19): Y: " "
390 MOVE X1,Y1: PLOT D,X,Y
400 UNTIL AS="F" OR L=NUMLN OR L=NL
410 ENDPROC
420 DEFPROCplot
430 IF (P=1 AND D=5) OR P=2 THEN GCOL0,1: MOVE X1,Y1:
  DRAW X,Y: GCOL3,1: L=L+1: PRINTTAB(8,23): L+1: " ": P=1: ELSE
  PLOT 69,X,Y: P=2
440 IF P=1 PROCstore: PROCch
450 PROCpoint
460 ENDPROC
470 DEFPROCstore
480 X=X1: Y=Y1: L1=L+1: X2=X1: Y2=Y1: L2=L1+1: X3=X2: Y3=Y2: L3=L2+1: X4=X3: Y4=Y3: L4=L3+1: X5=X4: Y5=Y4: L5=L4+1: X6=X5: Y6=Y5: L6=L5+1: X7=X6: Y7=Y6: L7=L6+1: X8=X7: Y8=Y7: L8=L7+1: X9=X8: Y9=Y8: L9=L8+1: X10=X9: Y10=Y9: L10=L9+1: X11=X10: Y11=Y10: L11=L10+1: X12=X11: Y12=Y11: L12=L11+1: X13=X12: Y13=Y12: L13=L12+1: X14=X13: Y14=Y13: L14=L13+1: X15=X14: Y15=Y14: L15=L14+1: X16=X15: Y16=Y15: L16=L15+1: X17=X16: Y17=Y16: L17=L16+1: X18=X17: Y18=Y17: L18=L17+1: X19=X18: Y19=Y18: L19=L18+1: X20=X19: Y20=Y19: L20=L19+1: X21=X20: Y21=Y20: L21=L20+1: X22=X21: Y22=Y21: L22=L21+1: X23=X22: Y23=Y22: L23=L22+1: X24=X23: Y24=Y23: L24=L23+1: X25=X24: Y25=Y24: L25=L24+1: X26=X25: Y26=Y25: L26=L25+1: X27=X26: Y27=Y26: L27=L26+1: X28=X27: Y28=Y27: L28=L27+1: X29=X28: Y29=Y28: L29=L28+1: X30=X29: Y30=Y29: L30=L29+1: X31=X30: Y31=Y30: L31=L30+1: X32=X31: Y32=Y31: L32=L31+1: X33=X32: Y33=Y32: L33=L32+1: X34=X33: Y34=Y33: L34=L33+1: X35=X34: Y35=Y34: L35=L34+1: X36=X35: Y36=Y35: L36=L35+1: X37=X36: Y37=Y36: L37=L36+1: X38=X37: Y38=Y37: L38=L37+1: X39=X38: Y39=Y38: L39=L38+1: X40=X39: Y40=Y39: L40=L39+1: X41=X40: Y41=Y40: L41=L40+1: X42=X41: Y42=Y41: L42=L41+1: X43=X42: Y43=Y42: L43=L42+1: X44=X43: Y44=Y43: L44=L43+1: X45=X44: Y45=Y44: L45=L44+1: X46=X45: Y46=Y45: L46=L45+1: X47=X46: Y47=Y46: L47=L46+1: X48=X47: Y48=Y47: L48=L47+1: X49=X48: Y49=Y48: L49=L48+1: X50=X49: Y50=Y49: L50=L49+1: X51=X50: Y51=Y50: L51=L50+1: X52=X51: Y52=Y51: L52=L51+1: X53=X52: Y53=Y52: L53=L52+1: X54=X53: Y54=Y53: L54=L53+1: X55=X54: Y55=Y54: L55=L54+1: X56=X55: Y56=Y55: L56=L55+1: X57=X56: Y57=Y56: L57=L56+1: X58=X57: Y58=Y57: L58=L57+1: X59=X58: Y59=Y58: L59=L58+1: X60=X59: Y60=Y59: L60=L59+1: X61=X60: Y61=Y60: L61=L60+1: X62=X61: Y62=Y61: L62=L61+1: X63=X62: Y63=Y62: L63=L62+1: X64=X63: Y64=Y63: L64=L63+1: X65=X64: Y65=Y64: L65=L64+1: X66=X65: Y66=Y65: L66=L65+1: X67=X66: Y67=Y66: L67=L66+1: X68=X67: Y68=Y67: L68=L67+1: X69=X68: Y69=Y68: L69=L68+1: X70=X69: Y70=Y69: L70=L69+1: X71=X70: Y71=Y70: L71=L70+1: X72=X71: Y72=Y71: L72=L71+1: X73=X72: Y73=Y72: L73=L72+1: X74=X73: Y74=Y73: L74=L73+1: X75=X74: Y75=Y74: L75=L74+1: X76=X75: Y76=Y75: L76=L75+1: X77=X76: Y77=Y76: L77=L76+1: X78=X77: Y78=Y77: L78=L77+1: X79=X78: Y79=Y78: L79=L78+1: X80=X79: Y80=Y79: L80=L79+1: X81=X80: Y81=Y80: L81=L80+1: X82=X81: Y82=Y81: L82=L81+1: X83=X82: Y83=Y82: L83=L82+1: X84=X83: Y84=Y83: L84=L83+1: X85=X84: Y85=Y84: L85=L84+1: X86=X85: Y86=Y85: L86=L85+1: X87=X86: Y87=Y86: L87=L86+1: X88=X87: Y88=Y87: L88=L87+1: X89=X88: Y89=Y88: L89=L88+1: X90=X89: Y90=Y89: L90=L89+1: X91=X90: Y91=Y90: L91=L90+1: X92=X91: Y92=Y91: L92=L91+1: X93=X92: Y93=Y92: L93=L92+1: X94=X93: Y94=Y93: L94=L93+1: X95=X94: Y95=Y94: L95=L94+1: X96=X95: Y96=Y95: L96=L95+1: X97=X96: Y97=Y96: L97=L96+1: X98=X97: Y98=Y97: L98=L97+1: X99=X98: Y99=Y98: L99=L98+1: X100=X99: Y100=Y99: L100=L99+1: X101=X100: Y101=Y100: L101=L100+1: X102=X101: Y102=Y101: L102=L101+1: X103=X102: Y103=Y102: L103=L102+1: X104=X103: Y104=Y103: L104=L103+1: X105=X104: Y105=Y104: L105=L104+1: X106=X105: Y106=Y105: L106=L105+1: X107=X106: Y107=Y106: L107=L106+1: X108=X107: Y108=Y107: L108=L107+1: X109=X108: Y109=Y108: L109=L108+1: X110=X109: Y110=Y109: L110=L109+1: X111=X110: Y111=Y110: L111=L110+1: X112=X111: Y112=Y111: L112=L111+1: X113=X112: Y113=Y112: L113=L112+1: X114=X113: Y114=Y113: L114=L113+1: X115=X114: Y115=Y114: L115=L114+1: X116=X115: Y116=Y115: L116=L115+1: X117=X116: Y117=Y116: L117=L116+1: X118=X117: Y118=Y117: L118=L117+1: X119=X118: Y119=Y118: L119=L118+1: X120=X119: Y120=Y119: L120=L119+1: X121=X120: Y121=Y120: L121=L120+1: X122=X121: Y122=Y121: L122=L121+1: X123=X122: Y123=Y122: L123=L122+1: X124=X123: Y124=Y123: L124=L123+1: X125=X124: Y125=Y124: L125=L124+1: X126=X125: Y126=Y125: L126=L125+1: X127=X126: Y127=Y126: L127=L126+1: X128=X127: Y128=Y127: L128=L127+1: X129=X128: Y129=Y128: L129=L128+1: X130=X129: Y130=Y129: L130=L129+1: X131=X130: Y131=Y130: L131=L130+1: X132=X131: Y132=Y131: L132=L131+1: X133=X132: Y133=Y132: L133=L132+1: X134=X133: Y134=Y133: L134=L133+1: X135=X134: Y135=Y134: L135=L134+1: X136=X135: Y136=Y135: L136=L135+1: X137=X136: Y137=Y136: L137=L136+1: X138=X137: Y138=Y137: L138=L137+1: X139=X138: Y139=Y138: L139=L138+1: X140=X139: Y140=Y139: L140=L139+1: X141=X140: Y141=Y140: L141=L140+1: X142=X141: Y142=Y141: L142=L141+1: X143=X142: Y143=Y142: L143=L142+1: X144=X143: Y144=Y143: L144=L143+1: X145=X144: Y145=Y144: L145=L144+1: X146=X145: Y146=Y145: L146=L145+1: X147=X146: Y147=Y146: L147=L146+1: X148=X147: Y148=Y147: L148=L147+1: X149=X148: Y149=Y148: L149=L148+1: X150=X149: Y150=Y149: L150=L149+1: X151=X150: Y151=Y150: L151=L150+1: X152=X151: Y152=Y151: L152=L151+1: X153=X152: Y153=Y152: L153=L152+1: X154=X153: Y154=Y153: L154=L153+1: X155=X154: Y155=Y154: L155=L154+1: X156=X155: Y156=Y155: L156=L155+1: X157=X156: Y157=Y156: L157=L156+1: X158=X157: Y158=Y157: L158=L157+1: X159=X158: Y159=Y158: L159=L158+1: X160=X159: Y160=Y159: L160=L159+1: X161=X160: Y161=Y160: L161=L160+1: X162=X161: Y162=Y161: L162=L161+1: X163=X162: Y163=Y162: L163=L162+1: X164=X163: Y164=Y163: L164=L163+1: X165=X164: Y165=Y164: L165=L164+1: X166=X165: Y166=Y165: L166=L165+1: X167=X166: Y167=Y166: L167=L166+1: X168=X167: Y168=Y167: L168=L167+1: X169=X168: Y169=Y168: L169=L168+1: X170=X169: Y170=Y169: L170=L169+1: X171=X170: Y171=Y170: L171=L170+1: X172=X171: Y172=Y171: L172=L171+1: X173=X172: Y173=Y172: L173=L172+1: X174=X173: Y174=Y173: L174=L173+1: X175=X174: Y175=Y174: L175=L174+1: X176=X175: Y176=Y175: L176=L175+1: X177=X176: Y177=Y176: L177=L176+1: X178=X177: Y178=Y177: L178=L177+1: X179=X178: Y179=Y178: L179=L178+1: X180=X179: Y180=Y179: L180=L179+1: X181=X180: Y181=Y180: L181=L180+1: X182=X181: Y182=Y181: L182=L181+1: X183=X182: Y183=Y182: L183=L182+1: X184=X183: Y184=Y183: L184=L183+1: X185=X184: Y185=Y184: L185=L184+1: X186=X185: Y186=Y185: L186=L185+1: X187=X186: Y187=Y186: L187=L186+1: X188=X187: Y188=Y187: L188=L187+1: X189=X188: Y189=Y188: L189=L188+1: X190=X189: Y190=Y189: L190=L189+1: X191=X190: Y191=Y190: L191=L190+1: X192=X191: Y192=Y191: L192=L191+1: X193=X192: Y193=Y192: L193=L192+1: X194=X193: Y194=Y193: L194=L193+1: X195=X194: Y195=Y194: L195=L194+1: X196=X195: Y196=Y195: L196=L195+1: X197=X196: Y197=Y196: L197=L196+1: X198=X197: Y198=Y197: L198=L197+1: X199=X198: Y199=Y198: L199=L198+1: X200=X199: Y200=Y199: L200=L199+1: X201=X200: Y201=Y200: L201=L200+1: X202=X201: Y202=Y201: L202=L201+1: X203=X202: Y203=Y202: L203=L202+1: X204=X203: Y204=Y203: L204=L203+1: X205=X204: Y205=Y204: L205=L204+1: X206=X205: Y206=Y205: L206=L205+1: X207=X206: Y207=Y206: L207=L206+1: X208=X207: Y208=Y207: L208=L207+1: X209=X208: Y209=Y208: L209=L208+1: X210=X209: Y210=Y209: L210=L209+1: X211=X210: Y211=Y210: L211=L210+1: X212=X211: Y212=Y211: L212=L211+1: X213=X212: Y213=Y212: L213=L212+1: X214=X213: Y214=Y213: L214=L213+1: X215=X214: Y215=Y214: L215=L214+1: X216=X215: Y216=Y215: L216=L215+1: X217=X216: Y217=Y216: L217=L216+1: X218=X217: Y218=Y217: L218=L217+1: X219=X218: Y219=Y218: L219=L218+1: X220=X219: Y220=Y219: L220=L219+1: X221=X220: Y221=Y220: L221=L220+1: X222=X221: Y222=Y221: L222=L221+1: X223=X222: Y223=Y222: L223=L222+1: X224=X223: Y224=Y223: L224=L223+1: X225=X224: Y225=Y224: L225=L224+1: X226=X225: Y226=Y225: L226=L225+1: X227=X226: Y227=Y226: L227=L226+1: X228=X227: Y228=Y227: L228=L227+1: X229=X228: Y229=Y228: L229=L228+1: X230=X229: Y230=Y229: L230=L229+1: X231=X230: Y231=Y230: L231=L230+1: X232=X231: Y232=Y231: L232=L231+1: X233=X232: Y233=Y232: L233=L232+1: X234=X233: Y234=Y233: L234=L233+1: X235=X234: Y235=Y234: L235=L234+1: X236=X235: Y236=Y235: L236=L235+1: X237=X236: Y237=Y236: L237=L236+1: X238=X237: Y238=Y237: L238=L237+1: X239=X238: Y239=Y238: L239=L238+1: X240=X239: Y240=Y239: L240=L239+1: X241=X240: Y241=Y240: L241=L240+1: X242=X241: Y242=Y241: L242=L241+1: X243=X242: Y243=Y242: L243=L242+1: X244=X243: Y244=Y243: L244=L243+1: X245=X244: Y245=Y244: L245=L244+1: X246=X245: Y246=Y245: L246=L245+1: X247=X246: Y247=Y246: L247=L246+1: X248=X247: Y248=Y247: L248=L247+1: X249=X248: Y249=Y248: L249=L248+1: X250=X249: Y250=Y249: L250=L249+1: X251=X250: Y251=Y250: L251=L250+1: X252=X251: Y252=Y251: L252=L251+1: X253=X252: Y253=Y252: L253=L252+1: X254=X253: Y254=Y253: L254=L253+1: X255=X254: Y255=Y254: L255=L254+1: X256=X255: Y256=Y255: L256=L255+1: X257=X256: Y257=Y256: L257=L256+1: X258=X257: Y258=Y257: L258=L257+1: X259=X258: Y259=Y258: L259=L258+1: X260=X259: Y260=Y259: L260=L259+1: X261=X260: Y261=Y260: L261=L260+1: X262=X261: Y262=Y261: L262=L261+1: X263=X262: Y263=Y262: L263=L262+1: X264=X263: Y264=Y263: L264=L263+1: X265=X264: Y265=Y264: L265=L264+1: X266=X265: Y266=Y265: L266=L265+1: X267=X266: Y267=Y266: L267=L266+1: X268=X267: Y268=Y267: L268=L267+1: X269=X268: Y269=Y268: L269=L268+1: X270=X269: Y270=Y269: L270=L269+1: X271=X270: Y271=Y270: L271=L270+1: X272=X271: Y272=Y271: L272=L271+1: X273=X272: Y273=Y272: L273=L272+1: X274=X273: Y274=Y273: L274=L273+1: X275=X274: Y275=Y274: L275=L274+1: X276=X275: Y276=Y275: L276=L275+1: X277=X276: Y277=Y276: L277=L276+1: X278=X277: Y278=Y277: L278=L277+1: X279=X278: Y279=Y278: L279=L278+1: X280=X279: Y280=Y279: L280=L279+1: X281=X280: Y281=Y280: L281=L280+1: X282=X281: Y282=Y281: L282=L281+1: X283=X282: Y283=Y282: L283=L282+1: X284=X283: Y284=Y283: L284=L283+1: X285=X284: Y285=Y284: L285=L284+1: X286=X285: Y286=Y285: L286=L285+1: X287=X286: Y287=Y286: L287=L286+1: X288=X287: Y288=Y287: L288=L287+1: X289=X288: Y289=Y288: L289=L288+1: X290=X289: Y290=Y289: L290=L289+1: X291=X290: Y291=Y290: L291=L290+1: X292=X291: Y292=Y291: L292=L291+1: X293=X292: Y293=Y292: L293=L292+1: X294=X293: Y294=Y293: L294=L293+1: X295=X294: Y295=Y294: L295=L294+1: X296=X295: Y296=Y295: L296=L295+1: X297=X296: Y297=Y296: L297=L296+1: X298=X297: Y298=Y297: L298=L297+1: X299=X298: Y299=Y298: L299=L298+1: X300=X299: Y300=Y299: L300=L299+1: X301=X300: Y301=Y300: L301=L300+1: X302=X301: Y302=Y301: L302=L301+1: X303=X302: Y303=Y302: L303=L302+1: X304=X303: Y304=Y303: L304=L303+1: X305=X304: Y305=Y304: L305=L304+1: X306=X305: Y306=Y305: L306=L305+1: X307=X306: Y307=Y306: L307=L306+1: X308=X307: Y308=Y307: L308=L307+1: X309=X308: Y309=Y308: L309=L308+1: X310=X309: Y310=Y309: L310=L309+1: X311=X310: Y311=Y310: L311=L310+1: X312=X311: Y312=Y311: L312=L311+1: X313=X312: Y313=Y312: L313=L312+1: X314=X313: Y314=Y313: L314=L313+1: X315=X314: Y315=Y314: L315=L314+1: X316=X315: Y316=Y315: L316=L315+1: X317=X316: Y317=Y316: L317=L316+1: X318=X317: Y318=Y317: L318=L317+1: X319=X318: Y319=Y318: L319=L318+1: X320=X319: Y320=Y319: L320=L319+1: X321=X320: Y321=Y320: L321=L320+1: X322=X321: Y322=Y321: L322=L321+1: X323=X322: Y323=Y322: L323=L322+1: X324=X323: Y324=Y323: L324=L323+1: X325=X324: Y325=Y324: L325=L324+1: X326=X325: Y326=Y325: L326=L325+1: X327=X326: Y327=Y326: L327=L326+1: X328=X327: Y328=Y327: L328=L327+1: X329=X328: Y329=Y328: L329=L328+1: X330=X329: Y330=Y329: L330=L329+1: X331=X330: Y331=Y330: L331=L330+1: X332=X331: Y332=Y331: L332=L331+1: X333=X332: Y333=Y332: L333=L332+1: X334=X333: Y334=Y333: L334=L333+1: X335=X334: Y335=Y334: L335=L334+1: X336=X335: Y336=Y335: L336=L335+1: X337=X336: Y337=Y336: L337=L336+1: X338=X337: Y338=Y337: L338=L337+1: X339=X338: Y339=Y338: L339=L338+1: X340=X339: Y340=Y339: L340=L339+1: X341=X340: Y341=Y340: L341=L340+1: X342=X341: Y342=Y341: L342=L341+1: X343=X342: Y343=Y342: L343=L342+1: X344=X343: Y344=Y343: L344=L343+1: X345=X344: Y345=Y344: L345=L344+1: X346=X345: Y346=Y345: L346=L345+1: X347=X346: Y347=Y346: L347=L346+1: X348=X347: Y348=Y347: L348=L347+1: X349=X348: Y349=Y348: L349=L348+1: X350=X349: Y350=Y349: L350=L349+1: X351=X350: Y351=Y350: L351=L350+1: X352=X351: Y352=Y351: L352=L351+1: X353=X352: Y353=Y352: L353=L352+1: X354=X353: Y354=Y353: L3
```


6 WEEKS OF FREE COLOUR BOOKLETS!



'Better Photography' series of cover-mounted supplements.

Free! Six super full colour booklets designed to help you get better results, whatever your camera. Each booklet concentrates on a specific aspect of photography, with really exciting colour photographs to illustrate the points—plus a problem solving section and a checklist of things to remember. You'll want to keep these handy booklets for reference. So don't miss a single one. Order a regular copy of Amateur Photographer today.

Week ending:

Sept. 21 Composing Your Picture. Sept. 28 People in Camera.

Oct. 5 Sport and Action. Oct. 12 Capturing Children.

Oct 19 Special Effects. Oct. 26 Get the Light Right.

EXTRA VALUE FROM THE WORLD'S NO. 1 PHOTO WEEKLY

At your newsagent every Tuesday 65p Place a regular order now!

SUMMER GAMES II

Competition

We're giving away £100 of sportswear plus a copy of Summer Games II from US Gold to each of the two best entries to this sporting competition. And another 30 copies of the multi-sport action game are up for grabs to the top 30 runners-up.

Don't be put off by the miserable summer. Here's your chance to invent some of the games that should have been played if they hadn't been rained off.



WIN £200'S WORTH OF SPORTSWEAR

COMPETITION RULES

- The winners of the competition will be the people who, in the view of the editor, come up with the most realistic, amusing or witty ideas for new sports to be added to a Summer Games-type game.
- The name of the winner will be printed in the January issue of *Your Computer*.
- All entries must arrive at the *Your Computer* offices by the last working day in October 1985.
- Entries to the competition cannot be acknowledged.
- No employees of BPI or their relatives may enter the competition.
- The decision of the editor is final.
- No correspondence on the result of the competition will be entered into.
- Business Press International assumes no responsibility or liability for any complaints arising from this competition.

Have you ever fancied yourself as a champion jay-walker? Do you think you could out-quantum leap Clive Sinclair over inflatable IBM PCs? What we want you to do is send us the mystery sport you think Summer Games lacks. You can be as serious or as jokey as you like. Write us a short description of your new sport or send a drawing of what it should look like.

YOUR COMPUTER

COMPETITION

Don't forget to enclose this coupon, or a photocopy of it, when you send in your entry to Summer Games II Competition, *Your Computer*, Room L221, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Name _____

Address _____

Ace down the line.

Punch data down the line with Miracle Technology's Modem WS2000.

WS2000 links your computer into the world-wide telephone network — the world of PRESTEL, Telecom Gold, Telex, MICRONET, databases and bulletin boards.

Flexible, versatile, high quality WS2000 wins every point, as over 11,000 business and home users know. MICRONET recommended, PCN Best Buy, British Microcomputing Awards Finalist — WS2000 plays its rival off the court!



Plus Free
Quarter's
Micronet Subscription

Our match winner, with BT telephone lead, mains power supply and comprehensive manual, costs £129.95 ex. (£154.73 inc. VAT & UK delivery). We can also supply the necessary leads and software for most computers — an unbeatable service!



Prestel is a Registered Trade Mark of British Telecommunications PLC. Micronet 800 is the Trading Style of Telemat Ltd and British Telecommunications PLC

MIRACLE TECHNOLOGY

MIRACLE TECHNOLOGY (UK) LTD ST PETERS STREET IPSWICH IP1 1XB ENGLAND
(0473) 50304 5 LINES TELECOM GOLD 79: KEY 001 946240 CWEASY G 19002985

STOPP!!! 60-80% RABATT!!!

VI KAN NU ERBJUDA ER ENGELSKA KONKURSLAGER TILL ABSOLUTA BOTTENPRISER!!!

PROGRAM FINNS FRÅN BLA. FÖLJANDE TILLVERKARE:

A&F, ARTIC, BUGBYTE, CDS, CRL, CRYSTAL, DK'TRONICS, HI TECH, IMAGE, LOTHLORIEN, MICROMANIA, MICROMEGA, MOGUL, PHIPPS, OCEAN, QUICKSILVA, R. SHEPARD, SINCLAIR, SOFTEK, VIRGIN, VISIONS, VORTEX, ULTIMATE, PSS, LLAMASOFT, ALLIGATA, RABBIT, SOFTEK, SOLAR, STATESOFT, ANIROG, MICRODEAL.

- | | |
|---|---|
| <input type="checkbox"/> FYNDPAKET 1
5 SPEL, 199:- | <input type="checkbox"/> FYNDPAKET 2
10 SPEL, 379:- |
| <input type="checkbox"/> FYNDPAKET 3
15 SPEL, 549:- | <input type="checkbox"/> FYNDPAKET 4
20 SPEL, 699:- |

TILL FÖLJANDE DATOR:

- | | | | |
|-----------------------------------|---------------------------------|---------------------------------|--------------------------------|
| <input type="checkbox"/> SPECTRUM | <input type="checkbox"/> VIC-20 | <input type="checkbox"/> VIC-64 | <input type="checkbox"/> ATARI |
| <input type="checkbox"/> ZX-81 | <input type="checkbox"/> DRAGON | <input type="checkbox"/> ORIC | <input type="checkbox"/> BBC |

EXTRA!!!

VID BESTÄLLNING INOM 10 DAGAR ERHÅLLER DU GRATIS SUCCÉ-KASSETTEN "SPELDORADO".
(8 ST SVENSKA MASKINKODSSPEL. VÄRDE 149:-.)

MOMS & PORTO INGÅR, INGET TILLKOMMER.
OBS!!! ENDAST ORIGINALKASSETTER!!!

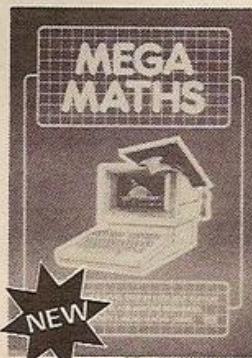
NAMN
ADRESS
POSTADRESS
TELEFON

VI ÄR EN AV SKANDINAVIENS STÖRSTA DISTRIBUTÖRER
AV HEMDATORPROGRAM MED DE LÅGSTA PRISERNA.

VID KATALOGBESTÄLLNING VG. ANGE DATORSORT OCH BIFOGA 5:-
FÖR PORTOT.

SWESCOT
BOX 213
121 02 JOHANNESHOV
SVERIGE
08-39 27 00

Educational Software LCL



BBC Micro

Tape, 40/80 track Disc,
Econet compatible.

**ZX Spectrum
Commodore 64**

Electron

**unexpanded Vic
ZX81 • Apple • PET**

NEC PC8201A

Dragon (book only)

**All software for the
above computers.**

MEGA MATHS (BBC, Electron). 24 program step-by-step, A-level course of 105 topics for mature beginners, A-level students and Micro Maths users. (2 discs/tapes + 2 books.) £24.00.

MICRO ENGLISH (BBC, Electron). Complete English Language self-tuition and revision course, to O-Level, of 24 programs. Includes "speak-and-spell" real speech (no extras required). £24.00.

MICRO MATHS 24 program revision or self-tuition course to O-Level. Includes 59 Topics plus two books. £24.00.

ANIMATED ARITHMETIC Teaches using moving colour pictures (not words) Ages 3-8. £6.50 (disc £7.50).

BRAINTEASERS Book of IQ tests and puzzle programs. £5.95

"... excellent" EDUCATIONAL COMPUTING.

* Immediate dispatch Micro Maths, Micro English, Mega Maths and Master Maths. Phone or send orders or requests for free glossy colour catalogue to:

LCL DEPT. Y.
**26 Avondale Ave.
Staines, Middx.**

Tel: 0784 58771

24 hrs. Orders

World leaders in
educational software
(distributors in 24 countries)



TRADE DISCOUNTS
NEW HOTLINE SERVICE

AS SEEN ON
TV

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

The crystal ball

Exciting new releases planned by Adventure International include Robin of Sherwood (first in a series), the Fantastic Four (following on from Hulk and Spiderman in the QuestProbe series), Gremlins 2 and a new Scott Adams adventure called Buckeroo Banzai.

They are also twin-packing the first 12 Scott Adams adventures. Each twin-pack will cost £7.95 so you'll get two classic adventures for the price of one. Great value.

They also plan to do the same with Brian Howarth's excellent Mysterious Adventure series. And two more in this same series are soon to be released: After The Fire and Midwinter.

Talking of twin-packs, Sentient Software are publishing a series of adventures where you get two versions (Spectrum and Commodore 64) on the same tape, and at only £2.99. One of the series is reviewed this month but others include The Key To Time (reviewed previously in this column), Scoop, the Amulet and the Crystal Frog.

A helping hand

My thanks to the Dundee reader who wrote to correct the June tip for 1942 Mission. To completely solve the Parachute problem:—

- (a) ETUH CARRA PEVO MER
- (b) LEWO RTHI IWEL OHGI D
- (c) ETUH CARA PYRU B

For those bewitched by Infocom's Enchanter:—
Can't open the jewelled box?

REGG ADLA ICIF IRCA
SEHT DEEN UOY
Can't survive the sacrifice?
YREL LAGE HTNI LLEP
SOOM ZOEH TROF KOOL
Yours in fable and fantasy
Hugo North.

QUEST

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

Red Moon

- Various
- £6.95
- Level 9 Computing

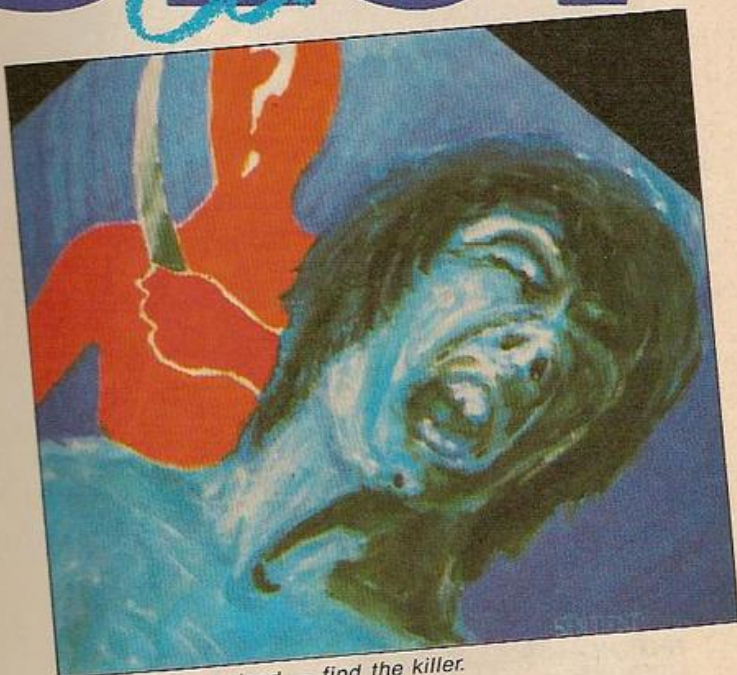
THE DAY a new adventure from those Quest masters at Level 9 arrives is always a red letter day in my calendar. Red Moon, their very latest text and graphics fantasy, maintains their high standard and will bring much pleasure to their legions of fans.

Red Moon signals a departure from Level 9's earlier themes — it is their first adventure to have a purely magical theme and also features a combat system based on hit points.

The quest is set in a time when sorcery fills the air, when strange creatures roam the land and when fabulous treasure is there for the finding.

In this tale, you must try to recover the stolen Red Moon Crystal, the source of all Magic. You begin on a wide grassy plain. Over to the north, a smouldering volcano beckons. Looking east, a deep dark pothole calls for inves-

Not Blue Moon.



Malice in Wonderland — find the killer.

tigation. Nearby, a ruined lunar temple and a large lake entices.

Careful exploration brings quick rewards and should see you gaining entrance to an enormous castle. At some point you'll come across So9 the Newtling. So9's role may not be immediately obvious but at least the program tells you what a newtling is. Young and mischievous, newtlings are the offspring of dragons but lack much of the power and wisdom of their parents.

As well as recovering the Red Moon Crystal, there are nine treasures to be collected along the way. There are 12 spells available to you, 10 of which also require the possession of a certain object before they are effective.

For example, you must have a dagger when you cast the zap spell (attack enemies magically). Other spells include bounce (reverse fall), strong (become stronger), magic (tell if an object is magic), extinguish (put out fire) and snoop (look into nearby room).

Every one of the 208 plus locations is described both textually and graphically. The text descriptions are fulsome and atmospheric, the graphics (which can be toggled on and off) simple but fast and attractive. Please note that the Atari and Memotech versions are text only.

Malice In Wonderland

- Spectrum/Commodore 64
- £2.99
- Sentient Software

OFFERING GOOD value for money, Malice In Wonderland is a traditional-style text adventure.

You take the role of a secret agent whose job is to investigate the murder of a contact. The action takes place around and inside a manor house. One interesting thing about the adventure is that the program randomly picks the murderer from the five possible suspects at the start.

Wishbringer

- Various
- £29.95 disc only
- Infocom

WISHBRINGER starts you out as a postal clerk with a tyrannical boss. You have to deliver a letter to the old Magic Shop.

Once you've delivered the letter, the adventure really takes off. The letter is really a ransom note. In exchange for the return of a kidnapped cat, somebody signing herself as The Evil One wants the legendary Wishbringer Stone. It will be your task to award the stone and bring back the cat.

It's all great stuff. Like all Infocom adventures, the prose is of the highest quality.

NEWS
GAMES
REVIEWS
UTILITIES
GRAPHICS
SOFTWARE
DISCOUNTS
PROGRAMS
HINTS & TIPS
USER GROUPS
INFORMATION
APPLICATIONS
SPECIAL OFFERS
TECHNICAL SUPPORT
TEN MAGAZINES PER YEAR

GET IN THE PICTURE WITH BEEBUG

JOIN BRITAIN'S LARGEST COMPUTER USER GROUP TO GET THE MOST FROM YOUR BBC MICRO

JOIN BY SENDING £11.90 FOR 1 YEAR MEMBERSHIP (10 MAGAZINES)

OR £6.40 for 6 MONTHS MEMBERSHIP (5 MAGAZINES).

OR SEND £1.00 FOR A SAMPLE ISSUE (UK ONLY)

UK ONLY — OVERSEAS PRICES ON APPLICATION

MAKE CHEQUES PAYABLE TO BEEBUG DEPT YC2 PO BOX 109 HIGH WYCOMBE BUCKS.

ADVANCED Z80 MACHINE CODE

A new authoritative guide, for those who want to improve their Z80 machine code programming skills to a genuinely professional level, has just been published by Interface, at £12.95.

If you already know the fundamentals of programming in Z80 machine code, and now want to expand your skills, to tackle advanced, serious and practical program development, then this is the book for you.

Advanced Z80 Machine Code Programming, by William Nitschke, fills a serious gap in the literature on programming the Z80. Rather than dealing with the elementary concepts of Z80 architecture, this new book discusses the material you now need to know to advance your skills. The core of the book looks at popular programming applications. Starting with the basics of organising information, generating arrays and tables, block moving, shifting and erasing, string manipulation, data compression and command tables, it moves on to advanced applications like word and sentence decoding. Games programming is then examined in detail, including three-dimensional maze generation, animated graphics and the development and coding of arcade games, and the synthesis of speech and sound effects. There is also a complete set of 'undocumented' Z80 instructions.

You can buy *Advanced Z80 Machine Code Programming* by William Nitschke (ISBN 0 907563 90 2) at £12.95 from most book and computer stores, or direct from the publisher, post free, at:

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

(Trade only: WHSD Leicester)

Interface

RSD Connections Ltd

MONITOR LEADS	RIBBON CABLE (price per ft)	SPECTRUM EX. LEADS
BBC to Microvitec £2.20	Grey £0.13	6 inch extensions cable M to F £10.50
TV to Computer £1.25	10-way £0.15	6 inch F to 2M's £14.75
Green to Screen £2.95	14-way £0.18	12 inch extension cable M to F £10.75
BBC to Fidelity etc £4.95	15-way £0.20	
QL to Fidelity etc £4.95	16-way £0.22	
Commodore to Fidelity etc £1.25	20-way £0.30	
BBC to Fergusson £2.50	24-way £0.35	
QL to Microvitec £2.50	25-way £0.40	
QL to mono monitor £1.50	26-way £0.45	
BBC to Sony/Kaga £5.95	34-way £0.60	
BNC to BNC £2.95	36-way £0.65	
Commodore to Fergusson £2.50	40-way £0.70	
BBC to Hitachi £2.50	40-way £0.85	
Sony to Fidelity etc £6.50	50-way £0.95	
MSX to Fergusson £2.50	60-way £1.10	
QL to Fergusson £2.50	64-way £1.25	
DISK DRIVE LEADS	EDGE CONNECTORS	IDC SHROUDED HEADERS WITH EJECTING LOCKING ARMS
Dual disk drive power lead £4.50	2 x 23-way (ZX81) £1.85	Straight £0.85
Dual disk drive lead 1m £10.25	2 x 28-way (Spectrum) £2.10	Right angle £0.90
Single disk drive power lead £2.75	DOUBLE SIDED PLUG BOARD	10-way £1.00
Single disk drive lead 1m £7.25	ZX 81 23-way £1.25	14-way £1.25
Disk drive extn lead 1m £7.25	Spectrum 28-way £1.50	16-way £1.45
Amstrad 2nd drive 1/2mm £6.95	ADDITIONAL IDC 56-way Card Edge for Extension Lead £4.25	20-way £1.40
CASSETTE LEADS	D CONNECTORS	26-way £1.70
BBC to cassette £2.25	Solder £0.75	34-way £2.00
Dragon to cassette £2.20	Bucket £0.75	40-way £2.15
Spectrum to cassette £1.25	Male £1.00	50-way £2.30
BBC to Acorn cassette £2.25	Female £1.50	60-way £2.45
Amstrad to cassette £2.20	37-way £2.40	
PRINTER LEADS	HOODS £0.95	BBC MONITOR STAND
ALL 1 METRE LENGTH		Heavy duty stand Vinyl covered in BBC colours to match ONLY £11.95
BBC £9.95		
ATARI £13.25		DISTRIBUTION SOCKET
AMSTRAD £16.75		4-way top quality 4-WAY MAINS trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug. ONLY £9.50
MEMOTECH £12.75		
EINSTEIN £12.75		TELEPHONE CONNS
IBM PC £15.75		Surface master jack socket £3.75
SPECTRUM interface one to RS 232 £9.75		Surface extn socket £2.50
ATARI £13.95		Dual outlet adaptor £4.25
MSX £15.20		Line jack cord 3mtr £1.85
APRICOT £9.95		4 core cable per metre £0.48
ORAGON £10.75		All surface units shuttered BT approved
ANY COMBINATION OF LEADS MADE TO ORDER	CONNECTORS IDC	SPECTRUM DRIVES
	Card Trans 2 Row	RS232 WAFA lead 1m £10.50
	Edge PCB Socket	Centronics WAFA lead 1m £10.50
	10-way £1.20	Micro Extn. lead 12" £6.00
	14-way £1.20	
	16-way £1.60	IDC D CONNECTORS
	20-way £1.90	9-way Male £2.70
	24-way £2.40	15-way Female £3.20
	34-way £3.10	25-way £3.80
	40-way £3.40	37-way £5.90
	50-way £3.85	
	60-way £4.80	

TRADE ENQUIRIES WELCOME

75p P&P IN U.K. Access & Visa accepted. Add 15% VAT to all orders

Cheques made payable to

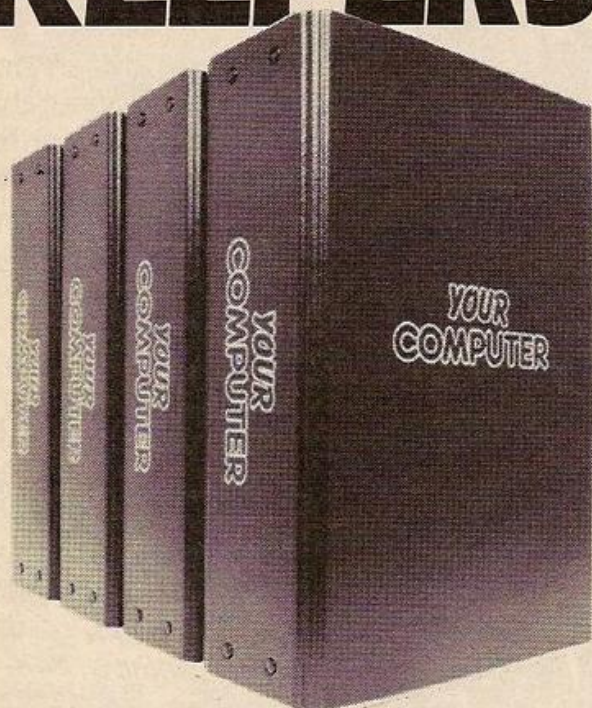
RSD Connections Ltd, Dept YC10

PO Box 1, Ware, Herts.

Tel: 0920 5285



BINDERS KEEPERS



£3.45 each
incl. post and packing

These purpose-designed binders provide the ideal home for your copies of Your Computer. Now you can pack those back copies away safely. No more worries about all that valuable information being thrown out with last week's newspapers. They are sturdily made and attractively finished in dark green with gold block title on front cover and spine. Order yours now!

Sundry Sales Dept., Room 1605, Quadrant House,
The Quadrant, Sutton, Surrey SM2 5AS.

To: Sundry Sales Dept., Room 1605, Quadrant House,
The Quadrant, Sutton, Surrey SM2 5AS.

Please send me.....(state quantity)
Your Computer Binder/s @ £3.45 each (£5 overseas)
including post and packing. I enclose cheque/P.O. for
£.....payable to Business Press International Ltd.

NAME.....
(Please use block letters)

ADDRESS.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Registered in England No. 151537

ROTRONICS DX-85 DOT MATRIX PRINTER

- 100 cps, 80 column
- Italics, condensed, expanded
- Centronics

ONLY
£199.95
(Serial add £18.00)
(Commodore add
£34.00)



ONLY
£24.95

STONECHIP BARGAIN BASEMENT

Spectrum Keyboard	£24.95
Spectrum prog joystick i/f	£12.95
Prog plus Kempston joystick i/f	£16.95
16K expansion for ZX81	£9.95
Echo amplifier	£6.95
Vixen Motherboard	£14.95
Commodore cassette i/f	£4.95
VIC20 Programm	£9.95
Aid Cartridge	£7.95
VIC20 Programm	£7.95
Aid ROM	£2.95
Lucky Dip 6 Spectrum programs	£2.95

- Audio and data
- Suits all home micros
- Direct VIC 20 and CBM 64 connection



Rotronics DR2301 Data Recorder

Rotronics Portable Case

- 23" x 15" cubed foam
- Holds Spectrum or VIC 20/CBM 64
- Components work in situ

ONLY
£27.95
(26" x 15" £31.95)

All prices include VAT and p + p. Please make your cheque/P.O. payable to SMT. Or quote Access/Barclaycard number. Write your name and address clearly. Please allow 28 days for delivery. SMT, FREEPOST, Greens Norton, Towcester, Northants, NN12 8BA



THE MICRO WORKSHOP MICRO COMPUTER SPECIALISTS

(Spectrum Group Member)

Software and hardware over the counter for Sinclair Spectrum, BBC, CBM-64, Memotech, Amstrad, Einstein, etc.

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

Educational/Business Programs available.

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

★ In house programming ★

Overseas/Export orders welcome

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

(continued from page 91)

think differently when writing in Logo that underlies Logo's importance as an educational language. Many home computer Logos are designed mainly for educational use, following the guidelines set out by Logo originator Seymour Papert, and most have good manuals.

To a Basic programmer, it can be difficult to realise how many elements of the language are optional. What! languages with *no line numbers*? What! languages in which you don't write programs at all? Both these things are true of Logo.

In Logo you write short procedures, procedures which call on other procedures, procedures which call those procedures, and so on. You don't run a special kind of thing called a program: you run one of these procedures, no different in essence from any other procedure.

From another angle, you might

think of each Logo procedure as the definition of a word in the Logo language. Words which you define yourself — say, Square, or Picture — can be used — once their definitions have been loaded into memory — in just the same way as words defined for you by the Logo interpreter like Forward or Penup. The name of a procedure/program is just another, comparatively specialised Logo word.

Logo grammar is based on the list-processing idea and can make a good introduction to other more impenetrable list processing languages such as Lisp and Prolog. Logo itself has two basic strengths. One is turtle graphics, the type of graphics, using relative rather than absolute co-ordinates, that can control a "turtle" robot on the floor as well as mock-turtle cursor on the screen.

The other is formal list processing, which is particularly useful for the creation and

BEGINNERS

first bytes

manipulation of databases. Though other types of program can be written in Logo, most Logo programs are either database-oriented or graphics-oriented.

Logo interpreters are available for most, if not all, popular home computers. Be cautious in choosing one. The best interpreters are written in assembly language or a low-level like C; mock-Logos written in Basic will be much less versatile, and far slower in operation.

The word "Logo" is sometimes

applied to sets of turtle-graphics subroutines that don't include proper list-processing facilities.

The number of command words defined in the interpreter is not too important: it's easy to add more. What is more important is the support for screen handling and for peripheral devices.

A good Logo will handle multiple turtles, rather like sprites on screen: some will handle only one, making graphic programming much more cumbersome. Look out, too, for Logos whose syntax keeps reasonably close to the MIT standard pioneered by Papert.

Susan Curran.

Difference between different Basics

THERE IS NO such thing as a standard Basic. Or rather there are a number of standard Basics. By dint of its popularity, the most standard in the microcomputer world is Microsoft Basic. On the other hand the standard version of the language in the British educational market is BBC Basic. Here is a look at some of the versions of Basic available for more up-market machines.

Microsoft Basic is the best-known dialect of computing's most popular language. Commonly known as MBasic, it is the granddaddy of nearly all home computer Basics. It is used on business machines like the IBM-PC and the Apricot. There is a special implementation of MBasic — called version 2.0, for the Apple Macintosh that makes special use of the machine's facilities.

The program uses a list window which can both edit and debug a program. There is a mode which allows the user to run a program and see the results of that program's actions appear in one window, while highlighting the sections of code being used in another. Programs can be halted or suspended using the mouse.

A number of commands exist to allow the mouse to be used, so within a Basic program you can read the position of the mouse and determine whether the button is pressed — or not. Input and output is device independent, that is

output files can be sent to the screen, the printer or a disc. More than anything else, the Mac is a graphics machine and Microsoft Basic makes the most of those graphics by using the famous inbuilt Quickdraw routines.

MSX Basic is directly derived from the original Microsoft dialect, as are the versions of Basic used by the Commodore micros — though Microsoft disown the awful implementation of Basic on the Commodore 64.

CBasic is Digital Research's answer to Microsoft Basic and can be found on a number of CPM micros. Its special feature is the way that it allows you to write complex user-defined functions with many program lines. These effectively function as mini-programs, or as procedures.

ANSI Basic is another attempt to a 'standard' version of the language. It took the ANSI committee the best part of 10 years to define the language, but although it is very good, the computer world has not exactly taken to it. You can find a version of it on the Enterprise range of computers — called IS-Basic.

IS-Basic allows long variable names and is highly structured, more so than BBC Basic. Listings look a little like Pascal listings and there are some interesting commands. Like CBasic, IS-Basic allows multi-line functions — which makes for some elegant



structured programming, as does the Do...While and Do...Until constructions.

A particularly nice feature is the way that If...Then...Else works, with program blocks between the If, Then and Else, rather than mere commands as in other Basics. A further neat construction is Select...Case, which enables program control to be sent to a block determined by the value of a variable.

GWBasic is known as 'Gee-Whizz Basic' — apparently the Americans liked it when they first saw it. Underneath all the razzamatazz, GWBasic is essentially the same as Microsoft Basic with some extra commands to handle high-resolution graphics, sound, light-pen and all the frills of home computing.

The other main improvement over MBasic is that it has a screen editor, not very different from the one found on Commodore computers.

Big computers have big Basics. Hewlett-Packard's Basic is more than 200K, but it is designed to be

used for scientific calculations, and has a whole host of built-in functions to handle matrices and the like is included. DEC Basic-Plus is another version of the language designed to run on huge machines.

On the whole, Basic is not a portable language. That is, programs written in one version of Basic are not likely to run on machines using a different version of the language. However right at the very top of the computer market there is a portable Basic called BLS, the Basic Language System. Like the Basics we know and love on home machines it is interactive and is easy to use.

With BLS, a programmer can write an application program on any system, and that program can be compiled to more or less any other system provided it uses a commonly found operating system. Unfortunately this does not apply to many home computers, though programs can be developed in BLS for the QL and MS-DOS computers.

Bill Bennett.

COMMODORE 64, BBC AND SPECTRUM

```

5 REM  HEX LOADER FOR CBM 64  FIG.1
6 REM
10 FOR I=680 TO 727:READA:POKEI,A:T=T+A
20 NEXT I:IF T=6716 THEN GOTO 100
30 PRINT"ERROR IN DATA ":T-6716:END
40 DATA 169,1,133,186,169,1,133,184
50 DATA 133,185,169,8,133,183,169,208
60 DATA 133,187,169,2,133,188,169,56
70 DATA 133,251,169,199,133,252,169,251
80 DATA 162,231,169,206,32,216,255,96
90 DATA 68,79,87,78,76,79,65,68
100 SA=51000:LA=52855
110 INPUT"START ADDRESS":A
120 IF (A<SA) OR (A>LA) THEN GOTO 140
130 IF A/8=INT(A/8) THEN GOTO 150
140 PRINT"PRINT ADDRESS ERROR":GOTO 110
150 T=(A-32768)AND255:PRINTA:INPUTD$
160 IF D$="END" THEN GOTO 900
170 IF LEN(D$)=20 THEN GOTO 190
180 PRINT"WRONG LENGTH":GOTO 150
190 FOR B=0 TO 7:B$=MID$(D$,2*B+1,2)
200 GOSUB 300:IF E=1 THEN GOTO 280

```

```

210 POKE A+B,D:T=T+D:NEXT
220 B$=MID$(D$,18,3):GOSUB 300
230 IF E=1 THEN GOTO 280
240 IF T=D THEN GOTO 260
250 PRINT"CHECKSUM ERROR":GOTO 150
260 A = A+B:IF A<LA THEN GOTO 150
270 GOTO 800
280 PRINT TAB(8+2*B,D)C$;"??"
290 B=B+1:NEXT GOTO 150
300 E=0:D=0:FOR N=1 TO LEN(B$)
310 C$=MID$(B$,N,1):GOSUB 400
320 IF E=1 THEN D=N:N=4:NEXT:RETURN
330 D=D+16*X:NEXT:RETURN
400 X=ASC(C$)-48:IF X<0 THEN E=1:RETURN
410 IF X<10 THEN RETURN
420 X=X-7:IF X<10 THEN E=1:RETURN
430 IF X>15 THEN E=1
440 RETURN
500 H$="0123456789ABCDEF"
510 FOR A=8A TO LA STEP 8
520 PRINT A:" "T=(A-32768)AND255
530 FOR B=0 TO 7:X=PEEK(A+B):GOSUB 600
540 T=T+X:NEXT:PRINT" "
550 Y=INT(T/256):PRINT MID$(H$,Y+1,1)
570 X=255 AND T:GOSUB 600:PRINT
580 NEXT:GOTO 900
600 PRINT MID$(H$,INT(X/16)+1,1)
610 PRINT MID$(H$,1+(XAND15)+1):RETURN

```

THE PROGRAMS given here will enable Spectrum, BBC, and CBM-64 owners to download via *Your Computer's* Telsoft service. Each month for each machine we transmit at least one — and usually two — of the main programs appearing in the current issue. Also available is the full user to user communications program, Dialsoft.

So far OE LTD's Telemod 2 and the VTX 5000 modems have been tested with the BBC and Spectrum but the service also works with

```

800 SYS 680:C$=CHR$(34)
810 PRINT"PRINT" TO PELORD CODE :
815 PRINT"PRINT" LOAD"C$DOWNLOAD":
820 PRINTC$,1,1 (RETURN)
825 PRINT"PRINT" THEN TYPE NEW":
830 PRINT" (RETURN)"
835 PRINT"PRINT" TO RUN THE PROGRAM":
840 PRINT" SYS 51000 (RETURN)"
900 PRINT"PRINT"PRINT"1 ENTER DATA"
910 PRINT"PRINT"2 PRINT DATA"
920 PRINT"PRINT"3 SAVE DATA"
930 INPUT Z:ON Z GOTO 100,500,800

```

```

51000 ? A9068D21D08D20D0=3E2
51008 ? A90F8D60A2A90E20=2E4
51016 ? D2FFA9008D15D0A9=4D0
51024 ? F8D08A02B8E92CE=510
51032 ? 20CAC920C7CB20E=405
51040 ? CAAD80CEC931F023=532
51048 ? C93F014C936D006=43F
51056 ? 208EC74C5BC7A914=410
51064 ? 20D2FF202FCB0D0D=52E
51072 ? 203FC0A92020D02F=461
51080 ? 4C93C94C4C82063=411
51088 ? CC2022CDA95B85FD=4F1
51096 ? AC85FE2028CDA0=547
51104 ? 002095CC202FCBC9=404
51112 ? 44F00BC954D0E0D2=4E1
51120 ? D2FFA901D007A944=4EF
51128 ? 20D2FFA90085BA20=489
51136 ? 25CD8A90820A8C9A=4A3
51144 ? B0E5DA9C0D85FEA0=6A0
51152 ? 002095CC2025CD20=383
51160 ? 95CC9848A0048C83=4CC
51168 ? CE20D0C968A82025=4C4
51176 ? CD2095CC9E48A906=4C5
51184 ? 0D83CE208C9AD7=5E3
51192 ? CE5FAD80CE85FC=6EA
51200 ? 68A82060CBA90185=38A
51208 ? B885B398A293A0CE=539
51216 ? 20BDFFA9A9CEA8A=567
51224 ? CEEDB001C82025CD=479
51232 ? A9F8208FF20F1CB=597
51240 ? 6820D9C9C90D00B=3FE
51248 ? A90085C7A92020D2=3E0
51256 ? FFA90D20D2FF60A9=4E7
51264 ? 0D2029C8A90D20D2=30F
51272 ? FF602063CC0A00A9=436
51280 ? FF9993CEC8D0FA20=5FB
51288 ? D2C8B9FB20D2CB80=5ED
51296 ? FB8D72CEA0008C7=4D0
51304 ? C8C7CE20E20ECCD=404
51312 ? 72CE29F0C98D0E4=5C6
51320 ? 20D2CB80DA9973CE=599
51328 ? C820ECC0009D0F0A=4EB
51336 ? A000AD75CE298D0A=492
51344 ? 0FA52B85F18A52C=3D8
51352 ? 6D75CE85FC4C8A0C=587
51360 ? AD79CE85FBAD79CE=697
51368 ? 85FC20D2CBB8A820=55E
51376 ? D9CC20D2CBB8A820=55E
51384 ? C220ECC001D0E8A=528
51392 ? A920D2CFAAD79CE=56A
51400 ? 20E2CD20D2CB8087=4D7
51408 ? CD7CECF00BA95820=503
51416 ? D2FF2030C84C57C8=52C
51424 ? 20D2CB80F8C7DCE=65D
51432 ? D0E8AD75CEA8B933=687
51440 ? CED00E2030C8A91=4EE
51448 ? 20D2FF47CE94C57=51F

```

```

51456 ? C8A0008C7CCE807D=447
51464 ? CE20D2CB80F091FB=5BF
51472 ? 20E2C0C0C77CED0=4D3
51480 ? F020D2CB80E0C7C=59E
51488 ? CEF008A95920D2FF=40E
51496 ? CD57C820D2CB80CE=4C8
51504 ? C07DCECF0034C23C=473
51512 ? 20ACC82030C8AD75=409
51520 ? CE8A90099930CEAD=506
51528 ? 84CE9020D2520BC=436
51536 ? CBA9C820F3CBA955=568
51544 ? 2016CDA95020F3CB=432
51552 ? 20C7CBAFC73CE888=54F
51560 ? B993CE023980DF7=5D4
51568 ? 4C5BC7A9552016CD=3DF
51576 ? 20F1C84C63C9AC77=4EF
51584 ? CE20D2CB80D0FA20=57D
51592 ? D2C820D2CB4C7C9=53E
51600 ? 4C5CC8A52B85FBA5=4F5
51608 ? 2C85FC0A00B1FB99=52A
51616 ? 2200C8B1FB8523F0=4C2
51624 ? 0BA52285FBA52385=447
51632 ? FC4C9BC918A5FB69=547
51640 ? 02852D852F8531A5=37B
51648 ? FC6900852E853085=412
51656 ? 32602063CC0A902D=3E1
51664 ? 84CEA908B0D2DE60=4A3
51672 ? 8E81CE8C82CEA200=533
51680 ? A9098DCEICE202FCB=4D4
51688 ? C914F016C90DF051=4E2
51696 ? C924D091920D2FF0D=544
51704 ? C3CE84CE5C9CE000=64B
51712 ? D0E3E000F0D20D2=554
51720 ? FFC44CE5C9C93009=554
51728 ? D4C93A901548ADC=344
51736 ? CE924F004684CE5=460
51744 ? C968C941905FC947=48A
51752 ? B0BB20D2FF30E930=4D5
51760 ? C90A9002CE907E005=36A
51768 ? F0AB9D02CE84CE5=61A
51776 ? C9E000FA0E001D0=52A
51784 ? 07ADC3CE924F095=4FF
51792 ? A92020D2FFA99F0D=54F
51800 ? C3CEA2008CECFCE=544
51808 ? D0CE8ED1CE8ED2CE=659
51816 ? ADC3CE924D006A9=512
51824 ? 0F8DCE8ED1CE8ED2CE=552
51832 ? C9FF01D20C8C8A0=5B0
51840 ? 3418DCE3CE6DCE=524
51848 ? 8DCECF0080D0CE=536
51856 ? 8D0CE00E20E84C75=534
51864 ? CADDCFC8C8C9E9=642
51872 ? A9009900D4C0C018=40E
51880 ? A9009900D4C0C018=40E
51888 ? D0F660A99320D2FF=5B3
51896 ? 6048A5A2290FD01F=37E
51904 ? A5A944A4C800C920=42B
51912 ? 20D2FFA90085D4A9=51C
51920 ? 20D2FF6085D468=53F
51928 ? 6020D2FFC8B1FD=620
51936 ? 21D0F6C8602025CD=4B9

```

```

51920 ? CEADCFCE8DD1CEAD=AC1
51928 ? D0CE8DD2CE18ADD1=639
51936 ? CE6DCFC8E0CCEAD=68F
51944 ? D2CE6DD0CE8DD0CE=68E
51952 ? B005CECECE0E60=625
51960 ? 2063CC9A9F8D8602=414
51968 ? A95185FAD9A9CD85FE=575
51976 ? A000209DCC2025CD=343
51984 ? 209DCC209DCC209D=30F
51992 ? CC2022CD20A9CC20=3A6
52000 ? 95CC2022CD2095CC=411
52008 ? 202FCB20D2FF608E=421
52016 ? 81CE8C82CE2069CC=48F
52024 ? 20ECC202CACC90C=48F
52032 ? 0620D2FDC0C931F0=440
52040 ? 0620D1CC4C35C8D=314
52048 ? 80CE8E81CEAC82CE=597
52056 ? 60A9E92CE9A4C5BC7=4CE
52064 ? 2022DFA92285FAD9=465
52072 ? CE5FEA0002095CC=4DA
52080 ? 2025CD80FA92099=393
52088 ? 93CE88D0FA8D93CE=619
52096 ? 202FCB20C914D010C=417
52104 ? 00FA9F520D2FF88A9=50F
52112 ? 209993CE4C80C8C9=50A
52120 ? 0DF00C20D2FF9993=4BD
52128 ? CEC8C01D0DA9A20=579
52136 ? CEC8C01D0DA9A20=579
52144 ? 20D2FF60A92020D2=4B4
52152 ? FFA94F20D2FFA94B=58C
52160 ? 20D2FF60A9138D0A=502
52168 ? DEA9128D0FA9528D0A=40E
52176 ? 538D0DFA9528D0A=40E
52184 ? DE60A996188D07CE=547
52192 ? 8C82CEAC82CE2004=4D4
52200 ? 02386020D2CCE0EE=509
52208 ? 60A9FA8C82CEA820=597
52216 ? 04CC88D0FA8C82CE=61E
52224 ? 6020A4CC8A82A8CA=30E
52232 ? D0FAD8A2069CC6020=454
52240 ? 25CD9A9220A8BCC20=364
52248 ? 55CCAD8CE20D2FF=573
52256 ? A92020D2FFA99320=3A6
52264 ? ABCC20D8C9604D7D=48A
52272 ? CE8D7DCEA208AD7D=4AA
52280 ? CE2A9010AD7DICE49=411
52288 ? 088D7DCEAD7DCE49=460
52296 ? 108D7DCEAD7DCE49=460
52304 ? 7DCEAD7DCE160A00=516
52312 ? A9009900D4C0C018=40E
52320 ? D0F660A99320D2FF=5B3
52328 ? 6048A5A2290FD01F=37E
52336 ? A5A944A4C800C920=42B
52344 ? 20D2FFA90085D4A9=51C
52352 ? 20D2FF6085D468=53F
52360 ? 6020D2FFC8B1FD=620
52368 ? 21D0F6C8602025CD=4B9

```

```

52384 ? A90C20A8BCC2095CC=46D
52392 ? 60A9908E81CEA9A9=4E6
52400 ? 2020D2FFC8B0FA8E=603
52408 ? 81CE60C914F008C9=505
52416 ? 7FF00160A91460A9=456
52424 ? 7F6020E4FFC9C10A=504
52432 ? 07C0DBB00338E960=4AF
52440 ? 60C941900EC95B90=494
52448 ? 08C9619006C97B80=49C
52456 ? 02492060488A880A=2D5
52464 ? 20E1FFD0034C59CB=533
52472 ? 20E68A8680AD00DE=485
52480 ? 49016A903A90060=250
52488 ? D0D1E60488AD00DE=3C7
52496 ? 49026A668060200C=223
52504 ? CD80FB8D01D0E20C=508
52512 ? CC602025CD2028CD=373
52520 ? A901D20D2FF604829=30A
52528 ? F06A6A6A6A6A930A=30A
52536 ? 37300318690720D2=21F
52544 ? FF68290F0930C93A=31B
52552 ? 300318690720D2=21F
52560 ? 60444F574E4C4F41=2C4
52568 ? 4420D4454552131=243
52576 ? 2020205245434549=228
52584 ? 56452135202045=1FE
52592 ? 58495420544F2042=28A
52600 ? 4153494321362020=22F
52608 ? 2053415645204259=28A
52616 ? 5445532128205553=285
52624 ? 5452012205544F50=26D
52632 ? 209220544F50245=204
52640 ? 5455524E20544F=20C
52648 ? 4D4545520292145=289
52656 ? 4E544552204E554D=2FC
52664 ? 4245522021494620=281
52672 ? 4144445245535320=2E6
52680 ? 4953204954E20485=481
52688 ? 582C119D9D9D9D9D=475
52696 ? 9D9D9D9D9D9D9D=500
52704 ? 9D9D9D9D9D9D9D=500
52712 ? 4958205749544820=305
52720 ? 242153441525420=2E3
52728 ? 4144445245535320=31E
52736 ? 464F522041524541=220
52744 ? 202146494E44C20=1D3
52752 ? 4144445245535320=236
52760 ? 464F522041524541=236
52768 ? 202150524F475241=22C
52776 ? 4D205449544C4520=2E7
52784 ? 284D415820313620=1E5
52792 ? 4348415227532920=21B
52800 ? 21124E4F54205641=219
52808 ? 4C494922C205452=2A5
52816 ? 5920414741494E20=249
52824 ? 4F52205441504520=26B
52832 ? 2820442F54202320=1E0
52840 ? 3F21000000000000=0D0

```


TELSoft



A reminder of how to use the Telsoft service.

a number of other makes. For the CBM-64 it will initially only be available with the OEL Comms pack together with the Telemond 2 or similar modem; later we hope to add the service to work with Commodore's modem.

To enter the download program first type in the hexloader for your machine — figure 1 — and then enter the machine code — figure 2. Once the program has been saved you can run it by entering CALL &6000 on the BBC, SYS 51000 on the CBM 64, RANDOMIZE USR

60000 on the Spectrum.

To find out what is available and how to receive software dial up Colchester (0206) 8068. This audio recorded information line will also advise you which telephone numbers to ring for the 300 and 1200 bit/s services.

When a program you want to download is on line, make sure your modem is set up and dial the number appropriate to its speed. As soon as you hear the modem tones switch the modem to line and replace the receiver. Select

Option 1 from the menu — Receive. After a block of data is received you will see "OK" printed if there are no errors, otherwise the program will wait for the blocks to come round again. When the "Program loaded OK" message appears return to the Telsoft menu and select Option 5. You can now save and run the program.

Note that CBM-64 owners will need to use Option 6 if machine code is to be saved.

Figure 1. BBC.

```
10 REM BBC HEX CODE LOADER
15 HIME=69FF
20 CLS:PRINT
30 INPUT "START ADDRESS (Hex)";A$
40 A=VAL("&"+A$)
50 IF A<69FF THEN 200
60 IF A<2A00 OR A>6FE7 THEN 200
```

Figure 2. BBC.

```
6A00 :A9C8A0FEA28120F4,4C6
6A08 :FF20616C20406DC9,38A
6A10 :31F000C934F0E9C9,4CB
6A18 :35F0064C8C6A9C47,200
6A20 :6AA9C820E3FFA948,4B2
6A28 :A000A2FF20FAFFA9,4FD
6A30 :B3A20820FAFFA902,363
6A38 :A20220FAFFA902,363
6A40 :FEA20220FAFFA902,363
6A48 :8C20E3FF20FAFFA9,439
6A50 :15A20120FAFFA900,3EB
6A58 :A9FF80995AFA0FA,507
6A60 :A915A20120FAFF20,394
6A68 :8C6C9F08200C6C30,34B
6A70 :F8A00064778A708A,416
6A78 :798A708A708A708A,499
6A80 :D56A057829F0C908,499
6A88 :DE220C6C80D099,46B
6A90 :7100C820D56C0C09,364
6A98 :D0F8000A574208A,422
6AA0 :D000A51C087518A5,354
6AA8 :1D65730577200C6C,289
6AB0 :800520E3F0A57320,435
6AB8 :6DC818D09FA05732,435
6AC0 :B26D20C6C80D09,364
6AC8 :17AF00A570A20C6C,34F
6AD0 :20E700CC3F20FAFF,48C
6AD8 :5820E3FF20FAFF,48C
6AE0 :5820E3FF20FAFF,48C
6AE8 :676AA573A08950A,43E
6AF0 :D00E220FA0820,388
6AF8 :E3FAC836A4C676A,469
6B00 :A0000A7A847B200C,2C9
```

Figure 1. Spectrum.

```
3 REM SPECTRUM 48k
10 REM Hex Code Loader
15 CLS:PRINT
20 POKE 23650,0:CL:PRINT
30 INPUT "Start Address ";A$
40 IF A<23650 THEN 200
50 IF A<60000 THEN 200
60 IF A<60000 THEN 200
70 PRINT A$
```

Figure 2. Spectrum.

```
60000 :CD15EDC307ECCD15,4C7
60008 :EDC307ECCD154C7D,631
60016 :50EDC307ECCD154C,3AF
60024 :B0EDF31CA99FAE,69A
60032 :35C8A7EAC36A6ACD,5D0
60040 :15ED307ECCD154C7D,5F3
60048 :15ED307ECCD154C7D,5F3
60056 :EACD6AED115E3E6A,58C
60064 :803FEF712130FCCD,58C
60072 :15EE11C0E0B173E,30A
60080 :20121310FCCD154C,58C
60088 :30F0C050EDC307E,589
60096 :30F0C050EDC307E,589
60104 :30F0C050EDC307E,589
60112 :30F0C050EDC307E,589
60120 :30F0C050EDC307E,589
60128 :30F0C050EDC307E,589
60136 :30F0C050EDC307E,589
60144 :30F0C050EDC307E,589
60152 :30F0C050EDC307E,589
60160 :30F0C050EDC307E,589
60168 :30F0C050EDC307E,589
60176 :30F0C050EDC307E,589
60184 :30F0C050EDC307E,589
60192 :30F0C050EDC307E,589
60200 :30F0C050EDC307E,589
```

```
70 PRINT "A"
80 INPUT "B";B$
90 IF LEN(B$)<16 THEN 50
100 T=0
110 FOR N=0 TO 7
120 X$=MID$(B$,2*N+1,1):GOSUB 300
130 IF E=1 THEN 260
140 X$=MID$(B$,2*N+2,1):GOSUB 300
150 IF E=1 THEN 260
160 B=EVAL("&"+MID$(B$,2*N+1,2))
170 "A-B=A+A+1:T=B
180 NEXT N
190 FOR M=1 TO LEN(C$)
200 X$=MID$(C$,M,1):GOSUB 300
210 IF E=1 THEN A=A+1:GOTO 260
220 NEXT M
230 IF T=EVAL("&"+C$) THEN 50
240 PRINT "CHECKSUM ERROR!"
250 A=A-B:GOTO 50
260 PRINT "TYPING ERROR!"
270 A=B:(A DIV 8):GOTO 50
280 "SAVE "DOWNLOAD" 6A00 6FB7
290 END
300 E=0:IF ASC(X$)<48 THEN E=1:RETURN
310 IF ASC(X$)<58 THEN RETURN
320 IF ASC(X$)<65 THEN E=1:RETURN
330 IF ASC(X$)>71 THEN E=1
340 RETURN
```

```
80 INPUT "I";I$
90 IF B$="END" THEN GO TO 200
95 IF LEN B$<28 THEN GO TO 260
100 LET t=a-256*INT (a/256)
110 FOR n=0 TO 7
120 LET x=b-(2*n+1 TO 2*n+1)
130 GO SUB 300:LET y=x
140 LET x=b-(2*n+2 TO 2*n+2)
150 GO SUB 300:LET y=x+16*x
160 LET x=b-(2*n+3 TO 2*n+3)
170 POKE A+I:LET A=A+1
180 LET t=t+1:NEXT n:LET y=0
190 FOR m=1 TO 3
200 LET x=b-(17*m TO 17*m)
205 GO SUB 300:LET y=y+16*x
210 IF A=1 THEN LET A=A-1:GO TO 260
220 NEXT m
230 IF t=y THEN PRINT "I";I$:GO TO 50
```

```
6400 :A9C8A0FEA28120F4,4C6
6408 :FF20616C20406DC9,38A
6410 :31F000C934F0E9C9,4CB
6418 :35F0064C8C6A9C47,200
6420 :6AA9C820E3FFA948,4B2
6428 :A000A2FF20FAFFA9,4FD
6430 :B3A20820FAFFA902,363
6438 :A20220FAFFA902,363
6440 :FEA20220FAFFA902,363
6448 :8C20E3FF20FAFFA9,439
6450 :15A20120FAFFA900,3EB
6458 :A9FF80995AFA0FA,507
6460 :A915A20120FAFF20,394
6468 :8C6C9F08200C6C30,34B
6470 :F8A00064778A708A,416
6478 :798A708A708A708A,499
6480 :D56A057829F0C908,499
6488 :DE220C6C80D099,46B
6490 :7100C820D56C0C09,364
6498 :D0F8000A574208A,422
6500 :D000A51C087518A5,354
6508 :1D65730577200C6C,289
6510 :800520E3F0A57320,435
6518 :6DC818D09FA05732,435
6520 :B26D20C6C80D09,364
6528 :17AF00A570A20C6C,34F
6530 :20E700CC3F20FAFF,48C
6538 :5820E3FF20FAFF,48C
6540 :5820E3FF20FAFF,48C
6548 :676AA573A08950A,43E
6550 :D00E220FA0820,388
6558 :E3FAC836A4C676A,469
6560 :A0000A7A847B200C,2C9
```

```
80 INPUT "I";I$
90 IF B$="END" THEN GO TO 200
95 IF LEN B$<28 THEN GO TO 260
100 LET t=a-256*INT (a/256)
110 FOR n=0 TO 7
120 LET x=b-(2*n+1 TO 2*n+1)
130 GO SUB 300:LET y=x
140 LET x=b-(2*n+2 TO 2*n+2)
150 GO SUB 300:LET y=x+16*x
160 LET x=b-(2*n+3 TO 2*n+3)
170 POKE A+I:LET A=A+1
180 LET t=t+1:NEXT n:LET y=0
190 FOR m=1 TO 3
200 LET x=b-(17*m TO 17*m)
205 GO SUB 300:LET y=y+16*x
210 IF A=1 THEN LET A=A-1:GO TO 260
220 NEXT m
230 IF t=y THEN PRINT "I";I$:GO TO 50
```


SCHOOL REPORT

ACT PRIZE *Competition*

THANKS TO ACT we were able to offer some of the best prizes ever for the July competition — £2500 worth of Apricot computers. Third prize was a stock F1E, a 16-bit micro with 128K Ram and a built-in 320K Sony disc drive. The second and first prizes included a monochrome and a colour monitor.

All you had to do to enter was write a school

report for your existing computer or for a personality in the home micro market, and then say what you would do with an Apricot F1E that you cannot do at the moment.

A few people missed the point and sent in reports on Arthur Scargill, James Bond, and God — "Thinks He knows it all". The rest gave us their generally rather severe verdicts on their

RESULTS

Spectrums, BBCs, CBM 64, Vics, Orics, Ataris, Amstrads and Sir Clive Sinclair.

Many of the traditional and time-worn school report phrases — such as "tries hard", "shows no aptitude", "needs to build up his vocabulary", "unable to get through to him" — turned out to be particularly appropriate. It is only too true that the CBM 64 "needs to be poked before he gives his best performance".

And how better to describe the BBC than: "Works well but let down by poor memory"? Or take this report on Sir Clive: "Has promising ideas, but produces slipshod work which is invariably handed in late". Another apt report was G. Lea's on the Atari; the subject is Games: "An excellent term. A born games player".

The ZX-81 and the Oric received the worst reports. "Progress has been disappointing" was the most common verdict on the Oric, although one entry explained this as due to an unhappy family background. As for the ZX-81, it did badly in almost every subject.

The best anyone could say about its performance in Art was "tends towards cubism". Helen Jeffrey, 3 Raby Road, New Malden, Surrey, KT3 3QT, wins the third prize for her report on the ZX-81:

General Studies: Frail constitution leads to frequent absences and fainting fits.
Physical Sciences: Mathematical ability is good but displays a strange blinking expression when asked to work fast.
Games: Unbelievably slow. ZX's resourcefulness does not make up for lack of basic ability.
Overall: Mature student held back by failing memory, colour blindness, and baldness of the keyboard.

We awarded the second prize to T. Smith, 48 Henor Vean, Truro, Cornwall. Reporting on the Amstrad after its first year, he wrote:
Basic: Speed of a train. Others would do well to follow his example.
Software: Produces quantity but could improve quality.

Sound: Manages to envelope the whole class with noise. Well done.

The first prize goes to F. Bryant, 36 Wain-A-Long Road, Salisbury, Wiltshire, SP1 1LW, for his report on the Spectrum:

English Language: Very Basic — could do better, but excellent command of syntax.
Maths: In-built ability but still makes occasional mistakes.

Music: Perfect pitch. Outstanding range but must project voice more.

Religious Knowledge: Has unorthodox view of religion. Worships Sir Clive.

His answer to the question about what he would do with an Apricot F1E was:

"Convince my boss that we need a computer".



TOP★ TIPS

COLOUR RESTORE

I have devised a very simple routine which will restore the screen to the switch on colours when called on the Spectrum. The routine is just 11 bytes long and is called with: RANDOMIZE USR address where address is 65357 for a 48K machine or 32589 for a 16K machine.

I have located it above Ramtop and just below the UDG area, but it is relocatable anywhere in memory.

Enter the program loader and Run. The machine code can be saved with: SAVE "COLOURS" CODE (USR "a":11),11

To test the routine type BORDER 0: PAPER 0: INK 0: CLS followed by RANDOMIZE USR address. Press Enter twice and the screen should show Black ink on white paper with white border.

The routine alters the system variables BORDER and ATTR P to 56 i.e. switch on values.

Mark Robinson.

```
10 DATA 62,56,1,141,92
20 DATA 2,1,72,92,2,201
30 CLEAR (USR "a"-12)
40 FOR n=(USR "a"-11) TO (USR "a"-1)
50 READ a: POKE n,a: NEXT n
```

BORDER COLOUR

This is a short program for the CBM 64. It consists of a Basic loader which enters a small machine code program into locations 740 to 766. The code re-routes the Stop-Test vector so that when the Restore key is pressed (without Run/Stop), the border colour is increased to the one which you desire.

The Stop-Test vector also comes into action during Loading/Saving/Verifying (as well as file saving to the tape). This means that during these operations, the border flashes. You may find this useful as you can tell whether or not the computer has crashed during loading.

An interesting side effect is that whilst the computer is running a Basic program, the border also flashes.

Shaun Chapman.

```
10 FOR A=740 TO 763: READ B: POKE A,B
20 C=C+B: NEXT
30 IF C>3171 THEN PRINT "ERROR":END
40 DATA 169,239,141,40,3,169,2,141,41
50 DATA 3,96,238,32,208,162,0,232,224
60 DATA 13,208,251,76,237,246
70 SYS 740
```

RESPONSE

Frame

USING POINTERS

■ I own a Commodore 64 and have been programming it in Basic and have recently learned machine code. However, I cannot quite get the hang of the use of the pointers 51/52 and 55/56 to bring down the top of Ram and to move up the bottom. I know how to use the low byte/high byte system, but cannot seem to get it to do what I want. Things do not move, or things reset themselves, or Basic gets muddled. Could you please throw some light on the subject? Also, is it possible to get an auto-run after loading, without using Shift/Run/Stop, using these vectors? If not, how is it done?

Nick Smith,
Rossendale,
Lancashire.

AFTER LOWERING Ramtop, you need to enter a CLR. The CLR clears all variables, which cleans up the memory you wish to save. If you don't do this, some variables will still be stored above the new Ramtop. To auto-run a program, you can use the vectors hex 0300 and hex 0302. Many commercial software programs use these.

GETTING COPY

■ I have a program which gives a 40-column display on by Vic-20. I have written a program which displays tables of figures on the 40 columns screen. However, I am unable to print hard copy of the screen display on my MPS801 printer, using either the normal or an amended routine. Can you suggest a way to solve this problem?

Ross Dickinson,
Berwick-upon-Tweed,
Northumberland.

AS THE Vic-20 prints out character by character — rather than pixel by pixel — when dumping to a printer, all you need is the address of the first character on the screen.

This may well be with the documentation which accompanied your program, or you might have to contact the company which wrote it.

Then you need to Peek each character in turn on the screen, and hand that information on to the printer. It should not be too difficult to write a short routine to do this.

A HEAD START

■ In the classified section of your magazine there are many advertisements for "copy tapes". I'm afraid I don't know what such things as "headerless", "headers", "false headers" and "autostart" mean. As I need to make backup copies for my Spectrum programs, I need to know which copy program can tape absolutely any program. Can you help me?

Garry Cappuccini,

Do you have a problem related to your micro? Tim Hartnell will do his best to help. Please include only one question per letter and mark it "Response Frame". Alternatively, perhaps you have an idea you'd like to pass on to others. Why not write to us with your top tips?

Bishop's Stortford,
Hertfordshire.

No PROTECTION-BREAKER tape can guarantee 100 per cent success, as software writers are continually trying to outwit those who break protection schemes by developing new ones. However, the more expensive of the copy tapes have a success rate in excess of 95 per cent and this should cover most of your needs.

The header on a program tape contains information — such as the location of the machine code, and its length — which is used to break copy protection, so a headerless program is one which does not so easily yield its secrets to someone wanting to break into it so it can be copied.

You do not need to know what the words mean. Just follow the copy instructions. Of course, I need hardly add that any copy tape should only be used for making backup copies of your own tapes, and not for ripping off copies from others.

IS IT A BUG?

■ I have been experimenting with the Screen 0,1 command — orange background colour — on my Dragon 32, and found a curious effect:

```
10 FOR J=1 TO 24
20 SCREEN 0,1
30 GOTO 10
```

Try to press some keys while the program is running. You can easily make variations, such as having the first loop running from 1 to 23. If you try to increase or decrease the counter, it will move faster, and Print statements between those lines will slow it down. What is happening? Is it a bug?

O Egil Rorovs,
Norway.

It is a bug of sorts, but not one which will affect your programs. I cannot imagine any situation where you are within a loop and you make a jump back to the start of that loop. It seems that the Screen 0,1 command is being asked to operate continuously, and it doesn't get enough time to complete one change before another is thrust upon it.

WHICH COMPUTER?

■ I am considering buying the Commodore 64, BBC, or the Amstrad. My main interests are programming and game playing. Which should I buy?

Paul Lyall,
Loughborough.

TWO YEARS ago I could not possibly have said, in reply to this type of question, "This is the machine you should buy". But now, with far fewer machines being launched, and manufacturers like Amstrad actually being sensible enough to ask people what they want, and then provide it, the choices are far simpler. Get an Amstrad.

Response Frame has had a number of queries regarding the production of multi-coloured, user defined graphics. Fifteen-year-old Garry Martin from Oldbury, West Midlands, has come up with an elegant solution to the problem.

There is a simple way of construction multi-coloured graphics in any mode. You do this by using the Amstrad's unique Transparent mode. Line 50 of the demonstration program does this, and line 75 switches it off. The program fills a golden-coloured goblet with red wine.

```
10 MODE 1
15 INK 0,26:INK 1,24
20 BORDER 26:INK 2,3
25 SYMBOL AFTER 254
30 SYMBOL 254,66,66,66,
66,102,60,24,126
35 SYMBOL 255,60,60,60,
60,24,0,0,0
40 LOCATE 20,12
45 PEN 1:PRINT
CHRS(254)
50 PRINT
CHRS(22)+CHRS(1)
55 FOR i=0 TO 999
60 NEXT i
70 LOCATE 20,12
80 PEN 2:PRINT
CHRS(255)
75 PRINT
CHRS(22)+CHRS(0)
```


SJB DISKS LIMITED

BLANK DISKS

Top Quality 5¼" Bulk Packed Disks

Supplied in 10's with a **FREE** Plastic Library Case, Labels etc.

10 Single Sided/Double Density* **ONLY £13.95**

10 Double Sided/Double Density* **ONLY £17.95**

50 Single Sided/Double Density* **ONLY £59.95**
(Supplied with a Perspex Storage Box)

50 Double Sided/Double Density* **ONLY £74.95**
(Supplied with a Perspex Storage Box)

★ **LIFETIME WARRANTY** ★

★ **FREE FAST DELIVERY** ★

All prices are inclusive of V.A.T.
Delivery **FREE** throughout the U.K.

3" & 3½" Disks also available

Bulk Orders, Export Enquiries & Educational Enquiries Welcome

* Double Density is the equivalent of 40/80 Track

Please Send Cheques/Postal Orders to:-

SJB DISKS LIMITED (Dept YC2)

11 Oundle Drive, Nottingham, NG8 1BN

Telephone (0602) 782310



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.

Computers by Post

PRINTERS

Anadex DP9625	£859
Epson LX80	£199
Epson FX80	£325
Epson RX100FT	£339
Epson FX100	£425
Epson LQ1500	£895
Brother HR5	£82
Brother M1009	£153
Brother HR10	£249
Brother HR15	£312
Brother HR25	£599
Brother HR35	£695
Commodore MPS 801	£99
Commodore MPS 803	£119
Commodore DPS 1101	£219
Canon PW1080	£279
Canon PW1156	£355
Daisystep 2000	£219
Kaga Taxan KP810	£245
Kaga Taxan KP910	£375
Juki 6000	£199
Juki 6100	£309
Smith Corona Fastext 80	£139
Smith Corona D100	£179
Star SG10	£219
Shinwa CPA80	£189
Seikosa GP500A	£99

COMPUTERS

Amstrad 128 Colour	£329
Amstrad 128 Green	£249
Apricot F1E	£525
Apricot F1	£749
Apricot F2 + Mouse	£1145
Apricot F10 + Mouse	£1745
Apricot F11 Portable	£809
Atari 520ST	£609
Commodore C64	£119
Commodore C128	£219
Commodore 1541 Disk	£125
Commodore 1571 Disk	£229
Commodore PC10	£1389
Sanyo MBC555	£649
Sinclair QL	£261
Sinclair Spectrum Plus	£95
(P + P to Europe £11.00)	

MONITORS

Microvitec 1431DS	£165
Microvitec 1451DS	£219
Microvitec 1451DQ(QL)	£226

Send for our full price list on all Computer Products, Peripherals, Consumables and Disks.

4 Day Insured Delivery £7 + VAT
24 Hour Insured Delivery £10 + VAT

CREDIT CARD HOT-LINE



01-760 0014

All prices exclude VAT
Export Enquiries Welcome

**Galaset Ltd, 30 Bayford Road,
Littlehampton, West Sussex.**

CALDEW BUSINESS COMPUTERS SYSTEMS

Spectrum Plus	119.95
BBC Model B	335.00
BBC Model BC	380.00
Acorn Electron	99.00
Electron Starter Pack	143.00
Electron + 1 Interface	56.00
Electron + 3 Interface	199.00
Acorn Data Recorder	28.95
6502 2nd Processor	191.99
Speech Interface Kit	49.99
Z80 2nd Processor	349.00
Torch Z80 Disk Pack	719.00
Prestel Adaptor	120.00
CSX100 Disk Drive	105.00
CSX200 Disk Drive	139.99
CSX400 Disk Drive	164.00
12" Novex M/tors amber/green	99.99
12" Philips Green monitors	82.99
14" Grundig TV/monitor	249.99
Epson FX80 Printer	428.00
Epson RX80 FT Printer	272.00
Epson FX100 Printer	543.00
Juki 6100 Daisy Wheel	419.00
Brother M-1009 Printer	189.99
ATPL Sidewise ROM Board	46.99
Raven 20K Expansion Board	63.99
Quickshot II Joystick	8.95
Gunshot Joystick	7.95
Commodore 1541 Disk Drive	189.00

All Prices include VAT

Software over 500 separate titles in stock: Commodore 64, Spectrum, Electron, BBC, C16, Amstrad, Memotech, Vic 20, Atari

Including at least £1 off all Chart titles

Add £1.50 (P&P) per item to all orders and forward with address. Send stamped addressed envelope for detailed hardware and software price lists, with genuine reductions on all items.

Deliveries — software: 48 hours
— hardware: 7 days

**161 DENTON STREET
DENTON HOLME, CARLISLE**


```

50 REM
Graphics:
a=b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z,0-9,A-Z,_,.,/,<,>,&,@,&#32;,&#33;,&#34;,&#35;,&#36;,&#37;,&#38;,&#39;,&#40;,&#41;,&#42;,&#43;,&#44;,&#45;,&#46;,&#47;,&#48;,&#49;,&#50;,&#51;,&#52;,&#53;,&#54;,&#55;,&#56;,&#57;,&#58;,&#59;,&#60;,&#61;,&#62;,&#63;,&#64;,&#65;,&#66;,&#67;,&#68;,&#69;,&#70;,&#71;,&#72;,&#73;,&#74;,&#75;,&#76;,&#77;,&#78;,&#79;,&#80;,&#81;,&#82;,&#83;,&#84;,&#85;,&#86;,&#87;,&#88;,&#89;,&#90;,&#91;,&#92;,&#93;,&#94;,&#95;,&#96;,&#97;,&#98;,&#99;,&#100;,&#101;,&#102;,&#103;,&#104;,&#105;,&#106;,&#107;,&#108;,&#109;,&#110;,&#111;,&#112;,&#113;,&#114;,&#115;,&#116;,&#117;,&#118;,&#119;,&#120;,&#121;,&#122;,&#123;,&#124;,&#125;,&#126;,&#127;,&#128;,&#129;,&#130;,&#131;,&#132;,&#133;,&#134;,&#135;,&#136;,&#137;,&#138;,&#139;,&#140;,&#141;,&#142;,&#143;,&#144;,&#145;,&#146;,&#147;,&#148;,&#149;,&#150;,&#151;,&#152;,&#153;,&#154;,&#155;,&#156;,&#157;,&#158;,&#159;,&#160;,&#161;,&#162;,&#163;,&#164;,&#165;,&#166;,&#167;,&#168;,&#169;,&#170;,&#171;,&#172;,&#173;,&#174;,&#175;,&#176;,&#177;,&#178;,&#179;,&#180;,&#181;,&#182;,&#183;,&#184;,&#185;,&#186;,&#187;,&#188;,&#189;,&#190;,&#191;,&#192;,&#193;,&#194;,&#195;,&#196;,&#197;,&#198;,&#199;,&#200;,&#201;,&#202;,&#203;,&#204;,&#205;,&#206;,&#207;,&#208;,&#209;,&#210;,&#211;,&#212;,&#213;,&#214;,&#215;,&#216;,&#217;,&#218;,&#219;,&#220;,&#221;,&#222;,&#223;,&#224;,&#225;,&#226;,&#227;,&#228;,&#229;,&#230;,&#231;,&#232;,&#233;,&#234;,&#235;,&#236;,&#237;,&#238;,&#239;,&#240;,&#241;,&#242;,&#243;,&#244;,&#245;,&#246;,&#247;,&#248;,&#249;,&#250;,&#251;,&#252;,&#253;,&#254;,&#255;,&#256;,&#257;,&#258;,&#259;,&#260;,&#261;,&#262;,&#263;,&#264;,&#265;,&#266;,&#267;,&#268;,&#269;,&#270;,&#271;,&#272;,&#273;,&#274;,&#275;,&#276;,&#277;,&#278;,&#279;,&#280;,&#281;,&#282;,&#283;,&#284;,&#285;,&#286;,&#287;,&#288;,&#289;,&#290;,&#291;,&#292;,&#293;,&#294;,&#295;,&#296;,&#297;,&#298;,&#299;,&#300;,&#301;,&#302;,&#303;,&#304;,&#305;,&#306;,&#307;,&#308;,&#309;,&#310;,&#311;,&#312;,&#313;,&#314;,&#315;,&#316;,&#317;,&#318;,&#319;,&#320;,&#321;,&#322;,&#323;,&#324;,&#325;,&#326;,&#327;,&#328;,&#329;,&#330;,&#331;,&#332;,&#333;,&#334;,&#335;,&#336;,&#337;,&#338;,&#339;,&#340;,&#341;,&#342;,&#343;,&#344;,&#345;,&#346;,&#347;,&#348;,&#349;,&#350;,&#351;,&#352;,&#353;,&#354;,&#355;,&#356;,&#357;,&#358;,&#359;,&#360;,&#361;,&#362;,&#363;,&#364;,&#365;,&#366;,&#367;,&#368;,&#369;,&#370;,&#371;,&#372;,&#373;,&#374;,&#375;,&#376;,&#377;,&#378;,&#379;,&#380;,&#381;,&#382;,&#383;,&#384;,&#385;,&#386;,&#387;,&#388;,&#389;,&#390;,&#391;,&#392;,&#393;,&#394;,&#395;,&#396;,&#397;,&#398;,&#399;,&#400;,&#401;,&#402;,&#403;,&#404;,&#405;,&#406;,&#407;,&#408;,&#409;,&#410;,&#411;,&#412;,&#413;,&#414;,&#415;,&#416;,&#417;,&#418;,&#419;,&#420;,&#421;,&#422;,&#423;,&#424;,&#425;,&#426;,&#427;,&#428;,&#429;,&#430;,&#431;,&#432;,&#433;,&#434;,&#435;,&#436;,&#437;,&#438;,&#439;,&#440;,&#441;,&#442;,&#443;,&#444;,&#445;,&#446;,&#447;,&#448;,&#449;,&#450;,&#451;,&#452;,&#453;,&#454;,&#455;,&#456;,&#457;,&#458;,&#459;,&#460;,&#461;,&#462;,&#463;,&#464;,&#465;,&#466;,&#467;,&#468;,&#469;,&#470;,&#471;,&#472;,&#473;,&#474;,&#475;,&#476;,&#477;,&#478;,&#479;,&#480;,&#481;,&#482;,&#483;,&#484;,&#485;,&#486;,&#487;,&#488;,&#489;,&#490;,&#491;,&#492;,&#493;,&#494;,&#495;,&#496;,&#497;,&#498;,&#499;,&#500;,&#501;,&#502;,&#503;,&#504;,&#505;,&#506;,&#507;,&#508;,&#509;,&#510;,&#511;,&#512;,&#513;,&#514;,&#515;,&#516;,&#517;,&#518;,&#519;,&#520;,&#521;,&#522;,&#523;,&#524;,&#525;,&#526;,&#527;,&#528;,&#529;,&#530;,&#531;,&#532;,&#533;,&#534;,&#535;,&#536;,&#537;,&#538;,&#539;,&#540;,&#541;,&#542;,&#543;,&#544;,&#545;,&#546;,&#547;,&#548;,&#549;,&#550;,&#551;,&#552;,&#553;,&#554;,&#555;,&#556;,&#557;,&#558;,&#559;,&#560;,&#561;,&#562;,&#563;,&#564;,&#565;,&#566;,&#567;,&#568;,&#569;,&#570;,&#571;,&#572;,&#573;,&#574;,&#575;,&#576;,&#577;,&#578;,&#579;,&#580;,&#581;,&#582;,&#583;,&#584;,&#585;,&#586;,&#587;,&#588;,&#589;,&#590;,&#591;,&#592;,&#593;,&#594;,&#595;,&#596;,&#597;,&#598;,&#599;,&#600;,&#601;,&#602;,&#603;,&#604;,&#605;,&#606;,&#607;,&#608;,&#609;,&#610;,&#611;,&#612;,&#613;,&#614;,&#615;,&#616;,&#617;,&#618;,&#619;,&#620;,&#621;,&#622;,&#623;,&#624;,&#625;,&#626;,&#627;,&#628;,&#629;,&#630;,&#631;,&#632;,&#633;,&#634;,&#635;,&#636;,&#637;,&#638;,&#639;,&#640;,&#641;,&#642;,&#643;,&#644;,&#645;,&#646;,&#647;,&#648;,&#649;,&#650;,&#651;,&#652;,&#653;,&#654;,&#655;,&#656;,&#657;,&#658;,&#659;,&#660;,&#661;,&#662;,&#663;,&#664;,&#665;,&#666;,&#667;,&#668;,&#669;,&#670;,&#671;,&#672;,&#673;,&#674;,&#675;,&#676;,&#677;,&#678;,&#679;,&#680;,&#681;,&#682;,&#683;,&#684;,&#685;,&#686;,&#687;,&#688;,&#689;,&#690;,&#691;,&#692;,&#693;,&#694;,&#695;,&#696;,&#697;,&#698;,&#699;,&#700;,&#701;,&#702;,&#703;,&#704;,&#705;,&#706;,&#707;,&#708;,&#709;,&#710;,&#711;,&#712;,&#713;,&#714;,&#715;,&#716;,&#717;,&#718;,&#719;,&#720;,&#721;,&#722;,&#723;,&#724;,&#725;,&#726;,&#727;,&#728;,&#729;,&#730;,&#731;,&#732;,&#733;,&#734;,&#735;,&#736;,&#737;,&#738;,&#739;,&#740;,&#741;,&#742;,&#743;,&#744;,&#745;,&#746;,&#747;,&#748;,&#749;,&#750;,&#751;,&#752;,&#753;,&#754;,&#755;,&#756;,&#757;,&#758;,&#759;,&#760;,&#761;,&#762;,&#763;,&#764;,&#765;,&#766;,&#767;,&#768;,&#769;,&#770;,&#771;,&#772;,&#773;,&#774;,&#775;,&#776;,&#777;,&#778;,&#779;,&#780;,&#781;,&#782;,&#783;,&#784;,&#785;,&#786;,&#787;,&#788;,&#789;,&#790;,&#791;,&#792;,&#793;,&#794;,&#795;,&#796;,&#797;,&#798;,&#799;,&#800;,&#801;,&#802;,&#803;,&#804;,&#805;,&#806;,&#807;,&#808;,&#809;,&#810;,&#811;,&#812;,&#813;,&#814;,&#815;,&#816;,&#817;,&#818;,&#819;,&#820;,&#821;,&#822;,&#823;,&#824;,&#825;,&#826;,&#827;,&#828;,&#829;,&#830;,&#831;,&#832;,&#833;,&#834;,&#835;,&#836;,&#837;,&#838;,&#839;,&#840;,&#841;,&#842;,&#843;,&#844;,&#845;,&#846;,&#847;,&#848;,&#849;,&#850;,&#851;,&#852;,&#853;,&#854;,&#855;,&#856;,&#857;,&#858;,&#859;,&#860;,&#861;,&#862;,&#863;,&#864;,&#865;,&#866;,&#867;,&#868;,&#869;,&#870;,&#871;,&#872;,&#873;,&#874;,&#875;,&#876;,&#877;,&#878;,&#879;,&#880;,&#881;,&#882;,&#883;,&#884;,&#885;,&#886;,&#887;,&#888;,&#889;,&#890;,&#891;,&#892;,&#893;,&#894;,&#895;,&#896;,&#897;,&#898;,&#899;,&#900;,&#901;,&#902;,&#903;,&#904;,&#905;,&#906;,&#907;,&#908;,&#909;,&#910;,&#911;,&#912;,&#913;,&#914;,&#915;,&#916;,&#917;,&#918;,&#919;,&#920;,&#921;,&#922;,&#923;,&#924;,&#925;,&#926;,&#927;,&#928;,&#929;,&#930;,&#931;,&#932;,&#933;,&#934;,&#935;,&#936;,&#937;,&#938;,&#939;,&#940;,&#941;,&#942;,&#943;,&#944;,&#945;,&#946;,&#947;,&#948;,&#949;,&#950;,&#951;,&#952;,&#953;,&#954;,&#955;,&#956;,&#957;,&#958;,&#959;,&#960;,&#961;,&#962;,&#963;,&#964;,&#965;,&#966;,&#967;,&#968;,&#969;,&#970;,&#971;,&#972;,&#973;,&#974;,&#975;,&#976;,&#977;,&#978;,&#979;,&#980;,&#981;,&#982;,&#983;,&#984;,&#985;,&#986;,&#987;,&#988;,&#989;,&#990;,&#991;,&#992;,&#993;,&#994;,&#995;,&#996;,&#997;,&#998;,&#999;

```

```

Version: 2091216(?) © DG 84
60 RUN 2410
70 FOR n=0 TO .05 STEP .001: B
EEP n,n: NEXT n: FOR n=.05 TO 0
STEP -.001: BEEP n,n: NEXT n: RE
M thanks simon !!!
80 DIM d(3): LET sc=0: LET m:n
=10
90 GO SUB 1680
100 LET x=6: LET y=8: LET ay=6
110 LET ax=25:
120 POKE hf,1: POKE len,20: POK
E bef,2: FOR n=5 TO 1 STEP -1: P
OKE lf,50+n: LET zz=USR urun: NE
XT n
130 LET ls=""
140 REM game loop
150 LET lx=x: LET ly=y
160 LET x=x+(INKEY$="8")-(INKEY
$="5"): IF INKEY$="7" THEN BEEP
.001,20: LET y=y-1: GO TO 190
170 IF INKEY$="6" THEN LET y=y+
1: GO TO 200
180 PRINT AT y+1,x: LET z$=CHR
$ USR 60057: IF z$<" " AND z$<
" " THEN LET y=y+1
190 IF y<0 THEN LET y=0
200 PRINT AT ly,lx: LET ls=5
GREEN$ (y,x): IF ls<" " THEN GO
TO 590
210 PRINT AT y,x: BRIGHT 1: "
220 IF INKEY$="0" THEN GO TO 37
0
230 IF y=18 THEN GO TO 350
240 GO TO 250+(10 AND RND$.5)
250 LET ay=(3*(x)-(ax*x)): LET a
y=0: GO TO 270
260 LET av=(ay(y)-(ay*y)): LET a
v=0
270 LET ax=ax+av: LET ay=ay+av
280 PRINT AT ay-av,ax-av: "AT
ay,ax: LET z$=CHR$ USR 60057
290 IF z$=" " THEN LET al=2: GO
TO 720
300 IF z$<" " AND RND$.2 THEN
LET ax=ax-av: LET ay=ay-av: PRIN
T AT ay,ax:
310 PRINT "A"
320 IF USR 60248 THEN LET al=1:
GO TO 720
330 GO TO 150
340 REM next screen
350 GO SUB 2040: PRINT AT 19,x:
"LET ly=ly+13+(5 AND ly<5):
GO SUB 1710: LET y=0: LET ay=0:
GO TO 110
360 REM TNW activated
370 IF min=0 THEN BEEP .005,40:
GO TO 230
380 LET min=min-1: PRINT AT 20,
24: PAPER 1:min: "
390 PRINT AT y-1,x-1: OVER 1: "
"AT y,x-1: "
400 POKE lf,50: POKE hf,1: POKE
len,20: POKE bef,3: LET zz=USR
urun+USR drun
410 PRINT AT y-1,x-1: OVER 1: "
"AT y,x-1: "
420 DIM g$(2,3)
430 LET kil=0
440 FOR n=-1 TO 0: FOR m=-1 TO
1
450 PRINT AT y+n,x+m: LET z$=C
HR$ USR 60057
460 IF z$=" " THEN GO TO 520
470 IF z$="2" OR z$="8" OR z$="
" OR z$="3" THEN LET g$(n+2,m+2
):z$: GO TO 520
480 IF z$="A" THEN LET ax=25: L
ET ay=0: LET sc=sc+50
490 IF z$="X" OR z$="Y" OR z$="
" THEN LET sc=sc+10
500 IF z$="K" OR z$="L" THEN PO
KE 64000,6: POKE 64001,1: LET sc
=sc+25
510 IF z$="J" THEN LET kil=1
520 NEXT m: NEXT n
530 PRINT AT 19,24: PAPER 1:sc
540 LET g$(2,2)=" "
550 PRINT AT y-1,x-1:g$(1):AT y
,x-1:g$(2): LET zz=USR drun
560 IF kil THEN GO TO 1090
570 GO TO 230
580 REM wom collision detected
590 PRINT AT y,x: LET z$=CHR$
USR 60057: IF z$=" " THEN GO TO
210
600 IF z$="H" THEN LET ls=z$: G
O TO 210
610 IF z$="2" AND z$<" " THEN
GO TO 620
620 IF z$="Y" OR z$="X" OR z$="
" THEN GO TO 680
630 IF z$="0" THEN LET sc=sc+10
: POKE lf,120: POKE hf,1: POKE l
en,50: POKE bef,1: LET zz=USR dr
un: PRINT AT 19,24: PAPER 1:sc:
LET ls="" GO TO 210
640 LET ls="" LET x=lx: LET y
=ly: GO TO 210
650 REM damage on 1
660 POKE len,20: POKE bef,1: PO
R n=1 TO 3: POKE lf,200: POKE hf
:0: LET zz=USR urun: NEXT n
670 LET d=(z$<"X")+(z$<"Y")+(3
AND z$<"0")
680 LET d(d)=d(d)+1: PRINT AT 1
9+d,5+d(d): PAPER 6: "

```

SOFTWARE

Programs for Software File should be fairly compact and sent on a cassette. Please include clear instructions and say what computer it's for. We pay between £6 and £36 for programs published. They must be double-checked and submitted

File

Wombat Combat

D Green
Ashford,
Kent.

Spectrum

CAN YOU guide the wombat down into the underground chambers of Deep Fort to destroy the Mad Master computer lurking there? I hope so. The fate of Western Civilisation rests on your 48K Spectrum.

The game utilises an apparently unique method of registering damage, as each one of the three main systems of the wombat has its own damage monitor and is affected by different hazards. Other potential dangers on your mission include the moderately brain-dead flying robot and bouncing missiles, against which your most effective forms of defence are either running away or using your unbelievably short range tactical nuclear weapons, activated by key 0. Use the arrow keys to move, or change them in lines 160 and 170.

Since the actual destruction of the master computer is not really all that hard, to get a reasonable score of over 2000 points you also need to collect all of the batteries that are lying around by some improbable coincidence. These batteries and various other objects have somehow been granted the power of levitation and hover in the air. The wombat is susceptible to falling

if there is nothing to support it.

The program is a good example of sound effects overkill, since hardly anything ever happens in total silence. The five mindless tunes embedded in the game are all done from Basic, but to show that the Spectrum can do more than beep, two machine-code routines are used. If you want to experiment with these, then have a look at line 2790, which sets up the variables to be used as follows:

Poke lf, low (least significant) byte of frequency
Poke hf, high (most significant) byte of frequency
Poke len, number of beeps to be made
Poke bef, length of each beep

Then use Usr urun for a sound effect that goes up in pitch, or Usr drun for a sound effect which goes down in pitch. Be very careful when using numerically low frequencies, as if an uprunning sound effect goes into negative frequency values then a boring breakproof beep will occupy your computer for anything up to several hours.

The amazingly efficient language of machine code is also used to detect user-defined graphics and to move the missiles. Note that all this machine code means that multiple saves before running are essential, as checksums can't find all your errors and just one wrong poke can send all 16K of program to that great Ram chip in the sky.

```

590 IF d(d)=10 THEN PRINT AT ly
,lx: "GO TO 880
700 LET ls="" GO TO 210
710 REM damage on 3
720 POKE len,10: POKE bef,4: PO
KE lf,200: POKE hf,0
730 PRINT AT y,x: INK 2: FLASH
1: "
740 FOR n=1 TO 3: LET d(n)=d(n)
+1
750 PRINT AT 19+n,5+d(n): PAPER
6: "
760 IF d(n)=10 THEN GO TO 880
770 LET zz=USR drun: NEXT n
780 LET ls="" IF al=2 THEN LE
T ax=25: LET ay=0: GO TO 320
790 IF RND$.5 THEN POKE 64000,6
: POKE 64001,1: GO TO 150
800 POKE 64000,25: POKE 64001,-
1: GO TO 150
810 REM repairs
820 LET d=CODE z$-CODE "H"
830 IF d(d)=0 THEN BEEP .01,20:
GO TO 860
840 POKE lf,100: POKE hf,2: POK
E len,20: POKE bef,2: LET zz=USR
urun+USR drun
850 PRINT AT 19+d,5+d(d): PAPER
6: "
860 LET ls="" GO TO 210
870 REM explosion
880 LET lin=ABS (y-21): IF x<li
n THEN LET lin=-lin
890 POKE hf,10: POKE len,5: POK
E bef,1
900 LET col=ABS (x-31): IF y<co
l THEN LET col=-col
910 IF col=lin THEN LET lin=col
920 PRINT AT y,x: "PAPER 8
930 FOR n=0 TO lin: PRINT AT y+
n,x+n: OVER 1: "AT y+n,x-n: "

```

```

"AT y-n,x+n: "AT y-n,x-n: "
940 POKE lf,n+20: LET zz=USR dr
un
950 BORDER RND+7
960 PRINT AT 19,x+n: OVER 1: "
"AT y+n,x-n: "AT y-n,x+n: "
"AT y-n,x-n: "
970 NEXT n
980 BORDER 0
990 PAPER 0
1000 POKE len,150: POKE bef,2: L
ET zz=USR drun
1010 GO SUB 2000
1020 GO SUB 1330: GO SUB 1340
1030 DATA "it had severe brain d
amage", "its hydraulics system fa
iled", "its motor system exploded"
1040 RESTORE 1030: PRINT: "The
Wombat was destroyed because": F
OR n=1 TO 3: READ z$: IF d(n)=10
THEN GO TO 1050
1050 NEXT n
1060 PRINT z$: "
1070 PRINT "Score: ";sc
1080 GO TO 1250
1090 REM computer destroyed
1100 POKE hf,2: POKE lf,100: POK
E len,20: POKE bef,1: FOR n=1 TO
25: BORDER RND+7: LET zz=USR dr
un+USR urun: NEXT n
1110 GO SUB 1680
1120 POKE hf,3: FOR n=5 TO 10: P
OKE lf,n+20: GO SUB 1320: LET zz
=USR urun: NEXT n: POKE len,100:
POKE bef,2: LET zz=USR drun
1130 BEEP .1,0
1140 LET z$="

```

(continued on next page)


```

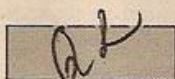
155 POKE832,0:POKE2042,223
160 POKEA+2,255:POKEA+3,100:POKE2041,221
161 PRINT"~~~~~TAB(30)"HISC"
162 PRINT"~~~~~TAB(30)HI
170 POKEA+40,8
180 FORI=6TO14STEP2:POKEA+I,-103+(I#24)
181 POKEA+I+1,208:NEXT
190 FORI=3TO7:POKE2040+I,224:POKEA+39+I,0:NEXT
191 PRINT"~~~~~TAB(30)"SCORE"
200 FORI=0TO10STEP2:B=4*256+(81*I)
201 POKE834+I,B/256
202 POKE833+I,B-(PEEK(834+I)*256)
203 NEXT
205 POKE830,BE:POKE831,1:POKE832,0
210 SYS49388
211 IFPEEK(829)=0THEN GOTO 3999
212 PRINT"~~~~~DEAD!"
213 POKE54276,0:POKE54277,255
214 POKE54273,10:POKE54276,129
220 GETA$:IFA$=""THEN220
230 IFSCDHITTHENHI=SC
240 GOTO1
250 PRINT"~~~~~" "SANTA'S DAY OF WORK"
251 POKE53248+21,0
253 POKE53248+33,0:POKE53248+32,0
254 PRINT"~~~~~" "BY Q.D.BARKER"
260 PRINT"~~~~~YOU ARE SANTA"
270 PRINT"~~~~~DELIVERING PRESENTS TO THE KIDS BUT
280 PRINT"~~~~~THEY BECOME VERY ANGRY AND "
290 PRINT"~~~~~IF THEY DON'T GET WHAT THEY WANT, YOU
300 PRINT"~~~~~DIE. TO INDICATE HOW MAD THEY ARE
302 PRINT"~~~~~THE LIGHTS WILL CHANGE COLOUR.
310 PRINT"~~~~~YELLOW MEANS DEATH."
315 PRINT"~~~~~COLLECT A PRESENT AND LET A SNOWFLAKE
316 PRINT"~~~~~KNOCK IT DOWN THE RIGHT CHIMNEY."
320 INPUT"~~~~~SPEED(1-3)";LE
330 BE=0
340 IFLE=2THENBE=4
350 IFLE=3THENBE=8
351 INPUT"~~~~~LEVEL(1-3)";LE
352 LS=2
353 IFLA=2THENLS=3
354 IFLA=3THENLS=6
356 POKE49457,LS
360 RETURN
999 REM CODE (M/C)
1000 DATA162,0,189,65,3,133,250,189
1001 DATA66,3,133,251,165,251,201,4
1002 DATA144,48,201,6,176,44,76,89
1003 DATA192,234,145,250,189,65,3,24
1004 DATA105,40,157,65,3,189,66,3
1005 DATA105,0,157,66,3,189,65,3
1006 DATA133,250,189,66,3,76,102,192
1007 DATA234,145,250,232,224,10,144
1008 DATA193,96,169,4,157,66,3,138
1009 DATA10,157,65,3,134,253,24,101
1010 DATA253,105,3,157,65,3,76,45
1011 DATA192,160,0,177,250,201,42,208
1012 DATA187,169,32,76,26,192,133,251
1013 DATA177,250,201,32,208,205,169,42
1014 DATA76,57,192,173,0,220,41,1
1015 DATA208,13,173,1,208,201,50,144
1016 DATA6,206,1,208,206,1,208,173
1017 DATA0,220,41,2,208,13,173,1
1018 DATA208,201,130,176,6,238,1,208
1019 DATA238,1,208,173,0,220,41,4
1020 DATA208,13,173,0,208,201,20,144
1021 DATA6,206,0,208,206,0,208,173
1022 DATA0,220,41,8,208,13,173,0
1023 DATA208,201,230,176,6,238,0,208
1024 DATA238,0,208,173,1,208,141,3
1025 DATA208,173,0,208,24,105,24,141
1026 DATA2,208,173,64,3,201,0,208
1027 DATA18,173,0,208,24,105,2,141
1028 DATA4,208,173,1,208,24,105,1
1029 DATA141,5,208,96,173,18,208,201
1030 DATA160,208,249,238,63,3,173,63
1031 DATA3,205,62,3,144,238,32,115
1032 DATA192,32,115,192,32,0,192,169
1033 DATA0,141,63,3,32,42,193,32
1034 DATA6,194,76,61,193,174,5,220
1035 DATA224,5,176,12,189,42,208,201
1036 DATA240,208,0,169,7,254,42,208
1037 DATA96,0,238,41,193,173,41,193
1038 DATA201,2,144,8,169,0,141,41
1039 DATA193,76,21,193,96,162,0,189
1040 DATA42,208,201,247,208,6,169,1
1041 DATA141,61,3,96,232,224,5,208
1042 DATA238,234,234,234,173,0,208,74
1043 DATA74,74,133,252,169,3,133,253
1044 DATA173,1,208,74,74,74,170,165
1045 DATA252,24,105,40,133,252,165,253
1046 DATA105,0,133,253,202,224,255,208
1047 DATA238,160,15,177,252,201,42,208
1048 DATA10,173,64,3,201,0,208,3
1049 DATA238,64,3,76,220,193,208,46
1050 DATA173,5,208,24,105,8,141,5
1051 DATA208,201,150,144,33,160,0,173
1052 DATA4,208,201,70,144,16,200,201
1053 DATA110,144,11,200,201,160,144,6
1054 DATA208,201,190,144,1,200,169,2
1055 DATA141,64,3,76,193,193,76,228
1056 DATA193,185,42,208,201,240,240,9
1057 DATA185,42,208,56,233,1,153,42
1058 DATA208,169,60,141,4,208,141,5
1059 DATA208,76,0,194,173,64,3,201
1060 DATA1,76,142,193,173,64,3,201
1061 DATA2,208,15,173,30,208,201,5
1062 DATA208,5,169,0,141,64,3,76
1063 DATA236,192,173,30,208,76,236,192
1064 DATA169,0,141,61,3,96,173,63
1065 DATA3,208,15,238,249,7,173,249
1066 DATA7,201,223,144,5,169,221,141
1067 DATA249,7,96,0,0,0,0,0
1500 REM CODE / SPRITE LOADER
1501 FORI=0TO543:READA:POKE49152+I,A:NEXT
1502 FORI=0TO330:READA:POKE14080+I,A:NEXT
1999 REM SPRITE DATA
2000 DATA0,0,0,0,0,0,64,0
2001 DATA0,32,0,0,40,0,0,20
2002 DATA0,0,20,0,0,60,0,0
2003 DATA40,0,0,42,144,0,42,149
2004 DATA0,42,0,0,85,64,0,255
2005 DATA160,0,255,160,0,255,160,4
2006 DATA255,252,4,85,85,80,0,0
2007 DATA0,0,0,0,0,0,0,0
2008 DATA0,0,0,0,0,0,0,0
2009 DATA0,0,0,0,0,0,0,0
2010 DATA0,0,0,0,0,0,0,0
2011 DATA0,0,0,0,2,0,0,0
2012 DATA128,0,0,40,32,0,170,40
2013 DATA42,162,2,170,160,10,170,160
2014 DATA40,0,160,32,0,40,128,0
2015 DATA8,0,0,0,0,0,0,0
2016 DATA0,0,0,0,0,0,0,0
2017 DATA0,0,0,0,0,0,0,0
2018 DATA0,0,0,0,0,0,0,0
2019 DATA0,0,0,0,2,0,0,0
2020 DATA128,0,0,40,32,0,170,40
2021 DATA40,162,2,170,160,10,170,160
2022 DATA10,0,160,2,130,128,0,138
2023 DATA0,0,0,0,0,0,0,0
2024 DATA0,0,0,0,2,128,0,10
2025 DATA160,0,26,172,0,166,184,2
2026 DATA169,232,14,169,100,11,174,88
2027 DATA6,250,104,9,185,96,10,118
2028 DATA64,2,154,0,0,184,0,0
2029 DATA48,0,0,0,0,0,0,0
2030 DATA0,0,0,0,0,0,0,0
2031 DATA0,0,0,0,0,0,0,0
2032 DATA170,186,171,170,186,171,170,186
2033 DATA171,170,186,171,170,186,171,170
2034 DATA186,171,170,186,171,170,186,171
2035 DATA170,122,167,85,117,87,255,255
2036 DATA255,170,186,171,170,186,171,170
2037 DATA186,171,170,186,171,170,186,171
2038 DATA170,186,171,170,186,171,170,186
2039 DATA171,170,122,167,85,117,87,0
2040 DATA0,0,0,0,0,0,0,0
3000 RETURN
3999 SC=SC+100:PRINT"~~~~~"TAB(30)SC
4000 POKE54276,0:POKE54277,7:POKE54273,
100:POKE54276,17
4100 GOTO210

```

READY.

Blue Meanies

Jonathan Bowring,
Caerphilly,
Mid-Glamorgan.



BLUE MEANIES is written entirely in machine code and takes up just over 3.5K of memory. It

is listed as a hex dump, with line numbers for easy reference and a simple checksum to prevent most errors. The hex should be typed in using the loader program provided — or any other loader for that matter.

Type in the loader program and save it to Microdrive. Then LRun it to enter the hexadecimal digits. You will first be prompted for the

number of bytes you are typing in. For this game you should enter the number 3800.

Now you can enter the code line by line. You don't have to enter the lines in numerical order, but it helps to prevent you missing out lines accidentally. This feature allows you to save the file and then edit it or add to it at a later date. (continued on next page)

(continued from previous page)

First type the line number as given in the listing. Press Enter. You must now enter the four eight-digit hex numbers given with that line number, pressing Enter after every one. Finally, type the given checksum, pressing Enter once again.

This sum is a simple calculation — the sum of the ASCII codes of the hex digits, added to the line number. Thus if any errors are made they will be detected and you can re-type the line.

An error is also reported if you enter an illegal digit or a number of incorrect length. Some untrappable errors may occur, such as typing a letter in the line number, causing the program to return to SuperBasic with an error message. If this happens just type "Input Row" and Enter to enter the line again.

Entering -1 as the line number allows you to save the code. Entering -2 as the line number allows you to load a code file. In both cases the filename will be MDV1-Meanies. When you have

entered all the lines, just enter -3 as the line number to exit the program. Now type the following:

```
'SEXEC MDV1_MEANIES_EXE_codespc,
3800,0'
```

To run the game type:

```
'EXEC_W MDV1_MEANIES_EXE'
```

You have been placed in charge of a defence trench on board a spacecraft. Unfortunately, the blue meanies which inhabit this sector of the galaxy are enraged by your presence and are determined to destroy the spacecraft. It is your task to stop them.

The meanies attack the trench in suicide squads of six. You must defend it with the four lasers and moveable base ship at your disposal. Firing your various guns saps your energy store, so accuracy counts!

As the meanies land they gradually erode the trench, stealing energy as they do so, but you can gain energy by shooting them with the base ship. You gain points for shooting a meanie with any

gun.

At random intervals energy modules descend into the trench. If you allow them to land they will give up energy to you. But be warned — shooting an energy module will cost you dearly in energy.

The game speeds up every 250 points. It ends if your energy level falls below zero or if all your guns are destroyed. My best score is 1,920 points.

Keys are:

D — fire top left gun
L — fire top right gun
C — fire bottom left gun
, — fire bottom right gun
S — move base ship left
; — move base ship right
Space — fire base ship
Enter — pause
Esc — exit from program

A copy of the game is available on a Microdrive cartridge from: 45 Lon-y-gors, Caerphilly, Mid-Glamorgan, CF8 1DP. Price: £4 — or £2 on receipt of your own cartridge.

```
100 RESTORE : PAPER 0 : MODE 4 : POKE 163976,255
110 DIM letters$(15,1),value(15)
120 FOR i=0 TO 15
130 READ letters$(i):value(i)=i:NEXT i
140 INPUT EO," Size: ";size
150 size=INT((size+15)/16)*16
160 codespc=RESPR(size)
170 Input_Row
180
190 Define PROCEDURE Input_Row
200 Repeat rows
210 INPUT row;TO 6 : IF row<1 OR row>size/16 THEN EXIT rows
220 IF row<1 OR row>size/16 THEN badline
230 lword=codespc*(row-1)*16
240 Input_row = sumsum+row
250 INPUT check : IF check<sum THEN badline
260 END Repeat rows
270 IF row=-3 THEN STOP
280 IF row=-2 THEN BYTES MDV1_MEANIES_codespc : PRINT : NEXT rows
290 IF row=-1 THEN DELETE MDV1_MEANIES : BYTES MDV1_MEANIES_codespc,38
300 : PRINT : NEXT rows
310 badline
320 END Define
330 Define PROCEDURE input_row
340 sum=0
350 FOR col=1 TO 4
360 INPUT H$," "
370 IF LEN(H$)<8 THEN badline
380 hexdec 1 : hexdec 5
390 END FOR col
400 END Define
410
420 Define PROCEDURE hexdec(start)
430 dec=0
440 FOR char=0 TO 3
450 sumsum=CODE(H$(char+start))
460 FOR digit=0 TO 15
470 IF H$(char+start)<>letters$(digit) THEN NEXT digit : badline
480 decdec=(value(digit)*16)+(S-char))
490 END FOR char
500 POKE W lword,dec : lword=lword+2
510 END Define
520
530 Define PROCEDURE badline
540 BEEP 3000,15 : CLS EO
550 PRINT EO," Error - retype the line"
560 PRINT : NEXT rows
570 END Define
580 DATA "0","1","2","3","4","5","6","7","8","9","A","B","C","D","E","F"
```

1	61000184	610000F4	61000158	610001A6	1642	51	00000032	6100032A	2A1F2C3C	00000060	1712
2	43FA0D98	610000A4	610000CA	43FA0D68	1807	52	43FA0918	610005B8	06450002	610005B0	1737
3	610000A8	4BFA0E44	610000A6	4BFA0E42	1813	53	04450002	28B54E75	243C0000	000549FA	1749
4	610000A6	4BFA0E40	610000A5	610001C6	1737	54	0ADA2F0C	2F026100	0170241F	285F053A	1819
5	4BFA0E2E	0C950000	00006D00	006448FA	1776	55	0AC26700	00F22A14	2C2C0004	610006CC	1787
6	0DD30C15	00006700	00584BFA	0DC60C15	1767	56	61000126	61000662	00000000	67000014	1666
7	00006600	00066100	019C143C	00016100	1632	57	4BFA0AA1	0F952C23	2A236100	039C6000	1819
8	0A660C01	00016600	00066100	0A680C01	1670	58	00C66100	05AC0C40	00006600	00BA0C46	1766
9	00086700	005C6100	01E86100	06C86100	1674	59	00726F00	00082C3C	00000000	4BFA0A78	1776
10	062E6100	02B46100	09A20281	0000000F	1674	60	26152B3C	00000060	61000654	0C400000	1693
11	0C410005	6E00FF9A	61000540	6000FF92	1750	61	660000AB	26150643	00022B3C	00000060	1701
12	4BFA0DBE	0C550000	6C000008	2ABC0000	1786	62	6100063C	0C400000	66000090	4BFA0A84	1767
13	000043FA	0D066100	0A02223A	0D9E4BFA	1782	63	2615282D	00046100	06260C40	00006600	1705
14	0D1C2A81	610009BE	61000A0A	6000FF26	1772	64	00384BFA	0A662615	282D0004	61000610	1765
15	33FC0002	000280BE	207A0D98	76FF7002	1768	65	0C400000	66000022	223C0000	000547FA	1721
16	4E427005	760072FF	4E41227C	00020000	1723	66	0A1A2618	281BB481	67000018	610005F0	1780
17	203C0000	20004299	51CBFFFC	43FA09FA	1802	67	0C400000	6700000C	2C2C0004	2A146000	1734
18	7C002219	7A000B01	66000018	52450C45	1702	68	000651C9	FFDE2F05	2F062A14	2C2C0004	1858
19	001D6600	FFF25246	0C46001E	6600FF4E	1805	69	610004C0	2C1F2A1F	43FA0840	610004A0	1807
20	4E752F05	2F06CAFC	0004CEFC	04000685	1835	70	29460004	28B5383A	0A2851CC	FFFFD9FC	1913
21	00020206	DC852446	7005D4FC	007E34FC	1788	71	00000008	51CAFEFC	4E756100	02BC48FA	1884
22	2A0034BC	A80051C8	FFF22C1F	2A1F6000	1839	72	09B62A15	2C3C0000	00606100	04860455	1755
23	FFBC4BFA	0A167203	2A1D2C1D	43FA0ABC	1919	73	00026100	047E2ABC	000000FF	4BFA0995	1834
24	0C450008	66000006	43FA0A90	61000770	1707	74	08950007	6000FFC0	02810000	000F0C41	1765
25	51C9FFE6	4E75123C	0008143C	00017010	1772	75	00026E00	00080646	00024E75	0C410007	1734
26	4E4143FA	0BD65A78	00C64E95	4BFA0CE4	1886	76	6E000008	06450001	4E750C41	000C6E00	1770
27	2A8B33FC	000A0002	80BC33FC	00030002	1751	77	00060445	00014E75	4BFA095B	0C150000	1788
28	80BE4E75	4BFA0CB4	2ABC0000	00002B7C	1842	78	6700010C	47FA0984	2A132C2B	00046100	1793
29	000001F4	00062B7C	00000000	000C2B7C	1709	79	05984252	426A0080	426A0100	426A0180	1755
30	00000001	00124BFA	0C4B1AFC	008F1AFC	1820	80	04460001	0C46FFFF	6F0000E6	6100057A	1839
31	00001ABC	00004BFA	0C3E2ABC	00000019	1792	81	0C52294C	670000DA	0C52A800	670000D2	1813
32	4BFA0C70	2ABC0000	001C2B7C	00000004	1781	82	083A0007	09106700	004249FA	0946282C	1784
33	00044E75	223A0C64	82FC0002	02FC0002	1817	83	00042614	96450C43	00006700	000A0C43	1742
34	49FA0C6E	4BFA0B3C	38B51000	43FA09BC	1896	84	FFFF6600	00269846	0C440000	6600001C	1814
35	45FA0C08	700B24D9	51CBFFFC	4BFA0BF4	1929	85	6100009E	4BFA091C	2A152C2D	00046100	1827
36	1ABC003F	4BFA0C40	06950000	00014BFA	1818	86	0C086100	010E6000	0086243C	00000005	1734
37	0C366100	08504BFA	0BDC0C15	00FF6700	1821	87	49FA08C8	053A08BC	6700004C	2614282C	1860
38	001E4BFA	0C280495	00000001	0C95FFFF	1826	88	00049645	0C430000	6700000A	0C43FFFF	1822
39	FFFF6600	000A4BFA	0BCC1ABC	00FF4E75	1944	89	66000034	98460C44	00006600	002A6100	1736
40	083A0007	0BAF6700	00CE49FA	0BAA2A14	1849	90	00506100	01944BFA	08D20695	0000000A	1780
41	2C3C0000	00066100	067A0645	00026100	1687	91	610004F2	4BFA08CA	06950000	003C6100	1816
42	0672143C	00036100	083E0C01	00086600	1702	92	04E46000	002AD8FC	000851CA	FFA86100	1877
43	00240445	00036100	07D00C6A	00000480	1689	93	04B80052	0200006A	02010080	006A0202	1729
44	6700000C	0C6A8B00	00806600	002C2A14	1744	94	0100006A	02030180	26852746	00044E75	1749
45	60000026	0C010080	6600FFFA	04450001	1719	95	4BFA0843	1ABC0000	4E7548FA	08380C15	1904
46	610007A6	0C6A0000	04866700	FFE20C6A	1801	96	00006700	005A47FA	086A2C2B	00042A13	1816
47	2A000086	6700FFD8	4BFA0B78	2615282D	1841	97	61000300	06460001	740549FA	081E2614	1771
48	00046100	071A0C40	00006600	001C2615	1689	98	282C0004	610003F8	0C4000FF	67000024	1795
49	282D0004	06450002	61000704	04450002	1671	99	DBFC0008	51CAFFEB	6100044E	0C6A2A00	1924
50	0C400000	6700001A	2F054BFA	0B540695	1777	100	03806700	001C0C46	00756700	00142746	1758

SOFTWARE *File*

101	00042C2B	000443FA	06626100	02A24E75	1811	168	00000001	6000FFD6	2F062F05	CAFC0002	1919
102	4BFA081E	06950000	019047FA	07B67011	1849	169	06850002	0204CCFC	0100DC85	24462A1F	1922
103	4E414BFA	080C0495	000000C8	4BFA07B6	1894	170	2C1F4E75	322D0004	0C410015	66000018	1869
104	42154BFA	07EE2C2D	00042A15	61000284	1855	171	2F0D7011	76FF4E43	43FA033C	6100001C	1947
105	610003B8	02810000	001E0081	00000001	1720	172	2A5F323C	0015207A	03CA7011	76FF4E43	1950
106	06810000	000D4BFA	07CA2A81	2B7C0000	1855	173	22153678	00CE4E93	4E75207A	03B63A78	1945
107	00050004	4BFA07CA	610003EA	6100038C	1841	174	000D4E95	4E7547FA	02727011	17420006	1896
108	00010000	00034BFA	07C42A81	4E75143C	1841	175	4E414E75	383CFFFE	51CCFFFE	41FA0288	2092
109	00016100	04120C01	00406600	005A083A	1746	176	72FF7001	4E4276FF	70014E43	70024E42	1941
110	00070751	67000030	4BFA074B	0C1500FF	1843	177	4E751F00	001F1F00	001F1F00	001F1F00	1911
111	67000044	47FA070C	70114E41	1ABC00FF	1882	178	001F1F00	001F1F00	001F1F00	001F1F00	1898
112	4BFA077E	04950000	000A6100	03984BFA	1867	179	001F1F00	001F1F00	001F1F00	001F1F00	1899
113	07262A15	06450001	2C3C0000	005E47FA	1824	180	001F1F00	001F1F00	001F1F00	001F1F00	1900
114	074A6100	03640C52	294C6700	000A0C52	1814	181	001F1F00	001F1F00	001F1F00	001F1F00	1901
115	A8006600	FE9A4E75	2F052F06	2A142C2C	1919	182	001F1F00	001F1F00	001F1F00	003F1FC0	1931
116	00046100	01CE2C1F	2A1F6100	01DC4BFA	1898	183	007F1FE0	00FF1FFF	FFFF1FFF	FFFF1FFF	2213
117	06E20595	28BC0000	000A297C	00000000	1802	184	FFFF1FFF	FFFF1FFF	FFFF0000	00080000	2126
118	00044E75	143C0004	6100037C	0C010040	1786	185	00100000	00080000	00380000	00300000	1744
119	6600000A	43FA0434	60000044	0C010001	1776	186	00240000	00300000	004C0000	000A0000	1771
120	6600000A	43FA0444	60000034	143C0002	1785	187	00120000	00000000	00010000	000A0000	1744
121	61000354	0C010008	6600000A	43FA041C	1803	188	003A0000	00010000	00010000	002F0000	1770
122	6000001C	143C0007	6100033C	0C010080	1778	189	00260000	0002FFFF	FFFF0000	002F0000	1935
123	6000000A	43FA0424	60000004	4E752A19	1820	190	004E0000	0003FFFF	FFFF0000	00100000	1931
124	2C192619	2419073A	066B6600	00044E75	1835	191	00000000	001C0000	00000000	00280000	1757
125	2F0547FA	062E7011	4E412A1F	4BFA06A2	1936	192	00000000	00120000	000A0000	001C0000	1768
126	04950000	000A203C	00000025	6100029A	1763	193	000A0000	00260000	000A000A	000A8556	1841
127	34BC8888	D827205	47FA0678	282B0004	1905	194	00B0AA55	00A000AA	806A00AA	806AA855	1973
128	26139846	0C440000	6E000048	0C44FFFF	1882	195	00A0A856	008000AA	00000000	00AA0002	1862
129	6D000040	96450C43	00006700	000C6E00	1804	196	2A95000A	AA5502A9	00AA02A9	00AA000A	1967
130	0032B682	6600002C	2F002F02	2F062F05	1847	197	AA550002	2A950000	00A00000	02010000	1849
131	4BFA0640	2A152C2D	00046100	00EC6100	1864	198	02010000	08070000	201FA005	807F201F	1861
132	FE322A1F	2C1F241F	201F0440	00016000	1871	199	00FF201F	00FF0A05	AA558040	0000B040	1938
133	006647FA	05E6261B	281B9846	0C440000	1873	200	000020D0	00000BF4	000002FD	A05000FF	1902
134	6E000062	0C44FFFF	6D00005A	96450C43	1916	201	08FA00FF	08FAAA55	0050000A	00A00025	1956
135	00006700	000C6E00	004C6B82	66000046	1809	202	00580891	20460095	00560095	00560A90	1857
136	4BFA05B0	03952F00	2F062F05	2C232A23	1906	203	A0660025	0058000A	00A00A05	80400A05	1872
137	26FC0000	000F26BC	00000000	6100008A	1821	204	80402010	2010A251	A854A050	2814A251	1879
138	4BFA05D8	06950000	000A2A1F	2C1F201F	1916	205	A8542010	2010A005	8040002A	00A80080	1867
139	04800000	0001283C	00000FFF	51CCFFFE	1917	206	00020080	00020080	00020080	00020080	1782
140	60000014	51C9FF90	51C8FF22	283C0000	1887	207	00020080	0002002A	00A80000	00000A0A	1833
141	0FFF51CC	FFFE9A82	610001AE	42520680	1983	208	A0A02020	08082020	08082020	08082020	1842
142	00000001	0C400025	6600FFEC	4BFA058C	1898	209	08080A0A	A0A00000	00000000	00000000	1829
143	610001B2	4BFA058A	610001AA	4E756100	1884	210	00000002	00800008	00200008	00200008	1784
144	01887007	2499D5FC	00000080	51C8FFFF	1914	211	00020000	00000000	00000000	00000000	1749
145	4E756100	0174203C	00000007	4292D4FC	1850	212	00000000	00000202	80800202	80800000	1788
146	008051C8	FFFB4E75	2F0547FA	04E67011	1953	213	00000000	00000000	00000901	00000000	1759
147	4E412A1F	43FA03A4	7E036100	FFC2303C	1953	214	000205DC	04E203E8	02EE01F4	00FA0000	1965
148	0FFF51C8	FFFE51CF	FFF26100	FFC64E75	2098	215	00000000	00000000	00000000	010701B0	1778
149	70006100	01340C52	A8006700	00500C6A	1818	216	000A0024	00F6000D	636F6E5F	31327831	1942
150	A8000080	67000046	0C6A2A00	00026700	1818	217	32613078	30000021	0A205343	4F52453A	1885
151	004C0C6A	2A000082	67000042	7E000C6A	1870	218	20202020	2020454E	45524759	3A202020	1867
152	2A000380	6700001A	7EFFF0C6A	A8000380	1899	219	20202057	41564553	3A00001D	0A202020	1870
153	6700000E	7E010C6A	2A000382	66000048	1850	220	20202050	72657373	20616E79	206B6579	1912
154	06860000	0003DA87	6000001E	06860000	1813	221	20746F20	73746172	7400001A	0A202020	1889
155	00020485	00000001	6000000E	06860000	1758	222	20202020	47414D45	204F5645	522E2053	1903
156	00020685	00000001	61000042	6100FD6A	1799	223	434F5245	3A200004	20202020	00000000	1842
157	4BFA04AE	04950000	00142F02	610000C6	1877	224	001A0A08	0000AAAA	0B150001	000A1100	1915
158	241F103C	00FF4E75	7E0047FA	019E261B	1963	225	01000A08	0000AAAA	010A0002	001F3705	1913
159	281B6100	002A0C00	00FF6700	000E0647	1864	226	01000A08	0000AAAA	06100001	001EF105	1914
160	00010C47	00046D00	FFE64E75	8CFC0004	1937	227	01000000	000C0000	00000000	00000000	1764
161	CCFC0004	8AFC0002	CAFC0002	4E757000	1971	228	00000000	00000000	00000000	00000000	1764
162	96850C43	00026C00	00200C43	FFFE6F00	1922	229	00000000	00000000	00000000	00000000	1765
163	00189886	0C440004	6C00000E	0C44FFFF	1928	230	00000000	00000000	00000000	00000000	1766
164	6F000006	103C00FF	4E754BFA	044A2215	1934	231	00000000	00000000	00000000	00000008	1775
165	D2BA0428	D2BA042A	60000006	2A814E75	1929	232	00000000	00150000	00000021	00000000	1777
166	E3816500	000E0801	00116600	00126000	1799	233	00000000	00001234	56780000	00000000	1805
167	FFEC0801	00116700	00066000	FFEC0081	1897						

```

1 ' REM HIGHLIGHTER !
2 ' by Stuart Clark !
3 REM
4 REM
5 ' reserve memory !
10 MEMORY HIMEM-63
15 ' machine code loader !
20 FOR n=1 TO 62:REM
30 READ a$:REM _ read each pair of hex digits!
40 POKE HIMEM+n,VAL("&"+a$):REM _ and POKE the code in
to reserved memory!
50 NEXT
55 ' object code!
60 DATA fe,27,28,08,fe,5f,28,04
70 DATA fe,21,20,07,f5,e5,cd,9c
80 DATA bb,e1,f1,c3,00,00,fe,21
90 DATA 20,04,3e,46,18,0f,fe,5f
100 DATA 20,05,3e,45,f5,18,0c,fe
110 DATA 27,20,10,3e,45,f5,3e,0a

```

(listing continued on next page)

Rem Highlighter

Stuart Clark,
Gelnrothes,
Fife.

REM STATEMENTS can be boring to type in, but when it comes to finding your way around a large program, the increased legibility afforded by a liberal scattering of Remarks within the listing makes it all worthwhile. The problem is, though, that these Rems can themselves recede into the mass of the listing unless surrounded by plenty of space.

The advantages of using Rem Highlighter are that valuable memory and time are not wasted creating space around each Rem. The inverse writing of the Remark is done automatically and results in a very prominent display without the need for extra spaces, and the messages in bold typeface produce a tidy and legible hard copy.

Rem Highlighter comprises two short routines which are patched into the Rom indirections

(continued on next page)

(continued from previous page)

TXT Write Char and MC Wait printer. For those of you who are a little mystified by indirections, let me briefly explain. A number of the Firmware routines in Rom jump to addresses in Ram which contain a jump instruction to direct the program execution back to Rom. The "why" of it is that the programmer has the opportunity to alter the address in Ram to point to his own program instead, only jumping back to the Rom after carrying out some task or other.

The method of implementing the patches used here has been selected to ensure that it will work

even if memory has already been reserved for another program. Study listing 1 to understand what is going on.

The first routine highlights Rems on the screen; the second causes the printer (Epson control codes) to emphasise the Rem message in accordance with the syntax below.

PRINTED OUTPUT

'message! — message printed in emphasised typeface, with a blank line before and after it. REM message! — as above but without the preceding blank line. Useful for in-line Rems.

Messages delimited as above are displayed in inverse lettering. Extra lines are not generated.

The indirections can be reset to their default values by using

CALL &bb51

for screen and

CALL &bd28

for printer, and the routines switched on again by lines 240-270.

Finally, editing highlighted Rems using the copy cursor is easier with the screen routine switched off and the program re-listed, but can otherwise be done by using the delimiter characters to flip to inverse at the appropriate points.

(listing continued from previous page)

```
120 DATA cd,2b,bd,3e,1b,cd,2b,bd
130 DATA 30,f9,f1,c3,00,00
155 ' copy addresses from the ROM indirections to the
    e jump instructions in our routines !
200 POKE HIMEM+21,PEEK(&BDD4)
210 POKE HIMEM+22,PEEK(&BDD5)
220 POKE HIMEM+61,PEEK(&BDF2)
230 POKE HIMEM+62,PEEK(&BDF3)
235 ' replace the indirection addresses with those of
    our routines !
240 POKE &BDD4,UNT(HIMEM+1)AND &FF
250 POKE &BDD5,(HIMEM+1)/256
260 POKE &BDF2,UNT(HIMEM+23)AND &FF
270 POKE &BDF3,(HIMEM+23)/256
280 ' CALL &bb51 to reset the screen print indirection
    CALL &bd28 to reset the
    printer indirection !
290 ' GOTO 240 to set up the highlighter routines again!
300 DELETE -230
```

Wokstix

R Sargent,
Donnington,
Gloucestershire.

RANDOM MUSIC on a computer is not easy to achieve. That this should be so when random numbers are a computer's stock-in-trade, is, on the face of it, something of a puzzle. Why can't the computer be asked to "produce a number, any number" and then go on to use it as a frequency which the sound chip will obligingly play?

In fact this can be done but the result won't be musical — it won't be particularly pleasant either. What the sound chip requires is a number representing one of the frequencies that forms the equal-tempered chromatic scale. Our Western ears are tuned to expect these notes, and anything else is treated as strange, discordant, or horrible!

Notes from the standard scale can't just be played in any order — certain sequences sound right whilst others don't, and, unluckily from the computers point of view, the right order can't be quantified mathematically. There is, though, a way of cheating. When you play the black notes at random on a piano, they tend to sound tuneful, whilst the same can't be said of the white notes. This fact — which is probably due to some fundamental law of physics — can be put to good use as the software offering Wokstix illustrates.

In this program, black notes values — they are, of course, sharps — are loaded into the B(N) array. They are then played in varied sequence, forever, or until Stop is pressed.

The RND function is used at various points to ensure that no regular pattern is followed. RND, which always looks complicated when it appears in a program, works like this:

$N = \text{INT}((\text{RND} * 15) + 1)$

places an integer random number in the range 1 to 15 inclusive into the variable N. Often the integer function can be dispensed with, leaving $N + (\text{RND} * 15) + 1$. If you want something to happen 20 per cent of the time, then a conditional branch can be set by the code:

IF (RND*100)>80 THEN GOTO some other routine

This play is used more than once in Wokstix to add variety to the music by adjusting tempo and sounding the chords. The program uses T or 15 consecutive sharps, although the amount

can be easily altered. A starting note is selected in line 230. Let's assume B(4) was chosen. Lines 260/270 "flip a coin" to see whether the program will play up the scale or down the scale — there are separate routines for each eventuality. Assuming the sequence chosen is a rising scale, line 300 determines S, the number of notes to be played.

Line 310 represents a joker in the pack. The RND function here will cause the "rising sequence" routine to be abandoned 20 per cent of the time and another starting note will then be chosen at line 230. If the joker is successfully

navigated, then S number of consecutive notes will be played, providing the limits of B(N) are not exceeded.

To add spice to the music, another RND at line 332 occasionally causes the length of the note played to be increased by half. Line 340 actually plays the note using one channel of the Dave Chip. Line 342 occasionally adds a chord — these Sound statements will be explained a little more fully later on.

At the end of the For-Next loop, either control passes back to the coin-flipper at line 260, or else the program decides to move directly to the "fall-

```
20 REM ENTERPRISE WOKSTIX
30 ENVELOPE NUMBER 1;.4,63,63,1;-4,0,0,10;RELEASE;0,-63,-63,30
40 LET D=15:LET V=100:LET Q=7:LET T=15:LET VL=V/2
50 NUMERIC B(20)
52 CLEAR SOUND
140 RESTORE 155
150 DATA 14,16,19,21,23
155 DATA 26,28,31,33,35
170 DATA 38,40,43,45,47
175 DATA 50,52,55,57,59
180 DATA 62,64,67,69,71
210 ! load array with sharps
220 FOR N=1 TO 20
222 READ B(N)
224 NEXT N
230 LET N=INT((RND*T)+1)
250 ! playing loop
260 LET COIN=INT(RND*11)
270 IF COIN<6 THEN GOTO 440
290 ! rising sequence
300 LET S=INT((RND*Q)+1)
302 LET Z=1
310 IF (RND*100)>80 THEN GOTO 230
320 FOR X=1 TO S
330 LET A=1:LET L=1
332 IF (RND*100)>80 THEN LET A=1.5
340 SOUND PITCH B(N),DURATION D*A,RIGHT V,LEFT V,SOURCE 0,ENVELOPE 1,SYNC 1
342 IF (RND*100)<66 THEN LET L=L+0.5
343 SOUND PITCH B(N+3),DURATION D*A,RIGHT V*L,LEFT V*L,SOURCE 1,SYNC 1
350 LET N=N+1
360 IF N>T+1 THEN GOTO 370
362 LET X=S:LET Z=0:LET N=N-1
370 NEXT X
380 IF Z=0 THEN GOTO 420
390 GOTO 260
410 ! falling sequence
420 LET S=INT((RND*Q)+1)
422 LET Z=1
430 IF (RND*100)>80 THEN GOTO 230
440 FOR X=1 TO S
450 LET A=1:LET L=1
452 IF (RND*100)>80 THEN LET A=2
460 SOUND PITCH B(N),DURATION D*A,RIGHT V,LEFT V,SOURCE 0,ENVELOPE 1,SYNC 1
462 IF (RND*100)<66 THEN LET L=L+0.5
463 SOUND PITCH B(N+2),DURATION D*A,RIGHT VL*L,LEFT VL*L,SOURCE 1,SYNC 1
470 LET N=N-1
480 IF N>0 THEN GOTO 490
482 LET X=S:LET Z=0:LET N=N+1
490 NEXT X
500 IF Z=0 THEN GOTO 300
510 GOTO 260
```


ing sequence" routine at 420. Unpredictable things, computers! However, the results are quite pleasant, and envelope shaping gives the music a decidedly oriental flavour.

The main Sound command is line 340, in the rising sequence loop, and its identical twin in the falling sequence loop is line 460.

The Pitch of the note is given by B(N), and is one of the values extracted from the pitch table in Data lines 155-175. The program is not set to use the low-sounding notes on Data line 150, though they could be used if Restore 155 were to be changed to Restore 150. The pitch values in Data line 180 are used in association with a simple chord mechanism.

The Duration of the note is set to 15 in line 40, but is modified in the Sound statement by multiplying it by A, where A is randomly set to 1, 1.5, or 2.

The Volume is set to V, which is 100, by the Right and left statements.

Source 0 is the channel used for the main melody, playing a note on every pass of the loop.

Envelope 1 modifies the Source 1 sound. The envelope itself is formed in line 30, and the values there provide the eastern emphasis. Envelope 255 is the default envelope, and can be used to westernise the sound if you don't like envelope 1.

Sync 1 is there to remind sound source 1 that it must wait to synchronise with the other sound source providing the chord option.

The chord note is sounded by lines 343 and 463. These lines make available a note which is two or three sharps higher than the melody note, thus providing the means of forming a simple chord. This, however, is not sounded on every note, but only on occasions which are determined by the random factor of lines 342 and 462.

No envelope statement is present, so the note has a different texture. When a chord is not required (which is 66 per cent of the time) L is set to zero rather than 1, and the chord-note is

thus turned off.

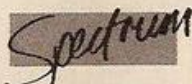
Adjustments can be made to the envelope shape and to the gap between the chord-notes but care is needed here, since +6 in Pitch B(N+6) is too wide a gap and will cause the program to run off the end of the B(N) array! Most of the values in line 40 can be altered, but T cannot exceed 15 unless the B(N) array is extended by a corresponding amount, and that, of course, cannot be done unless more sharps are entered into the data table lines 150-180.

The value of Q represents the maximum range that the notes can run in the rising/falling sequence routines and again, this value can't be too large or else the program will run out of data.

Finally, if you haven't got an Enterprise, this program will convert easily to other micros provided the pitch values are adjusted. The user handbooks will give the values for sharps — they may be called pitch, frequency or period values depending on the style favoured by the writers.

Sound effects

Kai Weber,
Reading,
Berkshire.



ONCE OF THE better features of the now defunct Dragon was its Play command which allowed the user to simply enter music as a string rather than lots of confusing numbers as with the Spectrum's Beep command. The program I have written for the 48K Spectrum imitates the Play command but instead of using the Rom subroutine to produce the notes, it makes use of a clever piece of machine code which generates music more like that heard on a Commodore 64 or BBC micro, greatly enhancing any program by giving it that professional touch.

The program is written entirely in machine code, but the hex is held in Basic Data statements so that it can easily be Merged with any of your programs.

To use the routine, start by carefully typing in listing 1, taking extra care with the hexadecimal in the Data statements. Before saving the program to tape or Microdrive, Run it so the computer can check that the numbers match with its checksum.

Once it has been successfully Saved and Verified, clear the Basic program by typing New — do not use Print USR 0. The machine code is stored out of harm's way above RAMtop.

In order to store the notes to be played, the routine reserves a string variable, namely T\$. Each time you want the computer to scan T\$ and play the notes held within, you should enter:
RANDOMIZE USR 65070

The note generator has a range of three octaves and for the sake of argument I shall refer to them as upper, middle and lower. When called, the routine scans the contents of T\$ one character at a time and depending on the character it finds it will act accordingly:

1. Characters in the range A to G — must be upper case — will cause the corresponding notes to be played. If the letter is followed by a hash symbol, the note will be played as a sharp and similarly if it is followed by a lower case b then the note will be played as a flat.

2. The characters 1, 2 and 3 are used to change octave. Character 1 will change the current octave to upper, 2 changes to middle and 3 changes to

Listing 1.

```
9900 CLEAR 65068: LET CHECK=0: L
ET X=65069: FOR N=1 TO 4: READ A
9910 FOR F=1 TO LEN A$ STEP 2: L
ET H$=A$(F TO F+1)
9920 LET Y=CODE H$-48: LET Y=Y-
7 AND Y>9: LET Z=CODE H$(2)-48:
LET Z=Z-7 AND Z>9
9930 POKE X,Y*16+Z: LET CHECK=CH
ECK+Y*16+Z
9940 LET X=X+1: NEXT F: NEXT N
9950 IF CHECK<>30299 THEN PRINT
"ERROR IN HEX DATA - PLEASE CHEC
K": STOP
9960 DATA "002A5D5C5E52154FF225D5
CDB228DA700523423463A2DFA7032
3CDB11FFCA07FF1115FF7ECBAFF646200
9970A7F63D20FC03FAFEFE54200ECD10F
7CA07FF237E3257FFC3FAFEFE5200050
9980 DATA "AF08187EFE4FC287FE03F
0010818737FEFE313315FE343011D630C
5470E151100FF788110FD5FC11859FE4
13855FE483051D50541835FE37FEFE232
0073E07835F0B180BFE56220063E0E835
F"
9990 DATA "0B232BC5E5E565A1C050
03A57FF4F3A485C0F0F0FE607F3D3FE1
```

```
5200356EE101D20045E1CEE1010EF0D2
0ECFB08200378787808E1C1D1CDE41FD
2520523CD10FFC251FE08322DFEE1225
D"
9990 DATA "5CC9087950C900231F3B3
42E2C272100373100292525210037310
029463E76695E594F4200706400544A4
A4200706400548D7FE0D48EB29E5500E
0C800A95958500E0C800A854243D00"
```

Listing 2.

```
5 PRINT "AN ADAPTION OF 'FRER
E GUSTAV' FROM CHAPTER 19 OF T
HE OLD SPECTRUM MANUAL."
HEN THE TUNE HAS FINISHED, P
RESS 'C' TO REPEAT OR ANY OTHER
KEY TO QUIT."
10 LET A$="t"+CHR$ 126+"p2CDt"
+CHR$ 64+"dD1"+CHR$ 126+"C"
20 LET B$="d+fOGpG"
30 LET C$="t"+CHR$ 96+"Gt"+CHR$
32+"G#t"+CHR$ 64+"GFD#t"+CHR$
126+"C"
40 LET D$="C3G20CpC"
1000 LET t$=a$+a$+b$+b$+c$+c$+d$
+d$
1010 RANDOMIZE USR 65070: PAUSE
0: IF INKEY$="C" THEN GO TO 1010
1020 STOP
```

lower. If the character represents the current octave then no change is made. It should be noted that each time the routine is called, it will always start off in the upper octave.

3. The letter T — or t — is used to change the duration of each individual note. The code of the character following this letter is taken as the new duration and can therefore be in the range 0-255 thanks to a bit of string slicing.

Because of the way the CPU works, a value of 0 is equivalent to 255, 1 being the fastest possible. At the place where you want any following notes to have a duration of, say, 50, you should have something like this in the reserved variable, T\$: "T"+CHR\$ 50+"REST OF STRING"

This is the simplest way to specify a new duration — if you are unhappy with a duration of 50 you just change the number following the CHR\$ function either by editing the appropriate line or by using

```
LET T$(XX+1)=CHR$ new duration
where XX is the number of characters in T$ up to and including the letter T. The routine will remember the duration that was used last time it was called to save you having to keep using the T command — the first time it is called it takes the duration to be 0, the slowest.

```

4. The letter P — or p — will make the computer pause for a very short period of time after each note has been played.

5. The letter O — or o — will turn off the pause between notes described above. The computer will remember whether it was on or off from the previous time it was called — the first time the

routine is called the pause is on.

6. H — or h — will halt the computer for one fifth of a second whatever the status of the pause command described above. This command is, in effect, a manual pause and can be used to provide a lengthy gap between, say, two different tunes by placing lots of Hs together. Five Hs will pause for one second.

In addition to the above, pressing Break at any time will stop the routine with report D, Break — Cont repeats.

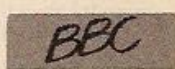
By specifying a very short duration with no pause between notes, much better sound effects can be generated than are possible using Beep. For example, try something like this:

```
LET T$="T"+CHR$ 5+"O3CDEFGAB2
CDEFGAB1CDEFGAB": RANDOMIZE
USR 65070
```

If you do not fancy typing in listings 1 and 2, I can supply them on cassette — just send a cheque for £1.50 to me at 25 Andrews Road, Earley, Reading, Berkshire RG6 2PJ.

Circus

A J Botham,
Lupset,
Wakefield.



BOUNCE THE flying clown on the end of the seesaw and catapult his colleague into the roof of the Big Top popping balloons as he goes. Achieve extra height by landing him close to the
(continued on next page)

(continued from previous page)

and but be careful, miss the seesaw altogether and loss life is inevitable. Points are awarded per balloon with a bonus for the completion of a line. Lives are restricted to three but an extra one can be obtained by accumulating more than 5,000 points.

The seesaw can be controlled by either joystick or keyboard the keys being Delete to move left, Copy to move right and Ctrl to turn the seesaw around.

Circus should be entered as follows. First type in program 1 and Save it as "CIRCUS". This sets up the user-defined characters and displays a title page while loading. Next type in program 2 and Save immediately after program 1 as "Circus". In future when the first program is chained, program 2 will be chained automatically.

For disc users, program 2 is too long to run

due to the lack of memory in Mode 2. This problem can be overcome by adding an extra line to program 1 as follows:

55 PAGE=&1200

The programs can then be saved as before.

Although Circus is written entirely in Basic the game runs extremely quickly. This is due to the use of structured programming techniques as well as extensive use of the GCOL 3,X command and string handling functions for smooth flicker-free graphics. Full use is made of the BBC's Sound and Envelope commands to provide some realistic sound effects which merge nicely with the animated graphics. A hall of fame is included which makes excellent use of Mode 7 as does the title page. Here is a brief explanation of the program.

Each line of balloons is held as a string. This makes life easy by allowing the use of the Left\$

and Right\$ functions for scrolling the balloons. When a balloon is burst, the Mid\$ function is used to place a space in the required position. A count of the number of balloons burst in each line is kept so that a new line of balloons can be produced upon completion of the line.

As the clown flies through the air his path is governed by the equation $Y=mx^2$ where m is a constant. The height reached by the man can therefore be varied by changing the value of m .

The GCOL 3,X command is used for speed and for its ease of use. When the character is printed, the foreground colour to be used, X, is exclusively-Ored with the colour already there. One of the advantages of this method is that the character can then be deleted by printing again with the same foreground colour in the same place. This method is also used when moving the seesaw.

Listing 1.

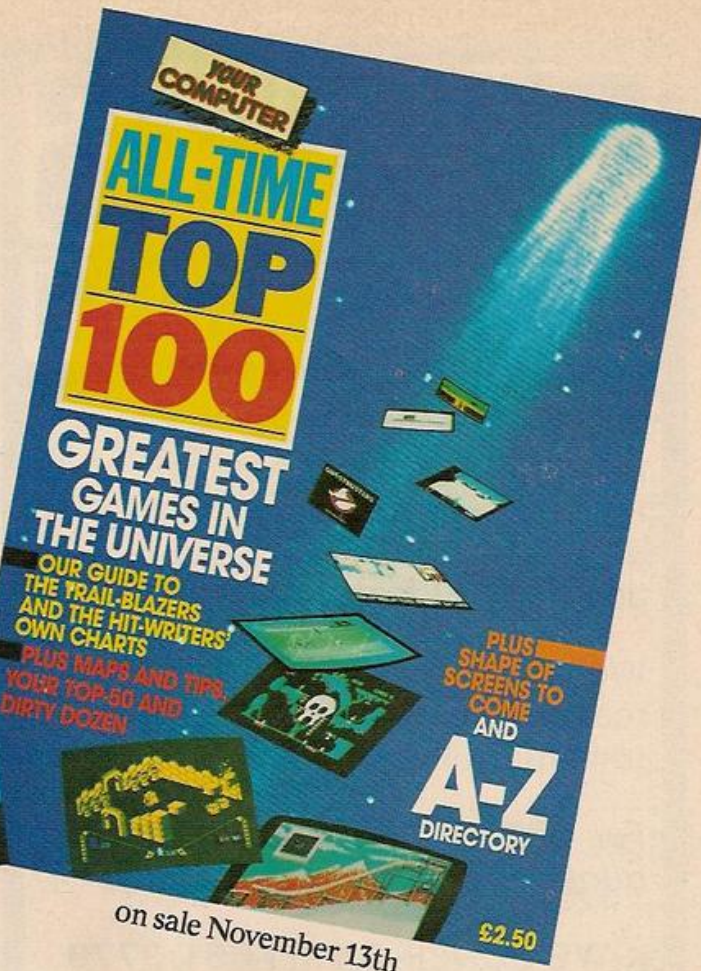
```
10 *TV255
20 PROCdefine
30 MODE7
40 VDU23:8202:0:0:0:
50 PROCtitle
60 *OPT 1,0
70 CHAIN"Circus"
80 END
90 DEFPROCdefine
100 FOR CHAR#224 TO 243
110 READ A,B,C,D,E,F,G,H
120 VDU23,CHAR#,A,B,C,D,E,F,G,H
130 NEXT
140 ENDPROC
150 DEFPROCtitle
160 FOR I#1 TO 2:PRINTCHR#129:CHR#157:CHR#131:CHR#1
41:TAB(17):"CIRCUS":NEXT
170 PRINT"CHR#134:" Scoring "-"TAB(19)"per":TAB(29
):"complete"
180 PRINTCHR#134:TAB(17)"balloon":TAB(31)"line"
190 PRINTCHR#133:TAB(5):"RED":CHR#135:TAB(13):"-"C
HR#130:TAB(17):"50 Pts":CHR#129:CHR#136:TAB(29):"200 P
ts"
200 PRINTCHR#131:TAB(5):"YELLOW":CHR#135:TAB(13):"
-":CHR#130:TAB(17):"30 Pts":CHR#129:CHR#136:TAB(29):"10
0 Pts"
210 PRINTCHR#134:TAB(5):"BLUE":CHR#135:TAB(13):"
-":CHR#130:TAB(17):"10 Pts":CHR#129:CHR#136:TAB(29):"100
Pts"
220 PRINTCHR#134:TAB(5):"extra life for 5000 Pts"
230 PRINTCHR#134:" Use joystick or keys "-"
240 PRINTCHR#130:TAB(6)"DELETE":CHR#135:TAB(14):"
-":CHR#133:TAB(17):"Move seesaw left"
250 PRINTCHR#130:TAB(6)"COPY":CHR#135:TAB(14):"
-":CHR#133:TAB(17):"Move seesaw right"
260 PRINTCHR#130:TAB(6)"CTRL":CHR#135:TAB(14):"
-":CHR#133:TAB(17):"Swap seesaw over"
270 PRINTCHR#131" loading main program - please wa
it"
280 PRINTCHR#129:CHR#157:CHR#135:TAB(13):"by A.J.B
otham"
290 ENDPROC
300 DATA112,248,248,252,252,126,50,0,255,255,255,0,0
,255,255,255
310 DATA 56,56,18,20,16,40,71,124,0,0,0,3,60,192,0
,0,0,15,248,24,60,126,0,3,60,192,0,0,0,62,192,0,0
,0,0,0,0
320 DATA 124,3,0,0,0,0,0,0,192,60,3,0,0,0,0,0,0,0
,240,31,24,60,126,0,0,0,192,60,3,0,28,72,56,8,20,2
6,62
330 DATA 28,28,0,127,8,20,34,65,28,28,72,62,9,116,2
,1,28,9,62,72,23,32,64
340 DATA 0,3,1,1,1,1,221,255,220,56,56,16,17,40,68
,102,3,1,221,255,220,127,0,0,28,28,0,62,200,20,34,51,0
,0,0,0,255,0,0,0
```

Listing 2.

```
10 *TV255
20 *FX19
30 *FX11,0
40 VDU5:PROCsetup1
50 REPEAT
60 MODE7:PROCtable
70 MODE2:SC#0:GO#2:EXTRA#FALSE
80 VDU23:8202:0:0:0:
90 PROCsetup2:PROClives:PROCscore
100 REPEAT
110 PROCinit:PROCmove:PROCpause(100)
120 REPEAT
130 FOR X#-9 TO 10
140 BOON#BOON#1:IF JOY# PROCseesaw2 ELSE PROCseesaw1
150 PROCcan:IF JOY# PROCseesaw2 ELSE PROCseesaw1
160 PROCpause(T#):IF JOY# PROCseesaw2 ELSE PROCseesaw
w1
170 IF BOON#5 PROCballoon:BOON#0
180 IF JOY# PROCseesaw2 ELSE PROCseesaw1
190 NEXT
200 T#T#1:IF T#>20 T#T#-1:T#0
210 IF RAMP#SEE# PROCcheck1 ELSE PROCcheck2
220 UNTIL DIEX#TRUE
230 PROCplat
240 UNTIL GO#0
250 VDU4:COLOUR 6:PRINTTAB(5,15)"GAME OVER":PROCpau
se(200)
```

```
260 IF SC#HI#(7) MODE5:PROCover
270 UNTIL FALSE
280 END
290 DEFPROCsetup1
300 ENVELOPE 1,5, 2,1,1, 1,1,1, 121,-10,-5,-2,120,12
0
310 ENVELOPE 2,1, 10,0,-5, 2,1,4, 127,-100,-5,-3,126
,126
320 ENVELOPE 3,2, 0,0,0, 1,1,1, 120,-10,0,-10,120,12
0
330 ENVELOPE 4,6, 2,-4,1, 1,1,1, 60,-1,0,-5,120,110
340 AS#""FOR BAL#1 TO 20:AS#AS+CHR#224:NEXT BAL#
350 DIM BS(3),B#(3)
360 SEE#CHR#226+CHR#227+CHR#228+CHR#229+CHR#230
370 SAW#CHR#231+CHR#232+CHR#233+CHR#234+CHR#235
380 STRET#CHR#240+CHR#243+CHR#242
390 STRET#CHR#240+CHR#241+CHR#242
400 DIM MAN#(2),H#(8),H#(8)
410 FOR AX#0 TO 7:H#(AX)=500:H#(AX)=""ADCOMSOFT
:NEXT AX
420 MAN#(0)=CHR#236:MAN#(1)=CHR#(237):MAN#(2)=CHR#23
6
430 ENDPROC
440 DEFPROCsetup2
450 VDU19,1,7:0:19,4,7:0:19,9,5:0:19,14,7:0:
460 FOR AX#1 TO 3:B#(AX)=20:B#(AX)=AS:NEXT
470 ENDPROC
480 DEFPROCinit
490 DISK#480:RAMP#SEE#H#0:V#96:LEAP#2:MAN#0:DI
RX#1:BOON#4:DIEX#FALSE:T#0:T#10
500 VDU4:COLOUR 2:FOR I#0 TO 19:PRINTTAB(I,30):CHR
#225:NEXT VDU5
510 GCOL 3,7:MOVE DISK,96:PRINTRAMP#
520 MOVE H#,V#:PRINTMAN#(MAN#)
530 ENDPROC
540 DEFPROCpause(T#)
550 TIME#0
560 REPEAT:UNTIL TIME#T#
570 ENDPROC
580 DEFPROCballoon
590 BAL#LEFT#(BS(1),1):B#(1)=RIGHT#(B#(1),19)+BAL#
600 BAL#LEFT#(BS(2),19):B#(2)=RIGHT#(B#(2),1)+BAL#
610 BAL#LEFT#(BS(3),1):B#(3)=RIGHT#(B#(3),19)+BAL#
620 IF V#>896 MOVE H#,V#:PRINTMAN#(MAN#)
630 PROCmove
640 IF V#>896 MOVE H#,V#:PRINTMAN#(MAN#)
650 ENDPROC
660 DEFPROCseesaw1
670 IF (NOT INKEY-90) AND (NOT INKEY-106) AND (NOT I
NKEY-2):ENDPROC
680 MOVE DISK,96:PRINTRAMP#
690 IF INKEY-2 AND RAMP#SEE# RAMP#SAW# ELSE IF INK
EY-2 AND RAMP#SAW# RAMP#SEE#
700 DISK#DISK+24:(INKEY-90 AND DISK#0)-24:(INKEY-106
AND DISK#960)
710 MOVE DISK,96:PRINTRAMP#
720 ENDPROC
730 DEFPROCseesaw2
740 JS#ADVAL(0) AND 3:K#ADVAL(1)
750 IF J#0 AND K#52000 AND K#12000 ENDPROC
760 MOVE DISK,96:PRINTRAMP#
770 IF J#1 AND RAMP#SEE# RAMP#SAW# ELSE IF J#1 A
ND RAMP#SAW# RAMP#SEE#
780 DISK#DISK+24:(K#52000 AND DISK#0)-24:(K#12000
AND DISK#960)
790 MOVE DISK,96:PRINTRAMP#
800 ENDPROC
810 DEFPROCman
820 MOVE H#,V#:PRINT MAN#(MAN#)
830 IF LEAP#1 PROCjump(8,96) ELSE IF LEAP#2 PROCju
mp(8,64) ELSE IF LEAP#3 PROCjump(8,32)
840 MAN#MAN#+1:IFMAN#3 MAN#0
850 IF (POINT(H#32,V#)<0 AND POINT(H#32,V#)>7) P
ROCpop(H#32,V#) ELSE IF (POINT(H#32,V#-32)<0 AND PO
INT(H#32,V#-32)>7) PROCpop(H#32,V#-32) ELSE IF (POI
NT(H#32,V#-16)<0 AND POINT(H#32,V#-16)>7) PROCpop(
H#32,V#-16)
860 MOVE H#,V#:PRINTMAN#(MAN#)
870 ENDPROC
880 DEFPROCjump(Z)
890 Y#INT(Z*(100-(X#X#)))+96
900 H#H#+(47*DIR#):V#Y#
910 IF H#1216 H#H#-45:DIR#-DIR# ELSE IF H#0 H#H#
X#45:DIR#-DIR#
920 ENDPROC
930 DEFPROCcheck1
940 DIF#H#-DISK
950 IF DIF#<=96 OR DIF#>200 DIEX#TRUE:ENDPROC ELSE
LEAP#1-(DIF#<224)-(DIF#<160)
960 MOVE H#,V#:PRINTMAN#(MAN#)
970 MOVE DISK,96:PRINTRAMP#
980 RAMP#SAW# RAMP#DISK
990 SOUND 111,1,0,30
1000 MOVE DISK,96:PRINTRAMP#
1010 MOVE H#,V#:PRINTMAN#(MAN#)
1020 IF DIR#-1 DIR#1
1030 ENDPROC
1040 DEFPROCcheck2
1050 DIF#H#-DISK
1060 IF DIF#>=32 OR DIF#>160 DIEX#TRUE:ENDPROC ELSE
LEAP#3-(DIF#>96)-(DIF#>32)
1070 MOVE H#,V#:PRINTMAN#(MAN#)
```

```
1080 MOVE DISK,96:PRINTRAMP#
1090 RAMP#SEE#H#DISK#256
1100 MOVE H#,V#:PRINTMAN#(MAN#)
1110 MOVE DISK,96:PRINTRAMP#
1120 SOUND 111,1,0,30
1130 IF DIR#1 DIR#-1
1140 ENDPROC
1150 DEFPROCplat
1160 MOVE DISK,96:PRINTRAMP#
1170 MOVE H#,V#:PRINTMAN#(MAN#)
1180 MOVE H#,V#:PRINTCHR#239
1190 SOUND 0,4,7,10:PROCpause(120)
1200 DIEX#FALSE
1210 *FX21,5
1220 SOUND 113,-10,130,10:FOR T#1 TO 5:SOUND 3,-10,95
,10:SOUND 3,-10,130,10:NEXT
1230 IF H#192 FOR ST#0 TO (H#-192) STEP 12:MOVE ST#
,96:PRINTSTRET#1:MOVE ST#,96:PRINTSTRET#1:NEXT
1240 MOVE H#,V#:PRINTCHR#239
1250 FOR ST#(H#-192) TO 1088 STEP 12:MOVE ST#,96:PRI
NTSTRET#2:MOVE ST#,96:PRINTSTRET#2:NEXT
1260 *FX21,0
1270 GO#GO#-1:PROClives:PROCscore
1280 ENDPROC
1290 DEFPROCpop(HORIZ#,VERT#)
1300 SOUND 111,2,253,50
1310 AX#(1024-VERT#) DIV 32
1320 SX#HORIZ# DIV 64+1
1330 B#(AX)=LEFT#(B#(AX),5#-1)+CHR#32+RIGHT#(B#(AX),2
0-5#)
1340 PROCvalue(AX):PROCnewline(AX):PROCscore:PROCmove
:X#X#
1350 ENDPROC
1360 DEFPROCvalue(AX)
1370 IF AX#1 SC#SC#50:ENDPROC
1380 IF AX#2 SC#SC#30:ENDPROC
1390 SC#SC#10:ENDPROC
1400 DEFPROCscore
1410 VDU4,30
1420 IF SC#>5000 AND EXTRA#FALSE EXTRA#TRUE:GO#GO
X#1:PROClives:SOUND 123,193,5
1430 COLOUR 7
1440 PRINT"SCORE":SC#TAB(15):STRING$(4-LEN(LIFE#),"
"):LIFE#
1450 VDU5
1460 ENDPROC
1470 DEFPROClives
1480 IF GO#<0 LIFE#="" ELSE LIFE#=""FOR LX#1 TO
GO#LIFE#LIFE#CHR#236:NEXT
1490 ENDPROC
1500 DEFPROCnewline(AX)
1510 B#(AX)=B#(AX)-1
1520 IF B#(AX)<0 ENDPROC
1530 B#(AX)=AS:B#(AX)=20
1540 IF AX#1 SC#SC#200
1550 IF AX#2 SC#SC#100
1560 IF AX#3 SC#SC#100
1570 ENDPROC
1580 DEFPROCmove
1590 VDU4,30,10
1600 COLOUR 9:PRINTB#(1);
1610 COLOUR 3:PRINTB#(2);
1620 COLOUR 6:PRINTB#(3);
1630 VDU5
1640 ENDPROC
1650 DEFPROCcover
1660 PROCcenter
1670 H#(8)=SC#H#(8)=NAME#
1680 FOR G#7 TO 0 STEP -1:IF H#(G#)<H#(G#+1) D#H#
H#(G#):H#(G#)=H#(G#+1):H#(G#+1)=D#D#H#(G#):H#(G
#+1)=H#(G#+1):H#(G#+1)=D#
1690 NEXT G#
1700 ENDPROC
1710 DEFPROCcenter
1720 NAME#=""
1730 CLS:VDU17,2:PRINT"" YOUR SCORE IS ONE":VDU17,
3:PRINT"" OF THE TOP EIGHT":VDU17,2:PRINT"" ENTER
YOUR NAME"
1740 VDU28,2,16,14,17,129,12:PRINT""
1750 CHAR#1:REPEAT:G#ASC(GET#):IF G#13 CHAR#16 ELSE
IF G#127 AND CHAR#1=CHAR#1:NAME#LEFT$(NAME#,
CHAR#1):VDUG ELSE VDUG:CHAR#CHAR#+1:NAME#NAME#+CHR#
(G)
1760 UNTIL CHAR#15
1770 VDU26,17,131,17,1:PRINTTAB(5,23)"PRESS SPACE":R
EPEAT UNTIL GET#
1780 ENDPROC
1790 DEFPROCtable
1800 VDU23:8202:0:0:0:
1810 FOR I#1 TO 2:PRINTCHR#129:CHR#157:CHR#131:CHR#1
41:TAB(10):"CIRCUS HIGH SCORES":NEXT
1820 PRINT"FOR I#1 TO 2:PRINTCHR#134:CHR#141:TAB(12)
:Today's greatest":NEXT
1830 FOR I#1 TO 8
1840 PRINT"":CHR#130:I:CHR#135:"":H#(I-1):TAB(
15):"":CHR#131:H#(I-1)
1850 NEXT
1860 PRINT"TAB(4):CHR#134:CHR#136:"Press SPACE or FI
R"
1870 REPEAT AX#ADVAL(0):UNTIL AX#1 OR INKEY-99
1880 IF AX#1 JOY#TRUE ELSE JOY#FALSE
1890 ENDPROC
```

Keep them close to your joystick this winter.

Joysticks and keyboards love a challenge on long cold nights, and that's when these two books will come in very handy. They're both written by the same people who've made *Your Computer* the country's most popular home computer magazine and they're packed with programs and games that will test even the toughest joystick or keyboard.

'Spectrum Greats' is on sale first. It's a collection of the best listings ever published in *Your Computer* for the Sinclair Spectrum — 15 of the best games, graphics, music and utility programs. Each clearly reproduced with explanatory text and a picture. It's bound in a specially laminated cover so the book will still look good after months of use.

The 'All Time Top 100 Games' is a comprehensive reference guide to the most popular commercial software ever released for all the best selling machines. As well as the Top 100 Games, this definitive guide for games players has tips on adventure playing, an A-Z directory of hundreds of games not in the top 100 and the top 20 choices of the professional authors themselves. Plus a reader top 50, games maps, features on flight simulators and telegaming, and the worst games ever.

Each of these books is on sale in good booksellers from the dates shown. Or you can order your copy direct from us by completing the coupon below or calling in at our trade counter, 5 Sumner Street, London SE1.

Please send me _____ copy/ies of 'Spectrum Greats' at £2.70 each inc. p&p.

Please send me _____ copy/ies of the 'All Time Top 100 Games' at £2.70 each inc. p&p.

Name _____

Address _____

Return this coupon to The Cashier, Room 1605, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Enclose a cheque or postal order payable to Business Press International Ltd.

Company registered No 151537 (England)
Registered Office: Quadrant House,
The Quadrant, Sutton, Surrey SM2 5AS.

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.

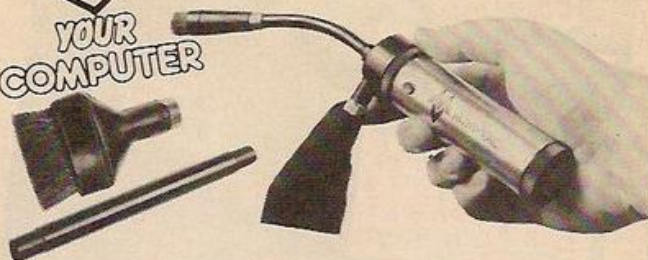
We offer an excellent reasonably priced service, (minimum order 250 copies).

For further details and a quotation contact:

KAYE JONES ON 01-661 3779

**SPECIAL
OFFER**
from

**YOUR
COMPUTER**



BEAT THE DUST PROBLEM

The Mini-Vac is a vacuum cleaner in miniature. It fits in the hand and comprises a chrome plated metal body, which contains a surprisingly powerful motor driven by a PP3 size battery (not included). There is a choice of two tubular nozzles on which can be fitted a large or a small soft bristle brush and a dust collection bag with Velcro flap for emptying. When used as a vacuum cleaner it was found to be ideal for dust removal from the inside of computers and peripherals, or around keyboard and screens. By removing the dust bag and putting one of the nozzles in its place it can also be used for blowing.

Has many other uses: for blowing or removing dust from stereo and video equipment, cameras, lenses and enlargers.

OFFER PRICE £8.99 incl. 15% Vat and UK p&p

Order from: Your Computer Mini-Vac Offer, 48 Beauchamp Place, London SW3 1NX using coupon or copy or plain paper. Allow up to 28 days for delivery. UK addresses only. Closing date 31.12.85. Cheques should be made payable to Your Computer Offers. If Vat receipt is required, it is essential to say so when ordering.

Coupon to: YC Mini-Vac Offer, 40 Beauchamp Place, London SW3 1NX.
Please send Mini-Vacs @ £8.99. Cheque enclosed £.....

Name

Address

Postcode

85/183

BUSINESS PRESS INTERNATIONAL LTD.

Registered in England No. 151637. Regd Office: Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Special Reader Offer!

£17.95
INCLUDES POST,
PACKING &
VAT

...the Duraplug
Mains Filter
Adaptor...

The Duraplug Mains Filter Adaptor is an essential, yet inexpensive, item for any user of sensitive electronic equipment in the office or home. Plugged into an ordinary wall socket it provides adequate protection against distortions in the mains supply, 'laundering' noise and spikes out of the current and preventing digital circuits from misbehaving.

...the end of the
line for spikes!

To: Your Computer Offer, Room 807, Quadrant House, Sutton, Surrey SM2 5AS

Please send me the following:

Quantity.....Duraplug Mains Filter Adaptor(s) @ £17.95 each incl. p&p and VAT.

I enclose my cheque value £..... made payable to YOUR COMPUTER OFFER.

NAME

ADDRESS



Don't miss it! The first-ever show to be devoted to the most talked about micros of 1985!

LOOK WHAT'S WAITING FOR YOU...

★ **SEE** – and try out for yourself – the whole range of Amstrad computers, including the latest CPC6128 and PCW8256.

★ **TALK** to some of Britain's leading Amstrad experts, who'll be on hand throughout the show giving free advice on hardware and software problems.

★ **DISCOVER** for yourself the latest exciting ways of linking your Amstrad to the outside world – including a satellite hook-up to a giant American database.

★ **BE AMONG** the first to see the fantastic collection of new-season products that users everywhere will be raving about between now and Christmas.

★ **CASH IN** on the biggest bargains ever offered for Amstrad hardware and software – never before have users been presented with such a wide range of money-saving offers.

How to get there

BY TUBE: Hammersmith station.
(District, Piccadilly & Metropolitan lines).

BY BUS: Bus station opposite the Novotel.
(Frequent services from Central London).

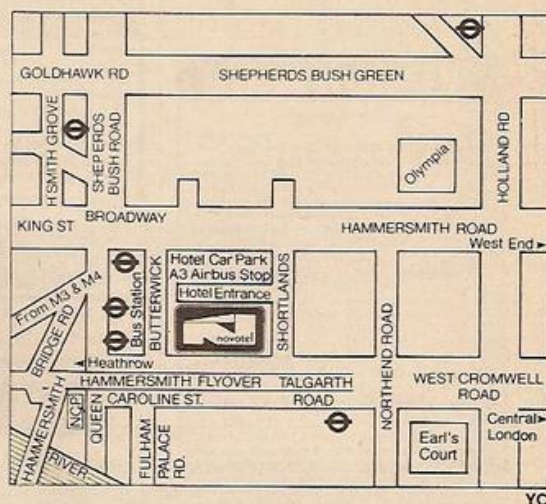
BY CAR: Make for the Hammersmith Flyover (A4/M4).
(Extensive car parking within easy reach).

AMSTRAD COMPUTER SHOW

An independent show organised by Database Publications with the cooperation of the two leading Amstrad magazines – *Amstrad User* and *Computing with the Amstrad*.

Novotel Exhibition Centre
Hammersmith, London W6

**Saturday-Sunday,
October 5-6, 1985**



Additional vouchers can be obtained by sending a stamped addressed envelope to:

Amstrad Computer Show
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY
Tel: 061-456 8500

**This
voucher
is worth
50p
per head!**

AMSTRAD COMPUTER SHOW

By handing in this voucher at the door you save 50p off the normal admission price of £2 (adults) and £1.50 (children).
(Valid for a maximum of 4 people)

10am-6pm Saturday, October 5, 1985
10am-6pm Sunday, October 6, 1985

**Novotel Exhibition Centre,
Hammersmith, London W6**

(Nearest tube: Hammersmith)

Number attending: 1 2 3 4

YOUR COMPUTER CLASSIFIED

01- 661 3036

Contact: Lorraine Black

ADVERTISEMENT RATES

Copy Date September 30

Lineage: 60p per word

(Min 20 words)

Box No: £7.00 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.

RATES QUOTED BELOW ARE SUBJECT TO THE ADDITION OF 15% VAT.

Display — rates per scc (Min. 2scc)

One insertion	:	£10.00
Three insertions	:	£9.70
Six insertions	:	£9.50
Twelve insertions	:	£9.00
Display advertisers should preferably reserve space by phone.		

Closing date for Classified advertisements is the 30th Sept. for the Nov. issue.

Post to

Your Computer, Classified
Department, Room H211,
Quadrant House, The Quadrant,
Sutton, Surrey SM2 5AS.

Britain's Biggest Selling Home Computer Magazine

WHY NOT

let your microcomputer earn you money? Your hobby can provide the key to a fabulous income, full or part time. Expert manual explains how you can use your microcomputer to set up your own business from home with little capital. Send today for your copy of "Make Money with your Microcomputer" £10 incl. p&p (U.K. only) or for free details to:

Enterprise Books (YC)
12 Felstead Road,
Waltham Cross, Herts.
EN8 7HB.
Money back if not satisfied.

DUST COVERS SETS FOR AMSTRAD CPC 464/664 £6.95

*Matching proofed nylon, treated with anti-static inhibitor. Green/Blue piping on monitor cover; AMSTRAD CPC on keyboard cover.
*Please state model, colour or mono.

Cover for Tatung-Einstein £7.50

Proofed pale grey nylon piped in black with name on keyboard.

Cover for other computers

Matching proofed nylon with toning piping and name on keyboard: BBC, DRAGON, £4.95, COMMODORE, GOLDSTAR, SANYO, SONY, TOSHIBA £3.95. In black but unpiped: SPECTRUM plus £2.50, QL £2.95.

Matching covers for Printers

Amstrad DMP-1, Canon PW 1080A, Commodore MPS 801, Epson FX-80, RX-80, Mannesmann MT-80, Panther DX 109 Shinwa CP-80, CPA-80, Seikosha 500, Takan KP810 £3.95, Brother HRS £3.50 and Juki 6100 at £4.50.

*48 Hour Turn-Round 1st Class Postage.
*ALSO AVAILABLE: Monitor, disc drives etc. and good range of Business Computer covers eg IBM-PC, Apricot, Macintosh, Olivetti M-24.

BBD COMPUTER DUST COVERS

39 MANSE AVENUE
WRIGHTINGTON WN6 9RP
Telephone 0257-422968

TRADE ENQUIRIES WELCOME

ASTROLOGY for beginners only £11.50

A Starter Pack comprising a simple program to calculate a horoscope, an introductory booklet & 2 self-teaching programs (how to interpret the horoscope).

No previous knowledge required

Spectrum, BBC/Electron, Oric, Dragon, Tandy/Genie, Commodore 64/PET, Atari Sharp, Amstrad/Schneider, Colour Genie.

Many more programs for experienced astrologers also other micros, CP/M and MSDOS. Deze programma's zijn thans in Nederlandstalige versies verkrijgbaar voor Spectrum & Commodore 64. Vraag Documentatie! Cash with order (add 50p outside UK) or large sae for free catalogue to:

ASTROCALC (Dept YC)

67 Peascroft Road,
Hemel Hempstead,
Herts. HP3 8ER.
Tel: 0442 51809

SOFTWARE AT EXPLOSIVE PRICES!

SAVE UP TO 50% OFF MANUFACTURERS' RECOMMENDED RETAIL PRICES! Many of the top cassette based titles for all popular makes of computers are on offer—with a full money back guarantee if not highly delighted.

Please rush me your FREE descriptive software catalogue.

Make of Computer _____

Name _____

Address _____

PHILIPS & PHILIPS CO LTD
Scriptomatic House, Torrington Park, Finchley,
London N12 9QU Telephone 01 446 5648

SEND FOR FREE DESCRIPTIVE SOFTWARE CATALOGUE

PROFESSIONAL REPAIRS

The complete Sinclair service centre

ZX-81	£13.95
ZX 16K RAM	£13.95
ZX Interface 2	£13.95
ZX Interface 1	£17.95
ZX Microdrive	£17.95
ZX Spectrum	£17.95
ZX Printer	£17.95
Sinclair QL	P.O.A.
16K to 48K Upgrade	£26.95

Also BBC, C64, ORIC, DRAGON, ATARI & AMSTRAD
Ring 0234-213645

* Av 3-4 day turnaround * 6 month warranty

* All inclusive price * Free estimates

ZEDEEM COMPUTERS LTD

2 Kimbolton Road, Bedford,

MSK40 2NR.

(Trade and overseas enquiries welcome).

CASSETTE FOR CBM 64 £15. Misc games for 64 and VIC. Duplicator for same computers £21. Wigan 225029 also games exchanged.

Spectrum Repairs

£16.95 inclusive of labour, parts, p&p etc. ZX81 for £11. Fast reliable service. (Av. repair 24 hrs) by qualified engineers. Send computer only to:

HS COMPUTER SERVICES
2 The Orchard, Warton, Preston, Lancs.
PR 1BE. Tel: 0772 632686

MICRODRIVE SOLVED

The Microdrive is without doubt an economical & practical solution to high speed loading of your progs & games. Unfortunately Sinclair does not help with the many problems. ZX-GUARANTEED has a range of tapes etc, plus the international postal Microdrive-Exchange Newsletters to solve vast majority of problems. A 13p stamp/international coupon brings you a list of all items.

ZX-GUARANTEED (Dept YC)
29 Chadderton Drive, Unsworth,
Bury, Lancs, BL9 8NL
Tel: 061-766 5712

ZX SPECTRUM REPAIRS

CHECK THESE FACTS

1. FAST RELIABLE SERVICE

2. QUALIFIED STAFF

3. 3 MONTH GUARANTEE

++ FREE POSTER ++

Send your machine only

Plus a cheque/PO for £19.95

To: MICROTRIX
24 Gr. Moor St. Bolton, BL1 1NP
Tel. 0204 398176

WDSOFTWARE

FOR THE QL

Utilities (3rd ed) (base £5.50)
PRINT 60 file directory or view it on screen, one-key LOAD, COPY or PRINT 60 files with one key (allows for namesakes). Multiple FORMATTing to prevent corrupting by stretching of tape. TOOLkit to give dated, numbered modules in program development. PRUNE old files to release space (one key DELETES a file). Full instructions in QJLL file. Use up to 6 EXTRA MICRODRIVES (add on your Spectrum ones!)

WD Utilities for CST Q-Discs (2nd ed) (base £8)
As above, with extra utilities: 100-file capacity, for CST/Computamate disc systems AND up to four extra microdrives. User-friendly timesavers. Update 1st ed for 25p (£1.25 outside Europe).

Ref QL (5th ed) (base £5)
900 useful QL references in an ARCHIVE file (too long to share cartridge with other software). Also ARCHIVE 2 search program.

FOR SPECTRUM/QL/BBC/ELECTRON

WD Morse Tutor (base £4)
From absolute beginner to beyond RYA and Amateur Radio receiving. Adjust pitch. Set speed to your test level (4-18 wpm). Learn from single characters, via groups with wide spaces to random sentences; decrease spacing to normal. Write down what you hear, then CHECK on Screen or Printer (for speech for Spectrum with Currah Microspeech). Also own message, random figures, letters or mixed.

FOR SPECTRUM 48K

WordFinder (microdrive/disc only) (base £8)
For CHEATING at crosswords. Finds m-45-g letters, solves anagrams of shingle words, 13,000 word vocabulary. 10-letter word ending in ATE? No problem!

Tradewind (base £4)
Sailing/trading strategy game with graphic surprises.

Jersey Quest (base £4)
Test adventure with Bergerac and the Dragon. Based on genuine folklore of the Island or Jersey. (Not on SPODS)

PRICES (incl. Europe postage — elsewhere add £1).

Cassettes — base price only: QL or Spectrum Microdrives —

£2 (cartridge plus base price: 5K* floppies £2, 3K* floppies

£4 plus base (SPODS/Intel/OPUS discs for Spectrum). State

required format when ordering. ACCESS/Mastercard welcome

lover £4).

Two or more programs on one medium — pay medium

+ base, e.g. WD Utilities and Morse on microdrive

for £11.50, but IMPOSSIBLE to mix QL/BBC/Spectrum

programs on one medium. Send YOUR cartridge and

base price, but FORMAT is FIRST six times like us for

reliability.

WDSOFTWARE (YC),
Hilltop, St Mary, Jersey

Tel: (0534) 81392 708

AMSTRAD 464

BINARY BANANA

MAGIC PEN

Fill or sketch and save to file.

Loaders allow position anywhere on screen, even half on. Loaders included £4.95

SYMBOL 464

Re-design your character set the easy way save to tape and/or Binary readout £3.95

BIG LETTERS

Can produce very large letters, pictures etc., with symbol 464 or standard a.s.c.i.i. character set. Loader program included £3.95.

LITTLE LETTERS

Ten to a file 9 colours in a sixteen by sixteen pixel letter or small picture, than enlarge X2-X4 loader programs supplied £3.50

THE ARTIST

Over 20 functions plus airbrush and Binary screen dump to tape. Includes text for titles etc. loader loads on screen while cassette runs £4.95.

DETAILS

Add a disk facility to your cassette system with this unique program. Now you can use C-60's or 90's. How did you ever manage without it? £2.95

Trade & export enquiries welcome.

Binary Banana c/o Pi Tec Ltd.
Park Crescent, Peterborough PE1 4BG.

IMPORT/EXPORT - TRADE ONLY

we stock all well-known brands all the time

HOME-COMPUTERS : Commodore, Atari, Spectrum, etc.

PERIPHERALS : printers, monitors, disk drives, etc.

ACCESSORIES : diskettes, joysticks, interfaces, ink-ribbons, etc.

and we are always looking for import/export connections.

IF YOU WANT TO SELL OR BUY, PLEASE CONTACT US

ECTRON
Handelmaatschappij b.v.

Kruiswaa 3 - 1161 AL Zwanenburg
Holland - telephone (31) 2907 7102
telex 10246 ectro nl

- MAXAM - FOR THE AMSTRAD

THE COMPLETE CODE DEVELOPMENT
SYSTEM FOR THE AMSTRAD CPC 464.

★ ASSEMBLER ★ MONITOR ★ TEXT EDITOR ★

"The Arnor system is the best editor/assembler to be released for the AMSTRAD so far" - PCN 100

"For flexibility and ease of use, ARNOR is easily the best I have seen" Pop. C. Wkly Vol 4 No 8

"assemblers.... look no further, ARNOR's is the best I have seen... by far the easiest to use and most friendly I have come across"

- Computing with the Amstrad. April 1985.

Now available in **ALL THREE** formats

Tape (only) £13.50

Disc £26.90.

16K ROM + multifunction adaptor £59.90

(All prices include VAT, p & p)

Cheques/POs to ARNOR Ltd Dept YC
PO Box 619, London SE25 6JL

-Overseas - no extra - Trade enq's welcome -

Make MAXimum use of your AMstrad

Hotline
01.653.1483

Technical
01.852.2174

FREE MEMBERSHIP

of F.U.G. (Feline User Group)



FOLLOW ME PLEASE

As a F.U.G. member you will be entitled to purchase supplies at **PREFERENTIAL TRADE PRICES** as and when required in any quantity.

Plus an **UNCONDITIONAL MONEY BACK GUARANTEE**

The following are just a sample of products that can be purchased by:-

F.U.G. MEMBERS ONLY.

Prices shown are inclusive of V.A.T. plus Postage & Packing.

CONTINUOUS PAPER

11 x 9 1/2 60 gms Micro-Perf.

500 sheets £ 5.00

1000 sheets £ 9.00

2000 sheets £16.00

FLOPPY DISKS

SS.SD 40 TRACK £1.11 each

SS.DD 40 TRACK £1.20 each

DS.DD 40 TRACK £1.25 each

SS.DD 80 TRACK £1.50 each

DS.DD 80 TRACK £1.65 each

Add 20% for orders of less than 10 units

Please enrol me as a F.U.G. member for one year **FREE OF CHARGE** (normal annual subscription £12.75) and send an up-to-date

PREFERENTIAL TRADE PRICE LIST plus my Membership Number



T. J. Services Co., 3 Beltona Gardens,
Cheshunt, Herts. EN8 0PA. Tel: 0992 20365

Name YC9

Address

.....

..... Tel. No.

Date.....Signature

SPECTRUM MACHINE CODE SYSTEM

ASSEMBLER, DIS-ASSEMBLER, TESTER/DEBUGGER, ON-LINE LEARNING AID with teach yourself machine code booklet.

Options include using microdrive, printer, hex or decimal numbers.
"A different approach giving a highly usable package... the most impressive part is the test/debug features... invaluable guide to the secrets of the Z80 (Spectrum CPU)" — PC Today July 85
"It seems to have absolutely everything you could possibly want for machine code... much care is taken in the manual in making the code as Basic-like as possible." — PC Weekly 21 Mar 85

Cassette £7.95, Microdrive Cartridge £9.75, Overseas + £1.
Orders with PO/cheque to ROYBOT, Dept. YC4, 45 Hullbridge Road, Rayleigh, Essex SS6 9NL. Write or tel: 0268 771663 for leaflets.

IMPROVE YOUR PROSPECTS

with skills that employers want — learn the easy way with modern home study courses from Ideal Schools.

MODERN ELECTRONICS

Train for success in the fastest ever growing industrial sector.

COMPUTER PROGRAMMING

The demand for Programmers is increasing constantly — don't miss out! For free booklet write today to



IDEAL SCHOOLS
(Ref. YC12)
60 St. Enoch Sq
Glasgow G1 1UK
Tel: 041-248 5200

AMSTRAD/ORIC-1/Atmos Software Club.
250+ Amstrad and 150+ Oric programs available. Send SAE stating computer. 26 Beechley Drive, Cardiff.

FREE MEMBERSHIP SOFTWARE HIRE

- VIC-20 • COMMODORE 64 •
- SPECTRUM •

SAE FOR YOUR HIRE KIT

VSH (YC), PO BOX 65,
NOTTINGHAM NG1.

PLEASE STATE MICRO

ORIC1 & ORIC ATMOS SOFTWARE OVER 100 TITLES AVAILABLE

ALL AT DISCOUNT PRICES. eg. (All Atmos compatible)
£4.50 Knyxis, Oric Munch, Super Advanced Breakout,
£4.95 Arena 3000, Kilburn Encounter, Skramble, Show Jumping, Waydor, Picture Book, Hangman etc.
£5.50 Cribbage, Frigate Commander, Super Fruit, £5.95 Chess II, Digger, Defence Force, Draculas Revenge, Elektrostorm, Galaxians, Harrier Attack, Hellion, Land Of Illusion, Ice Giant, M.A.R.C. Mr Wimpy, Panic, Rat Splat, Scuba Dive, Spooky Mansion, Super Meteors, Trouble In Store, Ultima Zone, Johnny Reb, Paras, Special Operations.
£8.50 Attack Cybermen, Backgammon, Chopper, Draughts, Ghost Gobbler, Invaders, Probe 3, Trickshot, Zebbia.
£6.95 Categorie, Classic Racing, Manic Miner, Space Shuttle, World Geography, 4 Games Children.
£7.50 Dambuster, Diabolical Tower, Fireflash, Don't Press Letter Q, Styx, Xenon, 1, Zorgons Rev.
£7.95 Don Juan, Trans Atl, Atmos Extended Basic, £11.50 Author, Account Book, Oric Calc, Oric Mon, Oric Forth, Oric Base, Orion Assembler/Disassembler, Dust Covers £2.95: On Off Reset Switch £4.50

ATMOS MCP 40 PRINTER £79.95
Incl cable. CH/PO's to:
O.J. SOFTWARE
(Prices Incl U.K. P&P)
273 Mossy Lea Rd, Wroughton
Wigan, Lancs. WN6 9RN
Tel (0257) 421915
Overseas Please Add 50p Europe £1 Others per item. Write or Phone for FREE List

"ESCAPE" is the top adventure game for the Sharp MZ-700 with over £200 worth of prizes. £14.95, C.W.O. to Maysoft (DMB), 50 Thompson Avenue, Colchester, Essex CO3 4HW.

NOTICE TO ADVERTISERS

VALUE ADDED TAX

Would classified advertiser's please note that 15% Value Added Tax must be added to advertisement rates quoted in this Journal.

COMPUTER REPAIR CENTRE

Have you got problems with your computer?

THEN CALL US

BBC, Spectrum, CBM, Dragon

Mail order or call in

ENFIELD

COMMUNICATIONS LTD

135 High St, Ponders End,

Enfield, Middx.

01-805 7772



BLANK CASSETTES

Guaranteed top quality computer/audio cassettes at great budget prices. Packed in boxes of 10 with labels, inlay cards and library case.

Prices include VAT, post and packing.

- (C5) £3.35
- (C10) £3.40
- (C12) £3.45
- (C15) £3.75
- (C30) £4.70
- (C60) £5.30
- (C90) £7.00

BASF FLOPPY DISCS

Prices of boxes of 10

- 5 1/4 Single side/Double density £19.95
- 5 1/4 Double side/Double density £21.85
- 5 1/4 Double side/Quad density £28.75

MICRO FLEXI DISCS

Price per unit

- 3 1/2" Single side £4.00 each
- 3 1/2" Double side £4.75 each

Indicate quantity of each product required in boxes. Free delivery UK only. Cheque/PO. Enclosed for £

NAME.....

ADDRESS.....

PROFESSIONAL MAGNETICS LTD

Cassette House, 329 Hunslet Road, Leeds LS10 3YJ
FREEPOST Tel: (0532) 706066

NOTICE TO ADVERTISERS

In view of legislation which may shortly be introduced, 'Your Computer' will not publish advertising for copiers or other equipment which may encourage copyright theft.

VDU BLUES — V2U

Fatigue, allergies, depression, headaches etc. maybe increased by long exposures to CRT emissions. A negative air ioniser could alleviate such side effects by precipitating positive electro static charges. For literature on ionisers from £26.04. Please contact: Surplusvalue, Beehive Workers Cooperative Ltd., 40a High Street, Stockport, SK1 1EG. Tel. 061 483 9436.

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.

128/128

Something Different for the ZX81

POOTER PUZZLER

4 Fast Programs containing 27 Puzzles!
Fun for all the Family. £2.95 post free.
MUSE OF POOTER - Computer generated prose on a ZX81! £1.95 post free.

GIRO:30 729 4609

G. ROWLAND, 24 PARLOES AVENUE,
DAGENHAM RM9 5NX

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 £8.45 or free details from: DISCUS SOFTWARE, FREEPOST, Windmill Hill, Brixham TQ5 9BR. Tel: 08045 55532. 477

C&F ASSOCIATES

SELECTED TITLES FOR BBC/SPECTRUM

TITLE	COMPUTER	RSP	OUR PRICE
SHADOWFIRE	SPEC	9.95	8.00
HERBERT'S DUMMY RUN	SPEC	9.95	8.00
JET SET WILLY II	SPEC	6.95	5.95
CASTLE QUEST	BBC	12.95	10.95
KNIGHT LORE	BBC	9.95	8.45
CONTRAPTION	BBC	8.95	7.25

CHEQUES/PO. PAYABLE TO:
C&F ASSOCIATES, P.O. BOX 2, BIDEFORD, EX39 3RE
SAE FOR LATEST LIST — ALL PRICES INCLUDE VAT AND P&P

"THE EPIC" "DESTINED TO BECOME A SPECTRUM CLASSIC"!!

BLANK CASSETTES

	WITH LIBRARY CASES			
	C10	C15	C20	C30
10	3.65	3.85	4.00	4.00
50	14.00	14.15	14.30	14.30
100	25.00	26.00	27.00	27.00

Fully inclusive (COD 65p extra)

Superior Tapes. Don't Settle for Less!

5 1/4" DS/DD DISKS

Manufactured by Memorex, Reinforced Centres.

10 for £13.50 inc. Plastic Storage Case

RING US NOW! (0793) 695034

UK HOME COMPUTERS (Dept YC)

82 CHURCHWARD AVE.

SWINDON, WILTS SN2 1NH

706

CHAMPIONSHIP GOLF — 48K Spectrum. The most sophisticated golf game yet. Four top courses — Woburn, St. Andrews, Troon and Sandwich. Bunkers, water hazards, one/two players, strokeplay/matchplay in a tournament against the professionals £2.95. Cheque/PO. to M. Walker, Charnwood House, Watford, Northants NN6 7UY.

UNIQUE data on over 1500 winning horses for use on your own horse race program. S.A.E. free details: 12 Wilton Road, Malvern, Worcs. WR14 3RL 756

MICROVITEC 1451 QL Monitor £199. 2nd disc drive for Amstrad £163. Both items brand new. Richard 01-729 1778. Bus. hours only.

'O' LEVEL REVISION

Our FREE INFORMATION PACK contains QUALITY TUTORIAL REVISION software for the Spectrum, BBC, Electron & CBM 64. Also educational PROGRAMS for all ages and learning abilities — with SPECIAL OFFERS for the VIC-20, ZX81, BBC & Spectrum — and VIDEO CASSETTES and BOOKS.

Send 24p SAE to: INFO-STREAM (Dept YC07), 36A Chase Green Avenue, Enfield, Middlesex, England, EN2 8EB.

631

EDUCATION

Whether it be SPECTRUM, ZX81 or BBC B, we hold in stock probably the largest range of educational software available, currently in excess of 50 DIFFERENT EDUCATIONAL CASSETTES produced by the major software houses. SAE for catalogue and SPECIAL OFFERS. Also GAMES TAPES: 3 for price of 2. LOCATOR, 12, Fernhall Drive, Redbridge, Essex, IG4 5BN. Tel. 01-550 5575 340

Remploy Metal Furniture— can you keep your computer on anything less?

For further information on our computer work station and display/storage module, please write to: Cass Richards, Remploy Metal Furniture, Neath Abbey Road, Neath, West Glamorgan, SA10 7BL. Telephone 0639 3812, Telex 48229.



Remploy

THE PROFESSIONAL MACRO ASSEMBLER PACKAGE FOR THE COMMODORE 64 (TM)

Assembler: Lets you create, maintain and assemble source code program files. ONLY £11.95
Disassembler: Lets you disassemble object program code either from memory or directly from disk. ONLY £10.50
Disk Monitor: Read, edit and write blocks from/to disk. Will also let you issue disk commands (copy file, scratch file and so on). ONLY £9.25
Machine Code Monitor: All the usual functions (hunt, fill, transfer, load, save etc.) ONLY £7.65
UNBEATABLE OFFER... BUY THE WHOLE PACKAGE FOR ONLY £22.95
ALL programs are supplied on disk for 1 or 2 1541 disk drives. Include £3.50 p&p with your order.

ORDER FORM

Name: _____
Address: _____

Assembler ☐ Disassembler ☐ Disk Monitor ☐ Monitor ☐
For 1 Disk Drive ☐ For 2 Disk Drives ☐

Payment on cheque only. Make payable to: LBS SOFTWARE
Send order to: LBS SOFTWARE, GLENTEVEJ 11,
DK-3650 OLSTYKKE, DENMARK.

Please allow up to 6 weeks for delivery because of postal delays.

643

totally confused?
made comparisons?
nearly compromised?
come to
northern
computers
completely committed!

THE
Showroom
for all
the
leading
micros



- BBC • Electron • Sinclair • VIC64
- Dragon • Printers • Disk Drives
- Plenty of Software
- Books/Games • Help & Advice
- Secondhand Computers

Churchfield Rd
FRODSHAM Ches.
WA6 6RD

**northern
computers**

Telephone:
FRODSHAM
0928 35110 10 Lines

THE computer centre of the NORTH

SELL IT WITH YOUR COMPUTER

CLASSIFIED ORDER FORM

Classified Rates

Linage: 60p per word (Min 20 words) —
prepayable

Linage advertisers should complete the form
provided in BLOCK CAPITALS. Phone number
counts as 2 words. Name and address to be
paid for if used in advertisement. Box Number
if required is £7.00 extra.

Display — rates per scc (Min 2scc)

One insertion : £10.00
Three insertions : £9.70
Six insertions : £9.50
Twelve insertions : £9.00

Display advertisers should provide separate
copy and preferably reserve space by phone
(01-661 3036).

Method of Payment

Cheques etc. should be made payable
to Business Press International Ltd, and
crossed. I enclose herewith
cheque/PO for

£ Please debit my Access/Visa Barclay
Card/American Express/Diners Club Int'l
as below



SIGNATURE

Post to:

Cut out the order form and return
together with your remittance to:
Classified Department, Your Computer,
Room H211, Quadrant House, The
Quadrant, Sutton, Surrey SM2 5AS.
(011 661 3036)

Please insert the following advertisement in Your Computer Classified Section

						LINAGE	PLUS 15% VAT	TOTAL
						£12.00	£1.80	£13.80
						£15.00	£2.25	£17.25
						£18.00	£2.70	£20.70
						£21.00	£3.15	£24.15
						£24.00	£3.60	£27.60
						£27.00	£4.05	£31.05
						£30.00	£4.50	£34.50

No. of insertions required ☐ Box No. required YES/NO

NAME (Please include initials).

ADDRESS

Payment by credit card please state address card is registered

Daytime tel. no

THIS FORM SHOULD BE RETURNED BY SEPT 30 FOR THE NOV ISSUE

Company Registered Number: 151537 (England) Registered Office: Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Hot★ lines

Acorn Computers

Telephone: Cambridge 0223 210111

Atari

Telephone: Slough 0753 24561

Amstrad

Telephone: Brentwood 0277 228888

Commodore CBM

Telephone: Northampton 0536 205252

Enterprise

Telephone: 01-739 4282

Sinclair

Telephone: Camberley 0276 685311

Tandy Corporation

Telephone: Birmingham 021 5566101
ext 33

Toshiba

Telephone: Camberley 0276 62222

DATEBASE

Local, national and international micro events are updated here. To publicise your event, phone Paul Bond on 01-661 3472.

Amstrad User Exhibition

A lot of people reckon Amstrad is the future, if only because it works. However this may be Amstrads for home and business use will be on display at the Novotel, Hammersmith, from October 5 to October 6. Organised by Nydus Consultants, telephone 0267 681027.

Computer Graphics 85

Restricted to those involved in computer graphics (aren't we all?). The applications-oriented show is at Wembley Conference Centre from 16-18 October. Organised by Online Conferences, telephone 01 868 4466.



Birmingham Children's Hospital staff pharmacist Patrick Ball has written an intravenous feeding software package for the Epson HX-20. Designed to be complementary to the hospital's non-portable Apple system, it guides an experienced prescriber through the standard Parenteral nutrition (look it up) process. (Telephone Bracknell 482923)

Schools Computer Fair

Takes place at the Camden Centre, in Bidborough Road, London NW1

from October 30 to October 31. More details available from the Publishers Association, telephone 01 580 6321. A hands-on opportunity for teachers and educationalists. Books and software.

EXPORT

AND OVERSEAS VISITORS

ALL MAKES OF MICRO
COMPUTERS, PRINTERS,
PERIPHERALS AND SOFTWARE
SUPPLIED AT DISCOUNT
PRICES.

AMSTRAD • ORIC • SINCLAIR
• BBC MICRO • ATARI •
COMMODORE • APRICOT •
STAR • BROTHER AND ALL
POPULAR MAKES

MICROGOLD

UNICOM HOUSE
182 ROYAL COLLEGE STREET,
LONDON NW1 9NN
TELEX: 295931 UNICOM G
TELEPHONE: 01-482 1711

INDEX TO ADVERTISERS

A	Activision	9, 58, 59	Mini Vacuum Cleaner	108
	Amateur Photographer	86	Miracle Technology	88
	Amstrad	4, 5, 6, 7	Mirrorsoft	28
	Anirog	I.B.C.		
	Arnor Ltd	42	O	
			Ocean Software	74, 83, B.C.
B	Beebug	90	P	
	Beta-soft	20	Pentel	82
			Phillips Electronics	I.F.C.
C			Practical Electronics	22
	Caldew Business Computer		Q	
	Systems	98	Quendata	16
	Chartsearch	8	Quicksilver	62
	Chiltern Electronics	18		
	Commodore	32	R	
	Computers by Post	98	Romantic Robot	22
D			Rose Software	20
	Datastar	109	RSD Connections	90
	Dennison	67	S	
	Duraplug	108	Selec Software	26
E			Simtron	22
	English Computer Shop	18	SJB Discs	98
F			SMT	18, 92
	The First Byte Club	26	Swanley Electronics	42
			Swescot	88
H			System 3	30
	Hewson	71	T	
	Hi-Soft	78	Tandy	49
I			Tasman	24, 25
	Interface		Thoughts & Crosses	16
	Publications	26, 42, 90	U	
L			U.S. Gold	34, 79
	LCL	88	V	
M			Vision Store	11
	The Micro Workshop	92	Y	
	Micro X	20	Your Computer	
	Microgold	114	Subscriptions	76
			Your Computer	
			Supplements	107

Trivia

A family game for 2 to 4 players in which mum is just as much at home as the sports crazy son.

Over 2000 questions on six subjects like Entertainment - Sports - History.

C64 - Amstrad - Atari - BBC - Spectrum £7.95



FIVE-A-SIDE

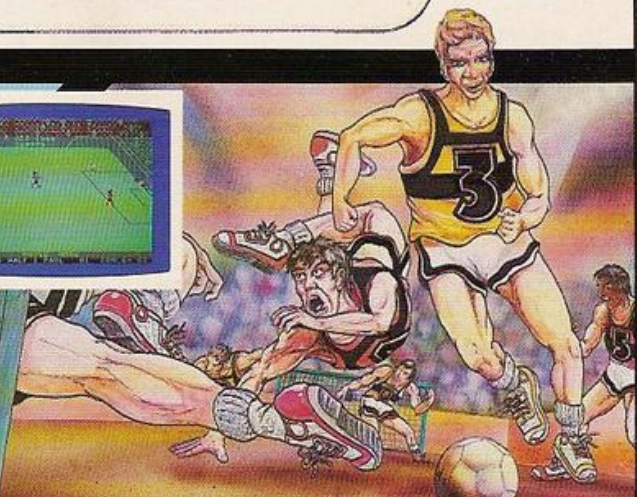
A soccer game with real pace in which passing skills are as essential as speed. Penalty shoot out truly tests your anticipation.

One or two player option.

C64 - £5.95

Spectrum - Amstrad

Atari - BBC - MSX SOON



SLAP SHOT

A fast and furious game which requires skill and fast reactions. Ice Hockey is a tough game but persistent rough game is punished by roughing penalties.

One player or two player option.

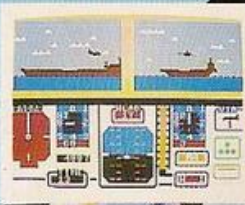
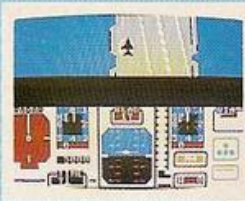
C64 - Amstrad - MSX £8.95



Assume control of this unique fighting machine. Take care that you practice take off and landing thoroughly before you embark on a combat mission to seek and destroy the enemy aircrafts. Use your radar to locate the carrier and land in worsening weather conditions as you progress through the ranks.

C64 - Amstrad - BBC £9.95.

Atari - Spect - Electron SOON



JUMP JET



VOICE MASTER A unique three in one package.

Speech Reproduction - Speaks in your own voice. Easy to incorporate speech in your own programmes. Recorded speech does not require Voice Master for reproduction.

Speech Recognition - Imagine your computer actually understanding what you say.

Voice Harp - Just whistle or hum to produce music



PRICE
£59.95
CASSETTE
OR DISC

THE ULTIMATE HUMAN TO COMPUTER INTERFACE

TRADE ENQUIRIES ANIROG Unit 10 Victoria Industrial Estate Dartford Kent 0322-92513/18
MAIL ORDER 8 High Street, Horley, Surrey. 029 378 6083
24 Hour Credit Card Service or pay by Cheque, P.O., Visa or Access

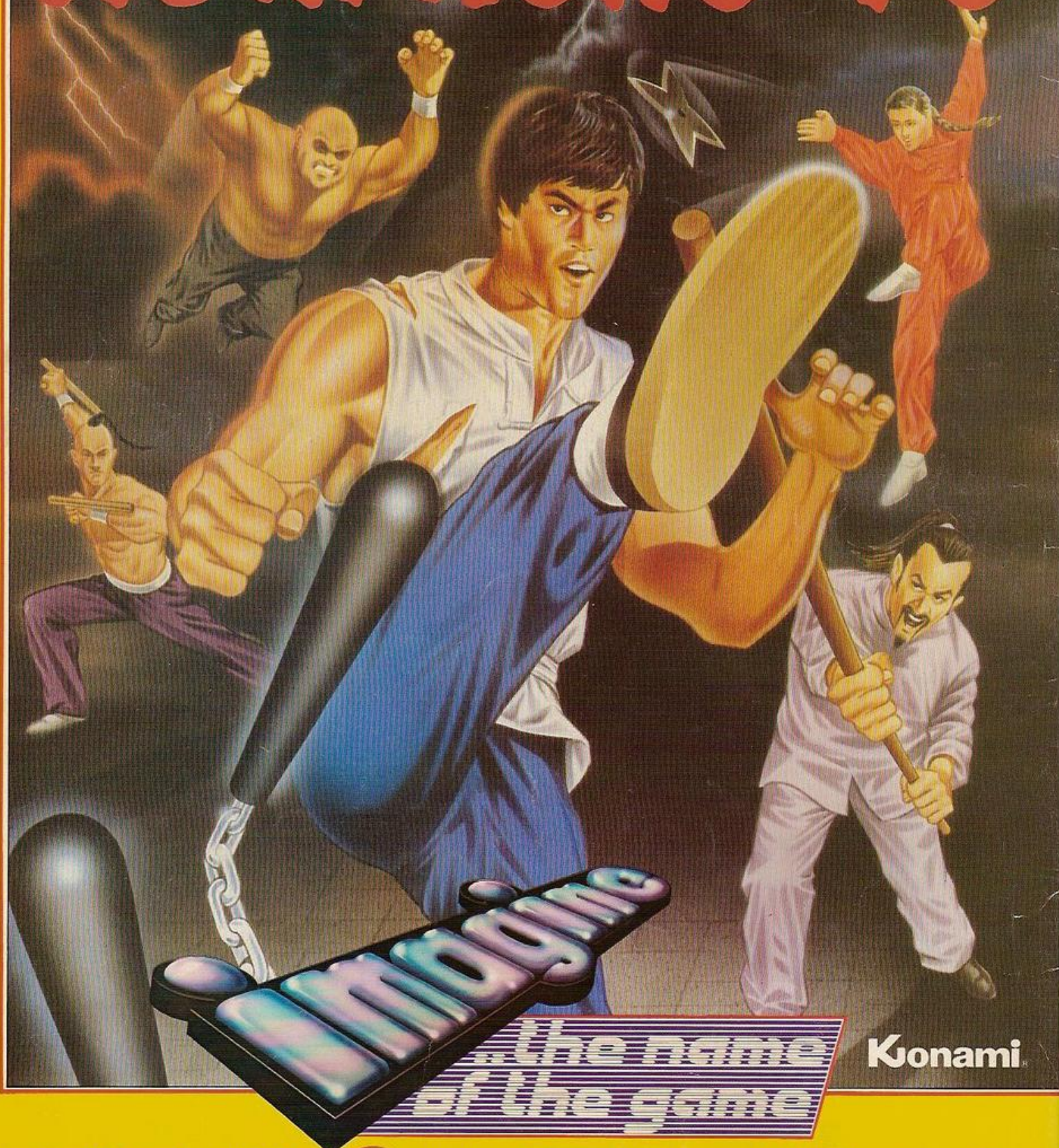
ANIROG

AMSTRAD 18-95

2K SPECTRUM 17-95

COMMODORE 64 18-95

Yie Ar KUNG~FU



Konami

Imagine Software is available from:  WHSMITH,  John Menzies, **WOOLWORTH**, LASKYS, Rumbelows, **Greens**,
Spectrum Shops and all good dealers.

Imagine Software (1984) Limited • 6 Central Street • Manchester M2 5NS • Tel: 061 834 3939 • Telex: 669977