

All you want to know about the **BBC MICRO!**

THE MICRO USER

Volume 1
Number 12
February 1984
£1

INSIDE!

Two great games

alien
INVASION

Frogs 'n' Dogs

Arcade action for all the family



Arrays made easy

Number balance: fun with sums

EEC Gallery: play the Eurocrats at their own game

Create stunning sound with our envelope generator

WIN!

a tame Beasty

Your passport to the world of robotics

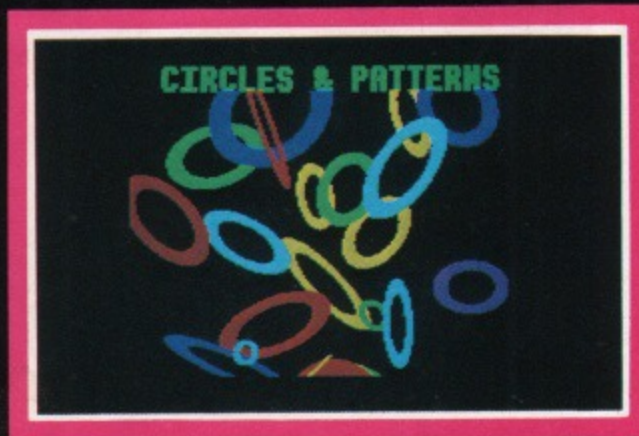
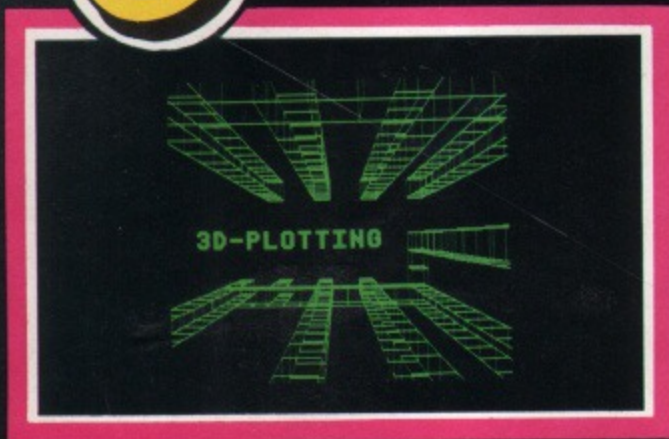
Build your own real-time clock



... in this month's Beeb Body-building Course

Software for the BBC micro

Graphics ROM



The Graphic Extension ROM for the BBC Micro 32K

Our latest utility ROM includes over 28 new graphics related commands. These can be typed in like any normal commands and can of course, be included in BASIC programs. The commands are split into 3 distinct areas:-

1. **Sprite graphics**
These are multi-coloured shapes up to 24 x 24 pixels in size.
Once a sprite has been designed (using in-built routine) it can be plotted at any position on the screen and easily moved around. A sprite can also be part of a 'film' — a sequence of frames allowing animation. Up to 32 sprites or 'films' can be active on the screen at any time. A 'film' can contain up to 47 frames, each frame being any sprite image.
2. **LOGO 'turtle' graphics**
By using simple FORWARD, BACKWARD, LEFT and RIGHT commands a 'turtle' can be moved very quickly around the screen, producing intricate patterns by the most user-friendly means. Including these commands in structured BBC BASIC programs provides a system faster and more powerful than many of the packages currently used to demonstrate the LOGO language.
3. The third section consists of a large number of general purpose commands, such as:-
 - ★FILL which will fill ANY area on screen.
 - Fast circle and arc drawing
 - 3D graphics routines allowing X, Y, Z co-ordinate plotting
 - Large character printing in a range of patterns
 - Scaling — allowing any part of the screen to be expanded or diminished
 - A rotate command that will rotate all plotting by any angle around the originBecause this is a ROM, all the commands are instantly available, and has a built-in help menu showing the syntax of all commands. Supplied with a comprehensive manual and step-by-step fitting instructions, suitable even for the inexperienced. This ROM represents extremely good value for money.

Available directly from us, mail order only, or from all good dealers
£28.00 plus £1.00 p&p plus VAT

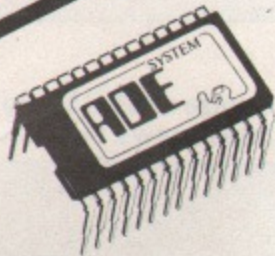
**COMPUTER
ONCEPTS**



CASH OR ROYALTIES. We specialise in quality software for the BBC machine and can offer the best rates around. We are always interested in obtaining new programs to add to our range and offer either a cash payment for the outright purchase or alternatively pay a royalty on each one sold.

16 Wayside, Chipperfield, Herts WD4 9JJ. Telephone (09277) 69727

Available now

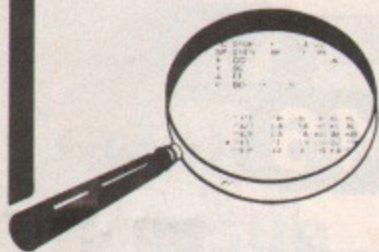


SYSTEM SOFTWARE

ADE is a complete program development package on 16k ROM for assembly language programmers.

ASSEMBLER

A full 6502, 2-pass MACRO assembler using standard 6502 mnemonics. It has the facilities you would expect on an assembler for a much larger machine. Features include MACROS with LIBRARY facilities; nestable CONDITIONAL ASSEMBLY; flexible LISTING OPTIONS; hex, decimal, binary and ASCII data formats; full range of ARITHMETIC and LOGICAL OPERATORS; symbol table sort and dump; file chaining; 29 powerful PSEUDO-OPS. Source and object programs are kept on disc so NO LIMIT ON PROGRAM SIZE or location.

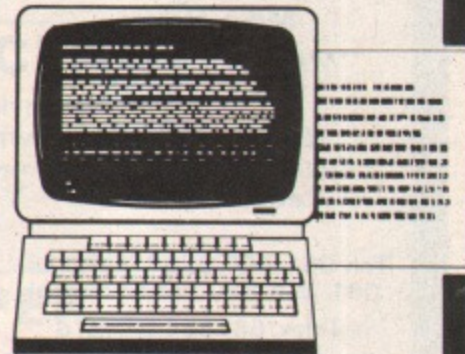


DEBUGGER

The renowned SPY DEBUGGING MONITOR! Instantly available for inspecting, modifying, debugging and dis-assembling machine code programs. Features include easy-to-read COLOUR display; hex, ASCII or DIS-ASSEMBLED display modes; SINGLE-STEP; BREAKPOINT; MEMORY SEARCH; DIS-ASSEMBLER and much more!

EDITOR

A dynamic TEXT EDITOR with WORD PROCESSING CAPABILITY! Designed with the programmer in mind to produce both programs and documentation. Features include SCREEN EDITING and DEFERRED EDIT modes; MACRO commands; NO LIMIT on document size; sideways SCROLLING; COLOUR display; full use of FUNCTION KEYS. A fully STRUCTURED COMMAND LANGUAGE makes this editor THE MOST POWERFUL YET DEvised for the BBC Micro.



£60 incl. vat

OS1.0 or above
Use with disc or tape

ADE

is complete with a 160 page comprehensive reference manual including tutorial and reference sections as well as details on how to code your own 'sideways' ROMs. Demonstration/utilities/macro library disc available in 40 or 80T format. Please specify.

Available February



The best debugging/utility ROM for the BBC!

All the superb easy-to-use facilities of the renowned SPY debugging monitor/dis-assembler.

Still only
£24.15
incl. vat

plus

Inspection/dis-assembly of ANY sideways ROM (by name or number). Relocator; Single-step through subroutines in one go; Toggle/clear breakpoints; Full DISC UTILITIES including disc/tape transfers; ROMsave; format; core dump; edit catalogue; disc recovery; disc edit; writeSPACE.

Order now or send for further details.

Available soon . . . the ADE MACRO ASSEMBLER on its own ROM for only £35 incl. vat. Use with other text editors/debugging monitors.

Please enclose cash with order or an official order form. **SYSTEM** Dept B 12 Collegiate Crescent, Sheffield S10 2BA (0742) 682321

All you want to know about the **BBC MICRO!**

THE MICRO USER

INSIDE!
Two great games
INVASION
People's Design
Brave action for all the lads!

Accepts credit cards
Number balance: fun with sums
LED display: play the Curators at their own peril
Create stunning sound with our envelope generator

Build your own real-time clock

WIN!
a time display

...in this month's Best Body-building Course

Vol. 1 No. 12 February 1984

Managing Editor
Derek Meakin

Features Editor
Mike Bibby

Technical Editor
Mike Cook

Production Editor
Peter Glover

Layout Design
Heather Sheldrick

Advertisement Manager
John Riding

Advertising Sales
Mike Hayes

Marketing Manager
Sue Casewell

Editor-in-Chief of
Database Publications:
Peter F. Brameld

Tel: 061-456 8383 (Editorial)
061-456 8500 (Advertising)

Telex: 667664 SHARET G
Prestel: 614568383

Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

Subscription rates for
12 issues, post free:
£12 - UK
£13 - Eire (IR £16)
£18 - Rest of world
(surface)
£30 - Rest of world
(airmail)

ABC Member of Audit
Bureau of Circulations

The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

© 1984 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles or listings.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

Distribution to the news trade in the UK and Ireland is by Wells Gardner, Darton and Co Ltd., Faygate, Horsham, West Sussex RH12 4SU (tel: Faygate 444). Enquiries regarding overseas distribution should be made direct to the publishers.

CONTENTS

NEWS

Keep your finger on the pulse of BBC Micro happenings with our latest news bulletin.

27

BEGINNERS

After investigating GET\$ we begin our in-depth exploration of the BBC Micro's modes.

34

ONLY HUMAN

The start of our series on user-friendly programs, with the emphasis on education.

42

NUMBER BALANCE

Weigh up your ability to do sums with this neat program that's ideal for the classroom.

46

SINGLE KEY ENTRY

Save wear and tear on your fingers with this utility to give Electron-type single key entry.

49

COMPETITION

Think of the most original use for the Beasty - and win one to try it out in practice.

55

SOUND ADVICE

Synchronise sound, and change from discord to harmony with the latest in the series.

61

ALIEN INVASION

A first-rate version of an arcade classic, plus a revealing article on Mode 7 animation.

64

BACK ISSUES

Make sure your Micro User collection is complete. All you've missed and how to get it.

68

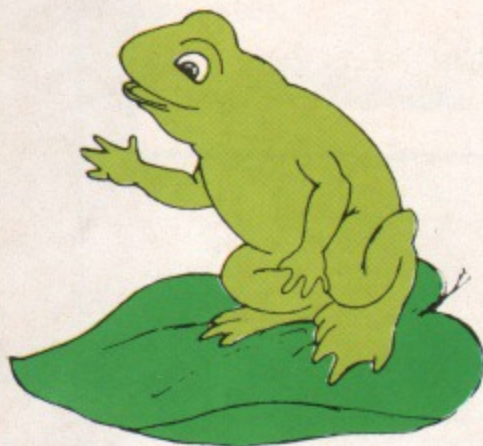
TAPE & DISC OFFER

Save yourself the chore of keying in programs with this month's cassette or disc.

70

57

Inside this issue



FROGS 'N' DOGS

Hop from lily pad to lily pad, avoiding hostile dogs in this delightful game for all the family.

75 ARRAYS

Feeling DIM about arrays? This easy-to-follow article will help you to see the light.

83 DIY ROM BOARD

Take advantage of the power of sideways ROMs with our do-it-yourself ROM board.

90 GALLERY

Strive to make sense of the Euro bureaucrats' latest ruling in this intriguing logic game.

96 ADVENTURES

Our forthright columnist takes her usual critical look at the world of adventures.

107 SOFTWARE SCENE

Our team of frank and thorough reviewers assess some of the latest software releases.

113 SOUNDSHAPER

Investigate the amazing sounds your micro can make with our envelope generator.

116 BODY BUILDING

Never forget an important date again! Build a real time clock for your BBC Micro.

136 SUBSCRIBE NOW

A year's subscription to The Micro User will bring you a FREE Micro User cassette.

139 HARDWARE REVIEW

Our impartial experts give their assessment of new pieces of hardware for the BBC Micro.

143 MICROMAIL

The section you write yourself. Your ideas, queries and opinions make fascinating reading.

COLOURJET

7 COLOUR INK JET PRINTER

Logic seeking in
dot address mode

£499 + VAT

With Centronics parallel interface
and free BBC Micro dump listing.

Options available:

- Buffered RS232 interface.
- Viewdata & RS232 interface.
- Apple II interface.
- IBM PC dump.

Specifications:

640 dots/line.

84 dots/inch both axes.

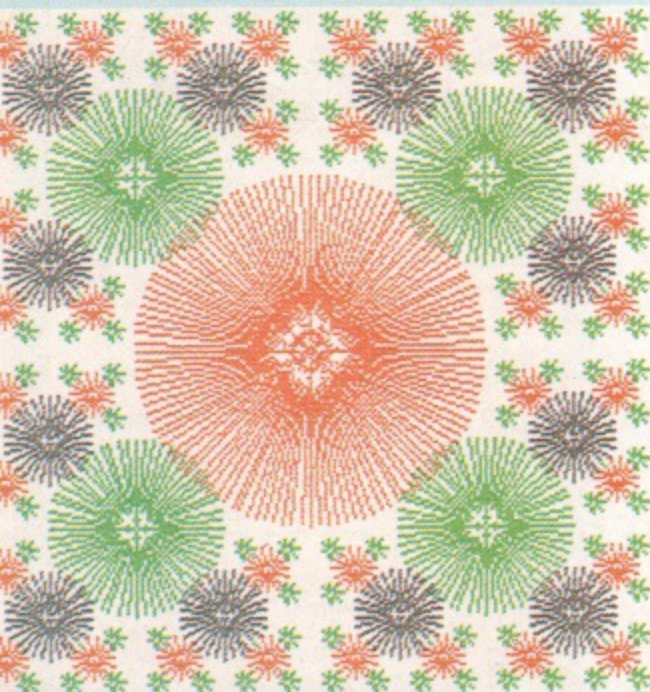
Friction feed rollpaper with single sheet
feed A4.

37cps in full colour.

Ink cartridges, 4 million character life.



from BBC Micro screen - 1/2 size mode



Virtually
silent



INTEGREX LTD.

Church Gresley, Burton-on-Trent, Staffs DE11 9PT
Tel: 0283 215432 Telex: 377106

Dealers, OEM & Educational
enquiries welcome

ONE-STOP SHOPPING

BBC MICROCOMPUTER



Model B	£399
Model B & Disc Interface	£469
Model B & Econet	£446
Model B & Econet & Disc Int	£516
Disc Interface Kit	£97
* Speech Synthesizer (official BBC)	£54
Teletext Receiver	£225
1.2 Operating System (incl. fitting)	£11.50
Basic 11	£15

* New in stock Price incl. fitting



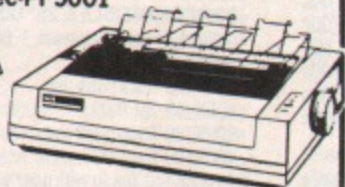
**NOW AVAILABLE
THE ACORN ELECTRON
ONLY £199.00**

WORD PROCESSORS

View Word Processor	£59
Word Wise Word Processor	£45

Logitec-FT 5001

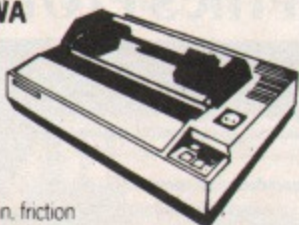
STAR BUY



Friction and adjustable sprocket feeding, variety of printing models, (PICA & ELITE pitch) user font registry command, automatic paper insertion, 96 ASCC11 with descender, 8 international character sets, 48 semi graphics!

At the very low price of £330

SHINWA CP80



80 column, friction and adjustable tractor feed, bidirectional logic seeking, HI-RES graphics and block graphics, sub and superscripts, condensed and emphasised print, and underlining, vertical and horizontal tabs, self test, italic print, etc.

Shinwa CP80 F/T	£289
Parallel Printer Lead	£13
2000 Sheets Fanfold Paper	£15

UTILITY SOFTWARE



Screen Dump Rom
£17.25
Analyse Disk
£15
Compatible for MX80, FX80 etc.

DOT MATRIX PRINTERS



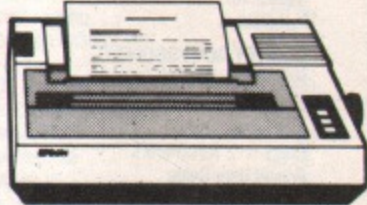
MANNESMANN MT80

High quality 80 column serial dot matrix printer. Dual density dot addressable graphics, quick tear facility as standard, optional sound reduction kit to give an impressive L55dBa acoustic noise rating. Ability to handle both tractor-fed fanfold and single paper.

Special price of £295

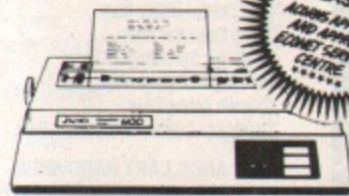
FREE CABLE AND PAPER WITH ALL PRINTERS

EPSON



Epson FX80 F/T	£415
Epson RX80 F/T	£315
Epson FX100 T/T	£499

DAISYWHEELS



JUKI 6100

20 CPS print speed, supports all wordstar features, emulates diablo protocols.

Juki 6100 Daisywheel with 2K Buffer... £395

NEWS FLASH!
ACORN APPROVED AND APPROVED
ECONET SERVICE CENTRE

FREE CABLE AND PAPER WITH ALL PRINTERS



BROTHER HR15

Buffer ... 3K byte, shadow printing, super/sub script, carriage skip movement, text reprinting, colour printing (red and black), auto under-scoring, proportional spacing, clear buffer—

Also available with keyboard.

Brother HR15	£431
Keyboard	£176

MONITORS

PHILIPS TP200 Green Monitor

You can use this latest Philips Green Monitor for personal computers, business computers, control systems, automatic test equipment. The picture quality of the TP200 means not only 80 x 24 lines of information but also usage for high resolution graphics.



At the bargain price of £79
BBC Official 12" £95

NORDMENDE 14" TV/MONITOR



This TV Monitor is not a modified television as many TV Monitors are, but a 14" TV Monitor which has been designed to perform both functions. It has RGB and Composite video and sound. An RGB cable for a BBC is supplied as standard.

With Remote Control £269

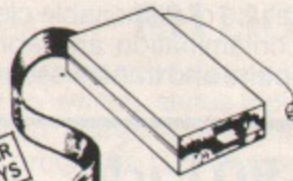
Colour monitor
Micovtec 14" 1431 £247

TORCH DISK PACK

Torch Z80 Disk Pack
4MHZ Z80 Application Processor
Perfect Software

At New Low Price
£835.00 Inc. Installation

SLIM DISK DRIVES



STAR BUYS

TEAC 55A S/S 40 TRACK 100K SD Single 200K DD Dual	£169 £339
TEAC 55E S/S 80 TRACK 200K Single 400K Dual	£220 £440
TEAC 55F D/S 80 TRACK 400K S/D Single 800K D/D Dual	£269 £539
MITSUBISHI 400K D/S DD Single Dual	£269 £539
FORMATTING DISK & MANUAL	£10

*ALL DRIVES CASED WITH FREE CABLES



KOMORI - MICROPROCESSOR CONTROLLED

Ideal for BBC Micro and any other computers with standard interface 5 1/2" Simline on-board single chip microcomputer reduces TTL count by 70% extra low power requirement direct drive (no belts!) guide rail means completely quiet operation, unique eject mechanism fast 6ms track to track access time. Fully guaranteed Cased with leads. Priced at the **STAR BARGAIN PRICE** of £169

Power supply	£40
Cables Single	£9.50
Cables	£13.50

FLOPPY DISKS



Floppy Disks in packs of 10	£20
Single sided 40 Track	£35
Double sided 80 Track	£35

BBC Compatible

KLICK STIK JOYSTICK - SELF CENTRING

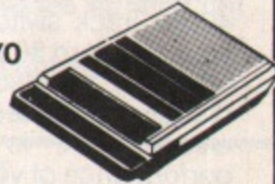


Two Fire Buttons

Single - £17.95
Dual - £34

STAR BUY

SANYO



SLIM 3A

The slim 3G Sanyo Cassette Recorder only recently available in the market - ONLY £28.95
Official BBC Cassette Recorder £29.95
Cassette Recorder lead £2.50

ODDS

Official Joysticks	£13
Compatible Joysticks Damping Control	£15
Dust Covers - for various machines - from	£3.95

- * SERVICE CONTRACTS TO EDUCATION AUTHORITIES AT DISCOUNT
- * OFFICIAL ORDERS FROM DEALERS, GOVERNMENT DEPARTMENTS, COLLEGES AND SCHOOLS WELCOME
- * ALL PRICES INCLUSIVE OF VAT

NEW BOOKS AND SOFTWARE IN STOCK

FITTING SERVICES AVAILABLE

HOW TO ORDER

You may purchase any of the items listed by cheque, Barclaycard or Access. All you have to do is fill in the details in the coupon below and list your requirements on a separate sheet of paper. Post to us and we will despatch within 7 to 14 days. All prices inclusive of 15% VAT. Add £2.50 P&P for orders below £150, over, add £8 P&P.

TELEPHONE ORDERS (01) 574 5271

Credit card holders may order by telephone. Give Card No., Name, Address and item required.

Post to:
Twillstar Computers Ltd,
17 Regina Road, Southall, Middlesex.

I have enclosed my list of requirements along with my cheque/P.O. for £

I prefer to pay with my ACCESS/BARCLAYCARD (Delete whichever not applicable)

CARD NO _____
SIGNATURE _____
NAME _____
ADDRESS _____



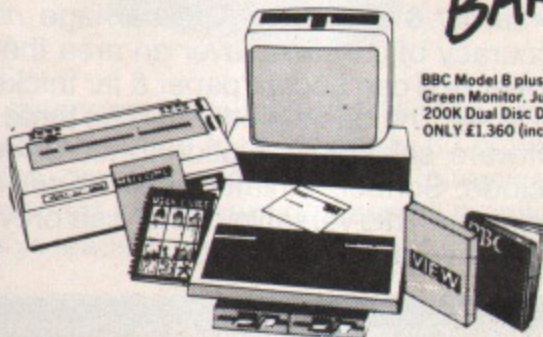
TEL: (Day) _____

TEL: (Eve) _____

CREDIT CARDS VALID IF SIGNED BY CARD HOLDER. ADDRESS ABOVE MUST BE THE SAME AS CARD HOLDER.

***STAR BARGAIN!**

BBC Model B plus Disc/Interface fitted view, V.D.U. Green Monitor, Juki Daisywheel Printer, 200K Dual Disc Drives and manual and formatting disc. ONLY £1.360 (incl. all cables)



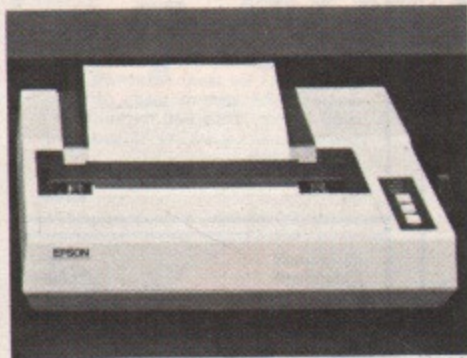
Twillstar Computers Limited

17 REGINA ROAD · SOUTHALL · MIDDLESEX · TEL: (01) 574 5271

(OPEN SIX DAYS A WEEK - 10 a.m. to 8 p.m.)

EMS

PRINTERS:



We have selected a range of printers that will meet most requirements.

SEIKOSHA—ranging from a low-cost utility printer, right up to an advanced four-colour printer.

EPSON—the high quality dot-matrix printers that set the standard in the industry—versatile printers that provide the optimum in performance

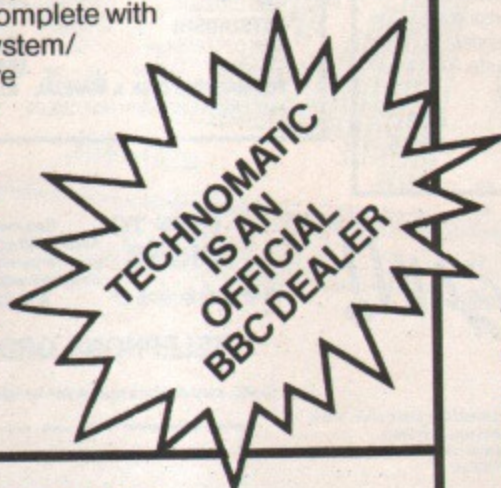
& reliability. The RX80/FT provides all standard printing & graphic functions, (single sheets & perforated paper), with the de-luxe FX80 giving in addition proportional printing, italics, programmable characters etc. The FX100 also allows the use of 15" wide paper. The **JUKI** daisywheel provides a quality normally found in printers costing far more. Printer cables, interfaces, ribbons, paper etc. are all normally available from stock.

DISC DRIVES:

Our disc drives are supplied ready to connect to your BBC, & come complete with all necessary cables, formatting disc, manual etc. Our switchable disc drives give the user flexibility, by allowing access to both 40 & 80 Track discs. The 40/80 Track switching module can be simply attached to your standard 80 track drives, thereby vastly increasing their versatility. We also have a full range of discettes, variety of disc storage cases, disc-drive cables. The **Floppiclone** head cleaning kit, is the ideal way to ensure optimum performance of your drives. The use of disposable cleaning discs eliminate the risk of recontamination and abrasion, and ensure continuous data capture and transmission.

TORCH Z-80 Pack:

Your BBC computer can be converted into a business machine at a cost slightly higher than a 800K disc drive. The Torch pack with twin disc drive and a Z80A processor card greatly enhances the data storing and processing capability of the computer (NOTE: In BBC mode the disc pack functions as a normal BBC drive). Z80A card comes with 64K of RAM and a CP/M compatible operating system in ROM. The system is supplied complete with a BBC owner's user guide, a System/Demo disc, a PERFECT software package and COMANEX, a business management game. The PERFECT software package comprises of a DATABASE, CALC, WORD PROCESSOR and SPELLER commercially valued at over £1000. We are now supplying a Utility that enables software on 40 Track discs to be transferred to 80 Track discs.



SANYO DR101

Data Recorder. An advanced data recorder that consistently achieves superior performance.

ACORN COMPUTER SYSTEMS

BBC Model B	£348.00a
BBC Model B+Econet	£389.00a
BBC Model B+DFS	£409.00a
BBC Model B+DFS+Econet	£450.00a
Acorn Electron	£175.00a
BBC Teletext Receiver	£195.00a
BBC Dust Cover	£4.00d
Pair of Joysticks	£11.70c

TORCH Z80 SYSTEM

TORCH Z80 Disk Pack	£730.00a
TORCH Z80 2nd Processor Card	£375.00a

UPGRADE KITS

A to B Upgrade Kit	£75.00d
Installation	£15.00
DFS Kit	£84.00d
Installation	£15.00
Econet Kit	£45.00d
Installation	£25.00
Speech Kit	£47.00d
Installation	£10.00

ECONET ACCESSORIES

Printer Server Rom	£41.00c
File Server Level 1	£86.00c
File Server Level 2	£216.00b
Clock + 2 Terminators	£85.00b
Econet User Guide	£10.00d

BBC FIRMWARE

1.2 Operating System	£7.50d
Basic II Rom	£32.00d
View Word Processor Rom	£52.00c
Wordwise W/P Rom	£32.00c
Beebpen W/P Rom	£29.00c
BCPL ROM+Disc	£87.00b
Pascal-T ROM	£44.00c
Disc Doctor Utility Rom	£30.00c
Termi Emulator Rom	£29.00c
Beebcalc Spreadsheet Rom	£32.00c
ULTRACALC Rom (BBC Publ.)	£65.00c
Gremlin debug Rom	£28.00c
Computer Concepts Graphics Rom	£28.00c

BBC ANCILLARY HARDWARE

EPROM Programmer	£79.50b
Smartmouth Speech Synthesiser	£37.00b
RH Light Pen	£39.50b
"Time-Warp" Real-Time Clock/Calendar	£29.00b
ACORN IEEE Interface ANK01	£322.00c

PRINTERS & PLOTTERS

EPSON FX-80	£350.00a
EPSON RX-80 FT	£270.00a
EPSON FX-100	£555.00a
NEC PC80 23BE-N	£310.00a
SEIKOSHA GP100A	£170.00a
SEIKOSHA GP250X	£199.00a
SEIKOSHA GP700A Colour	£375.00a
JUKI 6100 Daisy wheel	£365.00a
MCP40 Col. Printer/Plotter	£129.00a

Accessories:

Parallel Printer Lead	£10.00d
Serial Printer Lead	£8.00d
Epson Serial Interface 2K	£60.00c
Epson Serial Interface	£50.00c
NEC Serial Interface	£42.00c
Epson Paper Roll Holder	£17.00c
FX-80 Tractor Attachment	£37.00c
PAPER Fanfold 2000 sheets	£13.50b
Printer Sharer Parallel 3 computers - 1 printer	£59.00c
Gratpad Graphics Tablet	£125.00c
GRAPHICS Plotter	£270.00a

COLOUR/GREEN MONITORS (leads incld)

Microvitec 1431 14" RGB Std Res	£215.00a
Microvitec 1431P 14" RGB/PAL Std Res	£249.00a
Microvitec 1431PS 14" RGB/PAL + Sound	£259.00a
Microvitec 1451 14" RGB Med Res	£325.00a
Microvitec 1441 14" RGB Hi Res	£440.00a
Microvitec 2031 20" RGB Std Res	£287.00a
KAGA Vision I 12" RGB Std Res	£230.00a
KAGA Vision III 12" RGB Hi Res	£385.00a
KAGA 12" Green Hi Res	£106.00a
SANYO DM8112CX 12" Green Hi Res	£99.00a
KAGA RGB Lead	£6.50d
BNC Green Screen Monitor Lead	£3.50d

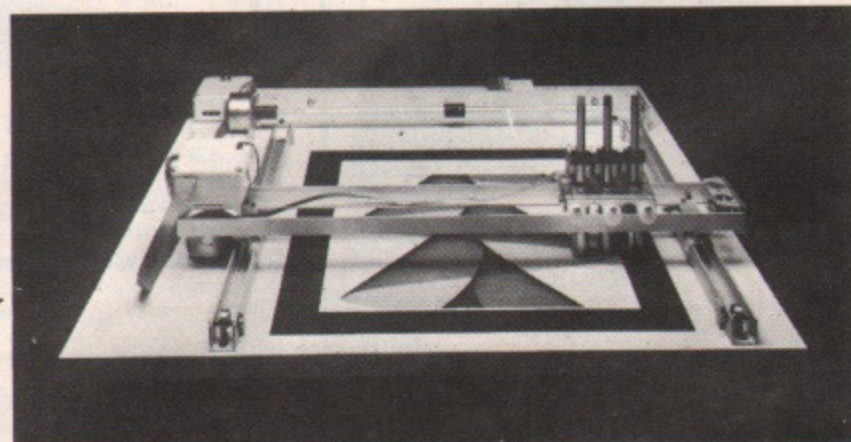
BBC COMPATIBLE 5.25" DISC DRIVES:

(All include cables, manual + format disc)

100K (40 Track)	£150.00a
100K (40 Track) with psu	£185.00a
200K (40/80 Track)	£215.00a
200K (80 Track) with psu	£260.00a
400K (80 Track DS)	£240.00a
2x100K (40 Track) with psu	£335.00a
2x200K (40/80 Track) with psu	£440.00a
2x400K (80 Track DS) with psu	£490.00a
Accessories:	
40/80 Track Switching Module	£30.00c
Single Disc Cable	£6.00d

ALL PRICES EXCLUDE VAT. Please add carriage 50p

COLOUR GRAPHICS PLOTTER:



This robustly built 3-colour graphics plotter provides both versatility & precision. The carriage can be moved with an accuracy of 0.025cm. over an area the size of A4 paper. The plotter bed can accept paper & far thicker materials, at sizes of up to A3. The basic plotter carries three pens each of which is software selectable. Optional accessories that can be fitted include: Scriber, miniature drill, router, and optical sensor for scanning. This versatile plotter can provide an endless source of creative ideas.

Everything you need for your BBC Computer

Plus friendly service and professional advice

Double Disc Cable	£8.50d
DISCS 40T SS/SD Pkt of 10	£15.00c
DISCS 80T SS/DD Pkt of 10	£24.00c
DISCS 40T DS/DD Pkt of 10	£18.00c
DISCS 80T DS/DD Pkt of 10	£26.00c
FLOPPICLENE Drive Head Cleaning Kit	£14.50c
Disc Library Case	£2.50d
Disc File Case 30/40	£8.00c
Disc Lockable Case 30/40	£16.00c
Disc Lockable Case 60/70	£30.00b

EPROMS:	
2764-250nS	£5.00
27128-300nS	£18.00
27128-250nS	£22.00

SOFTWARE:	
GEMINI BUSINESS including Database Mail-List, Beebcalc, Beebplot, Stock-Control, Home Accounts, Above on Cassette	£17.25c
Above on Disc	£20.25c
CashBook on Disc	£52.00c
Final Accounts on Disc	£52.00c
Cashbook/Final Accounts both	£82.00c
GEMINI Leisure - Full Range	
TABS BUSINESS SOFTWARE FOR TORCH	
Sales Ledger (CP/N)	£99.00c
Purchase Ledger (CP/N)	£99.00c
Mailing List (CP/N)	£99.00c
ACORNSOFT - Full Range	
ACORN LANGUAGES including BCPL, LISP FORTH with Manuals	
BBCSOFT - Full Range	
PROGRAM POWER - Full Range	
ACORNSOFT (Electron) - Full Range	

CASSETTE RECORDERS:	
SANYO DR101 Data Recorder	£34.00b
Datex Slim Line	£24.00c
BBC Tape Recorder	£28.50b
Cassette Lead	£3.00d
HOBBIT Floppy Tape	£135.00b
HOBBIT Zero Memory Option	£25.00d
Computer Grade C-12 cassette	£0.50d
Computer Grade Cassette 10 off	£4.50c
Phillips Mini-data cassette	£3.00d

BBC BOOKS (NO VAT) p&p £1.50/book	
Advanced User Guide (p&p £2)	£12.95
Advanced 6502 Assy Lang Prog	£10.25
CP/M Handbook	£10.75

Micros Interfacing Techniques	£13.05
Programming the 6502	£9.75
6502 Applications	£9.75
BBC Computer Books	
Assembly Lang Prog for BBC Birnbaum	£8.95
Assembly Lang Programming on BBC Micro by Ferguson and Shaw	£7.95
Basic Prog for BBC	£5.95
BBC an Expert Guide	£6.95
Micro Revealed	£7.95
Easy Programming on BBC	£5.95
Further Programming on BBC	£5.95
Games BBC Computer Play	£6.95
Introducing BBC Micro	£5.95
Let Your BBC Teach You	£6.45
Programming The BBC	£6.50
30 Hour Basic	£5.95
35 Educational Programs	£6.95
BBC Sound & Graphics	£7.95
Creating Adventure Programs	£6.95
Discovering Machine Code	£6.95
Structured Programming	£6.50
Assembly Language Shiva	£7.95
6502 ALP	£12.50
Using the 6502 Ass Lang	£14.50
6502 Machine Code for Beginners	£5.95
6502 Software Design	£10.25
BBC Basic (Melbourne)	£7.95
ALP on BBC Addison	£7.95
BBC Graphics and Sound	£6.95
Advanced Prog Techniques	£7.95
Programming the Z80	£12.10
Forth Acorn	£7.50
Using Floppy Disk with the BBC Micro	
Computer Cumana	£7.50
BCPL User Guide Acorn (p&p £2)	£15.00
LISP Acorn	£7.50
Creative Graphics Acorn	£7.50
Graphs and Charts Acorn	£7.50
The Friendly Computer Book BBC	£4.50
Beyond Basic BBC	£7.25
Into View BBC Word Processor	
Acorn	£2.50
Advanced 6502 Interfacing	£10.95
Electron	
Start Programming with the Electron	£7.95
Assembly Language Programming on the Electron	£7.95
The Electron Book	£7.95
Basic Sound and Graphics	
6522 Book	£3.25

MANY MORE BOOKS IN STOCK

EPROM PROGRAMMER:

A fully self-contained mains-powered eprom programmer housed in an attractive finished case. It is able to program 2716, 2732/32A, 2764 & 27128's in a single pass. It is supplied with vastly superior software when compared to any currently available similar programmer. In addition to normal eprom programming, you are now able to load your favourite basic programs onto eprom.



* **Menu Driven Software provides user friendly options for programming the eprom with:**

- a) Basic programs.
- b) Ram resident programs.
- c) Any other program.

* **Programmer can read, blank-check, program & verify at any address/addresses on the Eprom.**

* **Personality selection is simplified by a single rotary switch.**

* **Programming voltage selector switch.**

* **Full Editor with ASCII Disassembler, allowing direct modification of memory data in HEX or ASCII.**

* **Continuous display of time left for completion of programming.**

* **Continuous display of current addresses as they are being programmed.**

The programmer comes complete with cables, software & operating manual.

RH LIGHTPEN:

The Acorn-approved superior design, with a programmable 'push tip' switch, status indicator LED and an interface box. Supplied complete with manual, full software and basic demo programs. Colour graphics programs will be available separately.

unless indicated as follows: (a) £7 (b) £2.50 (c) £1.50 (d) £1.00

EPROM ERASERS

UV1T Eraser with built-in timer and mains indicators. £59 + £2 p&p. UV1 but without the timer. £47 + £2 p&p.

MONITORS:

MICROVITEC—a range of British Made DTI/ACORN approved Std/Med/Hi-resolution RGB colour monitors that have a consistent, reliable performance. The **KAGA** range provides a similar performance in 12" screen format. Our Japanese manufactured Hi-Res green screen **SANYO** is an ideal solution for high clarity 80 column text display. The **KAGA** green screen, with its 'chemically etched' anti-glare screen for the discerning user. All monitors are supplied with suitable leads at no extra charge.



ENQUIRE ABOUT ACORN'S NEW HARDWARE RELEASES

SMARTMOUTH:

WITH AN INFINITE VOCABULARY—A ready built speech synthesiser unit, allowing the creation of any English word, with both ease and simplicity, while, at the same time being very economical in memory usage. You can easily add speech to most existing programs. Due to its remarkable infinite vocabulary, its uses spread throughout the whole spectrum of computer applications—these include industrial, commercial, educational, scientific, recreational etc. No specialist installation—simply plugs into the user port—and due to the simple software, no ROMS are needed. **SMARTMOUTH** is supplied with demo and development programs on cassette, and full software instructions.

'TIME-WARP' REAL-TIME-CLOCK/CALENDAR:

A low cost unit that opens up the total range of Real-Time applications. With its full battery backup, possibilities include an Electronic Diary, automatic document dating, precise timing & control in scientific applications, recreational use in games etc—it uses are endless and are simply limited by one's imagination. Simply plugs into the user port—no specialist installation required—No ROMS. Supplied with extensive applications software.

MAIL ORDERS TO: 17 Burnley Road, London NW10 1ED
(Tel: 01-452 1500, 01-450 6597 Telex 922800)
SHOPS AT: NW London: 15 Burnley Road, London NW10 1ED
(Dollis Hill 2 mins walk, ample car parking space)
West London: 305 Edgware Road, London W2. Tel: 01-723 0233
(Near Edgware Road)

TECHNOMATIC LTD.

All prices exclude carriage & VAT. Please add carriage as indicated and add 15% VAT to the total order value. For fast delivery telephone your order quoting VISA or Access card or official order number. (Minimum telephone order £5).

ROMS

SOFTWARE FOR THE BBC MICRO

WORDWISE

32K

```

WORDWISE
(C) Computer Concepts 1982

1) Save entire text
2) Load new text
3) Save marked text
4) Load text to cursor
5) Search and Replace
6) Print text
7) Preview text
8) Spool text

ESC Edit Mode
Please enter choice_
  
```

The renowned word processing package. Still clearly the market leader with sales now over 20,000. This has become "the standard" word processor for the BBC Micro and is still receiving very favourable reviews. Wordwise will work with tape, disc or Econet and includes automatic word counting and full control over text entered into the system. Supplied with a detailed spiral bound manual and an excellent free typing tutor program. After 8 months on the market there is still no other product as simple to use and as powerful as Wordwise.

£39.00 + £1.00 p&p + VAT

GREMLIN

32K

```

A=57 X=00 Y=00
S =01FF 89 10 E3 DA 92 93 DC 89
PC=8213 78 A9 DA 80 02 02 A9 92 x
SEI
7FF0 20 20 20 20 20 20 20
7FF8 20 20 20 20 20 20 20
M =8000 4C 13 82 4C 30 80 C2 15 L LO
8008 A8 47 52 45 40 4C 49 4E GREMLIN
8010 00 38 2E 33 32 00 28 43 8 32 (C
8018 29 31 39 38 33 20 43 6F >1983 Co
-----
!LVAR
START 9000
FRED 6
END 8100
JIM 5
!PRINT FRED+JIM
OB
!
  
```

The GREMLIN system is a powerful de-bugging tool for 6502 machine-code programs. It includes all the usual features found in good machine-code monitors, such as memory search, intelligent memory move routines, memory editors etc. These work at byte, word or string level. A built in help menu can also be displayed at any time. This ROM contains many more unique features such as an assembler as well as a disassembler. An extremely powerful expression evaluator is included allowing complex expressions to be entered in a format that is only normally available in high level languages. Variables are also allowed (any length) and may be included into expressions. GREMLIN allows single stepping through machine-code programs. It is also possible (on to a printer or disc) to single step through graphic routines without disturbing the screen. Supplied with full manual, this 8k ROM has more features than any other de-bugging package for the BBC machine.

£28.00 + £1.00 p&p + VAT

```

DISC DOCTOR 1.09
DIS <<ata>> <<end>> <<ofs>>
DISCTAPE <<afsp>> <<afsp>>
DOWNLOAD <<fsp>> <<adr>>
DSEARCH <<str>> <<trk>> <<trk>><<act>><<drv>>
DZAP <<trk>> <<trk>><<act>><<drv>>
EDIT <<key no >>
FIND <<str>>
FORM <<drv>> <<no trks>> <<stt>> <<S>>
JDIN <<fsp>> <<afsp>> <<afsp>>
MENU <<drv>>
MOVE <<dest page>> <<src page>>
MSEARCH <<str>> <<adr>>
MZAP <<adr>>
PARTLOAD <<fsp>> <<ofs>> <<ext>> <<adr>>
RECOVER <<trk>> <<act>> <<act>> <<adr>> <<drv>>
RESTORE <<trk>> <<act>> <<act>> <<adr>> <<drv>>
SHIFT <<src>> <<dest>> <<ext>>
SWAP <<drv>>
TAPEDISC <<fsp>>
VERIFY <<drv>> <<no trks>> <<stt>>
  
```

DISC DOCTOR

32K

This utility package has many special features for use with discs but also contains many other utilities that everyone will find useful: Function key editing, powerful disassembler, recovery of any data from the disc, merging of files, complete disc editor. Compatible memory editor, String search in memory or on disc, automatic tape to disc and disc to tape routines, built in help menus, formatting of 35, 40 and 80 track discs, and also a special format that allows 60 files per disc.

£28.00 + £1.00 p&p + VAT

```

TERMI - BBC TERMINAL PROGRAM RELEASE 2.0
FROM COMPUTER CONCEPTS
(C) D.J.Martin and R.Riles 1983
----- Function key definitions -----
Key No. Key use --- Key with SHIFT Key with CONTROL
Printer start stop
Change Mode start char stop char
Spooler start stop
Transmit file start abort
Receive file cause continue
Mulate custom
Set handshake custom OFF BBC
Special funct'n locally None
Special Options Sully/Half Parity
Reset Soft Hard
SHIFT/CONTROL FUNCTION KEYS
!B Print Screen.
!C Mode 7
!D Reset XMIT block.
  
```

TERMI

32K

This program enables the BBC machine to act as an advanced terminal when connected to another computer or to a modem via the RS-423 (RS-232) interface. This provides facilities to transmit data from disc and the spooling of data from the 'line' to the disc or printer. Termi has 3 modes of operation — dumb terminal, BBC graphics terminal and customised intelligent terminals including DEC VT52.

£28.00 + £1.00 p&p + VAT

coming soon!
BASIC COMPILER
ROM

COMPUTER CONCEPTS



Dept. BMU 14

16 Wayside, Chipperfield, Hertfordshire. WD4 9JJ Telephone: Kings Langley (09277) 69727

- The complete AMS disc drive package, tailored to your BBC micro, is compatible with all disc interfaces and includes cables, a comprehensive manual and utilities on disc and EPROM. Housed in a steel case, matching the BBC micro, these reliable and robust Hitachi 3" disc drives are the ultimate for home, office and classroom.
- The 3" disc is totally enclosed in rigid plastic and a unique automatic steel shutter protects the delicate disc surface from dust and finger marks. For the first time discs can be used in industrial, educational and commercial environments without the worry of corrupting precious programs and data.
- The disc is "flippable" like a cassette tape and has a storage capacity of 100K on each side in single density mode (twice as much when used with a double density interface). A neat plastic switch can be flicked back and forth to write-protect valuable discs.

- The AMS disc drives are completely hardware and software compatible with 5¼" drives which can be used in parallel so allowing easy transfer of software. Consequently the 3" drives will operate with all the standard floppy disc interfaces. They take their power from the outlet provided by the BBC micro – there's no onboard power supply to corrupt data.
- The AMS package includes utilities on both a disc and an EPROM for formatting and verifying discs. The EPROM, which is easily fitted, offers a simple to use and permanent alternative to using the utilities disc.
- The impressively engineered Hitachi 3" drives feature an eject button allowing single handed operation, a multi-colour LED indicating the disc side in use, and a brushless direct-drive motor for reliable operation. The super fast track-to-track access time of 3ms is at the forefront of disc drive technology. The longest of programs are loaded in a flash.

Advance with AMS

3" Disc Drives – The Ultimate Choice

Single 100K – £225
 Double 200K – £399
 includes VAT and delivery
 to your door



Reliable delivery

If not available from your local dealer fill in the coupon below and we will send it to you with our full no-quibble money-back guarantee.
 Advanced Memory Systems Ltd, Green Lane, Appleton, Warrington, WA4 5NG
 RING 0925 62907
 24 HOURS 62682.

TO: Advanced Memory Systems, Ltd, Woodside Technology Centre, Green Lane, Appleton, Warrington, Cheshire WA4 5NG.

Please send me by door-to-door courier:

- Qty AMS-3 (S) single disc drive all inclusive package at £225 each
- Qty AMS-3 (T) twin disc drives all inclusive package at £399 each with two free discs.

Prices include EPROM, utility disc, cables, manual, VAT and delivery.

Please send me by post, if not with drives:

- Qty double sided (100K x 2) discs at £4.95 each.
- Qty packs of five at £22.50 per pack.

I enclose a cheque for £ or debit my credit card

No _____

Name _____

Address _____

Post Code _____ Tel No _____

Signature _____ Date _____

Please allow up to 28 days for delivery.



Hitachi – in a word reliability

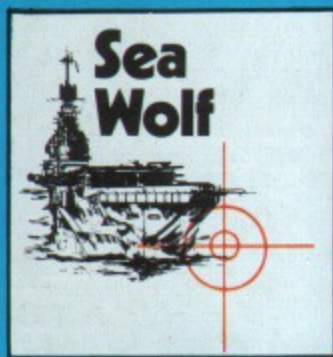


OPTIMA SOFTWARE



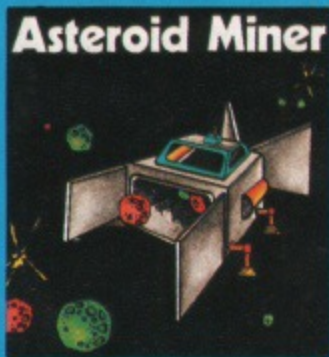
Atomic Protector
As a robot at a secret research establishment you are left in charge of the uranium deposits — your only means of life support. You have to defend the isotopes from the ruthless attacks of hostile infiltrators.
To add to your troubles, one by one the intruders begin to achieve critical mass — you must catch and deal with each as soon as possible if you're to survive.

£8.95



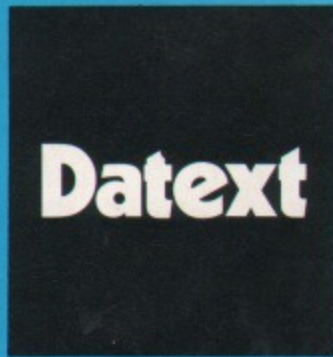
Sea Wolf
So far all has gone well. You have successfully guided your submarine safely through enemy controlled waters and you are beginning to relax.
Suddenly alarm bells scream in your ears — you are under attack! Desperately you scan the radar screen. Should you try to get him within range of your torpedoes, or attempt evasive tactics? Can you lead your crew to safety?

£8.95



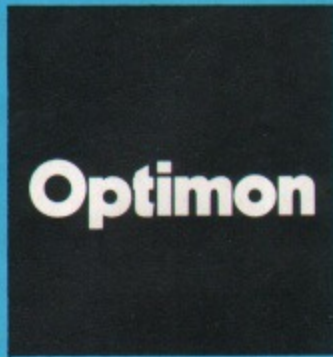
Asteroid Miner
A truly original all-action machine code game that will test you to the limit.
As you battle to harvest precious metal from the asteroid swarm, you have to combat an unscrupulous rival who stops at nothing.
Can you gather enough asteroids to survive? Are you skilful enough to avoid your opponent's neutron mines?

£8.95



Datext
A high-powered, easy to use teletext editing and library program.
With Datext you can create colourful teletext pages simply and speedily, storing them for later recall.
Uses for this versatile utility include shop window displays, school newspapers, personalised story books for children, and many more.

£9.95



Optimon
A full machine code monitor, designed to help the average programmer.
Its many features include two modes of memory dump, full disassembler with OS calls labelled, intelligent block memory moves, a speedy string and hex byte search.
Beginners will find Optimon's ability to display the opcodes for all 6502 mnemonics invaluable.

£9.95

Software. With a touch of brilliance

Please send the following cassettes, BBC Model B version.

Qty.		Price (incl. VAT)	Amount
	Atomic Protector	£8.95	
	Sea Wolf	£8.95	
	Asteroid Miner	£8.95	
	Datext	£9.95	
	Optimon	£9.95	
		TOTAL:	

Add 50p for post and packaging (post free for 2 or more)

Name

Address

.....

.....

.....

.....

I enclose cheque made payable to Optima Software Ltd.

I wish to pay by No.....

Access Visa Expiry date

Optima Software Ltd., 36 St. Petersgate, Stockport SK1 1HL.

ARE YOU SERIOUS?

STOP PRESS – REPLICA II NOW AVAILABLE

(now compatible with Acorn, Pace and Watford DFS)
In addition to the features below it also works with Acornsoft "locked" programs plus very long programs (HEX & E00 to 7B00)

available at
BOOTS

NOW ON 3" DISC

Ring to check compatibility if you are NOT using Watford, Acorn or Acorn DFS.
Hotline 0606 48511

REPLICA II and THE KEY give you, the user, what you want. You have bought your disc drives and now want to take advantage of them, but most of your favourite software will not run with the disc interface and even if you are prepared to pay out for disc versions of everything you can't get them and if you have 80 track drives you might as well give up. If you know everything about the DFS, memory locations, saving procedures etc, you can probably save some of them onto disc. What's a half hour per program, and it only takes a few minutes to find, load and relocate it each time (if you can remember the sequence).

On the other hand you could buy REPLICA, enter a few details i.e. 1) program name, 2) number of sections, 3) CHAIN, *RUN or *LOAD 4) press play and then make a cup of tea whilst the program loads from cassette for the last time. When you return the program will be on the disc and shown in a menu under the name you gave it. There are now only two alternative storage methods required and one of them will work with most programs. There are some exceptions to REPLICA II but the number is insignificant. Many users have purchased 4 or 5 copies of REPLICA and it is now the recognised format that dealers use to display their software.

REPLICA II will now hold up to 16 programs on each disc, they can be erased if required and a new batch saved, but why not just buy another REPLICA and keep your programs on disc permanently (it only costs approx. £1.00 per program).

REPLICA II £12.00 (state 40 or 80 track)

THE KEY

THE KEY provides you with the facilities that should have been included in the Disc Filing System and also helps you reach the parts other discs can't reach. This new version of THE KEY has been made compatible with ECONET at the request of many schools, colleges and universities. The whole program has been turbocharged and the facilities are:

- 1) FORM40 – now much faster.
- 2) FORM80 – now much faster.
- 3) BACKUP – has that effect on some people because it allows even most of the protected discs to be backed up – faster too.
- 4) EDITOR – display, read and alter sectors, even if you can't list the program. Highlight any byte whilst searching, make additional searches, edit bytes – now allows entry in HEX or ASCII and in string format. Dump a sector to printer, file pointers etc etc. You can now see how data is stored on a disc and alter it if you wish. Of course, it's also faster.
- 5) RETRIEVE – don't despair when you have a corrupted disc or if a program is accidentally deleted, using RETRIEVE your worries are over.

With so much from one utility it is no wonder that THE KEY is outselling programs that cost the same but provide far less.

THE KEY £12.95

(state 40 or 80 track)

available at
BOOTS

GRAFKEY/GRAFDISK

The first and best CAD program for the BBC Micro. Used in education, business, art, video etc. Recommended by LASERBUG, BBC MICRO USER, PCW, SOFT and thousands of satisfied users (see earlier issues of BBC Micro User for screen pictures). In a comparative review of the major CAD programs PCW said: "Considering the options it is by far the best value". Need we say more, if you need a graphics utility then this is it.

GRAFKEY (joystick & keyboard) **£9.00**
GRAFDISK (state 40 or 80 track) **£12.95**

SHADOW

A tape cloning program that will enable you to make security backups of your valuable cassette based software.

SHADOW works with 99% of all known programs including those with "locked" sections or those containing 300 BAUD sections. Handles programs of any length and works with any operating systems.

SHADOW is the definitive tape backup system. Also on the same tape is a very useful program called "INSPECTOR" which allows the user to page through memory, search for a string, etc.

BOTH PROGRAMS £8 incl.
(This program for personal use only).

JOYSTICK UTILITY

Converts non-joystick programs to work with joysticks. Works with any program using INKEY(-), which applies to most programs. Easy to use, just press the keys you want to transfer. Supplied on cassette but can be transferred to disc.

CASSETTE **£6.00**

available at
BOOTS

SINGLE KEY ENTRY

Requires 1.2 O.S.

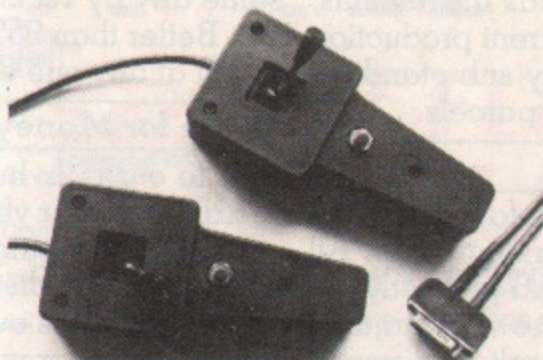
A very useful utility that provides single key input of 66 key words. Just like having 66 function keys. Compatible with issue 1 & 2 basic and discs.

CASSETTE **£5** inclusive

JOYSTICKS

Pair of fully proportional joysticks of compact and handy size

£17.95



EDUCATIONAL CORNER

(for the 5-11 age group)

THE GARDEN – 3 programs with superb graphics. Covers: colours, spelling and understanding. Cassette **£8.00**

COUNTING – robots, rockets, flowers, etc. Excellent graphics, good range. Cassette **£6.00**

MATCHING – 4 programs covering numbers, words, shapes and patterns. Cassette **£7.00**

HUE-MEN – A superb teaching-aid, using animation techniques in Mode 7. A hit with adults and children alike. Cassette **£6.00**

And now **SHAPE MEN** using the same techniques. This is the second in an integrated approach to teaching. **£6.00**

INTRO – A simple programming language which uses the immediate visual response of "Turtle" graphics to introduce a number of programming concepts and techniques. Cassette (and 9 page manual) **£10.00**

PROGRAMMERS

We are constantly seeking new and interesting programs. Why not send yours for appraisal? You have got nothing to lose but much to gain – So why not send your program today? 40 track disc if possible or two copies on cassette. In some cases we will even provide disc drives against future royalties.

CLARES MICRO SUPPLIES



Dept. BMU2,
98 Middlewich Road,
Northwich,
Cheshire, CW9 7DS.
Tel: 0606 48511

All prices inclusive of
VAT + Carriage – No Extras.

“I was pleasantly surprised to receive your parcel yesterday only 2 working days after I first wrote to you – not many suppliers in the small computer market manage such a fast turnaround time.”

J.L., London

BBC Microcomputers		Price £ inc VAT
ANB01	BBC Microcomputer Model B	399.00
ANB02	BBC Microcomputer Model B + Econet	447.51
ANB03	BBC Microcomputer Model B + Disc	498.19
ANB04	BBC Micro. Model B + Disc & Econet	545.20

BBC Microcomputer Compatible Disc Drives		
BBC31S	Single 100K drive	201.25
BBC31D	Dual disc drive 2x100K	362.25
BBC32S	Single 200K double sided drive	258.75
BBC32D	Dual double sided disc drive 2x200K	483.00
BBC34S	Single 400k double sided 80 track disc drive. 40/80 track switchable	327.75
BBC34D	Dual double sided 80 track disc drive 40/80 track switchable	603.75

All disc drives supplied with connecting cables, utilities disc and manual.

BBC Microcomputer Compatible Floppy Discs		
BBC40TS	Single sided 40 track discs Box of 10	17.25
BBC40TD	Double sided 40 track discs Box of 10	28.75
BBC80TD	Double sided 80 track discs Box of 10	36.80

BBC Microcomputer Compatible Monitors		
14MON	Microvitec 1431 colour monitor	247.25
12MNON	NEC 12" high resolution monitor Green phosphor	159.85
9MON	NEC 9" high resolution monitor Green phosphor	148.35
STAND	Monitor stand	11.44

BBC Microcomputer Accessories		
ANC01	2nd Processor 6502	195.50
ANC04	2nd Processor 280	339.25
ANED1	Teletext receiver	225.00
BBC45	Pair of joysticks	13.00

BBC Microcomputer Upgrade Kits		
BBCA2B	Model A to B upgrade kit	69.00
BBC3	Disc interface kit	97.70
BBC3D	Double density disc interface kit	103.45
BBC7	Econet interface kit	70.00
ANB14	Speech interface	55.00

BBC Microcomputer Econet Accessories		
AEH18	10 Station lead set	28.75
AEH15	Terminator box	35.00
AEH14	Clock box	45.00
AES20	Fileserver Level 1	99.00
AES21	Fileserver Level 2	249.00
AEH17	100m Econet cable	99.00

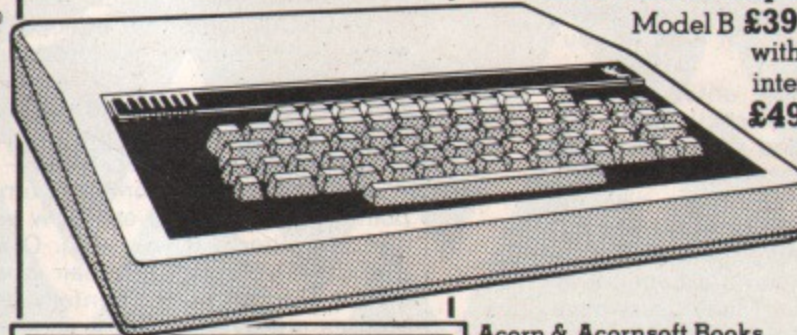
Acornsoft Languages		
SBL01	Forth cassette	16.85
SBL02	Lisp cassette	16.85
SBL04	Microtext cassette	55.60
SNL02	Lisp 40 track disc	19.90
SNL01	Forth 40 track disc	19.90
SNL04	Microtext 40 track disc	59.80
SNL03	BCPL Rom disc & Manual	99.65
SBB03	View ROM	59.80

BBC Microcomputer Cables and Connectors		
BBC21	Printer cable inc Amphenol plug	14.95
BBC22	User port connector + 36" cable	2.83
BBC23	Cassette cable 2x3.5mm + 1x2.5mm jacks	4.03
BBC24	7 pin din pl. (cassette int)	0.69
BBC25	6 pin din pl. (RGB output)	0.69
BBC26	5 pin din pl. (serial int.)	0.69
BBC27	5 pin din pl. (Econet int.)	0.69
BBC35S	Data cable single drive	9.77
BBC35D	Data cable dual drive	14.38
BBC36S	Power cable single drive	5.17
BBC36D	Power cable dual drive	6.32

“Once again, many thanks for your speedy and efficient service.”

B.Y., London

BBC Microcomputers Model B £399.00 with disc interface £498.19



Acorn & Acornsoft Books

SBD01	Creative Graphics	7.50
SBD02	Graphs and Charts	7.50
SBD03	Forth	7.50
SBD04	Lisp	7.50
SBD07	View guide	2.50
SBD08	Into View	2.50
SBD10	BCPL Manual	15.00
ANJ01	User Guide	10.00
BBC37	CCU DFS Manual	1.00

BBC Microcomputer Compatible Printers

RX80	Epson RX80 printer	310.50
FX80	Epson FX80 printer	425.50
LIST	Box listing paper 2000 sheets	14.95

“Thank you for your prompt, helpful service.”

J.W., Langley, Berkshire

“I am impressed with your quick and efficient service.”

R.N., Peterborough



Carriage Charges

Computers, Monitors, & Printers by Datapost	8.63
Disc drives, paper, 2nd Proc, Teletext Normal post	5.75
Books and joysticks by normal post	1.15
All other items by normal post	0.86

Terms

All items offered subject to availability. All prices include VAT which is charged at the prevailing rate (currently 15%) as shown above. Government, Local Authority and educational establishment official orders welcome. Account facilities available subject to status otherwise strictly cash with order. Credit cards (Access & Visa) accepted with no surcharge on all items except BBC Microcomputers. Full refund, if requested, on out of stock items.

Delivery

Most items are available ex stock and orders received up to 3PM will be despatched the same day.

Guarantee

All products are guaranteed for 12 months from date of purchase irrespective of original equipment manufacturers guarantee.

Telephone Orders

24 hour service (ansaphone after hours) available for telephone orders.

Prices: all prices INCLUDE

V.A.T. but NOT carriage. Please add the carriage to your order.

“Fantastic service- I wish more people were as ‘on the ball’ as you are.”

T.P., Tiverton, Devon

If you think our prices are keen, wait 'til you try our service.

Quality:

We only sell prime branded products from the industry's leading manufacturers such as Texas Instruments, Motorola, National etc. They are all current production with recent date codes. We do not buy sub standard products, manufacturers surplus or job parcels.

Reliability:

All systems' products are fully tested before despatch and are guaranteed to be in good working order. All faults reported are fully investigated and promptly put right. Investigation has revealed that the vast majority of these faults have occurred as a result of damage caused in transit.

Service:

All orders received by 3.30 pm are despatched that same day by 1st class post or Datapost, stock permitting. Better than 95% of the product range is in stock in depth at any one time.

Value for Money:

Due to our bulk buying power and low overheads we are able to offer very attractive prices for even modest quantities. A straight comparison of our price list with any franchised distributor will reveal a huge difference – in some cases our price is a third of the competition. There are no minimum order charges and our post and packing costs are actual costs.

For **FREE CATALOGUE** post to Midwich Computer Company Limited, Rickingham House, Hinderclay Road, Rickingham, Suffolk IP22 1HH.

Name _____

Address _____

Telephone _____

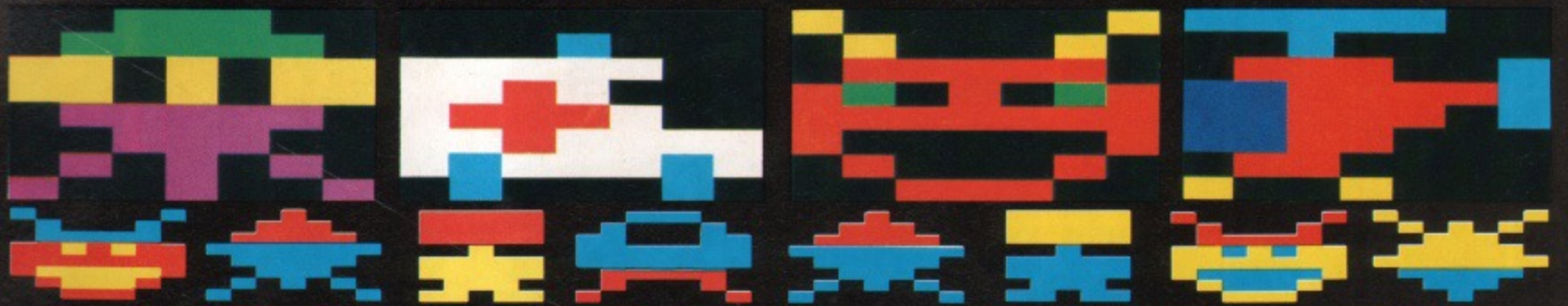
MU2

MIDWICH
COMPUTER COMPANY LIMITED

RICKINGHALL HOUSE, HINDERCLAY ROAD, RICKINGHALL, SUFFOLK IP22 1HH. TEL. DISS (0379) 898751.

Write your own 'Arcade Action' games without machine code.

YOURS TO CREATE AND COMMAND



with the revolutionary **SPRITE-GEN**
for the BBC microcomputer

SPRITE-GEN is an amazing and revolutionary piece of software. You can create multi-coloured fast-moving sprites quickly and easily without machine code. Until now, only experienced machine-code programmers could produce 'Ghost Gobbling Monsters' and 'Light Speed spacecraft'. With **SPRITE GRAPHICS** any character or object you imagine are at your command, moving smoothly at any speed in any direction. Supplied on cassette it can be used on disk.

Look at these features:

- * Up to 32 SPRITES on screen at any time.
- * Limitless SPRITE design using the SPRITE Generator program included in the package, allows ALL SIXTEEN logical colours "In each SPRITE" if desired. Full operating system capable of logical/actual colour assignment.
- * There can be up to EIGHT different SPRITE DESIGNS active at one time, each of which can have up to THREE "CLONES" (copies of the primary SPRITE but each with individual movement control).

* Each SPRITE actually has TWO images which given slight differences will achieve the animation effects when the two are alternated. Or, if you choose, give the two images totally different designs and you have created two SPRITES out of one, usable alternately. This technique can also be applied to the CLONES which means that all 32 SPRITES can be animated, multi-coloured, moving objects!!!

* Once you have completed the design of your SPRITES using the simple grid-based generator utility, they and the high speed machine-code routines that control their movement are secreted into RAM and the BASIC system is ready to accept your own program lines through which you can direct the SPRITES to appear, move, disappear or just remain stationary.

* SPRITES can be linked together in pairs or groups to produce large scale animation. Of course, if you wish they can be as small as a single pixel.

* Your own creations can move in front of each other with no loss of detail.

With **SPRITE-GEN** you can use your imagination and micro to the full for fun *and profit*. Ideal for Schools and Colleges. Comes complete with two brand new sample games and fully illustrated instruction manual at just **£17.95** (U.S. \$49.95)



SUPER - 7

The best value in arcade-type games available today. Seven exciting machine-code games in full colour and sound. Space Pilot Test, Guns of Navarone, Creatures of the Deep (COD), Fire Chief, Space Rescue, Chopper Chase, Bouncer. (BBC B Only) **Only £8.95.**

747 FLIGHT SIMULATOR

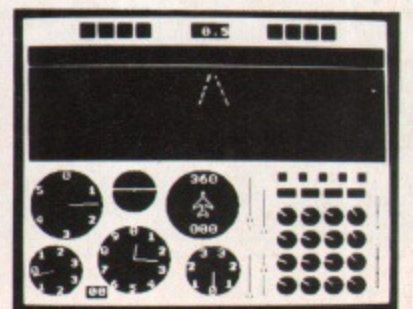
Now Electron!

BBC * Dragon * TRS 80 C/C * Electron

Exactly reproduces the flight deck of a 747, 21 real dials and 25 other indicators. You select passenger level, fuel loads and flight plan. Random emergencies make this one of the most exciting and taxing programs even written.

Your controls operate throttle, ailerons, elevators, flaps, slats, spoilers, landing gear, reverse thrust, brakes etc. Runway shown in true perspective to position, indicators show distance and bearing: Operates with two joysticks and keyboard.

"A real simulation, not just another game" (Your Computer, April '83)
Cassette £9.95 inc VAT (US \$27.95)



ACTUAL SCREEN PHOTOGRAPH

To DACC Limited, 23 Waverley Road,
Hindley, Nr. Wigan, Lancashire WN2 3BN. BBM/12

Please rush me:

_____ qty. SPRITE-GEN at £17.95 each

_____ qty. FLIGHT SIMULATORS at £9.95 each

_____ qty. SUPER 7 at £8.95 each

Please state machine.

I enclose a cheque/PO to the value of £ _____

Name _____

Address _____

_____ Postcode _____

DACC Limited,
23, Waverley Road,
Hindley, Nr. Wigan,
Lancashire WN2 3BN.



In US order from sole distributor:
Frank Ashton, PO Box 7037,
Chula Vista, CA 92012-7037.
(California residents add 6%)

MICROAGE - LONDON'S PREMIER

More an experience than a computer shop.

• A complete range of games, application and business software.

• Friendly assistant to offer help and advice when you request it.



• A library of books that give specific or general information.

The Acorn Expert

If you are thinking of buying a BBC Micro or the amazing new Electron, then come to Microage and benefit from our experience. We have been a dealer practically since Acorn started. In fact we have been selected by Acorn to be the *official* London Distributor. This means we get the latest products in quantity first.

The Amazing Acorn Electron - In Stock Now!

We have stocks of Acorns new Electron and all Acornsoft software. Come and buy one now. £199.

! £ Bargain of the Month £ !

BBC micro with Disk Interface, 800K disk drive, word processing ROM, Epson or Juki printer, Zenith Monitor, dust covers Basic Programming book, leads, paper and cables. Free carriage. Normal price £1,843. Save £244. Our price £1,599.



A Selection from Acornsoft

Snooker, Starship Command, Missile Base, Draughts and Reversi, Acardians all	£9.95
Personal Money Management, Arcade Action	£11.90
View	£59.95
BCPL	£99.95

A Selection from Computer Concepts

Wordwise, Beebcalc	£39.95
Disk Doctor	£33.00
Termi price on application	
Chess, Android Attack, Swarm all	£8.95

Some of our books

Easy Programming for BBC	£5.95
Basic Programming on the BBC micro	£5.95
Assembly Language Programming for BBC	£8.95
Discovering BBC Machine Code	£6.95
Creative Graphics, Graphs and Charts, LISP and FORTH all at	£7.50
30 hour BASIC	£5.95
BBC Micro Expert Guide	£5.95



BBC Machines

Model A, 32K RAM and 6522	£329
Model B	£399
Model B + Disk interface	£494
BBC dust cover	£3.95

Disk Drives

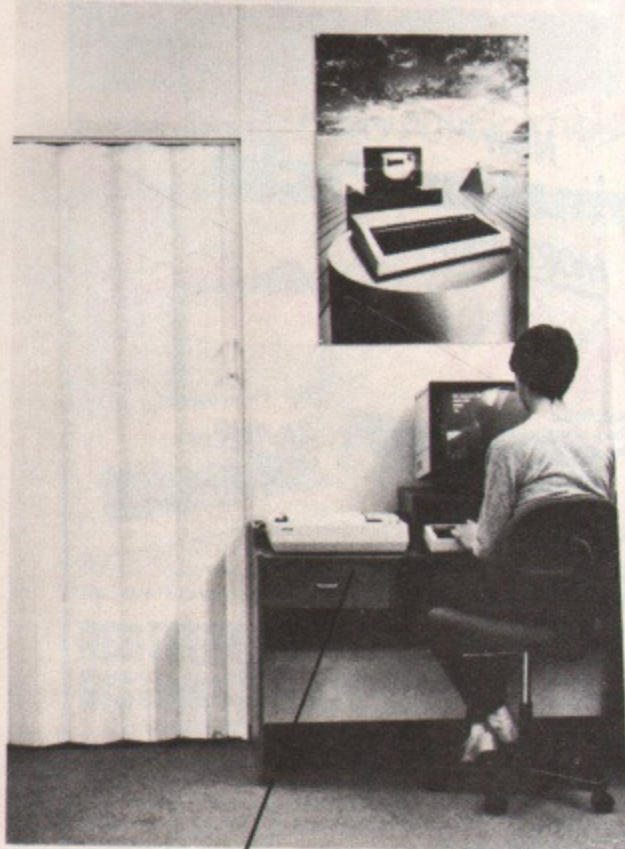
BBC compatible single disk drive (100K)	£235
BBC compatible dual disk drive (200K)	£389
BBC compatible single slimline (400K)	£399
Verbatim single sided diskettes 10 for	£22.50
Verbatim double sided diskettes 10 for	£39.95

Monitors

14" RGB Microvitec Colour Monitor inc. lead. (As used in BBC Computer prog.) Price dramatically reduced to Microvitec medium res. colour monitor. Price cut to	£245
12" Zenith High res. green screen monitor.	£369
The new model at	£95
BNC Cable	£4.95

HOME COMPUTER DEALER

If you are interested in joining the home computer revolution or adding to your present system, then come along to Microage. In a relaxed atmosphere you can browse through the best selection of computer products and peripherals in London. Helpful assistants who really know about the products offer unbiased advice to help you choose a personal computer or get the best out of your own.



• The Microage Space Station, you're always in command. Sit at the controls and you'll see everything laid out neatly before you.

There's room for your printer, monitor, keyboard, cassette recorder and disk drives – and a handy draw for programs and manuals.

The Microage Space Station takes off for just £49.95

Printers

Seikosha AP – 80A now	£189
Seikosha AP – 100A now	£215
Epson FX – 80	£430
Epson MX – 100	£460
Juki 6100 Daisywheel	£430
All printers include paper and cable.	
Printer Cable	£13
10" listing paper, 2000 sheets	£16.50

Miscellany

RH Electronics colour light pen	£39.95
BBC Compatible Cassette Player	£29.95
DIN to Jack Lead	£2
APTL ROM Board	£43.70
Official joystick per pair	£13
10 Blank C12 tapes	£3.95



• Business computers too!

• A complete range of personal computers.

Computer Users Data File

If you can't make it to the shop you don't have to miss out on our prices and services. Just write for our Computer Users Data File. 24 fact-packed pages of current stock and prices.



Microage Discount Card

Why not ask for our discount card guaranteeing you 5% discount off everything after your first purchase. All items subject to availability.

Institutional and Educational

Microage offer very competitive rates and quotations for quantity orders on all equipment including Econet networks. We have four years experience of supplying and servicing Acorn equipment in schools, polytechnics and universities.

POSTAGE RATES

Small items such as Ribbon, books and software:– 1 item £1.00, 2 items or more 50p per unit.

BY COURIER TO YOUR DOOR

Large items such as Computer Disk Drives and Monitors:– 1 item £7, 2 items £10, 3 or more £13.

Barclaycard and Access welcomed. All prices include VAT.

MICROAGE ELECTRONICS
135 HALE LANE EDGWARE MIDDLESEX HA8 9QP
TEL: 01-959 7119 TELEX 881 3241

GSL

A **GSL** COMPUTING PUBLICATION

COMPUTING NEWS

FEBRUARY 1984

ISSUE 4



The New Streamlined Winchester System

WINCHESTER SETTING THE STANDARDS IN EDUCATION

E-NET a flexible network system for the BBC microcomputer is now being installed within Education. "Doctor Challiners Grammar School" in Amersham are now operating a twelve station networking system using a 10 Megabyte Winchester Hard Disc unit.

NORTHERN SOLE DISTRIBUTOR APPOINTED

Due to increasing demand for GSL Winchester System, GSL Computing Limited has appointed a distributor to cover the North U.K. Market.

The appointed Sole Distributor for the North U.K. Market is:- Pace Software Supplies Ltd., 92, New Cross Street, West Bolling, Bradford BD5 8BS. Telephone (0274) 729306.

Read the next ISSUE of this magazine for further developments and information of the "GSL WINCHESTER SYSTEM" and newly appointed dealers.

Showroom facility at GSL enlarged

Peripherals always available

GSL has an extensive showroom displaying all their advertised products and more. Customers are encouraged to use the equipment on show and helpful advice and personal demonstrations are readily available.

GSL know from talking to their customers that nothing is more frustrating than responding to an advertisement and finding the advertised goods are out of stock or not readily available. GSL hold large stocks of all computer peripherals advertised.

The GSL range is constantly growing and currently includes:

- BBC MICROCOMPUTER
- SHUGART DISC DRIVE RANGE
- NEC PRINTERS
- EPSON PRINTERS
- PRINTER BUFFER
- MICROVITEC COLOUR MONITORS
- SANYO COLOUR MONITORS
- GREEN SCREEN MONITORS
- TORCH Z80
- VARIOUS SOFTWARE INCL. WORDWISE
- PRINTER PAPER

GSL Announce the Hitachi 3" Disc Drive

Due to the ever increasing demand for reliable 3" disc drives, GSL are now marketing the proven Hitachi 3" drive. Ideal for Education the Hitachi drive is reliable and robust. Cased in rigid steel the drive is coloured to match the BBC Micro.

The compact disc which is now standard in Japan are strong and easily stored, like a music cassette. By simply turning the disc over they give 100K per side. The 3" discs encased in rigid plastic are also protected by a mechanical tab which prevents overwriting of data.

Like all GSL disc drives the Hitachi 3" drive runs off the BBC power supply thus saving considerable money over drives using their own power unit.

GSL have also ensured that all their disc drives are compatible. The Hitachi 3" can be run in tandem with the Shugart 5 1/4" drives.

*Price including case, leads and utility disc £180.00 exclude carriage and packing and V.A.T.

E-NET allows up to 200 computers to share a common, large central disc store, and overcomes many of the inconvenient features of earlier network systems.

E-NET uses a hard disc unit as the central disc store, allowing upwards of 8 Megabytes of storage. It has effective, simple structures to limit the disc space available to any user, and to permit access by any user to library programs. Many users of the few simple networks installed so far have complained of the difficulty of monitoring pupil's use of disc space, but E-NET overcomes all these problems by doing the monitoring for you. You simply allocate a space limit to each user on the Hard Disc using the simple command program. For most schools and colleges this size disc will allow each user to have a reasonable file store, but it can be extended if required by adding further hard disc

units. Important files can be easily copied to minifloppies if required.

E-NET has many useful extra commands. For example a simple command which only operates from the master (teacher's) machine, and which forces each client machine (in a certain specified room or area) to load and run a particular program is included. This is very fast, and flexible, and allows for efficient use of C.A.L. packages. Care has been taken to ensure that the command structure is simple enough not to intimidate the non-specialist, while remaining flexible and robust.

E-NET allows one or more printers to be connected to the network and although this is connected to one of the network computers this computer can still be used even while the printer is in use.

E-NET is fast, simple to use and versatile. The first system being installed for use in September, and demonstrations can be arranged.

GSL Computing to Exhibit at London Education Exhibition

GSL are attending the first Acorn Education Exhibition being held in Central Hall, Westminster on 25, 26 and 27th January 1984.

"We realise the importance computers now play in today's education and we will be displaying, amongst our Acorn systems our own E-NET Winchester System designed for education" said Rod Lewis, GSL's Sales Manager.

He went on to say that there has, for some time, been a growing need to have a general review of systems available to educationalists and this exhibition is to be a major showpiece for that purpose. The exhibition systems will cater for primary schools through to universities.

We will be on Stand No. 1A and I look forward to the opportunity of explaining our systems in more detail.

For further details contact: Wendy Russell



Rod Lewis (left), GSL's Sales Manager, discussing E-NET's speed, simplicity and versatility with a customer.

	Price £
5 MB Winchester System	1650.00
10 MB Winchester System	1950.00
20 MB Winchester System	2400.00
65 MB Winchester System	4700.00
105 MB Winchester System	5130.00
140 MB Winchester System	7000.00
280 MB Winchester System	9500.00



The complete system is compact and easy to use.

EDUCATION APPROVED DISC DRIVES MATCHING ACORN BBC MICRO

All disc drives supplied in metal case finished to match the Acorn BBC microcomputer.

Shugart SA200 Capacity 100K — Price £144.50 including Leads.

Less than two-thirds the height of standard models, Shugart's single-sided SA200 5-25 inch minifloppy disc drive offers 125 or 250 Kbytes of capacity in a low cost highly reliable package. Low cost, compact size and high reliability make the SA200 an ideal choice for entry level desk top applications in personal computers, word processors, memory typewriters, portable computers or terminal add

ons. Package includes all interconnecting leads.

Shugart SA455 Capacity 200K — Price £238.00 including Leads.

Shugart SA465 Capacity 400K — Price £281.50 including Leads. Prices excluding carriage and VAT.

Shugarts SA455/465 half height mini floppy disc drive offer a compact alternative to standard height drives for desk top systems requiring maximum performance in a greatly reduced space. Since users can quickly double existing storage capacity by fitting two drives in the space formerly occupied by one standard minifloppy the SA455/465 drives provided and excellent means to increase storage capacity without increasing space.

Return to **GSL COMPUTING LTD**, 2 North Way, Andover, Hampshire SP10 5AZ

I am interested in the following: (please tick)

- The GSL Winchester System
- 5 MB
- 10 MB
- 20 up to 200 MB
- The GSL Slim Line Disc Drives
- Your full range of Micro Computers and computer peripherals
- GSL Analogue Signal Display and Analysis System
- GSL Printer Buffer

Name: _____

Position: _____

Company: _____

Address: _____

Phone: _____

Send me by return full technical information

or phone Rod Lewis on Andover (0264) 58744/51699

We are an official Acorn Dealer and Service Centre

Dealer Enquiries Welcome

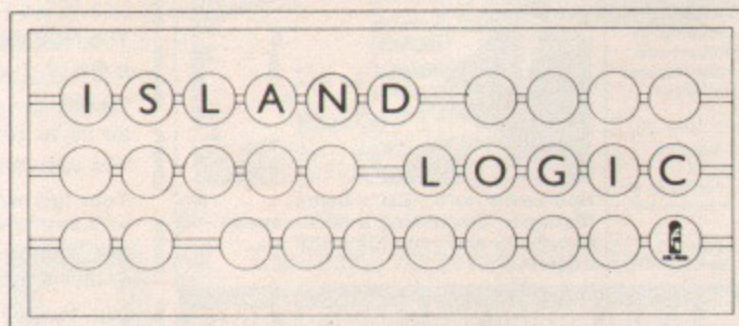
M.U.

The Space Invasion IS over!

It was a deserved victory, the alien attacks numbing an entire generation of terrestrial brains.

ISLAND LOGIC is a new company searching for TOMORROW'S software, programs that involve much more than a simple laser-gun response. Creativity is the keyword, We are interested in imaginative new projects that can both entertain and educate. ISLAND LOGIC can make your ideas a reality. The new software generation starts here.

ISLAND LOGIC 22 ST PETERS
SQUARE LONDON W6



ENTERTAINING INTELLIGENCE

BBC MICRO ^{IN} MANCHESTER

BBC MODEL

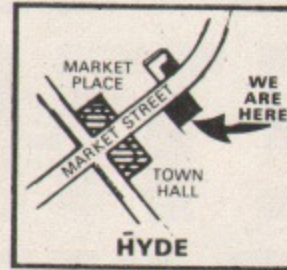
C

ONLY £499

includes Disc Interface and
Wordprocessor

C ★ TECH

COMPUTERS



184 Market Street,
Hyde,
Cheshire SK14 1EX

061-366 8223

BBC MODEL B	£399	BBC MODEL BD	£469	<i>Coming soon</i>	
BBC MODEL A	£299	Model B with Disc Interface		BBC SYSTEM X	£899
<i>All BBC Computers come with free cassette leads</i>				ELECTRON	£199

DISC DRIVES Complete – No hidden extras

100K SLIMLINE 55A (200K)	£179
400K SLIMLINE 55F (800K)	£279

NEW 3" MICRO DRIVE

ONLY £129.95 all inclusive

Complete 3" DISC SYSTEM with interface
ONLY £198.95

INTERNAL ADD-ONS Includes fitting while you wait.

Acorn DFS	£84.95	CTECH Chip Chat	£39.95
LVL Double Density DFS	£89.95	View Wordprocessor	£59.00
Acorn Speech Synthesiser	£55.00	Wordwise Wordprocessor	£39.95

MONITORS

Microvitec £249 Sanyo Green Screen £89

BBC ANALOGUE JOYSTICK

ONLY £14.95

PRINTERS includes Cables, Paper and Screen Dump Programs.

STAR 10-X

120 CPS, 10 character sets,
down loadable character set,
friction, tractor, roller feed.
Centronics I/F, true descenders,
etc.

ONLY £269

SILVER REED

EX500

DAISYWHEEL

A daisywheel at low cost from a
company with backup!

ONLY £299.00
+ VAT

MODEMS

OEL 200 PRESTEL MODEM

with 1200/15 and 1200/1200
at the amazing price of

£79.95 + VAT

Prestel and Micronet software
available NOW!!

SECOND PROCESSORS

6502 64K RAM	£CALL	Z80 64K RAM internal	£CALL
Z80 64K RAM	£CALL	6809 64K RAM flex O/S	£CALL

PRICES ...

All our prices are constantly moving, so
please ring us to check the latest price.

FREE DELIVERY TODAY

If you are in Greater Manchester, Cheshire,
Lancashire, Merseyside, West Yorkshire, South
Yorkshire or N. Wales, if you ring us now we
can send one of our highly trained staff to install
your computer equipment Today.

AS USUAL LOADS OF SOFTWARE AVAILABLE

RING 061-366 8223

YOU HAVEN'T SEEN ANYTHING LIKE THIS ON A COLOUR MONITOR BEFORE.

An RGB monitor from JVC offering a resolution of 370 x 470 pixels for less than £150?

We guarantee you won't see another bargain like that in this or any other micro mag—or in any other supplier's showroom.

For we've managed to acquire the sole distribution rights to these superb machines and we are able to offer them at an unbeatable price.

There are two models available: medium resolution (370 x 470 pixels) at £149.95; and high resolution (580 x 470 pixels) at £229.95. (Both excluding VAT.)

The units have a 14" screen and are suitable for the BBC Micro, Lynx, Oric, Apple, and most other leading micros.

They are robustly constructed in a handsome cream casing. And come with a full year's guarantee.

Delivery is good: your monitor should arrive by courier service within ten days of our receiving your order.

You can order by filling in the coupon below and posting to: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Or by telephoning 01-701 8668 quoting your credit card number. Or, of course, you can buy in person at our showroom between 9am-6pm Monday-Friday, 9am-1.30pm Saturday.

MODEL REFERENCE	1302-1 Medium Resolution	1302-2 High Resolution
RESOLUTION	370 x 470 Pixels	580 x 470 Pixels
C.R.T.	14"	14"
SUPPLY	220/240v. 50/60Hz.	220/240v. 50/60Hz.
E.H.T.	Minimum 19.5kv Maximum 22.5kv	Minimum 19.5kv Maximum 22.5kv
VIDEO BAND WIDTH	6MHz.	10MHz.
DISPLAY	80 characters by 25 lines	80 characters by 25 lines
SLOT PITCH	0.63mm	0.41mm
INPUT: VIDEO	R.G.B. Analogue/ TTL Input	R.G.B. Analogue/ TTL Input
SYNC	Separate Sync on R.G.B. Positive or Negative	Separate Sync on R.G.B. Positive or Negative
EXTERNAL CONTROLS	On/off switch and brightness control	On/off switch and brightness control



To Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE.

Please send me _____ Medium Resolution Colour Monitor(s) at £149.95 each (ex. VAT).

_____ High Resolution Colour Monitor(s) at £229.95 each (ex. VAT).

_____ Connection lead(s) at £6.00 each.

I understand carriage per monitor will cost an extra £7.00.

(N.B. A Medium Resolution Monitor including VAT, lead, and carriage costs £187.39. A High Resolution Monitor including VAT, lead, and carriage costs £279.39.)

I enclose a cheque for £_____. Or please debit my credit card account with the amount of £_____. My Access/Barclaycard (please tick) no. is _____

Please state the make of your computer: _____

Name _____

Address _____

Telephone: _____

Opus.
Opus Supplies Ltd.

BU6

THE DRIVE FOR QUALITY



In the rapidly expanding world of computer peripherals there is one company which continually leads the field — Cumana. Whether it is the best Japanese components used in our top quality designs, the rigorous training which all staff receive, or the superb technical service we offer, everything must be of the highest standard.

Cumana disk drives have an independent power supply, 12 months warranty, and are fully assembled and tested before packaging; and they are now available for the BBC and Dragon Micros — at unbeatable value for money prices — from selected branches of W. H. Smith and Spectrum UK in addition to Cumana's nationwide dealer network.

For further information on these and other Cumana products — including dual slimline disk drives for the BBC Microcomputer — contact:

Cumana Limited, Pines Trading Estate,
Broad Street, Guildford, Surrey, GU3 3BH.
Tel: (0483) 503121 Telex: 859380



Dragon is the registered trademark of Dragon Data Ltd.

For further information about Cumana disk drives, please complete and return this coupon.

I am interested in Cumana disk drives for the BBC/Dragon* Microcomputer. *delete as necessary

Interests:
Home Use
Education
Dealer
Business

Name

Address

Tel. No.

Note: If dealer, please attach this form to your letterheading

RMU/84

Sometimes even
the best of friends
need something
new to say
to each other...

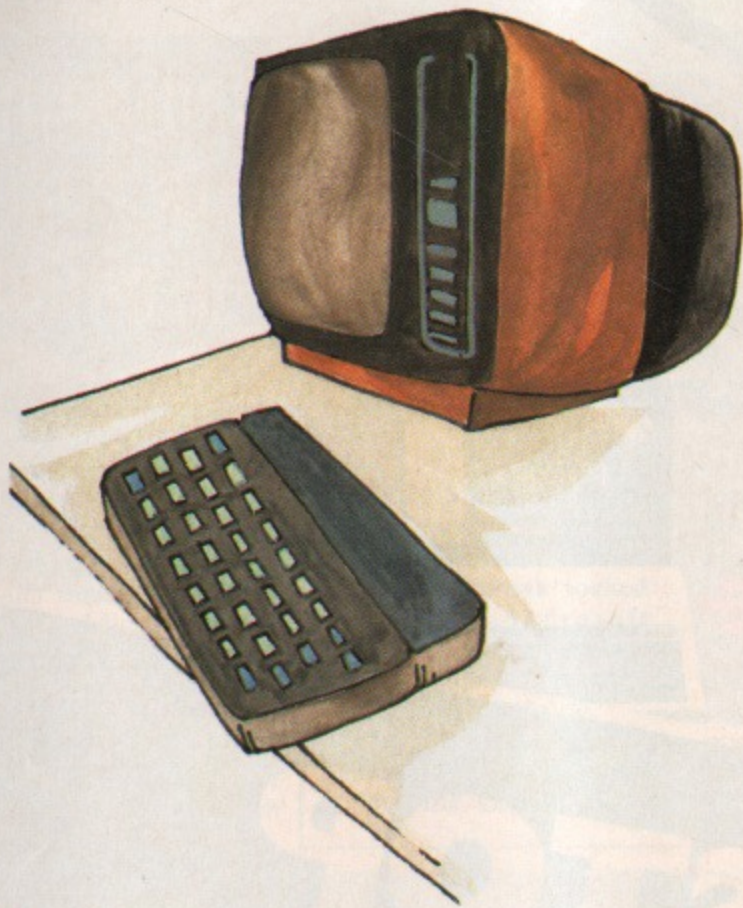


“I want

To get that excited feeling back again.
Lots more software. But I can't afford it all the time.
Lots of new programs. I know all mine backwards.
To swap notes with other people who love computers.
To know more about computers. And to use what I know.
Most of all I want my computer to do more!

and I don't want

To have a lot of hassle.
Or spend a fortune.
Or have to tramp for miles to find it all.”



You get

An amazing new world of fun and learning. A system that puts more muscle into many popular makes of micro.

Dozens of free computer programs and scores of exclusive software bargains. *Through your own 'phone line.* A whole sophisticated 2-way communication system. Prestel™ – the world's biggest viewdata system, under your control.

and you don't have to spend a fortune to get it all now.

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

I would like full details on Micronet 800.

Name _____

Make/Model of Micro _____

Address _____

Telephone _____

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

BMU2

micronet
800

It's enough to blow the mind of any micro



One of the many faces on Prestel

Turtle Graphics

Native Code Generators

Cross Assemblers

Z-80

8088

CROSS

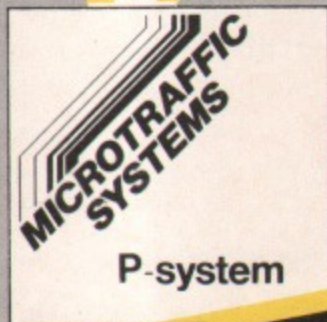
FORTRAN 77

UCSD PASCAL

UCSD BASIC

68000

6502



LET'S STOP PLAYING GAMES

The BBC micro is a great computer if you want to play games and learn about computing.

However, if the time has come for you to stop playing games and get on with the real business of producing professional programmes for the microcomputer market, you need the UCSD p-system from Microtraffic Systems.

Program Development environments.

The UCSD p-system is the fastest growing software development system for microcomputers. Microcomputer manufacturers, software houses and more than 50,000 end users have already made the p-system their choice. And more are doing so every day. This is because:

- p-system users can write program modules in Pascal Fortran, Basic and Assembler and integrate them into a single application program.

- p-system application programs can run on the widest range of microprocessors viz:- Z80, 8080/8085, 8088, 6502, 6809, 9900, 68000, PDP-11 and LSI-11.

- the p-system is the friendliest and most powerful professional program development environment available for microcomputers today. With program chaining and dynamic overlays the largest applications programs will run on the smallest machines. With single keystroke commands and a continuous display of available options, the operating system, editor, filer and other utilities are simple, yet sophisticated programs to use.

Ring Microtraffic today & we'll tell you the whole story.

MICROTRAFFIC SYSTEMS LTD.,
MELBOURN SCIENCE PARK
MOAT LANE, MELBOURN,
ROYSTON, HERTS SG8 6EJ.
TEL: ROYSTON (0763) 62221
or CAMB. (0223) 207627
TELEX: 817932 CAMTECH G



Tape-disc transfer

PEOPLE who have bought Acornsoft programs on tape now have the opportunity to put them onto disc – legally.

Acorn has launched a service which will transfer the program from tape to disc.

All the customer has to do is to send the cassette

to Acornsoft which will copy the program to disc.

The charge will be half the price of the disc version of that program.

The address to send the cassettes to is Acornsoft, c/o Vector Marketing, Denington Industrial Estate, Wellingborough, Northants NN8 2RL.

Three inch discs are rolling in

THREE inch discs seem to have come of age with the announcement that a leading producer of disc based software is to market its products on the smaller discs.

Clares Micro Supplies of Cheshire, publishers of The Key and Replica, has joined forces with AMS of Warrington and plans to offer the whole of its range on three inch discs.

Said Dave Clare: "We see a great future for the three inch drives, particularly in the educational field".

THE pre-Christmas BBC Micro User Show was such an overwhelming success that many exhibitors have already booked for the next show.

It will be held at the New Horticultural Hall, Westminster, from March 29 to April 1.

Full report on December's show starts overleaf.

Network group

A BBC Micro network user group is being started at Bedford College of Higher Education.

Anyone interested in more information should contact Mike Taylor at The Computer Centre, Bedford College of Higher Education, (Mander) Cauldwell Street, Bedford

Unlocking programs costs firm £65,000

FURIOUS that the magazine *Personal Computer World* published details of how to break locked programs, Acornsoft took legal action, forcing the publishers to settle out of court for £65,000.

Said Editor Jane Bird: "One feels a bit sad about it, but the situation was

that it could have been a long battle and we would have lost the issue".

Injunction

Acornsoft had demanded that the offending issue be removed from the bookstalls and took out an injunction claiming that the publishers were

"inviting others to infringe Acornsoft's copyright".

Despite their surrender, PCW feel that they were right in publishing the details since this allowed disc users to transfer their programs from cassette.

Now that it has become public knowledge could

we publish the details, having courageously restrained ourselves in the past, we asked the Acorn spokesman.

"Yes, if you want. We'll add the money we get from you to the coffers – we're using it to find a new way of locking programs", he said.



LATEST arrival at Little Green School, Rickmansworth, is a fully programmable robot controlled by a BBC Micro.

★ ★ ★

EDUCATIONAL software from Golem is now available on 40 track single sided disc, as well as in cassette form for the Electron.

Already widely acclaimed in educational circles, the new formats should ensure an even wider distribution.

DEMAND IS UP FOR THE BBC MODEL A

REPORTS from dealers that Acorn has stepped up production of Model A BBC Micros owing to a component shortage were discounted by a spokesman.

"We have increased production of Models As, but this is solely due to increased demand from

dealers", he said.

Acorn does admit, however, that it has been restricting the supply to Model As.

Apparently dealers had realised they could make a better profit by ordering Model As with upgrade kits than by ordering the Model B complete.

New range of Acorn books

RATHER than publish directly through Acornsoft, Acorn has launched a range of books in conjunction with Penguin, the paperback publishers.

First in the range are two books for the Electron, "The Acorn Guide to the Electron" and "Games and Other Programs for the Acorn Electron".

The former contains much information about add-ons and second processors for the Electron.

Several more titles are planned such as Jonathan Griffiths' "How to Write Arcade Games", a rewrite of the excellent book, "Creative Assembler", which was to be published by Acornsoft.

Peter Killworth's "How to Write Adventure Games" will also be part of the new series.

Whizz kid Janet, 5, scares off politicians

ALL three main political parties pulled out of a trial by computer after the news leaked out they would be competing against a five-year-old electronic whizz kid.



Janet cuts a tape to open the BBC Micro User Show

The contest designed to prove who can best run the country's economy was scheduled to take place at the official opening of the BBC Micro User Show recently.

However, it was learned at the last minute that the Tories, Labour and Liberals had all got cold feet and would not be turning up at the Westminster Exhibition Centre in the Royal Horticultural Halls.

Only the SDP was in fact prepared to send along a representative, Lord Perry, a former member of the party.

But once informed that the big three would not be there, he also backed out, if somewhat more gracefully.

Contest

This left pretty, five-year-old Janet McKnight, the daughter of a London college lecturer, to demonstrate her computer and political skills alone at the launch of the four day event.

The format of the contest was to have been Simon Hessel's game - Great Britain Limited - which allows each player to become at one and the same time Prime Minister and Chancellor of the Exchequer.

After making top level decisions on the economy over a five year period - the computer assesses the likelihood of the player being re-elected for another term in government.

"We had had discussions with the parties for several weeks over whom



The Sun picture

Show celebrity Janet McKnight was in great demand from the media on opening day, culminating in a visit to broadcasting house to be interviewed by Radio One DJ Mark Page.

they would be sending along", commented Mike Bibby, Features Editor of *The Micro User*, the show's organisers.

"And we were led to believe there would be a representative from each. But what we hadn't told them was that for a bit of fun they would be pitting

their wits against a child.

"Once the news leaked out, they obviously didn't want to end up with egg on their faces if the youngster topped the poll. But she still went ahead to demonstrate how effectively a child can run the country".

"The situation proved,

what a lot of people have suspected for a long time: even the smallest child can teach our political masters a thing or two..."

Said Janet McKnight: "I don't really want to be bothered with running the country. I'd rather play Snapper".

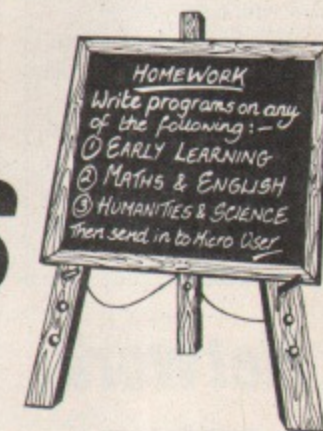
EXIT THOSE BLACKBOARDS

ONE of the highlights of the show was the Electronic Classroom, and it created the most interest among educationalists.

Both pupils and teachers were able to experience how, despite the total removal of blackboard and chalk from the classroom environment, the BBC Micro is able to form part of a structured educational environment.

Star performer was the UTAC video-controlled unit, a pseudo-network for the BBC Micro, offering the ability to monitor and interact with each pupil far more cheaply than with standard methods.

Keyboard Training demonstrated the capabilities of the system with their TechniTouch package - a program designed to teach keyboard



familiarity using colour coding.

Such was the popularity of the classroom that it is scheduled to be a regular feature of future shows, the next of which will be held, again at the New Horticultural Hall, from March 29 to April 1.

Walk-in forum was great success

GATHERING place for the BBC Micro addict was the walk-in forum, the general public's chance to interrogate *The Micro User* experts.

Almost every aspect of BBC Micro lore was covered in a series of talks that were as entertaining as they were informative, ranging from machine code for the beginner to advanced interfacing.

Said one appreciative member of the audience: "It's the first time I've felt really comfortable asking questions after a lecture.

"I felt the speakers were there to share what they'd discovered about the micro with their fellow explorers rather than just display their superior knowledge".

Another enthusiast commented: "It was nice to hear people speak who obviously enjoyed their

micro as much as I do – and admitted to making the same silly mistakes".

Highpoint of the forum was the Any Questions session where it became less of a lecture and more of a discussion between BBC Micro freaks, some of whom just happened to be standing on the plat-

form.

The forum also gave people the opportunity to meet *Micro User* writers in the flesh, and in some cases put them firmly in their place.

"Are you Mike Cook?" asked one fan. "Your articles make you seem much taller".



PUBLIC response certainly proved that Com-motion had chosen the right name for their company.

The area around their stand was a constant traffic jam – and all because of the Microrobotics' Beasty.

The Beasty is an interface providing a simple means of driving servos, the precision geared electric motors that aeromodellers use to control their models.

As the accompanying literature puts it, a servo "allows you to twist, turn, push, pull, lift, lower, open and close almost anything".

No wonder that Beasty, with its power to control four servos from the BBC Micro, has been heartily welcomed by robotics fans as a low-cost introduction to the subject.

At *Micro User* we were so impressed that we've made it both the subject and prize of this month's competition, as you'll see if you turn to Page 55.

Zoom in with Bit Stick

MAIN focal point on the Acorn stand was the amazing Acorn Bit Stik. It was surrounded by fascinated crowds on each day of the show.

The reason wasn't hard to see. Even expert users who have become accustomed to the BBC Micro's graphics were excited by this remarkable add-on.

The Bit Stik resembles an up-market joystick. Yet it is at the heart of a highly sophisticated computer aided drawing pack-

age.

It allows the user to create high-resolution graphics simply and relatively cheaply.

The software provided encourages the user to "dither" colours, permitting multi-coloured shading of screen areas.

Perhaps the most striking feature is its ability to zoom in on pictures. This means that sections of the drawing can be enlarged or reduced at will.

The package, which should be available by the

end of March, will cost £350, including the Bit Stik itself and its ROM based software.

Although it needs the 6502 second processor and dual 80 track drives to enable it to run, the system should be a cost-effective introduction to CAD for many small businesses.

● Also displayed on the stand was Acorn's Prestel Adapter. Looking very much like the Teletext Adapter, it should sell for £90.

SECOND PROCESSOR A BIG DRAW

ATTRACTING a great amount of interest was the Z80A second processor for the BBC Micro displayed on the Watford Electronics stand.

At £299, this must be seen as a serious rival to the official, still to be released, Acorn product.

Watford's second processor is in fact a totally stand-alone computer and thus can be used independently of the BBC Micro.

As such it features a Z80A running at 4MHz with 64k of RAM, with the possibility of adding another 64k onboard.

The unit contains its own disc interface capable of dealing with 40/80 track discs, single or double density.

This interface shares the drives with the BBC Micro. It can even operate without a disc interface inside the BBC Micro.

Supporting all the OSBYTE, screen and sound facilities, the system has fully licensed CP/M 2.2 – which opens up huge amounts of ready-to-run software to the BBC Micro.

Designed

Watford have done this by taking a standard industry product designed to interface to an RS232 computer terminal and

marrying it to software that makes the BBC Micro emulate such a terminal.

The result is an "instant" second processor for the BBC Micro which is capable of considerable expansion. Boards developed for the original system already include an IEEE interface, extra RAM, real time clock and prototype boards.

Scheduled for release in the very near future, the unit comes complete with power supply in a standard half-height drive case.

Secret of the black box

ONE of the *Micro User* experts was intrigued when he received a request for technical help from the Economatics stand. Some outside force appeared to be interfering with the equipment.

The Microvitec colour monitor was displaying a near perfect colour spectrum (no, not a Sinclair). There were regular graduations of colour bands ranging from red at the top of the screen to blue at the bottom.

But the display should, in fact, have been completely blue.

Had alien invaders finally landed? Or was some more mundane terrestrial force really at work?

The solution to the problem proved to be remarkably simple.

On the top of the monitor was a harmless-looking black box which turned out to be a loud speaker. The removal of the offending object restored the display to normal.

What happened was that the magnet in the speaker was bending the electron beams to produce this unusual effect.

While on this occasion the result was nothing more than a nuisance, the people at Economatics are now wondering if they are on the verge of discovering a new art form. . .

Graphic upgrade for Beeb

ROM-based software took a great leap forward at the December Micro User Show in London.

Computer Concepts, the people who produce the Wordwise word processor chip, have produced a Graphic Extension ROM.

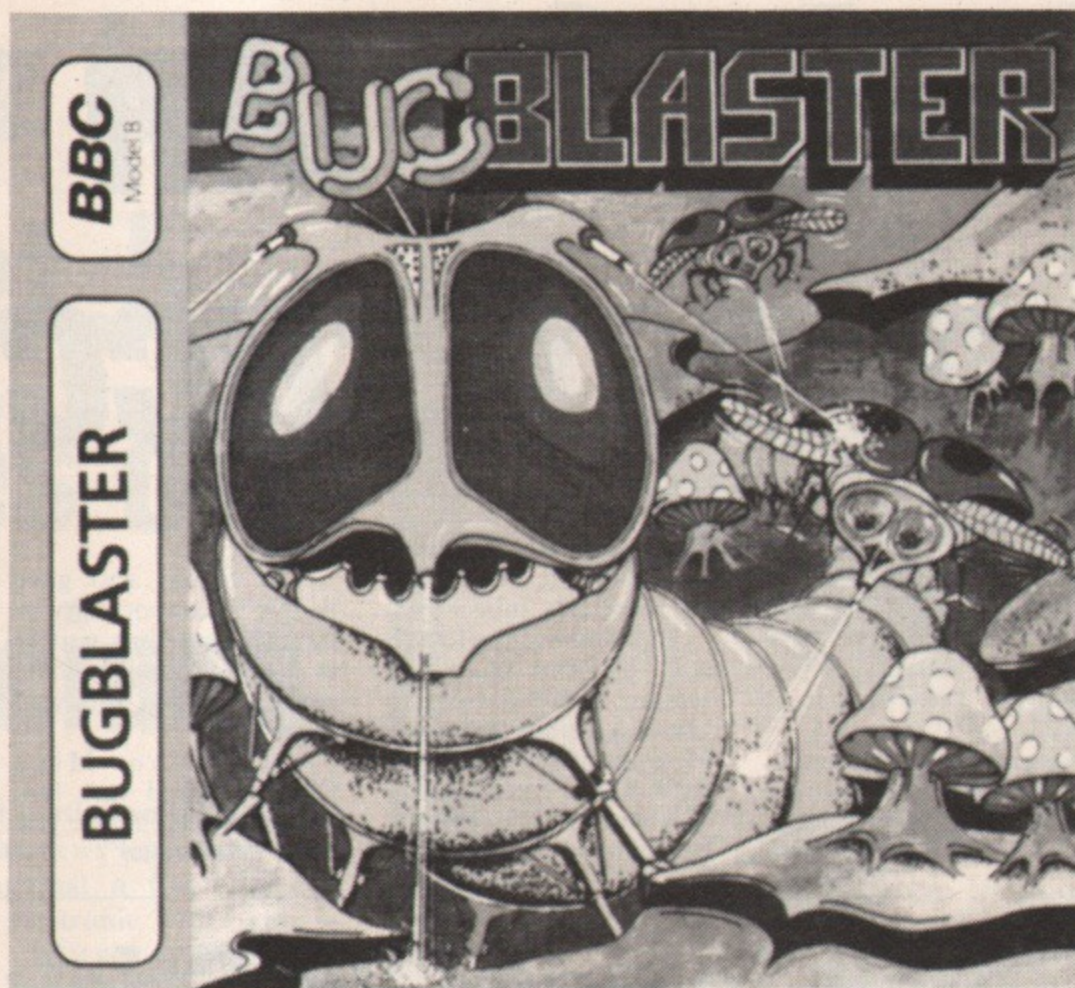
This adds 30 new commands to the BBC Micro, allowing users to take full advantage of its graphics capabilities. Sprites and Turtle graphics are available, as is the 16 colour, 80 by 256 resolution Mode 8.

Bradford-based Pace Disc Systems chose the show to display two new pieces of ROM-based software, Toolstar and Commstar.

Toolstar is a toolkit utility aimed at reducing program development time. It allows manipulation of Basic programs and machine memory, aiming at giving the user the "commands that the OS forgot".

The second ROM is Commstar, which promises to give the BBC Micro an "intelligent communications facility".

This allows communication with other computers and access to Prestel and other databases via a suitable modem.



Games galore on show

ALLIGATA Software chose the BBC Micro User Show to launch a new range of games for the BBC Micro.

The new titles include Eagle Empire, Neanderthal Man and Dam-busters.

At the same time they have released Bugblaster, Lunar Rescue and Fruit Machine for the Electron.

Other new offerings from the Sheffield-based firm include three home/business utilities for the BBC Model B.

Flexibase is a database, the oddly-named Alligatacalc a simplified accounting package and Scribe II a word processor system.

New add-on boosts BBC micro by up to 20k

HARDWARE add-ons were a major part of the BBC Micro User Show, and none attracted more interest than the 20k RAM upgrade from Aries.

The Aries-B20, as it is known, allows you to gain an extra 20k of memory by intercepting the official Acorn calls to the screen and switching them to its own on-board memory.

This ensures that the BBC Micro's RAM, normally tied up with screen

memory, is free for Basic programs – an increase of up to 20k in program size.

One minor drawback is that programs that directly address the screen, bypassing the official Acorn calls, can't take advantage of this extra memory, although the system does allow you to use such programs.

Despite this, Cambridge Computer Consultants, who produce the board, are convinced that the package will have large sales on the more serious side of the market since it remedies one of the BBC Micro's most serious shortcomings, lack of memory.

For instance, with

Aries B-20, View users can edit files of up to 25k in Mode 0, a four-fold increase. In Mode 7 programs the user can access 47k of memory, giving the BBC Micro a potential that several software houses are already designing programs to take advantage of.

BARRY WOOD'S TAILPIECE

DID anyone see those poor girls on the Acorn stand at our London Show? They were gorgeous. But why dress them in those outfits?

Only Acorn could do such a thing – take a fantastic product, then put it in the wrong package ...

★ ★ ★

OUR beloved features editor chose the London show to unveil to the world the fact that he has a twin brother.

Denying that this was his version of a second

processor, he claimed that he'd been playing with a disc copier and something had gone wrong.

★ ★ ★

"IT'S not fair. You reviewed our program and we've brought out another one since. The one we sent you was version 1.2. We've now brought out version 1.3, and that sometimes works, so your review is all wrong."

So muttered a software producer about the all too

accurate review of his product.

Our renowned editor took it in his stride.

"Don't worry," he replied, "that was the 1.2 version of our review."

★ ★ ★

SPOTTED at the show – a tee-shirt stating: "Electron Users make it last twice as long ..."

★ ★ ★

YOU won't believe it, but it's really true. One structured programming freak has actually blown himself a Basic

ROM that produces "Syntax Error" when you use a GOTO or GOSUB!

★ ★ ★

ACTUALLY, the ultimate blow in the "Structured Programming" debate was dealt when our omniscient editor demanded that one of our writers rewrite a program containing the dreaded GOTOs and GOSUBs.

This the miscreant did, replacing the offensive statements with PROCgoto and PROC-

gosub. We feel that honour has been satisfied.

★ ★ ★

ONE of our artists is a Greenham Common veteran. On being told that "those things at the bottom of the screen" in Alien Invasion were silos, she replied: "Well, why aren't there women dancing on them?"

★ ★ ★

OVERHEARD at the show's technical advice stand: "I've just bought an Electron."

"Oh, you're the one," chorused the crowd in unison.

Drives of the future



Now available for the BBC Microcomputer, this superb range of high performance, low profile disc drives which give more data storage, and use less space.

The Pace range of drives include drives which are switchable between 40 and 80 tracks. As these drives are double sided they give a massive 400 k *per drive* in 80 track mode, whilst in 40 track mode they retain compatibility with Acomsoft and other

commercially available software. These drives feature colour LED's to indicate operation.

All Pace drives are capable of being used as double density drives so that, as and when, a double density filing system and interface become available, the disc storage capacity will be doubled (eg. the dual 40/80 drive will have an unbelievable 1.6m of storage).

Pace disc drives are designed to run off the BBC power supply and are supplied complete with all cables, a utilities disc and manual.

PACE
Disc Systems

92 NEW CROSS STREET,
Bradford BD5 8BS.
Tel: (0274) 729306
Telex: 51564 SHAREY-133



Dealer enquiries welcome

Disc drives available:-

SINGLE DRIVES

		ex VAT	inc VAT
PSD1	Single Sided 40 Track (100k)	£185	£212.75
PSD2	Double Sided 40 Track (200k)	£235	£270.25
PSD3	Double Sided 40/80 Track (400k)	£305	£350.75
PSD4	Double Sided 80 Track Only (400k)	£285	£327.75
PSD5	Single Sided 40/80 Track (200k)	£235	£270.25

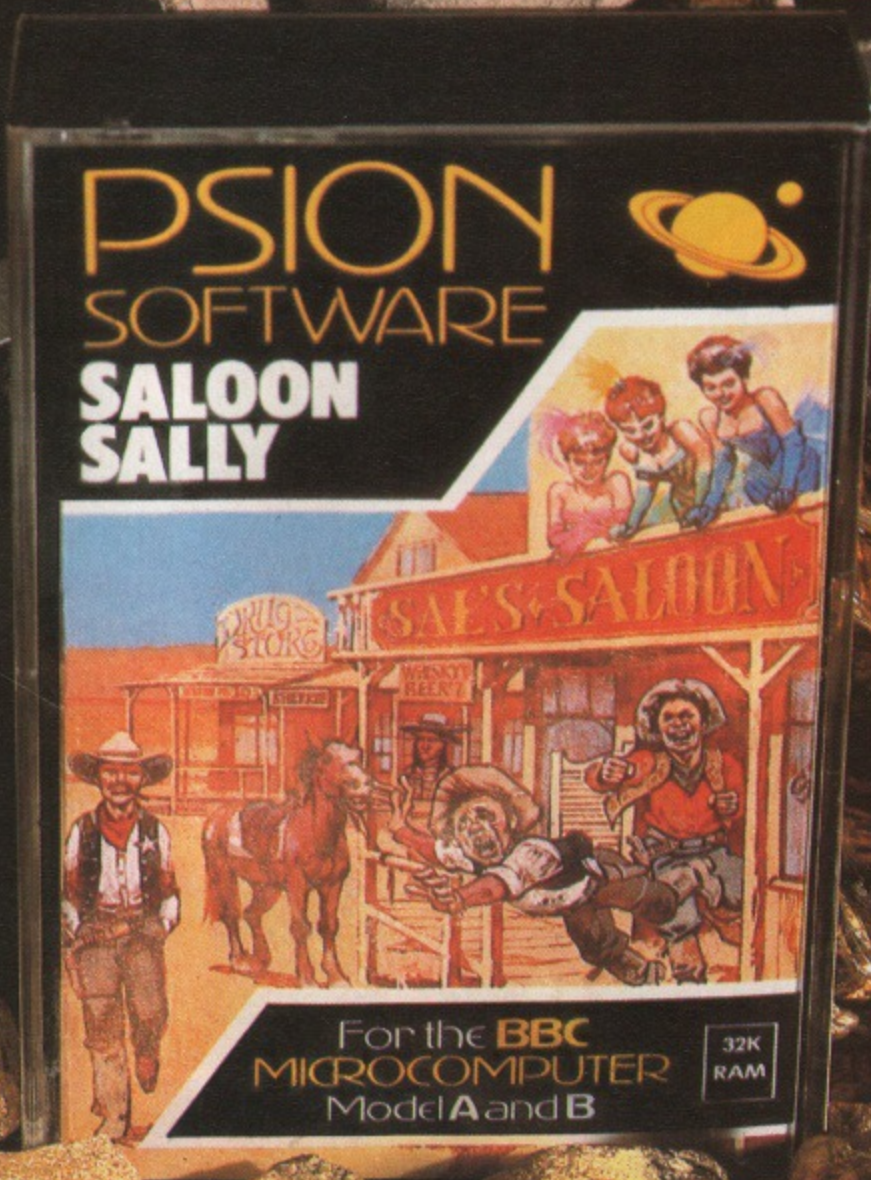
DUAL DRIVES

PDD1	Single Sided 40 Track (200k)	£338	£388.70
PDD2	Double Sided 40 Track (400k)	£449	£516.35
PDD3	Double Sided 40/80 Track (800k)	£579	£665.85
PDD4	Double Sided 80 Track Only (800k)	£538	£618.70
PDD5	Single Sided 40/80 Track (400k)	£449	£516.35

Available from good computer stores everywhere including:

Computer City, Widnes, Cheshire. Tel: 051-420-3333. Computerama, Stafford. Tel: 0785-41899. Silcon Centre, Edinburgh. Tel: 031-557-4546.
Computerama, Stoke on Trent. Tel: 0782-268620. G.T.M., Leeds. Tel: 0532-647474. Wilding Computer Centre, Wigan. Tel: 0942-44382
National Micro Centre, Stockport. Tel: 061-483-3605. Sir Computers, Cardiff. Tel: 0222-21341. P.J. Microsystems, Crowthorne. Tel: 0344-772351.

SO
WHISKEY
DISTILLED AND BOTTLED BY
JACK DANIEL DISTILLERY
LEM MOTLOW, Prop., Inc.
LYNCHBURG, TENNESSEE, U.S.A.
EST. & REG. IN 1866
PRODUCE OF U.S.A.



Turn the tables on the Cowboys

SALOON SALLY is in a tricky situation. After an evening of drinking and gambling, four roughneck cowboys are wreaking havoc in Sally's saloon.

While the fight progresses Sally spots her chance to pick up the gold lying around. Guide her from table to table filling her pockets but watch out in case the cowboys catch her.

As the pianist pounds away regardless of the commotion, Sally can keep the cowboys at bay by hurling tables and chairs. But the action gets more hectic and the music gets faster—you'll need all your wits about you to keep up with the pace.

SALOON SALLY from Psion Software is a compulsive and addictive machine code action game exclusively for the BBC Microcomputer (Model A and B with 32K RAM).

Available from W. H. Smith, Boots and all good software retailers for only £7.95.



PSION
SOFTWARE

The whole range of quality Psion Software, including the popular Vu-Calc and Vu-File applications programmes are available from W. H. Smith, Boots and all good software dealers.

Dealers are invited to contact Psion to find out details of substantial discounts for trade orders of our best selling software for the BBC Microcomputer.

LORDS OF TIME

Joins our range of acclaimed pure-text puzzle adventures, at £9.90, for:

BBC 32K **COMMODORE 64** **SPECTRUM** 48K **LYNX** 48K **NASCOM** 32K **ORIC** 48K **ATARI** 32K

ADVENTURE REVIEWS

"Adventures which have a fast response time, are spectacular in the amount of detail and number of locations, and are available to cassette owners... I am extremely impressed... The Level 9 Adventures are superbly designed and programmed, the contents first rate. The implementation of Colossal Cave (Adventure) is nothing short of brilliant; rush out and buy it. While you're at it, buy their others too. Simply smashing!"

- SOFT, Sept 83

"I found Dungeon exceedingly well planned and written, with a fast response. There are well over 200 locations and the descriptions are both lengthy and interesting. The objects number about 100. It could therefore take some months to explore the whole network, giving many hours of enjoyment in the process."

- C&VG, Sept 83

"The descriptions are so good that few players could fail to be ensnared by the realism of the mythical worlds where they are the hero or heroine... great fun to play."

- Which Micro?, Aug 83

"My appetite has been whetted and I intend to get my own copy (of Snowball) to play."

- What Micro?, Dec 83

ADVENTURE REVIEWS

"This has to be the bargain of the year. If adventures are your game then this (Colossal Adventure) is your adventure."

- HCW, 5 Sept 83

"Colossal Adventure is simply superb. Anyone who wishes to use adventures in an educational setting really must use and see this program as it emulates Crowther and Wood's masterpiece so well. For those who wish to move onto another adventure of similar high quality, Dungeon Adventure is to be recommended. With more than 200 locations, 700 messages and 100 objects it will tease and delight!"

- Educational Computing, Nov 83

Colossal Adventure is included in Practical Computing's Top 10 games choice: "Poetic, moving and tough as hell."

- PC, Dec 83

"To sum up, Adventure Quest is a wonderful program, fast, exciting and challenging. If you like adventures then this one is for you"

- NILUG # 1.3

"Colossal Adventure... For once here's a program that lives up to its name... a masterful feat. Thoroughly recommended"

- Computer Choice, Dec 83

"wholly admirable"

- Your Computer, Sept 83



MIDDLE EARTH ADVENTURES

1: COLOSSAL ADVENTURE

A complete, full size version of the classic mainframe game "Adventure" with 70 bonus locations added.

2: ADVENTURE QUEST

Centuries have passed since the time of Colossal Adventure and evil armies have invaded The Land. The way is long and dangerous; but with cunning you can overcome all obstacles on the way to the Black Tower, source of their demonic power, and destroy it.

3: DUNGEON ADVENTURE

The trilogy is completed by this superb adventure, set in the Dungeons beneath the shattered Black Tower. A sense of humour is essential!

THE FIRST SILICON DREAM ADVENTURE

1: SNOWBALL

The first of Pete Austin's second trilogy. The giant colony starship, Snowball 9, has been sabotaged and is heading for the sun in this massive game with 7000 locations.

THE LORDS OF TIME SAGA

7: LORDS OF TIME

Our congratulations to Sue Gazzard for her super design for this new time travel adventure through the ages of world history. Chill to the Ice-age, go romin' with Caesar's legions, shed light on the Dark Ages etc. etc. We'll be selling this game mail-order from January 1st.

Price: £9.90 each (inclusive)

Level 9 adventures are available from good computer shops, or mail-order from us at no extra charge. Please send order, or SAE for catalogue, to:

LEVEL 9 COMPUTING

Dept U, 229 Hughenden Road, High Wycombe, Bucks HP13 5PG

Please describe your Computer

THIS month we're going to look at the features the different modes on the BBC Micro provide.

However, before we do so, we'll cover a useful command we've neglected so far - GET\$.

Look at Program I. Line 40 is:

```
40 string$=GET$
```

When the computer reaches this line it waits for a key to be pressed. As soon as you press a key, the micro continues with the next line of the program.

The variable *string\$* now contains the character whose key you pressed. For instance, if you'd hit the letter "A",

```
PRINT string$
```

would print out the character "A".

```
10 REM *** PROGRAM I ***
20 MODE 6
30 PRINT "When you are ready, press a letter"
40 string$=GET$
50 PRINT "You pressed " string$
```

Run Program I and you'll soon see what happens.

Notice two points:

- Unlike INPUT, you do not have to press Return.
- Again, unlike INPUT, the variable used for storage only contains one character.

As well as GET\$, there is GET. Notice that this has no "\$" symbol on the end. This is because GET returns a number, which must be stored in a numeric variable, unlike GET\$.

On encountering GET, the micro waits until a key is pressed, then continues. The actual value that GET obtains from the keyboard is the Ascii code of the key pressed.

Look at Program II. Line 40 reads:

```
40 ascii=GET
```

When it reaches it the program waits for a key to be pressed, at which it continues.

If you pressed "A", the variable *ascii* would contain the value 65, which you'll remember, if you cast your mind back, is the code for "A".

Run Program II to see how it all

Get yourself into

Which of the BBC MICRO'S eight modes

```
10 REM *** PROGRAM II ***
20 MODE 6
30 PRINT "When you are ready, press a letter ";
40 ascii=GET
50 PRINT "The character had Ascii code ";ascii
60 PRINT "This means it was "CHR$(ascii)
```

```
10 REM *** PROGRAM III ***
20 CLS
30 REPEAT
40 PRINT "Next Mode?";
50 mode%=GET-48
60 MODE mode%
70 FOR loop%=1 TO 20
80 PRINT "THIS IS A DEMO"
90 NEXT loop%
100 UNTIL FALSE
```

works. Line 50 prints out the Ascii code of the character you inputted and line 60 uses CHR\$ to translate it into a character. Don't leave a space between CHR\$ and (.

Program III, which we're going to use to examine the BBC Micro's modes, uses GET to input the mode you want to look at (line 50).

Notice how I label the GET statement in line 40. It's bad practice not to tell people that you want them to enter something from the keyboard.

Line 60 then changes mode, and 70 to 90 consist of a FOR . . . NEXT loop printing out "THIS IS A DEMO" 20 times.

The whole affair is wrapped up in a REPEAT . . . UNTIL FALSE loop, so that you are repeatedly asked which mode you wish to view.

Once you understand it, try looking at the various modes with Program III.

The size of the letters varies in each mode. In Modes 2 and 5, you can have

only 20 characters across the screen.

Modes 1, 4, 6 and 7 allow 40 characters fit into the width of the display, while Modes 3 and 0 have 80 characters across.

At first all this diversity may seem a little confusing. However, it's all fairly simple and logical if we take it step by step.

You see the more characters you have to cram across the screen the more memory your micro has to set aside to remember what's happening on the display.

The more memory the micro reserves for the screen the less it has to store the program in. So it is often a trade-off between program size and the number of characters in the display.

It still might seem a little odd that we have more than one mode with the same number of characters in a row. For instance, Modes 1, 4, 6 and 7 all have 40 character rows.

Each of these modes, however, has

Mode
0, 1, 2, 3,
4, 5, 6,
or 7?

the right mode

es is the best one for your program?

characteristics that differ.

First, let's put Mode 7 to one side. This is the Teletext mode, the one the Electron hasn't got, and it works very differently to the others.

So that leaves us with Modes 1, 4 and 6 that have 40 characters to the row.

Try running Program III entering Mode 6 first, the one in which we've done almost all our work. Then try it for Mode 4, then Mode 1.

You should notice that in Mode 6 you get far fewer lines on the screen than you do in Modes 4 and 1. This is because Mode 6 puts more space between the lines.

You see, Mode 6 is a text only mode intended for word processing, and the extra spacing is designed for clarity.

In fact Modes 4 and 1 allow you 32 rows of 40 characters, while Mode 6 allows you only 25 rows of 40 characters.

We still haven't distinguished between Modes 4 and 1 though. After all,

they both have the same number of characters, so why bother with two of them?

The answer is colour, a subject that we have so far avoided.

Mode 1 allows you four colours on the screen at the same time, whereas Mode 4 allows only two.

So why not opt for Mode 1 all the time? The answer is memory. Mode 1 has to use exactly twice as much memory as Mode 4 to obtain the extra colours, and sometimes this is a bit too profligate.

In fact, on Model A computers you cannot even use Mode 1 because there isn't enough memory.

If you now use Program III to experiment with Modes 5 and 2 you will see that both give you 32 lines of 20 rather chunky characters.

However, as you probably suspect by now, Mode 2 allows you more colours than Mode 5 - 16 as opposed to 4.

Using Program III with Modes 0 and 3 shows that, while both give you 80 character rows, Mode 0 gives you 32 rows while Mode 3 gives you only 25 rows, leaving gaps between for clarity, as did Mode 6.

Mode 3 is for text only, as was Mode 6. Text-only means that the mode can't support graphics. It cannot draw the multicoloured lines and triangles associated with the BBC Micro's graphics modes.

However we're getting ahead of ourselves. Next month we'll look at colour on the BBC Micro. Then, armed with some useful Basic commands, we'll cover graphics.

Meanwhile, here are the answers to the problems I set you last month.

Programs VIIa and VIIb show alternative ways of inverting the triangle of asterisks we showed in last month's Figure IIIb.

As you can see, you can either tinker with the effect of the loop variable by providing a new offset, or you can rejig

the whole loop by altering the step (Programs IV and V).

I also asked you to invert the triangle of asterisks produced by last month's Program VIII. Programs VIIIa and VIIIb show two ways of doing this, again by altering either the offset or the loop parameter.

I'd be very happy to hear from readers who've found alternative solutions.

```
10 REM *** PROGRAM VIIa ***
20 REM *** JANUARY ***
30 MODE 6
40 FOR loop%=0 TO 10
50 asterisk%=asterisk%+"*"
60 PRINT TAB(10-loop%,10-loop%)
  asterisk%
70 NEXT loop%
```

```
10 REM *** PROGRAM VIIb ***
20 REM *** JANUARY ***
30 MODE 6
40 FOR loop%=10 TO 0 STEP -1
50 asterisk%=asterisk%+"*"
60 PRINT TAB(loop%,loop%) asteri
  sk%
70 NEXT loop%
```

```
10 REM *** PROGRAM VIIIa ***
20 REM *** JANUARY ***
30 MODE 6
40 asterisk%=""
50 FOR loop%=0 TO 10
60 PRINT TAB(10-loop%,10-loop%)
  asterisk%
70 asterisk%=asterisk%+"*"
80 NEXT loop%
```

```
10 REM *** PROGRAM VIIIb ***
20 REM *** JANUARY ***
30 MODE 6
40 asterisk%=""
50 FOR loop%=10 TO 1 STEP -1
60 PRINT TAB(loop%,loop%) asteri
  sk%
70 asterisk%=asterisk%+"*"
80 NEXT loop%
```



WATFORD ELECTRONICS



Dept. BBC, CARDIFF ROAD, WATFORD, HERTS. ENGLAND.

Tel: Watford (0923) 40588/37774 Telex: 8956095 WAELEC



BBC MICROCOMPUTER

Model A—£260; Model B—£346

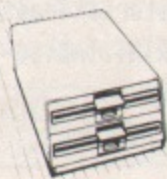
Upgrade your Model A with our Upgrade Kits and save yourself £ s s s

- BBC1 16K Memory (8 x 4816AP-3 100nS) **£24.00**
- BBC2 Printer User I/O Port **£8.10**
- BBC3 Disc Interface Kit **£85.00**
- BBC4 Analogue I/O Kit **£8.25**
- BBC5 Serial I/O Kit **£8.50**
- BBC6 Expansion Bus Kit **£7.75**
- Complete Mod. A to B Upgrade Kit **£55.00**

Dust Cover for BBC Micro

Protects your expensive Micro from foreign bodies. **£3.95**

DISC DRIVES (CUMANA) BBC COMPATIBLE



- **New Teac Slimline** Uncased Drive S/S 40 track, 5 1/4", 100K **£135**
- **New TEAC Slimline** Cased without PSU, S/S, 40 track, 5 1/4", 100K **£145**
- **CS100 - TEAC** Cased with own Power Supply, S/S 40 track, 5 1/4", 100K **£165**
- **CD200 - TEAC** Twin Cased with own PSU, S/S, 40 track, 5 1/4", 200K **£350**
- **CS200 - TEAC** Single Cased with own PSU, S/S, 80 track, 5 1/4", 200K **£250**
- **CD400 - TEAC** Twin Cased with own PSU, S/S, 80 track, 5 1/4", 400K **£475**
- **CS400 - TEAC** Single Cased with own PSU, D/S, 80 track, 5 1/4", 400K **£310**
- **CD800 - TEAC** Twin Cased with own PSU, D/S, 80 track, 5 1/4", 800K **£599**
- **MITSUBISHI Slimline** - Uncased, double density. Double track, 5 1/4", 1 Megabytes, track density 96TPI, track to track access time 3mSec. Plugs directly to BBC Micro. **ONLY £220**
- **SINGLE MITSUBISHI Slimline** - Cased with own PSU, DS/DD, 1 Megabytes. (400K with BBC) **£275**
- **TWIN MITSUBISHI Slimline** Cased with own PSU, DS/DD, 2 Megabytes. (800K with BBC) **£499**
- Single Drive Cable for BBC Micro **£7**
- Twin Drive Cable for BBC Micro **£10**
- **Dual SWITCHABLE DRIVES**, 40/80, 400K. Cased with own PSU, Slimline **£495**
- Carriage on Drives **£7**

5 1/4" DISKETTES

- 5 year warranty
- 10 Verbatim or 3M Diskettes, 5 1/4", S/S **£17**
- 10 Verbatim or 3M Diskettes, 5 1/4", D/S **£27**
- 2 year warranty
- 10 WABASH Diskettes, 5 1/4", S/S **£15**
- 10 WABASH Diskettes, 5 1/4", D/S **£25**

DISC ALBUMS

Attractively finished in beige leatherlook vinyl. Stores, protects and displays 20 discs in double-sided clear view pockets. **ONLY £4.95**

PLASTIC LIBRARY CASES
for Disc Storage 5 1/4" (holds 10) **£2**

BBC PRINTER GP100A



10" Tractor Feed, 80 columns, 30CPS Normal & Double width Char. Dot res graphics. Parallel Interface standard. **ONLY £155 (£7 carr.)**

INTERFACE CABLE

BBC to Seikosha Cable **£10.00**

DUST COVER for GP100 **£3.95**

FRICTION FEED

Attachment for GP100A or 250X Printers **£22**

- Spare RIBBON for GP80 **£4.50**
- Spare RIBBON for GP100 **£4.95**
- Spare RIBBON for GP250 **£5.95**

GP-700 Colour Printer Screen-dump routine in ROM FOR BBC Micro **£12**



Epson RX80

100 CPS, 9 x 9 matrix, dot addressable graphics, condensed and double width printing. Normal, Italic and Elite Graphics. Tractor feed, 10" max width, bi-directional, logic seeking. Centronics Interface standard.

ONLY £235 (£7 carr.)

RX80 F/T PRINTER

As above but has both Friction and Tractor Feed. **£259**

Epson FX80 Printer

160 CPS, 11 x 9 matrix, proportional spacing, superscripts, subscripts, dot addressable graphics. Normal, Italic and Elite characters. Up to 256 user definable characters. Down loadable character set. Condensed and double width printing. Full proportional spacing. Four user defined margin positions. Tractor and Friction feed. 10" maximum width Bi-directional, logic seeking Centronics interface standard.

ONLY £345 (£7 carr.)

	Ribbons	Dust Covers
MX80FT	£4.75	£4.50
MX100	£10.00	£5.25
FX80	£4.75	£4.95
RX80	£4.75	£4.50

PRINTER INTERFACE BUFFER

Neatly packaged self contained box, supplied complete with all leads, manual and detachable power supply.

Price: 16K Unit **£99**

Price: 48K Unit **£130**

BROTHER HR-15 DAISY-WHEEL PRINTER

An exceptionally high quality daisy wheel printer at the price of a dot matrix printer. 18CPS; bi-directional, 3K of buffer; has clear buffer facility, carriage skip movement, proportional spacing; underlining; bold print and shadow print. Prints in two colours; super and subscript facility. Impact control facility to vary pressure on paper for making carbon copies. Has Centronics parallel or RS-232 interface. Connects directly to BBC Micro. A ribbon cassette plus a separate red ribbon. Optional extras: single sheet feeder takes up to 150 A4 sheets; a keyboard that transforms HR15 into a sophisticated electronics typewriter. Attractively finished in beige.

Special Introductory Offer

ONLY £375

- Single Sheet Feeder** **£199**
- Keyboard** **£150**
- Ribbon** **£3**
- Daisy Wheel** **£18**

LISTING PAPER

- 8 1/2" or 9 1/2" Fanfold paper plain or ruled (1000 sheets) **£7 (£1.50p carr.)**
- 15" Fanfold paper (1000 sheets) **£9 (£1.50p carr.)**
- Teleprinter Roll (econo paper) **£4 (£1.50p carr.)**

PRINTER LEAD 36"

Ready made printer lead to interface BBC Micro to EPSON, SEIKOSHA, NEC, etc., Printers.

ONLY £10

Special Extra long (60") Cable **£14**

DATA RECORDER & ACCESSORIES

- Top quality Slimline, portable Data Recorder for computer use. Mains/Battery, operated with counter **£20 00**
- DATA RECORDER CABLE** For our Data Recorder to BBC Micro **£2.50**
- DATA CASSETTES** Top grade C12 Data Cassettes in library cases. **36p**
- STACK PACK** The unique Cassettes drawer rack system including 10 off C12 Data Cassettes **£6**

SPECIAL INTRODUCTORY OFFER

MITSUBISHI DISC DRIVES

Cased, including Power Cable and Interface Cable. Plugs directly to BBC's Power Supply socket.

- LCS400 Single 400K Drive **£199**
- LCD800 Twin 800K Drives **£385**

BBC Micro WORD-PROCESSING PACKAGE

A complete word processing package consisting of: BBC Model B, Zenith 12" Green or Amber Monitor, Twin 200K highly reliable (1 year warranty) Twin Cased Cumana Disc with own power supply, the popular WORDWISE word processor, Watford's own highly sophisticated 62 File DFS interface fitted, the world renowned Brother HR15 Daisy Wheel Printer, Gemini's Beebplot & Beebcalc Spreadsheet Analysis Software discs, 10 blank diskettes, 500 sheets of fan-fold paper. Manuals and all the leads.

All you require is a mains power point to have it up and running (we even supply the 4 way mains trailing socket).

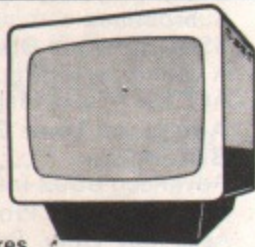
ONLY £1,350 (carr. £15)

(P.S. We will alter the package to suit your particular requirement. Call in for a demonstration.)

MONITORS

MICROVITEC 1431

14" Colour Monitor, RGB Input. (as used in BBC programmes) FREE Interface Lead. £209 (carr. £7)



● MICROVITEC 1451 Hi-res 14" Monitor incl. lead £319

● NEW MICROVITEC 14" Colour Monitor/Composite Video £249

● KAGA RGB 12" Medium Resolution Colour £210 (Carr. £7)

● KAGA RGB 12" High Resolution Colour £259 (carr. £7)

● BNC Connecting Lead £3

● RGB Connecting Lead £5

● ZENITH 12" Green or Amber Monitor Hi-resolution £75 (£7 carr.)

BEEBLOTTER

The Unique Graphic Tablet

Watford Electronics' BEEBLOTTER will work with 32K BBC Micro. Connects to Analogue port. The unique design makes it accurate and simple to use. Attractively finished. The comprehensive booklet supplied describes its use in detail and shows some of the possible applications.

The special features include:-

- Works in all graphics mode and any colour selectable.
- Commands printed on Tablet and On-screen instructions.
- Special routines enable pictures to be quickly loaded from tape.
- Works with all operating systems and ECONET. Tape and Disc versions available.
- Large drawing area (32cms x 23cms).
- Maps, Pictures and Diagrams produced quickly and easily.
- Transparent tablet enables maps and diagrams to be copied directly from books.
- Commands include line, circles and rectangle drawings, infilling, full editing and an easy to use copy and move feature.
- Screen dump routines included for Seikosha and EPSON printers.
- Routines are included to allow user to incorporate pictures in their own programs.
- Designed by a professional teacher with educational uses in mind.

ONLY £60 (£3 carr.)

READY-MADE LEADS for BBC

CASSETTE LEADS 7 pin DIN Plug to 5 pin DIN Plug + 1 Jack Plug £2.00
to 3 pin DIN Plug + 1 Jack Plug £2.00
to 7 pin DIN Plug £2.50
to 3 Jack Plugs £2.00
6 pin DIN to 6 pin DIN Plug (RGB) £2.50
Monitor Lead, BNC to PHONO £3.00
Disc Drive to BBC Micro Power Lead Single: £3.00 Dual £3.75

MISCELLANEOUS CONNECTORS

	Plugs	Sockets
RGB (6 pin DIN)	30p	45p
RS423 (5 pin Domino)	30p	40p
Cassette (7 pin DIN)	25p	65p
ECONET (5 pin DIN)	15p	25p
Paddles (15 pin 'D')	£1.10	£2.15
Disc to BBC Power Plug 6 pin	70p	
Disc Drive Power Plug 4 pin	60p	

13 ROM SOCKET BOARD

Simply plugs into one of the four ROM sockets currently available in BBC Micro. There are only 5 solder connections to be made. Full instructions are supplied.

Our 13 ROM SOCKETS BOARD enables the User to increase the Sideways ROM capacity the basic four sockets on the main board upto the full SIXTEEN capable of being supported by current operating systems. In addition the board is designed with the facility to hold upto 16K RAM, which when switched into operation is automatically selected by any WRITE signal to the Sideways ROM area. This gives the User the ability to write a utility or language and upon pressing break have the utility or language up and running (new ROM software can be developed and tested in situ.)

The Board gives the User, plenty of freedom to explore the possibilities of the new paged ROMs due in the coming months and offers them the chance to develop their own.

All essential lines are buffered and the Board meets or exceeds all timings for operation in the BBC Microcomputer. When fully populated, the ROM Board consumes less than half the recommended maximum current limit.

Supplied ready-built and tested complete with fitting instructions.

ONLY £29.95 (carr. £1)

EPROM for the BBC MICRO & 13 ROM SOCKET BOARD

	1+	25+
2764-250nS	£4.50	£4.10
27128-250nS	£18	£13
8271	£36	

CMOS RAM for the 13 ROM SOCKET Board

6116-150nS (2K)	£3.40
6264-150nS (8K)	£26.00

BEEBMON

The most powerful and versatile machine code monitor ROM yet written for BBC Micro. It has all the normal memory editing, moving and relocating facilities, plus all editing is with a full screen editor allowing scrolling up and down memory, entering in Hex, ASCII or standard assembler mnemonics.

In use as a debugging tool, you run code under a total emulation system. Ever felt a desperate urge to set a breakpoint in ROM? No problem - you can even have breakpoint on reading or writing locations in memory and on register contents. The system fully supports debugging of sideways ROMs e.g. BASIC can fully and easily be run from within Beebmon and from there DFS and other sideways ROMs can be used in total emulation mode.

Beebmon can even run itself. In so doing you can nest Beebmon up to a level limited only by the memory size. Beebmon uses 256 bytes of workspace, located anywhere in memory, even on the 1MHz Bus. Beebmon effectively uses no zero page workspace, so your program (e.g. BASIC) can use any or all of the base page. How does it achieve this? By providing a 6502 interpreter all programs running under it exist in a virtual BBC, so special memory locations like the ROM latch are not actually accessed by your programs, instead they alter a location in Beebmon's workspace. Emulation also allows immediate return to Beebmon command level by ctrl-escape no matter what code is being executed at the time. All this exceptional power and flexibility is complemented by a clear and detailed manual included in a value for money price of:

ONLY £25

- NEW LAUNCH -

Z80A WITH CP/M 2nd PROCESSOR BOARD

Plus Double Density Interface for
BBC MICRO

Yes it's here, our Z80A 4MHz 2nd processor board with 64K memory, 4K monitor EPROM, parallel printer interface, CP/M based, double density board will handle, 3½", 5½" and 8" floppy disc drives and many more facilities. All neatly housed in a twin slimline disc drive case.

ONLY £350

EPROM PROGRAMMER for BBC MICRO

At last! - the EPROM Programmer for BBC Micro Computer from WATFORD ELECTRONICS that will suit both your pocket and all your requirements. Programs all popular types of EPROMS from 2K bytes up to 16K bytes - 2716 - 2516 - 2532 - 2564 - 2764 - 27128.

This extremely powerful system is designed for your needs of TODAY & TOMORROW! - BBC Basic programs can be copied into EPROM and subsequently re-loaded faster than from a disc! Suitable for both hobbyist and professional users!

Just look at these features:

- COMPLETELY SELF CONTAINED - Housed in its own sturdy case - Uses its own power supply - connects directly to the 1MHz Bus - Simple and Safe!
- FULL SOFTWARE SUPPORT - Comes complete with simple to use fully machine code ROM based software and easy to understand manual. Facilities include Verification, Reading, Virgin Testing, Writing, Editing, Saving, Loading and more! NOTE!! - This software does not simply comprise hastily prepared routines to get you going, but is a professional, purpose designed applications package.
- ACORN BUS COMPATIBLE - Use of the 1MHz connection complies with all Acorn addressing recommendations - That means you can still add-on such things as the TELETEXT, IEEE 488 TUBE and PRESTEL
- Allows more than one program to reside in an EPROM using the ROM Filing System.

ONLY £89 incl. Manual (£3 carr)

BEEBFONT ROM

A new concept in BBC Software from Watford. This is a character FONT ROM that gives you 5 16x16' predefined FONT. The ROM is ideal for high quality demonstration on screen and when used in conjunction with EPSON printer, allows printing of letters etc., in mixed type faces. Now with BEEBFONT in your BBC you can write letters to your European friends with the correct alphabet. The package is complete, including an Editor to design your own fonts and several spare fonts which could not be fitted in the ROM. The Character sets included are: Expanded, Gothic, Roman, Frank, Coop and French. Can still be run from RAM. Supplied complete with ROM, software on disc/tape and manual.

Price: £39

FORTH ROM for BBC

This superb (FIG FORTH) compiling language now available in ROM. Simply plugs into one of the ROM Sockets. Manual included. £36

DISASSEMBLER

Will generate fully labelled assembly listings of any machine code program. Data is automatically differentiated from code and displayed together with its ASCII equivalent. Assembly listing can be saved in *EXEC format and subsequently incorporated into user programs.

Cassette: £6.95
Disk: £8.95

Continued →

★ THE ULTIMATE ★ BBC MICRO DFS

by Watford Electronics

High acclaimed at the Acorn User Show.
What do the independent press say?

Good value for money – *Beebug Aug. '83*
A very worthwhile package – *The Micro User*
You'll be buying a very powerful package –
Personal Computer News
Superior DFS; Excellent disc sector editor –
Computer Answers

Without a doubt, the most sophisticated DFS Software yet written for BBC Micro Computer. This powerful new DFS is fully compatible with ACORN DFS yet has much increased power due to additions, carefully designed to make life easier in normal use. It consists of over 14K of efficiently written machine code. It is entirely self contained and so does not require a utilities disc to function.

- * The system can either use the ACORN standard 31 files per disc side or DOUBLE THE CAPACITY to 62 files. The size is selected at formatting time. Copying between discs with different catalogue sizes works perfectly normally.
 - * A FORMATTING PROGRAM is built in, permitting formatting to 35,40,80 track formats with either 31 or 62 files. Since the formatter is built in to the DFS it can be used without affecting whatever program you are using.
 - * A DISC VERIFIER is also built in. This checks the internal checksums on each sector to identify any corrupted data. This is extremely useful when saving valuable data as it shows faulty discs quickly and easily. Again it does not affect the program you are using.
 - * A built in DISC SECTOR EDITOR gives a screen window onto the disc enabling detailed editing of any byte on the disc. This is very useful for recovering accidentally deleted files and can save weeks of work.
 - * A double step mode allows the user of 80 TRACK DRIVES TO READ 40 TRACK DISCS. This mode is software selected for each drive individually, thus allowing a 40 track disc to be copied onto an 80 track one very easily. THIS ELIMINATES THE NEED FOR EXPENSIVE SWITCHABLE DRIVES.
 - * A WORKFILE function sets the name to be used when the null filename is issued. This allows a program to be edited and repeatedly saved having only typed its name once.
 - * When using LOAD, CHAIN, etc. it is possible to specify an ambiguous filename. This will result in the first file whose name matches the specification being used. This saves typing the end of a filename that you know is uniquely identified by its first few characters.
 - * Two commands exist to simplify the transfer of programs from TAPE TO DISC. These load the file to &1100, switch off the disc system and then move the file to its correct load address; thus saving a lot of complicated programming. This command can be used to load files up to 27K75 long.
 - * An advanced COPY command is included which will prompt the user, requesting whether to copy each file.
 - * RENAME has been extended to allow the use of ambiguous filenames. This allows you to change BERT1, BERT2, BERT3 to FRED1, FRED2, FRED3 with only one command.
 - * OPENOUT has been improved to give you fewer annoying 'Can't extend' errors, as it automatically picks the biggest space on the disc in which to put a file. A SPACE command lets you know how much space *COMPACT could create before you waste time doing it.
 - * 2K of RAM can be reclaimed from the DFS by setting "PAGE" to &1100.
- Now with extra features:**
- * The powerful library system has been extended so that libraries now work on all accesses not only *RUN. This allows you to have a utility directory with all your commonly used programs without muddling in your current workfiles. Very useful for BCPL User.
 - * Programs can now reside lower in memory by reclaiming some of the DFS' workspaces, indeed PAGE can be taken as low as £1100 under most circumstances.
 - * To make DFS easy to use, wild cards ("*") have been made vastly powerful, e.g. *INFO

Continued:

- *A* gives information on all files in the current directory which have an "A" anywhere at all in their filename.
- * Comprehensive and clearly written Manual (available separately) gives the user a complete package deal.
- * Fully compatible with BBC TELETEX and TORCH Systems

DFS ROM **ONLY £35**
Complete Disc Interface Kit including DFS ROM and fitting instructions **ONLY £75**
Comprehensive and clearly written DFS Manual **ONLY £7.50**

(P.S. This manual will only be sold to those who purchase our DFS).
P.S. We will exchange your existing ACORN DFS or PACE (AMCOM) DFS for the highly sophisticated Watford's DFS ROM for **ONLY £30**

DISC DOCTOR **£26**

A sophisticated Disc Utility ROM with many useful commands. (For detail description please refer to Computer Concept's advert in this magazine.)

Wordwise

Without doubt a very sophisticated piece of software for the BBC Micro. It has all the features of a professional word processor yet is easy to use.

only £33

NEW DISC-FIX ROM

This ROM is an integrated, menu-driven DISC MAINTENANCE PACKAGE. Using simple menu selections, with intelligible prompts for any input required, the user can recover data from damaged discs. Facilities include:-

- Full screen editing of sectors on the disc.
- Sectors can be found by file name or sector number.
- Files and sectors can quickly and easily be dumped to a printer for examination and possible subsequent modification.
- COPY: blocks of data can be copied from any point on the disc to any other point. Blocks can be as small as one byte and can be transferred anywhere in a sector.
- SEARCH: The disc can be searched for any string, starting and finishing at any designated sector.
- VERIFY: Any block of sectors can be checked for their validity.
- FORMAT: Any track or group of tracks can be individually formatted to Acorn or Watford DFS standard.
- INSERT: Allows the manual creation of new directory entries to allow "undeletion" of files.
- BACKUP: This is similar to normal DFS backup but allows recovery after a disc error. Completely compatible with both Acorn and Watford Disc Filing Systems. Instruction manual supplied.

Price **£19.00**

TINY PASCAL (in 16K ROM)

PASCAL-T is capable of compiling source PASCAL into a compact very fast threaded-interpreters-code. Full editor and disc support are included. Comprehensive documentation supplied **£59**

VIEW

Acorn soft's Wordprocessor ROM. **£52**

**ONLY THE BEST AT
WATFORD**



ACCESS ORDERS BY TELEPHONE
Simply phone your order
through. We do the rest

(0923) 50234/40588

GEMINI'S BUSINESS SOFTWARE

Cashbook Accounts	£52
Final Accounts	£52
Invoices & Statements	£17.25
Commercial Accounts	£17.25
Mailing List	£17.25
Database	£17.25
Stock Control	£17.25
Home Accounts	£17.25
Beebcalc Spreadsheet Analysis	£17.25
Beebplot	£17.25
Payroll	£39

N.B. All the above Gemini software is on tape.
For Disc Based (40/80 track) please add £3.

BOOKS (No VAT on Books)

30 Programs – BBC Micro	£4.95
30 Hour BASIC (BBC Micro)	£6.00
35 Educational Programs for BBC	£6.95
36 Challenging Games for BBC	£5.95
100 Programs for BBC-Micro	£6.95
Cassette version of above	£10
6502 Application Book	£10.25
6502 Assembly Lang Prog	£12.50
6502 Assembly Lang.	
Subroutines	£11.80
6502 Software Design	£10.50
A young persons guide to BBC Basic	£4.50
ACORN ATOM Magic Book	£5.50
Advanced User Guide for	
BBC Micro	£12.85
Advanced 6502 Interfacing	£10.95
Advanced 6502 Programming	£10.50
Assembly Lang. Programming	
for BBC	£8.95
Advanced Programming Techniques for the	
BBC Micro	£7.95
BBC Basic	£7.95
Assembly Lang. Prog. on BBC	£7.40
BBC Forth	£7.50
BBC Lisp	£7.50
BBC Micro An Expert Guide	£6.95
Easyprogramming for BBC Micro	£5.95
BBC Micro Graphics and Sound	£6.95
BBC Micro ROM PAGING System	
Explained	£2.95
BBC Micro Revealed	£7.95
BBC Micro Instant Machine Code	
including Software Cassette	£34.00
BBC Micro Assembly Lang. Prog.	£7.95
BBC Micro Disc Companion	£7.95
BBC Micro in Education	£6.50
Basic Programming on BBC Micro	£5.95
Creating Adventure Programs	
on BBC Micros	£6.95
Creative Graphics Cassette (Acornsoft). Has	
36 graphics programs	£8.95
Creative Graphics on BBC Micro	£7.50
Complete Programmer for BBC	£5.95
Discover BBC Machine Code	£6.95
Discover FORTH – Osborne	£11.25
Easy Prog. for BBC Micro	£6.50
Further Prog. for BBC Micro	£6.90
FORTH Programming (Sams)	£12.50
Functional Forth for the BBC Micro	£5.95
Games on your BBC Micro	£2.95
Games BBC Computer can Play	£6.95
Getting Acquainted/Acorn ATOM	£7.95
Graphs & Charts on BBC Micro	£7.50
Intro to Micro Beginners Book	
(3 Ed.)	£9.90
Graphic Art for BBC Computer	£5.95
Graphs and Charts (Cassette)	£8.95
Graphics on BBC Micro	£6.95
Introducing the BBC Micro	£5.95
LISP	£9.25
Logo Programming	£8.95
Mastering VISICALC (Sybex)	£11.95
Micros in the Classroom	£4.90
Practical Prog. for BBC & ATOM	£5.95
Programming the 6502	£10.75
Programming the BBC Micro	£6.95
PASCAL	£9.25
Programing for Education on BBC	£5.95
Structured Prog. with BBC BASIC	£9.50
The BBC Micro Book, BASIC, SOUND & GRAPHICS	£7.40
Using Floppy Discs with BBC	
Micro	£5.95
Using BBC Basic	£6.95

WONDERFUL WATFORD

SURGE PROTECTOR Plug

Safely eliminates dangerous voltage surges. During a thunderstorm, a nearby lightning strike can induce high voltage spikes in the voltage supply or fluctuating loads can also result in transient overvoltages which if unchecked, lead to expensive data corruption/loss. Our surge protection plug will provide the necessary surge protection. Simply replace your standard 13Amp mains plug with the surge protection plug (which is almost the same size). Ideal for computers, Hi-Fi systems, precision instruments, fridge freezers, etc. Max. surge current 2KAmp; Max. Voltage 250 Volts.

Price: £8

BBC JOYSTICKS

Two versions available:

SINGLE: Player type £7.00 each
TWO Players type £11.50 per pair

EDUCATION Software

JUNIOR MATHS PACK (32K) £6.95

Makes learning fun for 5-11 year olds. This package consists of 3 programs (menu driven) that increase in difficulty as your child becomes competent. A very good supplement to standard educational methods.

CHEMISTRY £6.00

Make learning fun with this graded program which teaches the Atomic table including Atomic Symbols, Atomic Number and normal form using a fruit machine type display. 5 levels.

WORLD GEOGRAPHY (32K) £7.00

Beautifully drawn Hi-Res colour map of the world illustrates and aids this graded series of tests on capital cities and populations of the world.

WORDHANG £7.80

(Age 7-13). A word guessing program based on the well known Hangman game. Uses full colour graphics. Complete with 260 words and the facility save your own list of words.

WORLDWIDE £7.80

(Age 7-15). Two constructive geography programs allowing children to build detailed data bases covering both the UK and the world. Encourages children to refer to atlas and reference books. Save the database anytime.

PHYSICS £6.00

Displays measurements of mass, work, temperature, etc., their associated units and formulas for calculating these units. For 4th and 6th formers.

WHICH SALT £6.00

Identify a compound from the result of a series of tests. Superb graphical animation shows what would otherwise be observed in a laboratory. For 4th and 6th formers.

HAPPY NUMBERS £7.80

(Age 4-6). No reading skills are required to use this colour graphics number recognition and counting program. Children build patterns of flowers corresponding to figures, quickly learning their significance.

INTRO TO ARITHMETIC £10.45

4 programs - Additions, subtractions, multiplications and divisions. Help stage, moving graphics and colours. Worksheet produced at the end of program. (5-7 years old).

BBC LIGHT PEN

A ready-made Light Pen for BBC Micro. Enables you to produce drawings on your own TV/MONITOR screen. Supplied complete with Software Cassette and instructions.

ONLY: £17

DISC EXECUTOR

Disc Executor is a sophisticated disc utility, designed for the BBC Micro, which allows you to transfer almost all of your tape software to disc. It will handle 'Locked' programs and allows you to load full length adventure type programs (i.e. up to &6E blocks) from disc in seconds rather than minutes.

Price: £12

EPROM Programming Service

New from Watford, a service to the writer of Sideways ROMs for the BBC Micro or any other ROMs. Send us your ROM dump on BBC format disc, 40 or 80 track stating the type of EPROM required. We will program for you 2516, 2716 (single rail), 2532, 2564, 2764 or 27128. (You may send your own blank EPROMs or purchase them from us).

Programming service charge £8

PLINTH FOR BBC MICRO

Protect your micro from the weight of the heavy TV/Monitor. This sturdy plinth is attractively finished in BBC colour. It can be used to support a monitor or a printer. The micro slides underneath comfortably. A must for every BBC Micro owner, specially for those who have to move/open their computer frequently.

Price: £10 (carr. £1.50)

PLINTH FOR PRINTERS

Keeps your desk tidy. Place the printer on the plinth and the paper underneath. Finished in BBC colour.

£10 (carr. £1.50)

VOLTMACE'S DELTA 14 Hand-set

(Highly acclaimed at the Acorn User Exhibition) Save your BBC Keyboard from a games bashing with our precision, smooth, sprung return 'Delta 14' Joysticks which has a built-in 14 Button Keypad. The hand set is Acorn Soft compatible and will work as a Joystick and two Fire buttons. Adding the ADAPTOR BOX will enable the use of all twelve Buttons (plus two repeated).

A user friendly, Keyboard to Keypad transfer program allows you to assign any Keyboard Key to either Keypad button or Joystick direction. The program also allows you to adjust sensitivity on the Joystick and conversions can be saved in a library which already contains some Acorn-Soft conversions.

Price: 'Delta 14' Hand set £11.25
ADAPTOR MODULE £11.95
TRANSFER PROGRAM Tape £5.15
Disc £7.75

ONE STOP
SHOP

ATTACHE CARRYING CASE for BBC Micro

These Attache Carrying cases are attractively finished in mottled antique brown leatherette. An ideal and very safe way to carry your BBC Microcomputer. Price: £10 (£2 carr.)

Yes it's here... the NEW ROM you have been waiting for!!!

BEEB PRINTER ROM

Are you fed up with not being able to unravel your printer manual and use all those features you paid for? Need sensible paging for use in the creation of booklets? Then you certainly need our Beeb Printer ROM.

A machine code printer utility in ROM.

★ 'Single' key operations replace control code sequences for underline, front and size selection, paper movement, etc. Up to 30 come pre-defined, without effecting normal fn key usage.

★ Automatic fanfold page margins. Puts gaps in listings. PRINTed text etc to skip the folds. The gap size alternates to minimise paper wastage when using binders.

★ Form feed and related commands, made available on ALL printers. Can also provide a left margin.

★ User defined characters embedded within text are printed as on VDU.

★ ★ Commands select option for GP100, STAR, NEC, MX/FX, LP VII/DMP100, DMP200. Operates with parallel interface printers and is turned on by *FX5,3.

Supplied complete with Manual.

Price: £24

(When ordering, please specify the make of printer you have.)

BEEBMON

A ROM based machine code Monitor for BBC Micro. It enables machine code programs to be debugged and altered easily and quickly. Being a ROM, its commands are always readily available and occupy no user memory. Appears to take no base page and only one page of relocatable workspace (256 bytes) and no more anywhere in RAM. Beebmon can do more than any other machine code monitors currently on the market. The special features include facilities like: TABULATE, MODIFY, FILL, COPY, COMPARE, SEARCH (HEX & ASCII) CHEKSUM, DISASSEMBLE, RE-LOCATE and by Emulating the 6502 processor, SINGLE STEP, BREAK POINTS ON READ/WRITE/EXECUTE OF LOCATION also BREAK POINTS ON A, X & Y REGISTERS are provided. HAS WINDOWS INTO MEMORY & TEST WINDOWS. All this and more for only: £25

NEW NEW NEW TWO NEW GRAPHICS SCREEN DUMP ROMS from WATFORD

NEW

DUMP OUT 2

A versatile machine code hi-res Screen Dump ROM.

- You can now have small or large 2 tone dumps and multi-tone 'colour' pattern dumps (8 distinct mode 2 shades) on every printer.
- *Commands initiate the required dump optional parameters may be included for colour masking and selecting the part of the screen to be dumped.
- Clever use of the processor stack means that no workspace is required! (Multitone dumps also use 2 zero page locations.)
- For GP80/100/250, STAR, NEC, EPSON MX/RX/FX, LPVII, DMP100/120/200/400.
- Screen modes 0, 1, 2, 4, & 5.
- Instruction Manual

All this for

ONLY £15

NEW

EPSON DUMP ROM

Will accurately DUMP all Screen modes including TELETXT, GRAPHICS and DOUBLE HEIGHT. MULTITONE DUMPS are also supported. All this including the manual for

ONLY £16

WATFORD
ELECTRONICS

Continued →

ONE STOP SHOP

BEEB SPEECH SYNTHESISER

VERSATILE SPEECH SYNTHESISER UNIT FOR THE BBC MICROCOMPUTER

Watford Electronic's very own Speech System. Specially designed so that even a novice can make his BBC talk:-

SIMPLY the best! - An unlimited speech synthesis system. Complete with easy-to-follow manual. Controlling software is in ROM so no Cassette Loading problems!

PHONEMES for word synthesis - That means unlimited vocabulary! No extra speech dictionary chips to buy!

BUILT-in Library of approximately 500 words to get you started.

ENGLISH accent - Utilises inflexion techniques to produce highly comprehensible speech.

EASY to use system - Just plug the software ROM into a socket, the Speech unit into the User Port, and away you go! No specialised 'dealer upgrade' required!

COMPACT unit - The whole system is built into a small case - easily tucked behind the computer. Auxillary output socket provided for direct connection to an external amplifier.

HOURS of fun! - Suitable for any application - Games, Educational Programs, Specialised Packages.

We know this all seems to good to be true but **DON'T BE LEFT SPEECHLESS!** Order your Versatile Speech Unit now!

Only £39

BBC FORTH on Cassette

Follows FORTH-79 standard and has fig-Forth facilities - Provides 260 FORTH words - infinitely extensible - Full screen editor - Allows full use of MOS - Permits use of all graphic modes, even 0-2 (just) - Easy recursion - Runs faster than BBC BASIC. **ONLY £15** FREE 70 page manual and a Summary card.

BBC FORTH TOOLKIT

Adds following facilities to FORTH. 6502 Assembler, providing machine-code within FORTH - Turtle graphics enables easy to use colour graphics - Decompiler routines enables versatile examination of your compiled FORTH programs - Full double number set - An example FORTH program and graphics demonstration - Other useful routines - 64 page manual included **FREE**. **ONLY £13**

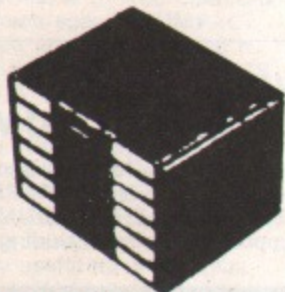
LOGO II

This language is very popular in American schools as it is an ideal educational program. It can graphically demonstrate the ideas of defined procedures, sub-routines, loops and even recursive programming. Gives excellent introduction to LOGO language for young and old alike.

£9.95

STAK-PAK

The unique computer program filing and storage system. Made of tough black plastic these compact drawer sections hold two cassettes each and lock together vertically to form miniature cabinets of any height. Each drawer section has two Agfa C12 Cassettes with labels plus external index card. Five twin Paks (10 Cassettes) (Postage £1.00)



£6

NEW LAUNCH

★ PENGO ★

One of the most sophisticated full colour, 100% machine code games software. This arcade game will give hours of fun. You (Pengo) are being harassed by the devouring Snobees (Snow Beasties) whose diet is the Ice-cubes and an occasional juicy Pengo!! Your only means of survival is to hurl the ice-cubes at the marauding snobees and crush them into the snow. Beware, as you crush them to death the remaining snobees turn even more vicious. Each act will bring a new species, even more aggressive!!! All is not lost; Bonus points are won by lining up the three indestructible DIAMOND cubes. Progressive levels of difficulty. Bonus Pengo at 30K points. A **MUST** for all BBC Micro owners.

Only: £7.75

CRAWLER

A new challenge for your reflexes, exercise your fingers. Crawler is the best yet BBC version of the game popularised in the arcades as "CENTIPEDE". Blast the voracious caterpillar before it eats you. Avoid the wandering spiders. Shoot the scorpions before they poison the mushrooms. Kill the descending fleas as they cause massive mushroom growth. This game is a delight to play, the controls are responsive and fast yet precise. All this for **ONLY £6.95**

GAMES SOFTWARE (PROGRAM POWER)

CHES	£6.95
CROACKER	£6.95
Escape from MOONBASE ALPHA	£6.95
FELIX in the FACTORY	£6.95
GALACTIC COMMANDER	£6.95
KILLER GORILLA	£6.95
MUNCHYMAN	£5.95
MOONRAIDER	£6.95
PENGO (Watford)	£7.75
SWOOP	£6.95
747 FLIGHT SIMULATOR	£7.75

LEVEL 9 ADVENTURE GAMES

COLOSSAL ADVENTURE. The classical mainframe game "Adventure" with all the original puzzles plus 70 extra rooms. **£8.65**

ADVENTURE QUEST. Through forest, mountains, desert, caves, water, fire, moorland and swamp on an epic quest vs tyranny. **£8.50**

DUNGEON ADVENTURE. Over 100 puzzles in the Demon Lord's dungeons. **£8.50**

SNOWBALL. Save a 7000 location colony starship in 2302 AD. **£8.50**

SEIKOSHA GP250X:

10" Tractor Feed, 80 columns, 60 CPS, normal and double - width/height characters, 128 characters with true descenders in ROM, 64 user definable characters in RAM (384 bytes) Programmed printing (80 bytes of memory) for storing your own print sequences, dot addressable graphics with repetitive graphics data printing, RS232 and Centronics parallel interfaces standard, paper empty function and buzzer, self test routine. All this for

ONLY £199 (£7 carr.)

Simply phone your order through and we will do the rest.
Tel: (0923) 50234

WATFORD - Always a step ahead

RESERVED

This space is reserved for the launch of yet another ROM based Software for BBC Micro.

For details please read our advert next month.

TEX EPROM ERASERS

* New Broom for EPROMS *

EPROMs need careful treatment to survive their expected lifetime. Rushing it could burn their brains out. So cop-out of this helter-skelter world; take it easy the TEX way and give your chips a well earned break. Cool, gentle and affordable. EPROMPT does it properly.

Two versions available:

- **EPROMPT EB** - The standard version. Erases up to 16 chips. **£30.00**
- **EPROMPT GT** - Erases up to 32 chips. Has an incorporated safety switch which automatically switches off the UV lamp when the Eraser is opened. **£35.00.**

TEXTIME

(SOLID STATE ELECTRONIC TIMER)

EPROM Erasers need just half an hour to finish their job. It is the proper erase time for all EPROMs. While the Eraser is busy you may take a break but not for too long without our **TIMER** on the job. Over erasing can shorten data storage time. **TEXTIMER** will remember to switch off the lamp and your chips will forget nothing new. **TEXTIMER** will pay for itself in no time.

ONLY £15.00

DISKETTE STORAGE

Attractive Continental designed, **LOCKABLE** Diskette Boxes. Strong plastic construction with lockable lid. Smoked acrylic top and cream base fitted with dividers and adhesive title strips for ease of filing.

- M-35 Holds up to 35 mini discs **£14.00**
- M-85 Holds up to 85 mini discs **£17.00** (carr. £2)

FLOPPY HEAD CLEANERS

Unless your office/home is dust free, you should clean heads at least once a week to avoid the risk of cross contamination.

Simply apply the cleaner to one of the specially formulated cleaning discs, insert into the drive and initialise. If your system has no initialisation program then insert the disc and open and close the door 5 times.

£16.00

Prices subject to change without notice.

MAIL ORDER AND RETAIL SHOP. TRADE AND EXPORT INQUIRIES WELCOME. GOVERNMENT AND EDUCATIONAL ESTABLISHMENTS OFFICIAL ORDERS ACCEPTED. CARRIAGE: Unless stated otherwise, please add 60p to all cash orders.

VAT: UK customers please add 15% VAT to the total cost incl. Carriage.

SHOP HOURS: 9.00am to 6.00pm. Monday to Saturday. (Ample Free Car Parking Spaces) ACCESS ORDERS: Simply phone: Watford (0923) 50234. (24 Hours)

WATFORD ELECTRONICS

Dept. BBC, Cardiff Road, Watford, Herts, England.
Telephone: 0923 40588/37774. Telex: 8956095

Special Offer from Viglen

Complete disc system for the BBC Model B

- Package assumes you own a BBC Model B with switched-mode power supply plus 1.2 Operating System



Offer includes:

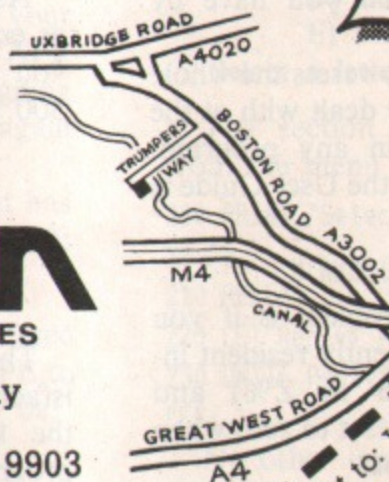
- 100K full height Olivetti Disc Drive (as used by Acorn), including case and all leads
- Disc Interface fitted free whilst you wait
- User Guide
- Formatting Disc

Disc Drive
and Interface

£229 INC. VAT

Viglen
COMPUTER SUPPLIES

Unit 7 Trumpers Way
Hanwell W7 2QA
Telephone: (01) 843 9903



Post to: VIGLEN COMPUTER SUPPLIES UNIT 7, TRUMPERS WAY, HANWELL, W7 2QA

Please send me (state number required)

I enclose Cheque/P.O. for £ _____

I prefer to pay ACCESS/BARCLAYCARD (Delete whichever not applicable)

Card No. _____

Signature _____

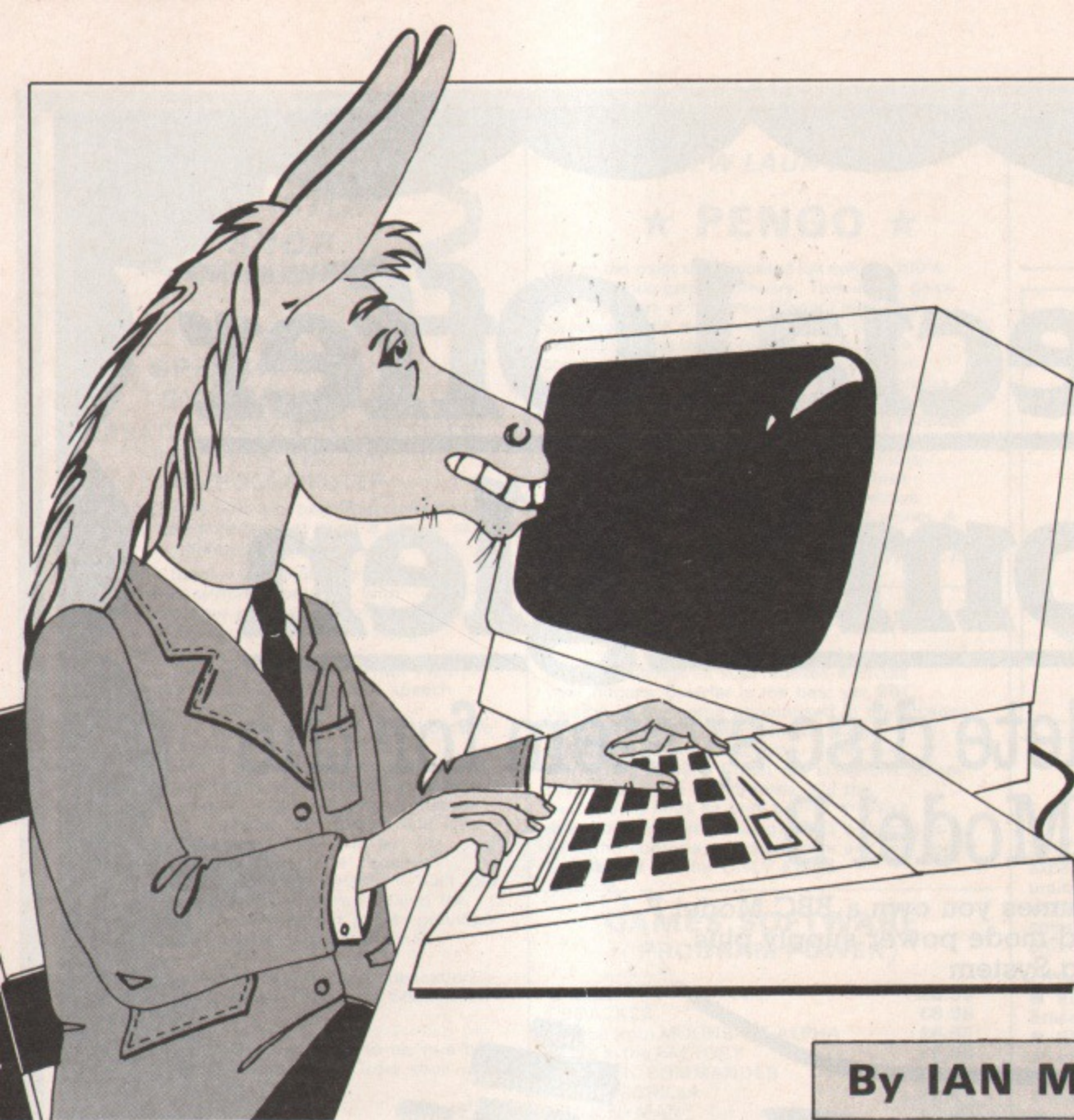
Name _____

Address _____

made out to VIGLEN COMPUTER SUPPLIES.

Scissors icon and dashed line indicating where to cut.





After a you're human

By IAN MURRAY

EXCRUTIATING ... UGH! ... what on earth does that mean ... Oh no - not again!

These are some of the more printable cries of frustration that a typical home micro user is likely to utter when trying to run much of the software currently available.

Nor is the home micro user alone in his frustration. There is a wealth of useless software available for the educational market as well.

This yields comments such as: "Oi Sir - look what this does". Or: "Is it meant to do that Miss?"

Or, more insidiously, just silence as the youthful scholar finds that the program has crashed and begins to roam around the operating system as if it were a huge doodle-pad.

A user friendly program is one that accepts that the user is actually a mortal human. Which means he is quite capable of acting like a demented maniac in charge of a cruise missile.

It assumes that each and every key on the keyboard will be pressed, in any combination, at some time - even if it is only done 'just for fun'.

Ideally this should extend to the ON/OFF switch at the back of the BBC

Micro. But for the purposes of this article I take it that you have already guarded against that particular act of malevolence.

User friendliness can be divided into three main areas:

- Anticipating the actions of human beings.
- Helpfully correcting the actions of human beings.
- Making the human being feel he is not dealing with a computer.

The first is the subject of this article while the latter two will be covered in future issues of *The Micro User*.

The first two keys to deal with are BREAK and ESCAPE. If you have version 1.0 of the operating system or later, then your options are slightly wider. Find out which you have by typing *FXO.

As the BREAK key resets the whole system, this should be dealt with at the earliest opportunity in any program. The method shown in the User Guide is probably the best:

```
10 *KEY10 OLD:MRUN:IM
```

The only major problem is if you have used the permanently resident integer variables (A% to Z%) and assume that they are reset to zero when you run. They are not.

Your next lines of Basic must then

assign the start values you want to any of these variables, such as:

```
20 B%=0:D%=0
```

Now on pressing BREAK your program will not let the user have a tour of the operating system and will re-run successfully. Provided, of course, that you haven't used any clever tricks such as deleting part of the program as you run.

The easiest way of dealing with the ESCAPE key - and this is applicable to all operating systems - is to trap it with the ON ERROR command.

This, like trapping the BREAK key, must occur at a very early stage in the program. For example:

```
10 ON ERROR GOTO 500
```

As the ESCAPE key is considered as error message 17, pressing it directs you to line 500. Subsequent lines at 500 could be as follows:

```
500 IF ERR = 17 THEN RUN
520 MODE7
530 REPORT
540 PRINT;" at line "ERL
550 END
```

The solution is fundamentally unsatisfactory as we now have two keys on the keyboard which will re-run the program.

Because we reached line 500 via an

r all, e only

absolute jump we cannot retrace our steps to where we came from.

But fear not! Sir Galahad Acorn has provided a solution to the gallant knights with OS 1.0 and OS 1.2.

We may either 'hang up' the ESCAPE key entirely or re-assign it to another key:

```
10 ON ERROR GOTO 1000
20 *FX229,1
30 REPEAT
40 PRINT"PRESS ESCAPE"
50 PRINT"No luck!!"
60 PRINT"Press @ to exit"
70 A$=GET$
80 UNTIL A$="@ "
90 PRINT MISTAKE
1000 MODE 7
1010 REPORT
1020 PRINT;" at line "ERL
1030 *FX229,0
1040 END
```

The *FX229 call has been used to turn off the ESCAPE key at line 20 and turn it on again at line 1030, which presumably you would wish to do. When you run the program you will notice that the ON ERROR has not been affected and correctly traps the deliberate error at line 90.

You may, of course, decide that your programs should still have an ESCAPE get-out. This is possible by assigning the ESCAPE key to another key, again at line 20.

You ought to choose a key that has no conceivable use. I suggest CTRL-O:

```
20 *FX220,0
```

This is keys CTRL and @ pressed down together. To restore ESCAPE to its rightful key, line 1030 should be:

```
1030 *FX220,27
```

I personally would avoid *FX220

calls in the finished program as it still provides the user with a combination of keys with which to experiment, and sooner or later some latent Einstein will find them.

I suggest using the *FX220 call while developing pre-release versions of the program.

When using the ON ERROR command make certain that you direct it to a line that exists. If you don't you will get a program that gives an impression of locking-up, but is in fact in an endless ON ERROR loop.

Having dealt with the obvious keys, you still have to out-smart the nine year old's propensity to destroy all your handiwork. Now you have to anticipate his every move across the keyboard. Can you do it? Is it even possible?

The secret is to *never* use the INPUT or INPUT LINE commands as up to 255 characters can be entered with these commands. Someone merely repeating a key could enter a string so long that it would corrupt the screen display.

The answer is to always use the GET and GET\$ commands, which only collect a single character at a time. You will need to provide your own delete routine where you think it's needed (see below).

However firstly turn off the auto repeat feature at the beginning of the program with:

```
10 *FX11,0
```

This will at least protect you from accidental entry of more than a single character.

Where your programs are menu driven – that is, your progress through the program depends on an item selected from a screen menu – then you should lay out your display something like this:

PROGRAM OPTIONS

- A) Create a File
- B) Amend a File
- C) Delete a File
- D) Sort a File
- E) Search a File

Select a letter from A to E >>

The section of program to select from the menu may look like this:

```
200 PRINT "Select a letter from A to E
>> ";
210 REPEAT
220 LET Reply$ = GET$
230 UNTIL Reply$ >= "A" AND Reply$ <
"F"
```

No other input will successfully get past this. However you may be locked

in the wrong size letters – small instead of capitals.

Line 230 can be extended with a complicated logical expression to cater for this or you may use the following alternative:

```
230 UNTIL INSTR( "ABCDEabcde" ,
Reply$) > 0
```

This again is not totally satisfactory as your analysis of the menu selection will still involve you in converting the lower case letters to upper case before deciding what action your program is to take.

For this reason it is better to use numbers on the menu selection. But take the number in as a character. This would involve a change of line 230 to:

```
230 UNTIL Reply$ > "0" AND Reply$ <
"6"
```

with the other obvious changes in any menu.

As a program designer you must decide whether the theory of your program will allow the user, in answering a question, to enter any character or a selection from a limited subset of characters.

This is particularly relevant when trying to get in numbers, or even names.

For example, when entering numbers you may feel that you will allow 0123456789. , but not allow other valid mathematical characters such as “-/+*”. This is possible using the GET\$ command, but not possible with the INPUT commands.

You will presumably still want the RETURN key to be used to signal the end of the numbers' input. The following suggestion may help your thinking:

```
100 PRINT "Enter a decimal number >>
";
110 REPEAT
120 REPEAT
130 R$=GET$
140 UNTIL R$ = CHR$(13) OR INSTR(
"0123456789.",R$ ) > 0
150 PRINT R$;
160 IF R$ <> CHR$(13) THEN Number$ =
Number$ + R$
170 UNTIL R$ = CHR$(13)
180 Number = VAL(Number$)
190 PRINT
200 PRINT Number
```

You can extend your control over the input by putting a restriction on its length at line 160 with the use of the LEN command. However the implication of this is that you will need to write



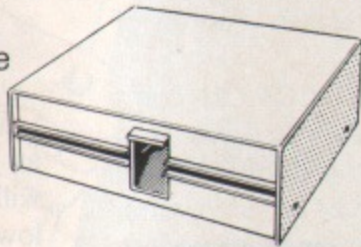
Epson Fx 80 Printer

£326

Including lead for BBC.
Send £375
to include VAT, p&p.

200K Disk Drive

40 Track
Single & Double



62 file names
including cable and power lead.
Send £175 to include VAT, p&p,
inc. formatting disk & manual.
800K & 800K switchable with
power supply available - ask for details.

£152

JOIN THE BBC DISCOUNT CLUB

**FOR THE KEENEST PRICES ON
BBC COMPATIBLE PRODUCTS**

400K Disk Drives

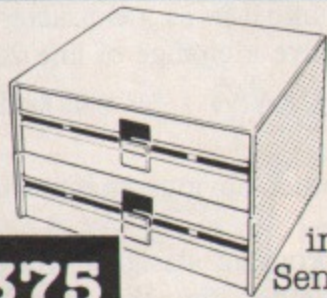
80 Track
Single & Double



124 file names
including all necessary leads.
Send £299 to include VAT, p&p,
inc. formatting disk & manual.

£259

Send
for a full list
of all our
drives!

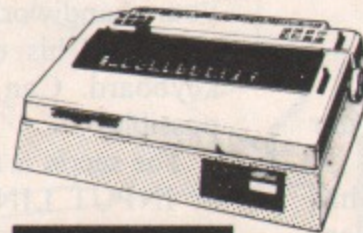


800K Disk Drives

800K & 800K Switchable
124 file names

including cable & power lead.
Send £432 to include VAT, p&p.
Send £460 for 800K Switchable.

£375



Juki Daisywheel Printer

£338

18 CPS including cable.
Send £389 to include VAT, p&p.

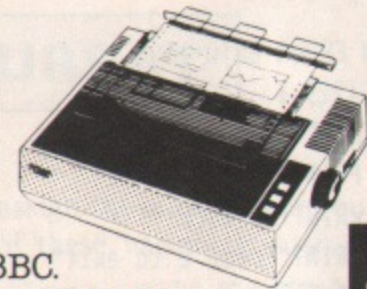
Sanyo/BMC Monitors



12" amber or green screens.
Send £99 to include VAT, p&p.

£86

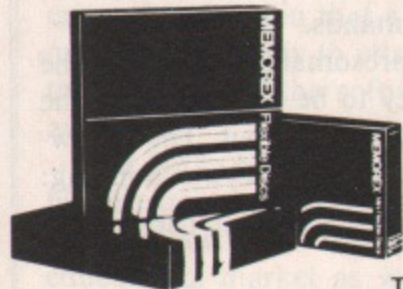
Epson Rx 80 FT Printer



Including lead for BBC.
Send £299 to include VAT, p&p.

£260

Diskettes



Memorex, in packs of 10
SS 40tk £16.00
DS 40tk £20.00
SS 80tk £26.00
DS 80tk £29.00

Including VAT, p&p.



Disk storage boxes
£15.00 (takes 35)
Disk storage boxes
£20.00 (takes 80)
Prices include VAT, p&p.

Accessories

BBC Stands £10.00
Dust covers £4.95
(for BBC,
Drives and
Printers)



Product	Price to members	Qty.	Total
200K DISK DRIVE *	<input type="checkbox"/> £175.00	_____	£ _____
400K DISK DRIVES	<input type="checkbox"/> £299.00	_____	£ _____
EPSON FX 80	<input type="checkbox"/> £375.00	_____	£ _____
800K DISK DRIVES	<input type="checkbox"/> £432.00	_____	£ _____
800K SWITCHABLE	<input type="checkbox"/> £460.00	_____	£ _____
JUKI PRINTER	<input type="checkbox"/> £389.00	_____	£ _____
SANYO/BMC-AMBER	<input type="checkbox"/> £99.00	_____	£ _____
SANYO/BMC-GREEN	<input type="checkbox"/> £99.00	_____	£ _____
EPSON RX 80 FT	<input type="checkbox"/> £299.00	_____	£ _____
SS 40 DISKETTES	<input type="checkbox"/> £16.00	_____	£ _____
DS 40 DISKETTES	<input type="checkbox"/> £20.00	_____	£ _____
SS 80 DISKETTES	<input type="checkbox"/> £26.00	_____	£ _____
DS 80 DISKETTES	<input type="checkbox"/> £29.00	_____	£ _____
BBC STAND	<input type="checkbox"/> £10.00	_____	£ _____
DUST COVERS	<input type="checkbox"/> £4.95	_____	£ _____
DISK STORAGE (35)	<input type="checkbox"/> £15.00	_____	£ _____
DISK STORAGE (80)	<input type="checkbox"/> £20.00	_____	£ _____

MEMBERSHIP APPLICATION FEE £10.00
TOTAL SUM ENCLOSED (Cheque or credit card no.) £ _____

To: The BBC DC, 46 Princes Avenue, Finchley, London N3.

I enclose my order for the above products at discount as a member of the BBC DC. I understand I will receive mailings of new products and special offers as they become available.

Name _____

Address _____

Signed _____

I would like you to return my money if the goods ordered are not despatched within two weeks of receipt of order.

ALL PRODUCTS ARE BRAND NEW, BOXED AND OFFERED WITH FULL MANUFACTURERS WARRANTY. ALL QUERIES WILL BE ANSWERED BY MAIL.

BBC % DC

From Page 43

your own delete routine.

This routine involves counting-in every character that passes any other restrictions you may have, and allowing the delete character, CHR\$(127), to be printed to the screen but not added to the final accepted string of characters.

Of course you will have to remove the most right hand character from the string input.

Restricting the length of the string

```
100 CLS
110 C=0
120 PRINT "Enter a four digit number
>> ";
130 REPEAT
140 REPEAT
150 R=GET
160 R#=CHR$(R)
170 Z=INSTR("0123456789", R#)
180 UNTIL R=13 OR Z<>0 OR (R=127 AND
C>0)
190 C=C+1
200 Number$ = Number$ + R#
210 IF R=13 THEN C=C-1
220 IF R=127 THEN C=C-2
230 N$ = LEFT$(N$,C)
240 IF ( C>4 AND R<>13 ) THEN
C=4:R#=""
250 IF R<>13 THEN PRINT R#;
260 UNTIL R=13 AND C=4
270 Number = VAL(Number$)
280 PRINT
290 PRINT Number
```

Figure 1

input creates a snag. You must allow the delete character to be the only character that can be the "length of the string + 1", so that you may delete the last character if required. A simple example of this is shown in Figure 1.

With little difficulty this type of routine can be made a procedure with parameters that can be specified. This will ensure your program does not slide to an unsuitable length.

The important point is that if the programmer is to be truly user friendly

in controlling and directing the user's general keyboard inputs, then the program will inevitably be lengthy.

As a rule of thumb, I believe you must expect 90 per cent of every program to be devoted to user friendliness, and only 10 per cent to the algorithm.

The cursor control and copy keys should also be taken out of action unless required in the program. From OS 1.0 onwards you may do this by using the *FX4,1 or *FX4,2 calls.

The former disables cursor editing and the latter permits redefinition of these keys similar to the red function keys. The normal mode is turned on with *FX4,0.

Subsequent articles will look at validation, helpful ways of correcting the user's errors, and how to make your BBC Micro actually seem relatively human.

Till then, a final tip: Always try your programs out on a complete dodo. In the business of friendliness there's none better than a complete idiot to discover what a fool you have been!

Teachers!

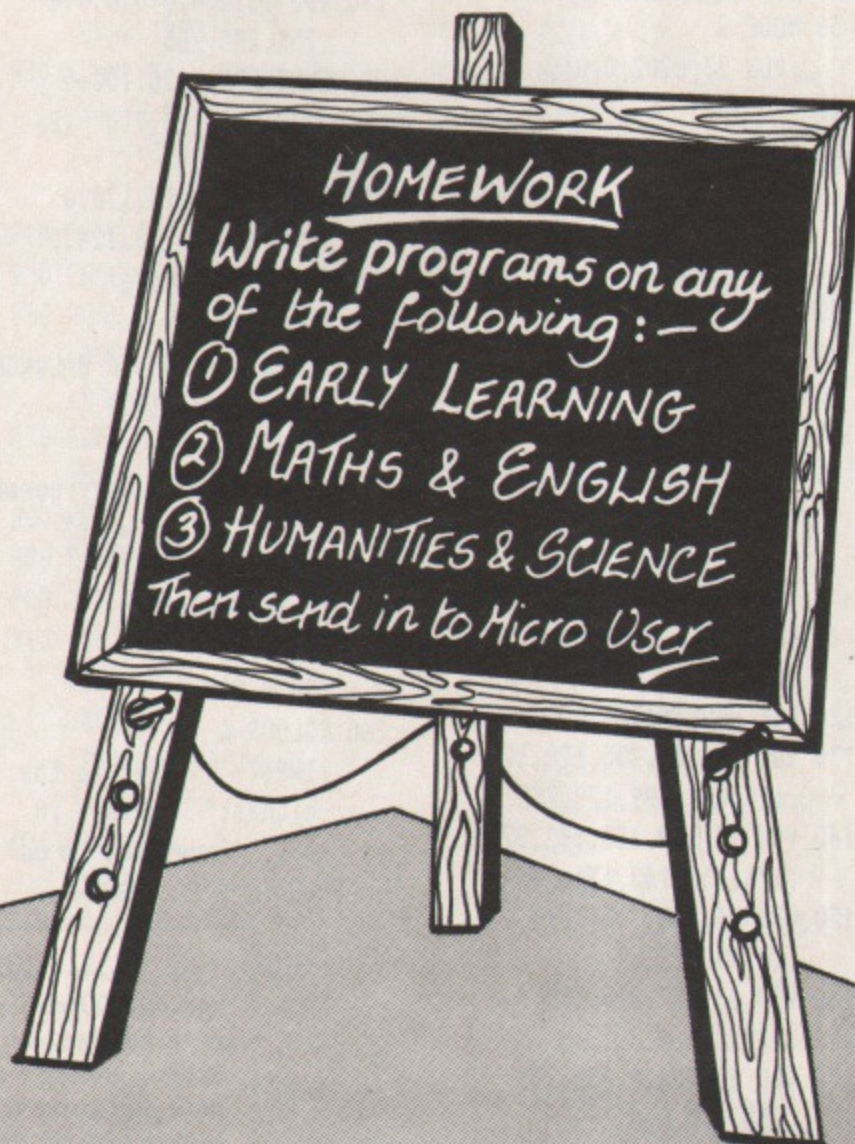
Don't confine your great ideas to your own classroom. Why not share them with your colleagues through the pages of *The Micro User*?

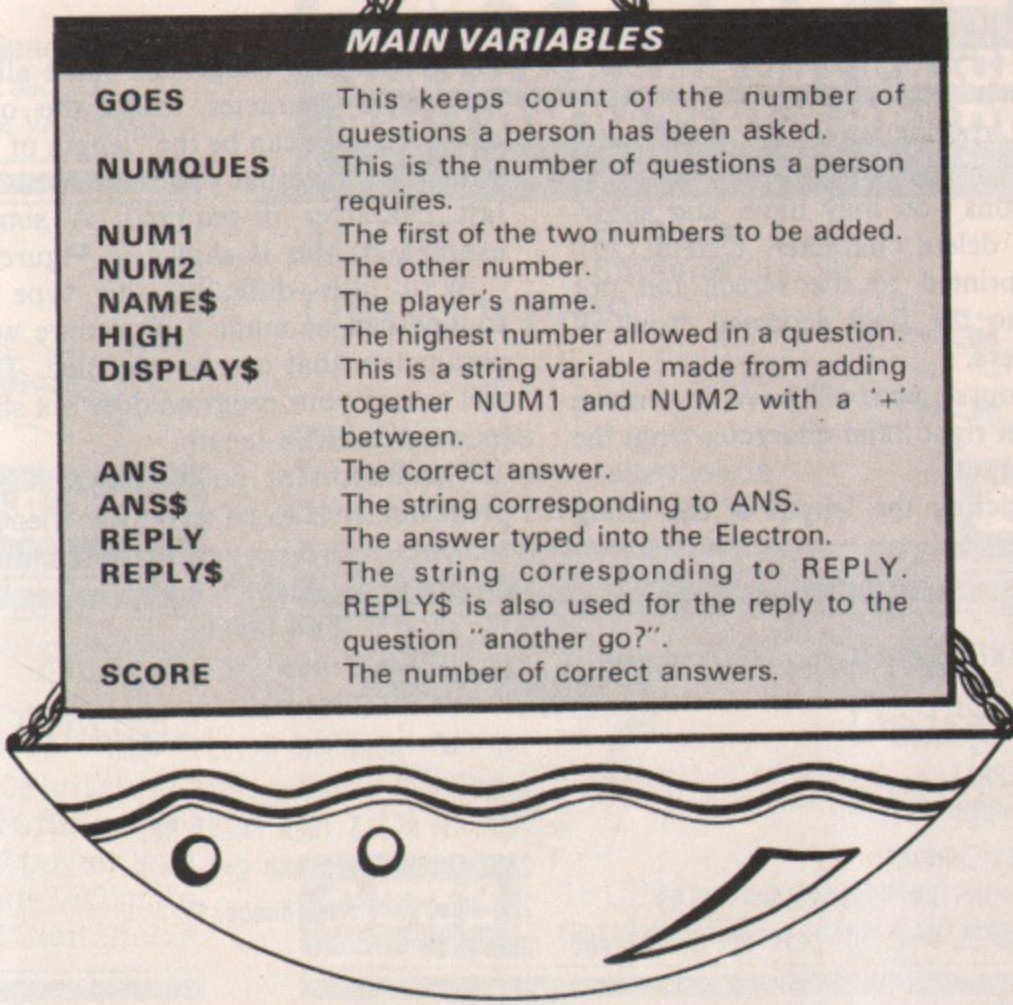
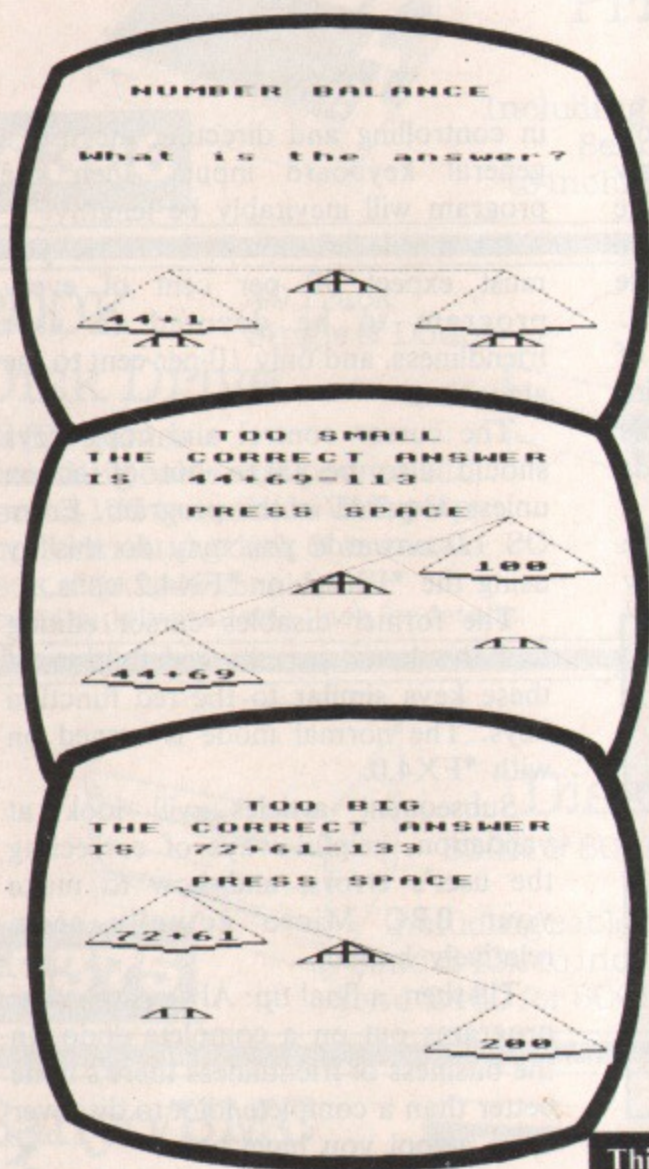
Each month from now on we'll be devoting articles to the use of the BBC Micro in education. As you can see, we've started in this issue with Ian Murray's article on user-friendly software and the excellent number balance program.

And our educational coverage won't be just pious theory - we'll be carrying programs you can try out in your own classroom.

To do all this, we're going to need your help. We need your programs, ideas and opinions. Why not send them to us at:

*Classroom Corner
The Micro User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.*





This listing has been taken from our sister publication, *Electron User* — one of the many excellent features appearing in this month's issue.

```

10 REM BALANCE
20 REM (C) Electron User
30 MODE 2
   :VDU 23;8202;0;0;0;
40 PROCINIT
50 GOES=0
   :REPEAT
   :GOES=GOES+1
60 PROCSELECT
70 PROCCENTRE
80 PROCINPUT
90 UNTIL GOES=NUMQUES
100 PROCRESULT
110 IF LEFT$(REPLY$,1)="Y"
    OR LEFT$(REPLY$,1)=
    "y"
    THEN RUN
    ELSE MODE 6
   :END
120 DEF PROCINIT
130 VDU 23,230,255,129,129
    ,129,129,129,129,255
140 VDU 23,229,128,192,224
    ,176,152,140,134,255
150 VDU 23,228,1,3,7,13
    ,25,49,97,255
160 VDU 23,227,255,255,0
    ,0,0,0,0,0
170 VDU 23,226,0,255,255
    ,255,0,0,0,0
180 VDU 23,225,0,0,0,255
    ,255,255,0,0
190 VDU 23,224,0,0,0,0,0
    ,255,255,255
200 ENVELOPE 1,20,100,0
    ,0,0,0,0,126,0,0,-126
    ,126,126
210 ENVELOPE 2,10,128,0
    ,128,200,0,200,126,0
    ,0,-126,126,126
220 COLOUR 2
   :PRINT " NUMBER BALANCE"
230 VDU 28,0,31,19,1
240 COLOUR 1
   :INPUT "'How many questi
    ons'"'"do you want"
    ,NUMQUES
250 IF NUMQUES<1
    THEN VDU 7
   :GOTO 240
260 COLOUR 6
   :INPUT "'What is the
    highest'"'"number in
    any'"'"question to be'"'"
    "(2 TO 99)",HIGH
270 IF HIGH<2 OR HIGH>99
    THEN VDU 7
   :GOTO 260
280 COLOUR 3
   :INPUT "'What is your
    name?"' NAME$
290 SCORE=0
300 ENDPROC
310 DEF PROCSELECT
320 NUM1=RND(HIGH)
330 NUM2=RND(HIGH)
340 DISPLAY$=RIGHT$(" "+
    STR$(NUM1),2)+"+"+
    LEFT$(STR$(NUM2)+
    ",2)
350 ANS=NUM1+NUM2
360 ENDPROC
370 DEF PROCPAN(X,Y,DISPLAY$)
380 COLOUR 5
390 PRINT TAB(X,Y-3)"
    "
400 PRINT TAB(X,Y-2)"
    "
410 PRINT TAB(X,Y-1)"
    "
420 PRINT TAB(X,Y)"
    "
430 PRINT TAB(X,Y+1)"
    "
440 PRINT TAB(X,Y+2)" "+DISP
    AY$+" "
450 COLOUR 6
460 VDU 31,X,Y+3,227,226
    ,225,224,225,226,227
470 PRINT TAB(X,Y+4)"
    "
480 MOVE X*64,896-32*Y
   :DRAW X*64+223,1055-32*Y
   :MOVE X*64+224,1055-32*Y
   :DRAW X*64+447,896-32*Y
490 ENDPROC
500 DEF PROCCENTRE
510 CLS
520 PROCPAN(0,18,DISPLAY$)
   :L=480
530 PROCPAN(13,19," ")
   :R=480
540 COLOUR 1
550 VDU 31,9,16,228,229
    ,10,8,8,8,228,230,230
    ,229
560 VDU 31,2,22,228,230
    ,229,31,15,22,228,230
    ,229
570 MOVE 224,L

```

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of *The Micro User*.

BALANCE tests your powers of mental arithmetic by giving you a sum to do. The sum appears on one side of a set of scales, and the answer you type in appears on the other.

The pans of the scales balance when the answer is correct, otherwise they tilt.

It's not always easy but it is colourful and fun to play.

It all adds up to a very balanced game

THE PROCEDURES

PROCINIT	This defines the characters, sets up the screen, and initialises NUMQUES, HIGH, NAME\$, and SCORE.
PROCSELECT	Selects two random numbers and calculates DISPLAY\$ and ANS.
PROCPAN(X,Y,Z\$)	Draws a pan at co-ordinates X,Y and puts Z\$ in the pan.
PROCCENTRE	Draws the scales in central position.
PROCINPUT	Takes in your answer and checks it.
PROCBIG	Handles answers that are too big.
PROCSMALL	Handles answers that are too small.
PROCCORRECT	This deals with the correct answers.
PROCMOVE(P)	This moves the scales, the direction depending on whether P is +1 or -1.
PROCRESULT	As might be expected, this procedure prints out the results.

```

:DRAW 1055,R
580 ENDPROC
590 DEF PROCINPUT
600 VDU 7
:COLOUR 3
:PRINT TAB(0,5)"What
is the answer?"
:COLOUR 5
610 REPLY$=""
:ANS$=STR$(ANS)
:FOR I=1TO LEN(ANS$)
620 A=GET
:IF A<>13AND(A<48
OR A>57)
THEN 620
ELSE A$=CHR$(A)
:PRINT TAB(14+I,20)A$
:REPLY$=REPLY$+A$
:NEXT
:REPLY=VAL(REPLY$)
630 REPLY$=LEFT$(" "+REPLY$+
" ",5)
640 IF ANS=REPLY
THEN SOUND 0,2,1,50
:PROCCORRECT
650 IF ANS>REPLY
THEN SOUND 0,1,10,40
:PROCSMALL
660 IF ANS<REPLY
THEN SOUND 0,1,10,40
:PROCBIG
670 IF GET <>32
THEN 670
680 ENDPROC
690 DEF PROCBIG
700 COLOUR 9
:PRINT TAB(6,3)"TOO BIG"
TAB(0,5)STRING$(19,"
")
710 PROCMOVE(-1)
720 COLOUR 10
:PRINT TAB(0,5)"THE CORRE
CT ANSWER""IS "DISPLAY
$;"ANS$;"
:COLOUR 8
:PRINT " PRESS SPACE"
730 ENDPROC
740 DEF PROCSMALL
750 COLOUR 9
:PRINT TAB(5,3)"TOO SMALL
"TAB(0,5)STRING$(19
," ")
760 PROCMOVE(1)
770 COLOUR 10
:PRINT TAB(0,5)"THE CORRE
CT ANSWER""IS "DISPLAY
$;"ANS$;"
:COLOUR 8
:PRINT " PRESS SPACE"
780 ENDPROC
790 DEF PROCMOVE(P)
800 YL=18
:YR=18
810 FOR I=1TO 5
820 GCOL 3,7
:MOVE 224,L
:DRAW 1055,R
830 YL=YL+P
:YR=YR-P
:L=-1*32*P+L
:R=32*P+R
840 PROCPAN(0,YL,DISPLAY$)
850 PROCPAN(13,YR,REPLY$)
860 GCOL 0,7
:MOVE 224,L
:DRAW 1055,R
870 FOR J=1TO 500
:NEXT
880 NEXT
890 ENDPROC
900 DEF PROCRESULT
910 VDU 7
:CLS
:COLOUR 3
:PRINT ""RESULTS:-"
"-----"
920 COLOUR 6
:PRINT ""You got ";
:COLOUR 1
:PRINT STR$(SCORE)
:COLOUR 6
:PRINT ""questions right"
""out of the ";
:COLOUR 1
:PRINT STR$(NUMQUES)
:COLOUR 6
:PRINT ""questions that
you""tried"
930 COLOUR 10
:PRINT ""Do you want
another""try? Answer
yes or""no, then RETURN"
940 INPUT ""REPLY$
:ENDPROC
950 DEF PROCCORRECT
960 SCORE=SCORE+1
970 CLS
:PRINT ""
:FOR I=1TO 10
:COLOUR RND(15)
:PRINT "WELL DONE ";
:COLOUR RND(15)
:PRINT NAME$
:NEXT
980 PRINT
:FOR I=1TO 10
:COLOUR RND(15)
:PRINT "YOU ARE RIGHT"
:NEXT
990 COLOUR 7
:PRINT "" PRESS SPACE
";
1000 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 137.

**"EXCELLENT FAST SERVICE -
EVEN DOWN HERE"
(M. BULLEN, FALKLANDS, South Atlantic)**

SOFTWARE SUPERMARKET

At Software Supermarket, we play all the programs we can get for the BBC Micro (and the Spectrum - send 50p stamp for a catalogue for either! FREE catalogue with each order). We put just the best of each type of program into our ads and catalogues. We don't have the biggest list of programs - just the ones you'll really enjoy for a long time. They come from many different companies, large and small, famous and just-about-to-be-famous. We produce no programs ourselves, so our choice is quite impartial.

We quote reviews from all the magazines to help you decide. We tell you if your joystick will work - all programs run with keyboard control, too. We save you money by choosing the best - and we send them fast, which saves you hunting round the shops. From over 40 countries you write praising our same-day despatch. Mail order or telephone credit card orders only please. Prices quoted include U.K. VAT. For orders abroad, prices are the same. You can phone VISA or ACCESS credit card orders to us on 01-789 8546 at any time, from any country where your own regulations permit this.

ALL PROGRAMS FOR 32K BBC

CYBERTRON MISSION Absolutely smashing graphics and animation in this new arcade/adventure, as you enter the stronghold of Fort Cybertron. As soon as you've got all the treasure you need, run with it to the Safe Room. Touching the Safe promotes you to the next level. 16 rooms on each level (draw a map): meet the evil Spinners, then the Clones, then the highly intelligent Cyberdroids. 8-way movement and firing. Watch out for the Spook who can glide thro' the electric walls (great effects!). It could become a classic. JOYSTICKS O.K. (ProgramPower) £7.95.

PINBALL ARCADE DESIGN YOUR OWN PIN-TABLES! This really is a d-i-y program. One example pin-table is included, but the fun is in designing your own (and saving them). PLAY is very convincing as you move the flippers, call the next ball and pull the lever. You can add or take away 38 different springs and wires and flashing lights and bumpers, move them all around the table, alter their scores, or their bounce, alter the flippers, even tilt the table. You can change just about everything quickly and easily. And then you can play with the result. Be a Pinball Wizard, now, and design the perfect pin-table. NO JOYSTICKS. (Kansas) £10.00

FRUITY FREDDY The very latest game from the authors of "Transistors Revenge". It's just as original and just as much fun to play. You are raiding the neighbour's fruit trees (beautiful graphics) and if you pick the fruit in time as it grows, your score mounts. But watch out for the fist-waving neighbour, the killer wasps, the deadly caterpillar and the bird flying overhead that might kill you with its well, er, droppings. You've got a can of bee-killer, if you've got time to use it. 9 skill levels; Hall of Fame. Buy it for the graphics. NO JOYSTICKS. (SoftSpot) £6.95.

CALL 01-789 8546 (24 hours)

CHARGE PROGRAMS TO VISA OR ACCESS

To: SOFTWARE SUPERMARKET, 87 Howards Lane London SW15 6NU.

If you do not want to cut this magazine, write your order out carefully on plain paper and quote this number: **MU3**

I own aK computer which is a SPECTRUM/BBC I enclose a cheque/PO made payable to Software Supermarket OR Charge my VISA/ACCESS/EUOCARD/MASTERCARD number:

Signature

Please write clearly. If we can't read it, you won't get it.

Name

Address

Postcode

Phone, if any, in case of query

PROGRAM NAME	Price
	£
	£
	£
	£
	£
	£
	£
POSTAGE	U K Add 55p only per order £0 55p
AND	EUROPE Add 55p for each program £
PACKING	OUTSIDE EUROPE Add £1 for each program airmail £
	OUTSIDE EUROPE, ADD £1 TO TOTAL TOTAL £
	FOR REGISTERED MAIL

CYLON ATTACK "OUTSTANDING ... Quite simply excellent ... the graphics leave most other games standing." (MicroUser) It is pretty staggering - so are the 3D graphics. You will believe you are launching from and docking with a mothership: you will see and feel you are refuelling. You will know just when you can kill the enemy as your sights change shape. **UNIQUE 50-PLACE HI-SCORE TABLE CAN BE SAVED FROM GAME TO GAME.** Now why don't all the programs do that - it's a great idea. JOYSTICKS O.K. (A & F) £7.90

TRAFALGAR Totally original new game, as you command your way through the graphic battle of Trafalgar. Great full-screen overhead line-of-battle pictures, as you choose your enemy ship and then sea-level viewpoint as you watch the two ships fight to the death. 1 or 2 players: FIRESHIPS can be launched (and blown up, if you're smart): your broadsides are very controllable and the graphics are very watchable. It makes a nice change from the space race. NO JOYSTICKS. (Squirrel) £8.00

BIRDIE BARRAGE Your BBC micro plays a decent game of golf now, too! Welcome to Acorn Park Golf Course, 18 holes, 72 par. You have a full bag of clubs (and full-screen graphics, of course): you can set the direction and power of each shot very accurately, provided you've chosen the right club - and watch your ball in flight. Special highly detailed display when you get on the green, of course. The graphics are well-thought out and very clear and it is quite simply the best golf simulation we've seen on the BBC. NO JOYSTICKS. (Computasolve) £7.95

SNOWBALL "The puzzles are logical and the program is enthralling ... well worth the money." (MicroAdvent)

The greatest ever text adventure. Over 7 thousand locations! As Kim Kimberley, agent extraordinary, you must safeguard Snowball 9. 700 messages: vocab over 200: every object has a purpose. Written in super-compact a-code. Helpful manual. NO JOYSTICKS. (Level 9) £9.90

TRANSISTORS REVENGE "Clever idea... noisy, fast, colourful and compulsive." (YrComp). Original: great sound and action: good full-screen graphics. The game is set inside your computer as you guard the CPU from the attacks of the chips! 50 alien chips on each sheet: every 4 levels, life gets harder! You choose whether to continue with a game or enter the hi-score ladder. NO JOYSTICKS. (SoftSpot) £6.95

THE HOBBIT "Sheer adventure... a must for all aspiring adventurers." (CompAnswers) At last a BBC version of one of the greatest adventures ever! Text only, but every detail of the plot is the same as the famous Spectrum version. FREE 285pps illustrated book with clues. Unique real-time quest: 80 locations: massive vocabulary: accepts multiple commands in plain English: 16pps manual. It IS as good as you've heard! NO JOYSTICKS. (Melbourne House) £14.95

TRENCH "Nothing short of manna from heaven." (PersCompNews) The least exciting name we've heard for one of the most exciting games we've played. How about flying your Beeb/X-Wing Fighter down the 3D Trench towards the Death Star-style target, dodging the tie-fighters as they attack? 9 skill levels: sensational graphics. JOYSTICKS O.K. (Virgin) £7.95

PIMANIA "This game can damage your brain." (PersCompGames) "An original and amusing game" (PersCompNews) AT PRESSTIME YOU CAN STILL WIN THE £6,000 GOLDEN SUNDIAL OF PI! Simply by solving this wonderfully witty adventure. Brilliant use of music and graphics. NO JOYSTICKS (Automata) £10.00

BOMB ALLEY "Very addictive game... good value for money." (Beebug) Beautifully executed 3D simulation of an air-sea battle. Just defend your ships against air attack. Some of the most complex graphics we've seen on the BBC. JOYSTICKS OK. (Software Invasion) £7.95

PARAS NEW graphic battle game: NOT an adventure or arcade game. A gripping simulation of small-unit actions. Command 15 men: 10 possible actions for each man, each move: 10 skill levels: 2-part game, first secure your retreat and then destroy the bridge. Absorbing. NO JOYSTICKS (Lothlorien) £6.95

747 FLIGHT SIMULATOR "The best flight simulator around that runs on the Beeb... a must for all budding pilots." (PersCompNews) By Captain Roger Selby of British Airways. You're in charge of a 747 which you may land at either Heathrow or Gatwick. 11 control keys: clear instrument display: good runway view as you approach: 8-pps on-screen flight briefing. Realistic crashes, but instructive flights too! NO JOYSTICKS. (Dr Soft) £8.95

FOR all those machine code junkies out there, here is a shot of code for you to get on with. But for the rest of us I will look at some of the simpler aspects of machine code on the BBC Micro.

You may not realise that your computer, even when it appears to be doing nothing, is actually churning through a very complex set of instructions from the moment you switch it on to the time you switch it off.

It is performing a program called the operating system. This looks after all the operations you take for granted such as seeing if a key has been pressed, writing characters to the screen, and updating the clock.

In fact, it is this program that actually runs the micro. Without it the machine would just sit there doing nothing, not even showing a picture on the screen.

Within the operating system are many other smaller programs designed to perform specific functions. Some of the more useful ones are given names: **OSNEWL** – which is used when you press the Return key.

OSWRCH – which handles all the printing to your TV screen.

OSRDCH – which checks the keyboard for key presses.

OSASCI – which puts a character on the screen, and handles linefeeds.

If you are good at puzzles you may see a connection between the name of the routine and its job. The letters OS always stand for Operating System, but some of the others seem a bit cryptic.

NEWL is short for NEWLine.

ASCI is simply short for Ascii, which is the character coding system inside the BBC. It stands for American Standard Code for Information Interchange.

Now we get to the hard ones. RDCH and WRCH are made of two parts, RD + CH and WR + CH. These stand for REad a CHaracter and WRite a CHaracter – all easy once you know.

OSRDCH and OSWRCH are the two I want to deal with now.

The first scans the keyboard to see if you have pressed a key. If you have, the computer works out which one and generates the Ascii equivalent for it.

This is then placed in one of the

computer's memory slots called the accumulator. This routine also signals your pressing the Escape key.

All of the routines the BBC Micro uses can be called for use in your own routines, by intercepting them and adding your own "patch" program.

To do this you must change the address to which the computer jumps when executing OSRDCH. Such an address is called a vector.

Suppose you want to get the TAB key to move the cursor eight characters

By
PETER WALKER

to the right every time it is pressed.

The first thing that must be done is to save all the computer's internal registers so they cannot be corrupted.

If this is not done the computer might not be able to continue from where it was interrupted, as these hold some important numbers. To save them you PUSH these numbers onto the stack by doing this:

PHA – puts the accumulator onto the stack.

TYA:PHA – puts the Y register onto the stack.

TXA:PHA – puts the X register onto the stack.

These variables are then safe from being corrupted by your program. Also when you have finished your routine these variables must be reloaded back into the machine as follows:

PLA:TAX
PLA:TAY
PLA

Program I shows how it works.

You then have to put this patch program into the operating system. You do it by changing the vector.

The vector for this routine sits at address &210. The contents of this will vary with the operating system you have.

You cannot just overwrite this address, as you need to jump back to it later on in your program. So your own routine must save it.

The address is made of two hexadecimal bytes which are stored in reverse order.

For example, 32768 decimal which equals 8000 hexadecimal is stored as 00(low byte),80(high byte).

If you look at line 50, you will see I have done this in machine code at address &70 and &71. I have also

**How to save
wear and
tear on
your
digits**

Mike Chalk and Kansas bring you the first of the
NEW GENERATION Arcade games

PINBALL ARCADE

The absolute in arcade games

THREE five star reviews!
Your Computer,
Computing Today, Home
Computing Weekly - no
other program has ever
had such rave notices

Going are the days of squashing frogs, killing gorillas and eliminating cats, purely as the programmer decrees, for now YOU can actually create your own Arcade games!

Create your own Pinball machines - save them to tape to play whenever you like

Yes, the 'levels' problem is solved at last - literally a thousand games in one!

There are six 'pages' of shapes for you to create a Pinball board, with each shape capable of being placed in any position required.

Targets, Slings and Bumpers can be moved into any required position anywhere on the board, with the actual 'bounce' being adjustable.

There is total control of the firing spring, with realistic action depending on amount of time taken to press control bar. The strength of the flippers can also be varied.

There is highest score, last and current score and ball count.

The actual tilt of the board can be altered, with amount of ball speed and bounce corresponding.

It's not just a game - it's an education!

But take warning - it will make you dissatisfied with common Arcade games

Pinball Arcade literally 'stole the show' at the PCW Show, easily outselling every other BBC program at the exhibition!

Available by our famed first class return post service with every program of course carrying the Kansas lifetime guarantee which means that should it fail, it will be replaced entirely free of charge, this year, next year, or in ten years ...

ACCESS OR BARCLAYCARD TELEPHONE ORDERS ACCEPTED WITH PLEASURE

£10.35 VAT and post paid

Kansas

Recognised Brand Leader in microcomputer software

Kansas City Systems, Unit 3, Sutton Springs Wood, Chesterfield, S44 5XF. Tel: 0246 850357

From Page 49

```

10 FOR I=0 TO 1
20 P%=&900
30 I
40 DPT I
50 LDA&210
   :STA&70
   :LDA&211
   :STA&71
70 LDA&15
   :STA&210
   :LDA#9
   :STA&211
90 RTS
100 .START
110 STA&80 \Save accumulator.
120 TXA
   :PHA
   :TYA
   :PHA \Save X and Y registers
130 LDA&80
140 CMP#9
   :BNE RT \Test for TAB key.
145 \Lines 150 to 190 Output 8 spaces.
150 LDX#8
   :LDA#32
170 .SS JSR&FFE3
180 DEX
   :CPX#0
   :BNE SS
200 .RT PLA
   :TAY
   :PLA
   :TAX \Restore X and Y registers
210 LDA&80
   :JMP(&70) \Restore accumulator
   and return to original OSRDCH
220 JMP(&70) \Return to original
   OSRDCH
230 I
240 NEXT I
250 END

```

Program I

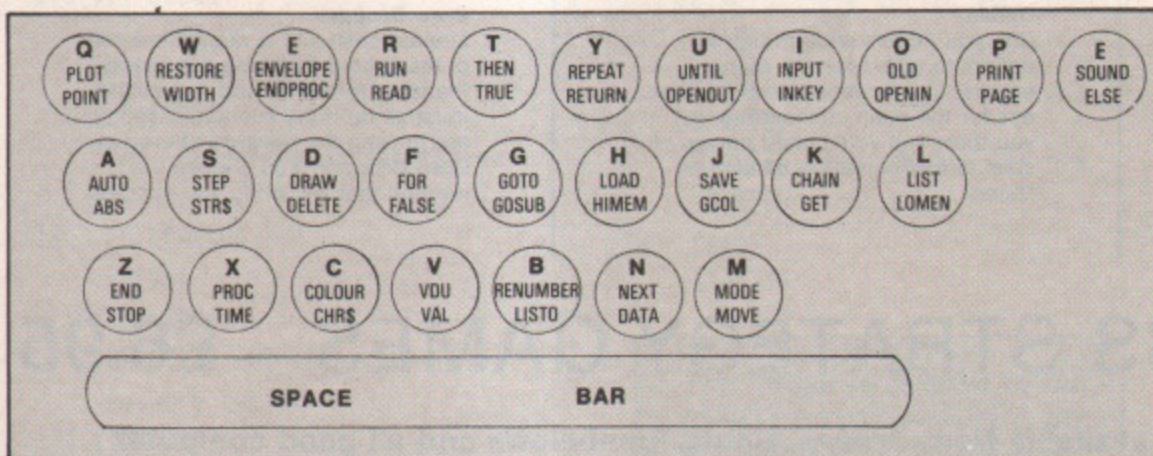


Figure I

changed the vector to the start address of my patch program.

To switch this program on you must type **CALL&0900**, after you have run it. Please note you will see nothing happen, you'll just get your prompt '>' back up.

But if you then press the TAB key you will find that the cursor will jump eight character positions along the screen.

This trivial example illustrates a powerful technique. We use this method in Program II to allow us to enter keywords directly from the keyboard without having to type them – very useful if your typing is not quite up to scratch.

With a bit of imagination and not a lot of knowledge you will be surprised what you can do with OSRDCH.

As with OSRDCH, you must be very careful about saving the registers when using OSWRCH.

When called it takes the Ascii character code in the accumulator and writes its pictorial representation to the TV screen.

All characters output from Basic, the operating system and anything else use this routine. So by using it you could change the action taken by any of the control codes.

For example, CTRL-G rings the bell once. We could make this ring more than once. Or you could make the computer print a pound sign instead of a dollar sign. The list of possibilities is endless.

As before, OSWRCH works through an address stored in a vector at &20E. Program II uses this routine to incorporate a keyboard sounder into the computer.

Every time a character is printed it makes a very short beep using the machine code equivalent of the Basic

sound command. When you press a key it is detected by OSRDCH, which places its code into the accumulator. This is then passed on to OSWRCH which prints the character on the screen and makes a short beep.

At the end of a lot of the lines in Program II you will see program comments. These do not have to be typed in – they just aid you in seeing how the program works.

This will only work on operating systems greater than 0.1, as it uses *FX138, which inserts characters into the keyboard buffer.

Once the program has been typed in and checked, save it so you do not lose it if the machine crashes. To start it just type **CALL&0900** as before, but this time it will return with a beep to tell you it is working.

You should still be able to use the machine normally, except that there will be a small beep each time you press a key.

If this gets on your nerves, don't worry. Just press CTRL @, and this will turn it off. Pressing it again turns the sound back on.

But now for the best bit. If you press the TAB key, then one of the alphabetic keys, a whole word will appear as if by magic on your screen. You will find that all the alphabetic keys do this, plus the @ key.

If, instead of pressing an alphabetic character after the TAB key, you press the TAB key again, it will give you a totally different set of keywords.

In all 54 keywords can be entered directly from the keyboard by pressing at most three keys.

Figure I shows the layout of the keywords. As you can see, most of the well used ones are actually on the letters they start with.

For example:

- PRINT = Key 'P'**
- INPUT = Key 'I'**
- MODE = Key 'M'**

Do not panic if when you press the key the whole keyword is not printed, because it was necessary to use some of the abbreviated forms of the keywords to fit all 54 into the available memory space. The diagram (left) can be used as a reference guide until you learn where all the keywords are.

The machine code sound command

From Page 51

is an option of the OSWORD routine. As you know from Basic, the SOUND command is a very powerful and flexible one and takes the format shown below:

C V P D
SOUND 1, -15, 20, 200

C = Channel Number (1 to 4)

V = Volume (-15 loudest to -1 softest)

P = Pitch (1 to 255)

D = Duration (0 to 255)

In the machine code equivalent you also need this data, which must be put into memory somewhere. The address at which you put this data is pointed to by the X and Y registers, X containing the low byte and Y-the high.

All numbers are in hexadecimal, including negative numbers. Each number takes up two locations, so the data will take up eight bytes of memory.

For the example above, the hexadecimal data for this will be:

01, 00, F1, FF, 14, 00, C8, 00

All the two byte numbers are in the

form low byte, high byte. Program III will produce all the notes from 1 to 255 five times in quick succession.

```
10 FOR I=0 TO 1
20 P%=&900
30 [
31 LDA#5
   :STA&70
35 .START
40 LDX#&40
   :LDY#&09
   :LDA#7
   :JSR&FFF1
80 INC&944
   :BNE START
   :DEC&70
   :BNE START
100 RTS
110 ]
120 NEXT I
130 !&0940=&FFF50001
140 !&0944=&00000000
150 END
```

Program III

To call the sound routine, set up the data in memory and set the X and Y registers to the address, for example:

Address = &0A00

X = &00

Y = &0A

Then place the number seven in the accumulator - this is the option number for OSWORD - and CALL address &FFF1.

When using any machine code program such as the keyword program, it always seems pointless to reassemble the program everytime you use it.

A better way would be for it to be executed when it had been loaded. This can be done by *RUNning it. To get this to work first run the program then type:

```
*SAVE"KEYWORD"900 800 900
```

If you are going to run this from tape you enter, *RUN"KEYWORD", but if from disc you just type, *KEYWORD.

*KEYWORD is a short form of *RUN"KEYWORD", where "*" means "*RUN". Please note, this only works with a disc system.

PLANE SAILING



Airline

Hijacks, strikes, crashes and spiralling fuel costs must all be overcome if you are to succeed at this game. A wing and a prayer will not be enough to turn your £3 million to £30 million in the time allowed, but your financial wizardry will enable you to take over British Airways, or will it?



Dallas

Can you amass enough petro dollars to take over the Euing empire. Cut throat business and an eye for the main chance may get you there but you'll need nerves of steel to overcome the oil king of Dallas.



Corn Cropper

Limited cash and droughts are two of the problems facing the farmer. Planting, fertilizing and harvesting must all be done economically if you are to reap the rewards offered in Corn Cropper. You choose the method that will bring you success.



BUSINESS STRATEGY GAMES - £6.95

Selected titles available from Greens, Boots, Rumbelows and all good computer shops or Cases Computer Simulations Ltd., 14 Langton Way, London SE3 7TL.

Single Key Entry listing

Program II

```

10 REM Copyright The Micro User
20 FOR I=0 TO 1
30 P%=&900
40 I
50 OPT I
60 LDA#&B0
   :STA&72 \Set flag for keyboard
   :sounder test.
70 LDA&20E
   :STA&74 \Save vectors for 'OSWRCH'
   :
80 LDA&20F
   :STA&75
90 LDA#&1C
   :STA&20E \Insert address for
   :new 'OSWRCH' routine.
100 LDA#9
   :STA&20F
110 JSR SDU \Call the keyboard sounde
   :r set up routine.
120 RTS
130 .START
140 STA&70
   :TXA
   :PHA
   :TYA
   :PHA \Save all registers A,X
   :Y.
150 LDA&70
   :CMP#9
   :BEQ KK
   :CMP#0
   :BEQ QQ
   :BNE EE \Test for TAB key and
   :CTRL '@'
160 .KK JSR KE
   :CMP#9
   :BNE YY
   :JSR KE
   :SBC#37
   :JMP ZZ \Get second key press.
170 .YY SBC#64
   :ZZ BMI KK
   :TAY
   :LDA&9C0,Y
   :TAY \Calculate offset table
   :value.
180 .LD LDA&A00,Y
   :CMP#64
   :BEQ EN
   :STY&71 \Get character from
   :keyword table.
190 LDY#0
   :TAY

```

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July issue of The Micro User.

```

   :LDA#&8A
   :JSR&FFF4
   :LDY&71
   :INY
   :BNE LD \Put chr into keybrd
   :buffer.
200 .QQ LDA&72
   :EOR #&80
   :STA&72
   :JMP EE \Change flag for keyboard
   :sounder.
210 .EE PLA
   :TAY
   :PLA
   :TAX
   :LDA&70
   :JMP(&74) \Restore all registers
   :A,X,Y.
220 .EN PLA
   :TAY
   :PLA
   :TAX
   :RTS \Restore registers X,Y.Return
   :n from subroutine.
230 .KE JSR&FFE0
   :CMP#9
   :BEQ KZ \Get key and test for
   :TAB key pressed.
240 CMP#91
   :BCS KE
   :CMP#64
   :BCC KE
   :.KZ RTS \Perform range check
   :64<=CHR<91.
250 .SDU LDA&210
   :STA&76 \Save vector for 'OSRDCH'
260 LDA&211
   :STA&77
270 LDA#&78
   :STA&210 \Set address for new
   :'OSRDCH' routine.
280 LDA#09
   :STA&211

```

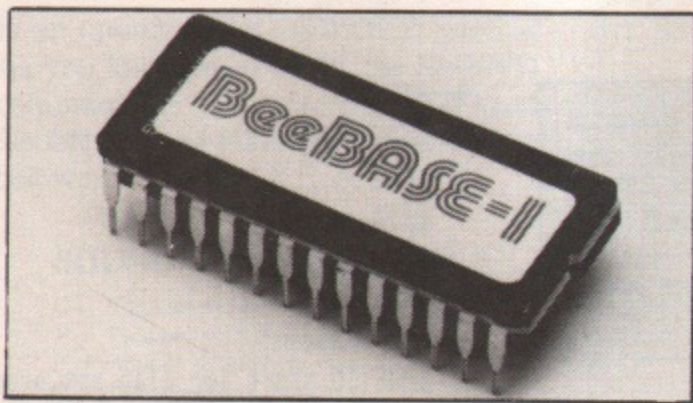
This listing is included in this month's cassette tape offer. See order form on Page 137.

```

290 RTS
300 TXA
   :PHA
   :TYA
   :PHA \Save registers X,Y.
310 LDA&72
   :CMP#&80
   :BNE SD \Test for flag set,branch
   :to end if not.
320 LDY#&B4 \Set address for data
   :for M/C sound routine.
330 LDY#&09
340 LDA#7 \Set function for 'OSWORD'.
350 JSR&FFF1 \Call 'OSWORD' routine.
360 .SD PLA
   :TAY
   :PLA
   :TAX \Restore registers X,Y.
370 JMP(&76) \Return to original
   :'OSRDCH' routine.
380 I
390 NEXT I
400 REM Data for sound routine from
   :'OSWORD'.
410 !&09B4=&FFF50001
420 !&09B8=&00010050
430 REM Puts data for program into
   :memory,keywords at &0A00,Table
   :at &09C0.
440 READ A$,B$
450 $&A00=A$+B$
460 MEM=&9C0
470 FOR I=1 TO 54
480 READ A
   :?MEM=A
490 MEM=MEM+1
500 NEXT I
510 END
520 REM Data for keyword table and
   :offset table.
530 DATA SDU.@AUTO@REN.@COLOURED@DRAW@E
   :NV.@FOR@G.@LOAD@INPUT@SAVE@CH.@LI
   :STEMODE@NEXT@OLD@P.@PLOT@RUN@STEP
   :@THEN@U.@VDU@RES.@PROC@REP.@END@
540 DATA ELSE@ABS@LIST@CHR#@DEL.@E.@
   :FA.@GOS.@H.@INKEY@GCOL@GET@LDM.@M
   :OVE@DATA@OP.@PA.@POINT@READ@STR#@
   :TRUE@OPEND.@VAL@W.@TIME@R.@STOP@
550 DATA 0,5,10,15,22,27,32,36,39
   :44,50,55,59,64,69,74,78,81
   :86,90,95,100,103,107,112,117
   :122,126,131,135,141,146,151
   :154,158,163,166,172,177,181
   :186,191,196,200,204,210,215
   :220,225,232,236,239,244,247
   :252

```


Ultra-fast BeeBASE -



**A machine code
database in EPROM
(for the BBC Micro)
for £45.94***



GCC (Cambridge) Limited
66 High Street, Sawston, Cambridge CB2 4BG
Telephone: Cambridge (0223) 835330

- Up to 25 user-defined fields
- Up to 250 characters in each field
- More than 16K of RAM available for storage (unlimited capacity when used with disk or tape). Extremely fast SEARCH, EDIT, and SORT facilities.
- SEARCH commands include: FIND and EXCLUDE - can be used on up to ten consecutive searches. Enables data to be extracted which meets ALL of the given FIND and EXCLUDE commands. Provides extremely selective data extraction.
- Extracted data can be SORTed on any field.
- EDIT enables records to be deleted or amended (shortened or lengthened).
- An ASCII file of extracted and sorted data can output to disk or tape for storage or further editing by a word processing package (such as Wordwise).
- Includes demonstration cassette which also contains a selective printing program.

Order today - Access and Visa welcomed.

*(Price includes VAT - p&p £1)

Trade and local authority enquiries welcome.
Prices correct at time of going to press.



**GCC are gaining
respect as one of
the country's
leading outlets for
the BBC micro
and compatible
peripherals**



GCC (Cambridge) Limited
66 High Street, Sawston, Cambridge CB2 4BG
Telephone: Cambridge (0223) 835330



BBC MODEL 'A'	£299.00
BBC MODEL 'B'	£399.00
BBC DISC INTERFACE KIT	£ 78.77
BBC JOYSTICK	£ 15.00
GCC ROMEX 13 (Rom expansion)	£ 45.94
GCC EPROM PROGRAMMER FOR BBC	POA
BEEBASE (Data Base Rom)	£ 45.94
WORDWISE	£ 44.85
PASCAL ROM	POA
FORTH ROM	POA

TEAC Slim-line	
Disc Drives	
GCC 55A 100K	£160.00
GCC 200K (ultra-slim)	£199.00
GCC 55F 400K	£246.00
GCC 55A2 200K (dual)	£325.00
GCC 55F2 800K (dual)	£505.00
GCC 55A2 + PSU 200K (40/80 Switchable)	£345.00
GCC 55F2 + PSU 800K (40/80 Switchable)	£590.00
Disc drive cables single	£ 12.00
Disc drive cables dual	£ 14.00

Printers	
EPSON FX80	£430.00
EPSON RX80	£339.25
SHINWA CP80	£297.85
NEC PL 8032-C	£330.00
Printer Cable for BBC	£ 9.57
JUKI 6100 (Daisy-wheel)	£437.00
STAR DP 510	£297.85

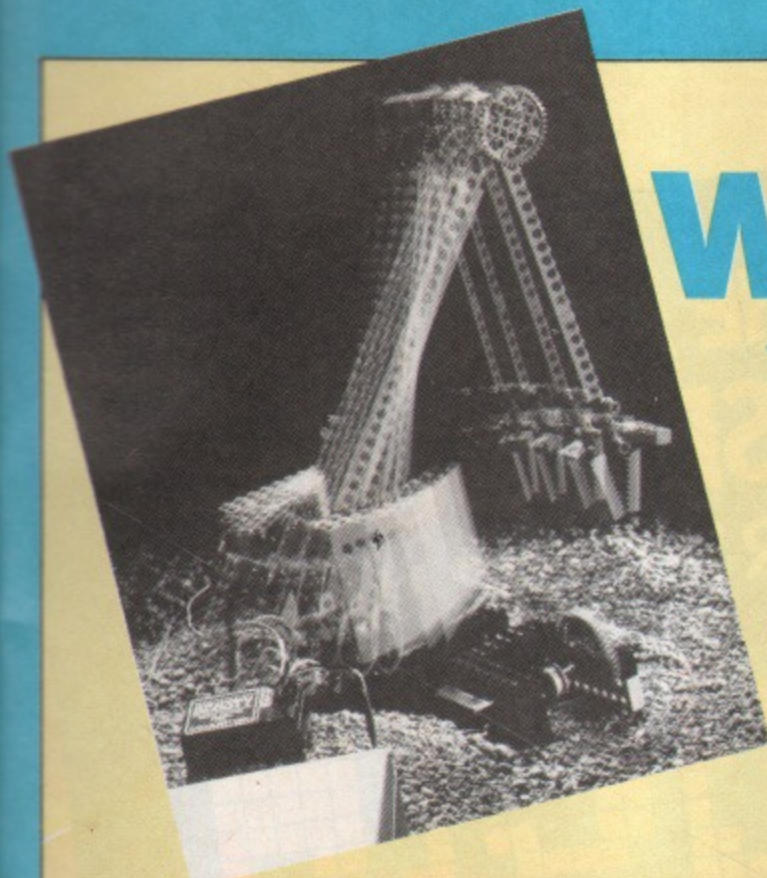
Sinclair Computers	
ZX Spectrum 16K	£ 99.95
ZX Spectrum 48K	£129.95
ZX Printer	£ 39.95

Other Computers in stock	
JUPITER ACE	£ 69.95
DRAGON 32	£174.98
ORIC 48K	£139.95

STOCK SUBJECT TO PRIOR SALE
ALL PRICES INCL. VAT

Trade and local authority enquiries welcome.
Prices correct at time of going to press.

What would YOU do with a Beasty?



Tell us and you could WIN this exciting robotics interface

THIS month's competition is based around Commotion's Beasty, the interface that makes robotics a real possibility for the computer hobbyist.

Beasty allows you to control up to four servos from your BBC Micro, without the need for complicated programming.

Servos are the precision electric motors that give "muscle" to your micro, enabling you to translate your ideas into physical movement.

By combining Beasty with children's construction kits, BBC Micro users have managed to create a variety of robots and computer controlled mechanical devices, one of which you can see in the photo. There's even a computer-controlled cat door based on the Beasty!

All you have to do for this month's competition is to describe how you would use a Beasty. Not more than 500 words, please, but you can send a couple of diagrams if you wish.

The most original and practical idea will be the winner – the prize, of course, being the Beasty together with a pair of servos.

Send your entry, together with the coupon below, to reach us no later than February 29.

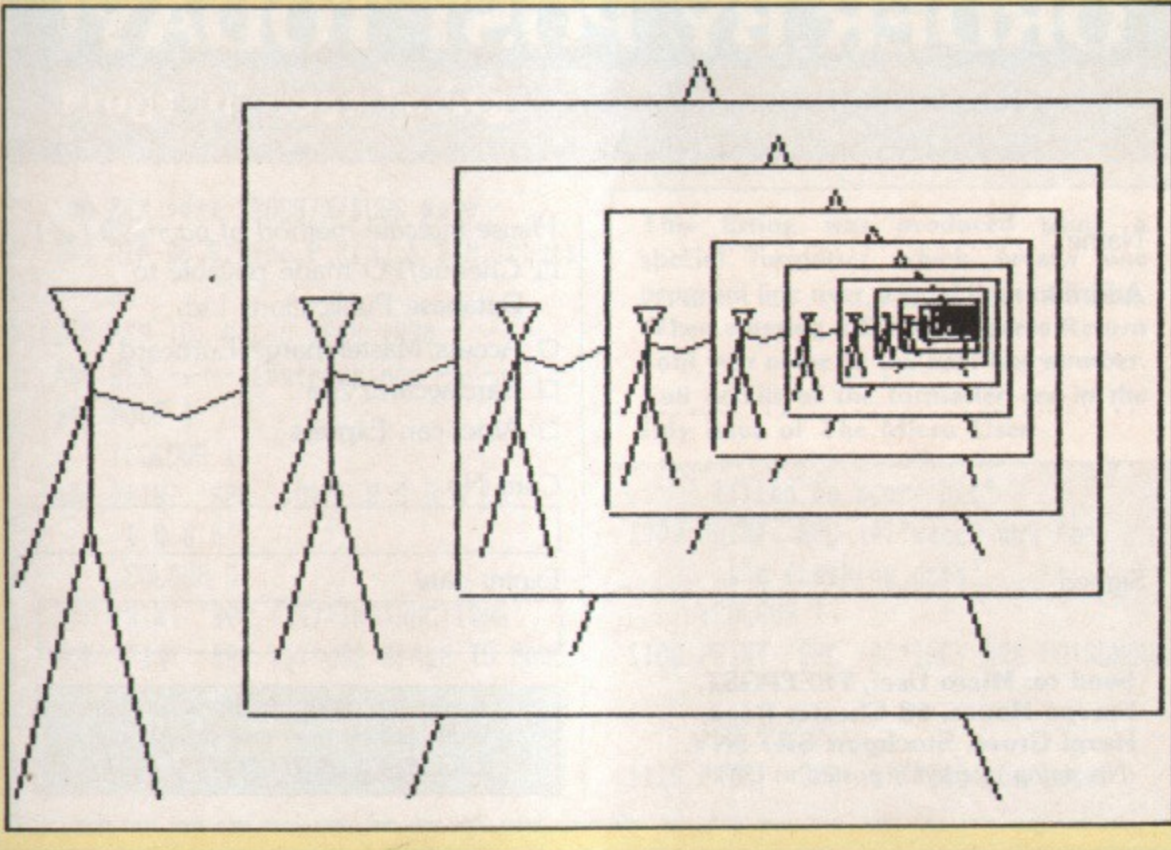
Speech synthesiser contest winners

WINNERS of the November speech synthesiser contest were J.C. Copley of Farnborough, John Todman of Welwyn Garden City and Richard Trout of Oldham. We've not room to

give all the listings so we've tossed some coins and decided to list Mr Copley's demonstration of recursion. Its excellent graphics more than make the point.

```

10 MODE1
20 PROCinit
30 PROCpic(0,0,1)
40 END
50 DEF PROCpic(XZ,YZ,S)
60 IF S<0.005 THEN ENDPROC
70 T=TIME:REPEAT:UNTIL TIME>T+100
80 VDU 29,XZ,YZ;
90 FOR IZ=1TON:PROCsp(IZ,S):NEXT IZ
100 XZ=XZ+U(21)*S:YZ=YZ+V(21)*S
110 PROCpic(XZ,YZ,S*RATIO):ENDPROC
120 DEF PROCsp(IZ,S)
130 GCOL 0,C(IZ):DRAW U(IZ)*S,V(IZ)*
S
140 ENDPROC
150 DEF PROCinit
160 N=25:DIM C(N),U(N),V(N)
170 FORI=1TON:READC(I),U(I),V(I):NEX
TI
180 RATIO=(U(22)-U(21))/1280:ENDPROC
190 DATA 0,50,100,1,120,420,1,190,10
0,1,120,420,1,120,600,1,80,700,1,160,7
00,1,120,600,1,120,580,1,50,350,1,120,
580,1,210,550,1,300,600,0,1040,100,2,1
007,200
200 DATA 0,767,920,2,750,970,2,733,9
20,0,493,200,2,460,100,0,300,200,3,120
0,200,3,1200,920,3,300,920,3,300,200
    
```



BEASTY CONTEST

Name _____

Address _____

Send this coupon together with your entry to:

**Beasty Contest, Micro User,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY**

**SPECIAL
OFFER FROM
THE MICRO USER**

The Advanced User Guide

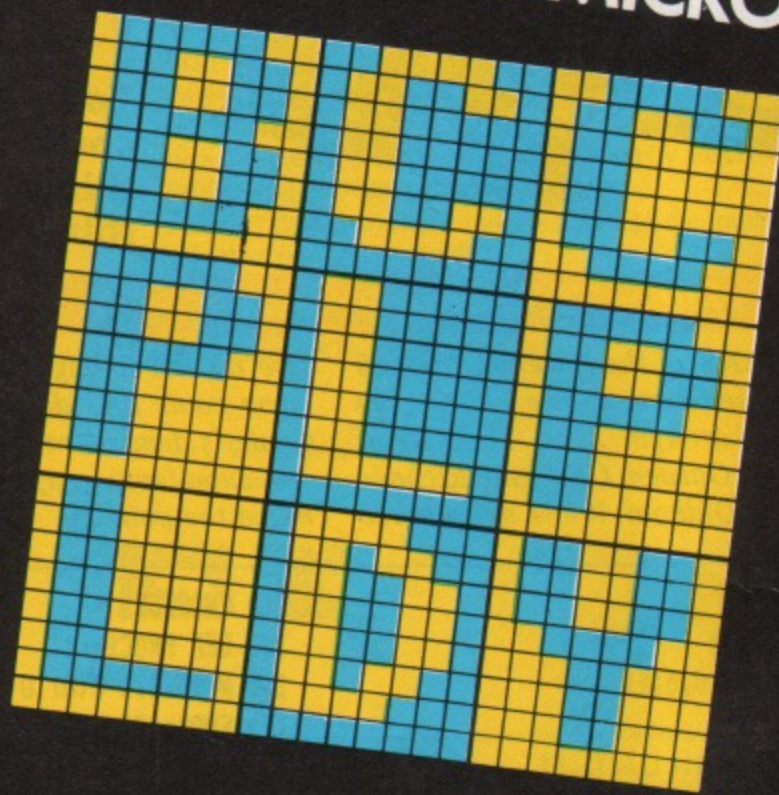
**The essential companion
for the BBC Micro.**

Featured in its 512
information packed pages
are

- ★ *the BASIC Assembler*
- ★ *6502 machine code
reference section*
- ★ *complete descriptions of
all FX calls*
- ★ *BBC memory usage and
vectors explained*
- ★ *full interfacing details for
the user port, tube,
analogue port, 1 MHz bus*
- ★ *paged ROMs explained*
- ★ *and lots, lots more*

With many examples to
illustrate the text, this guide
is the indispensable
reference work for the
serious BBC micro
programmer.

THE ADVANCED USER GUIDE FOR THE BBC MICRO



BRAY, DICKENS & HOLMES

**ONLY
£12.95**
(plus p&p)

ORDER BY POST TODAY!

Please send me copies of The Advanced User Guide
at £13.95 (inc. p&p) TOTAL £

Name

Address

.....

.....

.....

.....

Signed

Please indicate method of payment (✓)

Cheque/PO made payable to
Database Publications Ltd.

Access/Mastercharge/Eurocard

Barclaycard/Visa

American Express

Card No.

Expiry date

Send to: Micro User, FREEPOST,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.
(No stamp needed if posted in UK).

Or you can order by phone quoting
credit card number and expiry date.

061-480 0171

It's simple but it's fun, so hop to it and play this compulsive game

Frogs 'n' Dogs

By
SHARON KING
PAUL KING
and
DENNIS IBBOTSON



FROGS 'n' Dogs is probably one of the most compulsive games we've ever published. It's not the fastest game we've ever played, or the most ingenious – it's quite simply the most enjoyable.

The idea comes from eight and a half year old Sharon King, and her younger brother Paul, aged six and a half.

We published their letter describing

the game in our December 1983 Micromail, asking for programmers to take up the challenge.

Dennis Ibbotson, the man who programmed the DACC Sprite Generator, came to the rescue with this fun-packed interpretation of their idea.

So, Sharon and Paul, here's your game.

All you have to do is to use the space bar to jump over Fido the dog and the occasional poisonous lily pad – they're the flashing ones.

The longer you survive, the more points you get.

Get more than 500 and you move onto a more difficult sheet.

Good luck!

Frogs 'n' dogs listing

```
100 REM **** FROGS/N/DOGS ****
200 REM By S.King,P.King & D.H.Ibbots
   on
300 REM (C) MICRO USER 1984
400 REM ----- instructions -----
500 MODE 1
   :COLOUR 1
600 PRINT 'SPC (10)"F R O G S 'N'
   D O G S"
   :COLOUR 3
700 PRINT 'SPC (14)"INSTRUCTIONS"
800 PRINT 'SPC (6)"USE SPACE TO MAKE
   FREDDY JUMP"'
   :COLOUR 2
900 PRINT 'SPC (4)"Stay near the
```

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July issue of The Micro User.

```
   lilies to score but"
1000 PRINT 'SPC (4)"watch out for
   the flashing ones"
   :COLOUR 1
1100 PRINT 'SPC (9)"THEY ARE POISONOUS
   !!!"
   :COLOUR 2
1110 PRINT 'SPC (6)"FIDO the local
```

```
   Spaniel often"
1120 PRINT 'SPC (6)"strolls along
   the shallow"
1130 PRINT 'SPC (14)"lily ponds"
   :COLOUR 1
1140 PRINT 'SPC (8)"SNAPPING UP YOUNG
   FROGS"
1150 PRINT 'SPC (0)"TAKE CARE - IT'S
   NOT AS EASY AS IT LOOKS"'
   :COLOUR 3
   :*FX15
1200 FOR del=0TO 4000
   :NEXT
```


MRM SOFTWARE

Britain's newest software house.

DIAMOND MINE

Can you lay a pipeline to the diamonds without hitting the walls or having your pipes eaten by the bugs. You'll need a steady hand and perfect timing for the game.

Q Man No. 1 on Micronet Top Ten
Banana Man No. 4 (new entry)
Q Man's Brother No. 6 (new entry)

BBC MICRO SHOW

M.R.M's Software was without doubt the hit of the show. Order your game now and you won't be disappointed.

FOR THE BBC 32K

Previously only available on Micronet 800 - now by popular demand available direct to the public.

Q-MAN



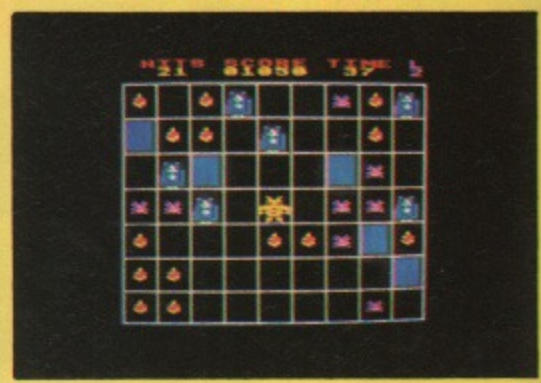
The very popular 3D pyramid game. Hop around the pyramid avoiding the bouncing balls and Jake the Snake. A highly entertaining game with increasing difficulty plus our own totally unique features. Game includes TRANSPORT DISCS, BONUS, HIGH-SCORE TABLE, HYPERSPACE and SMART BOMBS. Excellent graphics and terrific sound. One of the three top selling games on MICRONET this month.

Q-MAN'S BROTHER



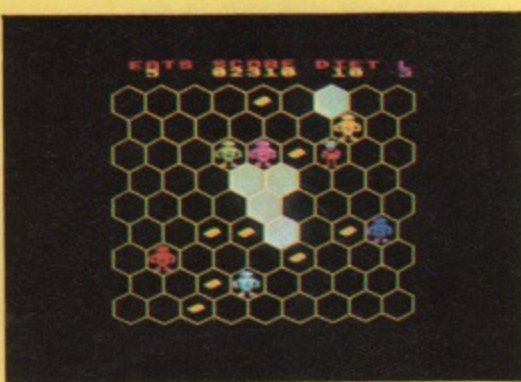
Q-MAN'S BROTHER is featured in the high score table of Q-MAN and now has his very own game. Have you time to paint all of the maze? Not if the PAINT POTS have anything to do with it or especially the deadly PAINT ROLLER which will erase all of your hard work! Increasing difficulty, excellent sound, AMAZING 3D graphics and high score.

BANANA MAN



A totally new concept from MRM. You are the BANANA MAN and you must eat 40 BANANA SANDWICHES each minute to stay alive. There are BLUE BLOCKS which may prevent you from reaching the food and deadly PURPLE TARANTULAS that are fatal if stepped upon. ETHEL the CAT also appears but can be scared away for mystery points. But watch out, she conceals a spider. Features include BONUS BANANAS, BLOCK 'SHUFFLE', INCREASING DIFFICULTY, HIGH-SCORE TABLE and GREAT GRAPHICS.

GUY IN THE HAT



You are THE GUY IN THE HAT entombed in a honeycomb labyrinth. Like BANANA MAN you have an increasing daily food diet, but this time your favourite snack is a BICKIE. Beware of the pursuing BICKIE BASHERS that are trying to ensnare you. Gain extra points by dropping your exploding hat and trapping the BICKIE BASHERS. Movement in 6 directions, HYPERLEAP and menacing sounds are included along with the usual great graphics and high-score table.

SECRET SAM SERIES



Two great original adventure games from MRM. Written in plain English on a spy based theme. Travel around meeting AGENTS, collecting CLUES and ITEMS that will aid you in your mission. SAM1 and SAM2 are completely separate missions and each game is a thoroughly enjoyable adventure in its own right. Many hours of frustrating fun plus sound effects.

3D MUNCHY



A visually stunning version of the now legendary arcade classic ... with a difference. Eat power pellets whilst avoiding the GHOSTS as usual, but can you get past the HOLES? Absolutely amazing graphics and sounds, increasing difficulty and high score. All this and you're battling against the clock as well. A CLASSIC from MRM.

INTRODUCTORY OFFER

EACH GAME ONLY £4.95 + 55p P&P PER ORDER



MRM SOFTWARE
17 Cross Coates Road
GRIMSBY
South Humberside
Telephone: 0472 44304

Dealers
telephone
now for
dealer prices

Frogs 'n' dogs listing

From Page 57

```

:PRINT SPC (13)"PRESS ANY KEY"
1300 IF GET
1400 REM --- initial settings ---
1500 VDU &F017;0;&4575;&4565;&45;&F117
;0;&5488;&5454;&88; &F217;0;0;&FF
00;&7E; &F317;&0406;&FF07;&7C7C;&
6644; &F417;&42;&81FF;&66FF;&E724;
1600 #FX9,5
1700 #FX10,5
1800 AX=RND(-TIME )
:A$=STRING$(19," ")
1900 EX=8
:f%=4
:l%=4
:s%=0
:t%=0
:u%=500
:v%=0
2000 DIM AX(3)
:AX(1)=96
:AX(2)=384
:AX(3)=672
2100 REM --- end of initialising
start of main program ----
2200 AX=2000
:B%=2000
:C%=0
:D%=96
:G%=2000
:H%=2000
:I%=1200
:J%=672
:F%=1
2300 MODE 2
:VDU 23;8202;0;0;0;19,15,5;0;
:PRINT " FROGS'N'DOGS"
:COLOUR 1
:PRINT "SCORE FROGS"
:COLOUR 7
:COLOUR 132
:FOR Z%=0TO 2
:PRINT TAB(0,Z%*9+12)A$
:NEXT
:COLOUR 143
:PRINT TAB(0,28)CHR$ 240CHR$ 241
TAB(0,29) " "
:COLOUR 128
2400 PROC1llys(7+V%)
:PROCfrogs
2500 REM ----- MAIN LOOP -----
2600 REM next line draws the frog
& dog
2700 REPEAT
:GCOL 3,2
:MOVE G%,H%
:VDU 244
:MOVE I%,J%
:VDU 244
:G%=I%
:H%=J%
:GCOL 3,15
:MOVE A%,B%
:VDU 243
:MOVE C%,D%
:VDU 243
:A%=C%
:B%=D%
2800 IF C<I%IF C%+64>I%IF D<J%+32
IF D>J%-32PROCd
:GOTO 2100
2900 IF C>1100PROCe
3000 Q%=POINT(I%+24,J%-28)
:IF Q<8T%=T%+Q%
ELSE PROCd
:GOTO 2100
3100 IF Q%SOUND &13,-12,100+Q%*16
,3
3200 IF T>100PROCS
:IF S>=U%PROCu
:GOTO 2100
3300 IF F%IF INKEY -99PROCj
3400 IF F%=0J%=J%+K%
:K%=K%-4
:IF K%=-34F%=1
3500 C%=C%+RND(EX)
:I%=I%-16
:IF I<0I%=1200
:J%=AX(RND(3))
:F%=1
3600 UNTIL f%=0
:#FX15
3700 REM ----- END OF MAIN LOOP -----
3800 VDU 4
:COLOUR 7
:PRINT TAB(2,16)"PRESS Y TO PLAY"
:REPEAT UNTIL GET$ ="Y"OR
GET$ ="y"
:RUN
3900 REM ----- end of main program
----
4000 DEF PROCj SOUND &10,-15,5,2
:SOUND 1,-15,0,3
:F%=0
:K%=30
:ENDPROC
4100 DEF PROCe C%=0
:EX=EX+2
:DX=AX(RND(3))
:ENDPROC
4200 DEF PROCS S%=S%+100
:PROCScore
:T%=0
:ENDPROC
4300 DEF PROCd f%=f%-1
:FOR Z=-15TO 0
:SOUND 0,Z,6,4
:NEXT
:PROCfrogs
:ENDPROC
4400 ENDPROC
4500 DEF PROCu FOR Z=100TO 200
STEP 4
:SOUND 2,-15,Z,2
:NEXT
:U%=U%+500
:PROCu_level
:ENDPROC
4600 DEF PROCu_level IF V<6V%=V%+1
4700 ENDPROC
4800 DEF PROCScore VDU 4
:COLOUR 6
:PRINT TAB(5,3);S%
:VDU 5
:ENDPROC
4900 DEF PROCfrogs COLOUR 2
:PRINT TAB(13,3);f%
:PROCScore
:ENDPROC
5000 DEF PROC1llys(B%)FOR W%=0
TO 4
:FOR Z%=0TO 2
:COLOUR RND(B%)
:PRINT TAB(3+W%*3,Z%*9+11)
CHR$ 242
:NEXT ,
:COLOUR 1
:PRINT TAB(3,29)CHR$ 242
:ENDPROC

```



This listing is included in this month's cassette tape offer. See order form on Page 137.

The BBC Sideways RAM System

The BBC Sideways RAM:

The most exciting add-on for the BBC micro, which many have been waiting for Acorn to produce! Neater, more reliable and far more economical than plugging in more ROMs into your BBC!

What is the Sideways RAM?

The sideways RAM is a 16K (upgradable to 128K) memory board which fits into the rightmost ROM socket on your BBC micro. The sideways RAM is an essential piece of hardware for any BBC computer. Strategically integrated into the BBC system, the system is capable of:

Running Any Languages, Wordprocessor, Electronic Spreadsheet:

The sideways RAM allows you to run any software normally available in ROM such as WORDWISE, VIEW, BEEBCALC, BASIC2, FORTH, PASCAL, BCPL, EXMON, DISK DOCTOR, NET FILING SYSTEM, ENHANCED 16K DISK FILING SYSTEM, SPEECH ROM etc. . . . These programs can be saved on disk or tape and loaded later in seconds into the sideways RAM.

Giving 27K Bytes Free with Acorn Disk Filing System:

The sideways RAM can also be used to increase available memory for BASIC, BEEBCALC, WORDWISE, VIEW etc. by moving disk workspace into sideways RAM. PAGE is then set to the lowest possible value, i.e. &OEEO.

Creating and Maintaining a Silicon Disk on your Computer:

If you have 128K of sideways RAM, 112K of it can be turned into a silicon disk. The system will address your floppy disk as drive 0 and the silicon disk as drive 1 but with a difference! The silicon drive has the capacity to load a 32K program faster than you can remove your finger from the 'RETURN' key with no clicking noise, no on/off LED, no wear. It can make you a backup floppy in 15 seconds from the original. The sheer speed of sideways RAM makes 3D-graphic look like a movie picture. It's life in the fast lane!

Free Software with Every Sideways RAM System:

The Sideways RAM comes complete with lots of free software, now and with future updates. The free software includes "ROMCOPY" to move sideways ROMs to disc (or tape), STL0E00 to move disk filing system workspace into sideways RAM thus giving 3K bytes extra memory to BASIC, WORDWISE, VIEW, BEEBCALC, etc., STLDISK to create and maintain a SILICON DISK on your system with extra disk facilities and demonstration programs.

Future releases include our own DFS (JAN. 84) and SILICON 100K DISK BASIC (MARCH 84). All sideways RAM system software is given in basic source code. Users are encouraged to personalise and benevolent contributors will be rewarded with free hardware gifts.

Increase the Computer Power by Increasing Sideways RAM:

The BBC comes with 32K of RAM and has access to a maximum of 3 languages. The BBC with 16K sideways RAM has 48K of RAM and has access to a wealth of languages. The BBC with 32K sideways RAM can run 2 loaded languages at the same time. The BBC with 128K sideways RAM can run 8 loaded languages at the same time. The power of the BBC relies on its intelligent use of software where several sideways ROMs execute different tasks such as filing, processing, debugging etc. The bigger the sideways RAM, the bigger the task the computer can handle.

The sideways RAM is such a powerful and promising device that ACORN HAS PLANNED to release a similar system on the ELECTRON.

Rather than being a software piracy aid, the Sideways RAM system is the key solution to selling more software to BBC computer users. This is because powerful sideways software can be shared by users of the same network and sold cheaper on tape, disk or by electronic mail.

Beautifully Designed, Easily Installed, no Soldering Required:

The sideways RAM was first introduced and the first issue sold out at the ACORN USER SHOW (Sept. 83, London). The new issue has been exhibited at the PCW SHOW (Oct/Nov. 83, London) and will be on general distribution release at the BBC USER SHOW (Dec. 83, Westminster, London). The system can be installed in 2 minutes by yourself or most BBC dealers and requires no soldering.

HERE IS HOW:

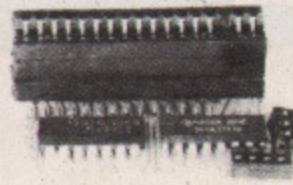
Open the computer case, plug into the rightmost sideways ROM socket the cartridge base unit (see picture 1). Install your sideways ROMs, one at a time, onto the mini ROM cartridge (see figure 2), insert the cartridge into the base unit and CHAIN "ROMCOPY". This program will save your sideways ROM on disk or tape. Locate S20 and S22 jumper blocks on the computer board. Replace the jumpers with control wires from the base unit. Install the sideways RAM card in place of the mini ROM cartridge. Switch on the computer and "LOAD any program saved with "ROMCOPY". Press the BREAK key. Call up your sideways software as usual. For example, *WORD etc.

Further upgrading to 32K or to 128K is very simple: from 16K to 32K is by straight exchange (cost: £12+p&p), from 32K to 128K is by plugging in the SOLIDISK extension (see figure 3) onto the 32K sideways RAM. It costs just £76 plus p&p.

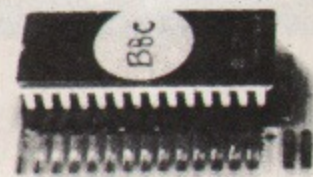
OTHER PERIPHERALS FOR THE BBC MICRO:

We are stockists of the EPSON range of PRINTERS, the SANYO range of COLOUR MONITORS, disk drives from various manufacturers and floppy diskettes (WABBASH, VERBATIM, DATALIFE, DYSAN etc.). Ring us for a quotation.

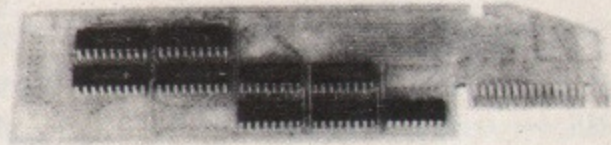
MADE IN ENGLAND
BY SOLIDISK TECHNOLOGY LIMITED
17 SWEYNE AVENUE SOUTHEND-ON-SEA
Essex SS2 6JQ
TEL: SOUTHEND (0702) 354674



THE CARTRIDGE BASE



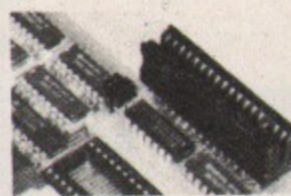
THE ROM CARTRIDGE



THE SIDE WAY RAM CARD



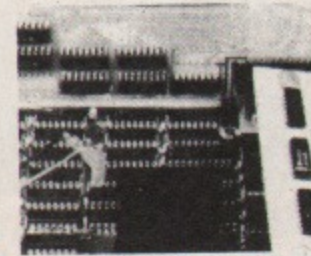
THE SILICON DISK EXTENSION



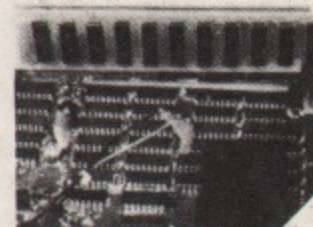
INSTALLING THE CARTRIDGE BASE



USING THE ROM CARTRIDGE TO TRANSFER SOFTWARE ON DISK



THE SIDE WAY RAM NOW REPLACES THE ROMS



THE SOLIDISK SUPER FAST DRIVE IS NOW INSTALLED

THE BBC-SIDE WAY RAM SYSTEM

Item	Qty	Price Inc VAT	Total
BBC 16K SIDE WAY RAM		£34.95	
BBC-32K SIDE WAY RAM		£46.95	
BBC-SOLIDISK		£119.95	
SOLIDISK extension alone for BBC-32K Side Way Ram, if bought separately:			£76.00
Post and packing			£1.00
TOTAL £			£1.00

Please charge my Access, Barclay account:

NAME _____
ADDRESS _____

*Please delete/complete as applicable
*I enclose a cheque/ P.O. payable to:
SOLIDISK TECHNOLOGY LTD
for: £ _____

THE Editor came up to my desk smirking. "I need your help with a program I've written. It's called Expenses. You type your expenses claim into the micro and it comes back with 'Not allowed, go away'.

"I want you to make the program make a rude noise". He turned, and made it into the office on his third attempt.

SO far, we've covered the production of notes on the BBC Micro using the SOUND command, and learned about the sound channels and how to flush them.

This month we'll be covering the problems of getting two or more notes to sound at the same time. This means synchronising the notes on different channels. Try out Program I.

```
10 REM PROGRAM I
20 SOUND 1,-15,60,20
30 SOUND 2,-15,76,20
40 SOUND 3,-15,88,20
```

This plays three notes at the same time. This is called a chord. If it sounds nasty, then it's a discord.

Peters' First Law states that it is much easier to produce discords than harmonious chords!

I doubt if anyone has ears sharp enough to tell, but, because it takes time for the micro to interpret a line of Basic, the second and third notes start a split second after each other.

Since they have the same duration, this means they will end in a ragged manner, first note one, then note two, then note three.

Program II has a couple of delay loops in it to accentuate this effect.

```
10 REM PROGRAM II
20 SOUND 1,-15,60,20
30 FOR N=1 TO 1000:NEXT N
40 SOUND 2,-15,76,20
50 FOR N=1 TO 1000:NEXT N
60 SOUND 3,-15,88,20
```

This is supposed to lessen the clarity of chords, though how anyone can tell beats me! Still, BBC Basic has a way to overcome this undetectable effect.

It's not as pointless as you might think, as it also comes in useful when you're writing tunes for the micro, helping you make sure that the right notes are played at the right time.

From my last article you'll remember that the channel parameter can be

treated as a four digit hexadecimal number &TUVW.

W was the channel number with values of 0, 1, 2 or 3 while V was the flushing control which was set to 1 to clear a channel's sound queue.

T we ignored, and will continue to do so until we get to the ENVELOPE command. It's the U parameter that decides how notes are synchronised.

If you think about it then you'll realise that for two or more notes to play at the same time each must be on a separate channel.

The U parameter in a SOUND command tells the micro that it is not to play that note until there is a certain number of other channels with notes.

When the required number of channels containing notes is reached then all of them start playing at the same time. The value of U decides how many other channels must have notes before the chord is played.

If U is 0, then the micro plays the note when it can, without reference to other channels. If it is 1, the micro will hold that note until there is another note available on another channel.

If it is 2, it will wait until two other notes are available, that is all three notes will start simultaneously. If it is 3, it will wait for three other notes when all four of the micro's channels will be in use. The values are shown in Figure I.

Try Program III to see it in action.

```
10 REM PROGRAM III
20 SOUND &0201,-15,60,40
30 FOR N=1 TO 1000:NEXT N
40 SOUND &0202,-15,76,40
50 FOR N=1 TO 1000:NEXT N
60 SOUND &0203,-15,88,40
```

Sorting out the chords from the discords

U Parameter	Effect	Note in chord
0	Plays without refer- ence to other channels	1
1	Waits for note on one other channel	2
2	Waits for notes on two other channels	3
3	Waits for notes on all channels	4

Figure 1: Synchronisation parameter values

What happens is that the micro reads the first SOUND statement and, because it has 2 in the U parameter, it waits for two notes to be available on other channels. When it has these it plays all three notes together.

The delay loops make for a slight pause before the chord is played. This shows that the micro really is waiting for the other two notes.

Since the duration parameters are the same, the notes all stop playing at the same time. If this weren't the case there would be a ragged ending. Setting the U parameter only synchronises the start of the notes.

Can you figure out why nothing seems to happen when you run Program IV?

```
10 REM PROGRAM IV
20 SOUND &0301,-15,60,40
30 SOUND &0302,-15,76,40
40 SOUND &0303,-15,88,40
```

Don't think your computer has gone wrong! What happens is that the micro

From Page 61

reads the U parameter of the first SOUND statement. As this is 3 it will not play that note until sounds are available from three other channels. Unfortunately the program only gives two other notes so the micro can't play. Hence the silence!

However, the notes in the channel don't just disappear. They are still in the queues waiting for a note on the fourth channel. Give them one by entering:

```
SOUND &0300,-15,88,40
```

and pressing Return. Now that the fourth channel has a note, all four will sound.

Before you run the other programs in this article, it would be wise to press Escape to clear the sound queues of any left-over notes. If you don't, you might get some strange results. You have been warned!

One point to bear in mind is that when the micro comes across a U parameter that makes it search the channels for other notes, it will quite happily accept ones that are already playing. Try Program V:

```
10 REM PROGRAM V
20 SOUND &0101,-15,60,40
30 SOUND &0102,-15,76,40
40 SOUND &0203,-15,88,40
50 SOUND &0200,-15,88,40
```

At first glance you might think it will play the first two notes as the U parameter ties them together. Then it

will hang up as the next two notes have a U parameter of 2 and need a third before they can sound.

Playing the program will soon show you that this isn't so, as all four notes are played at once.

This is because the micro comes to the last two SOUND statements and starts searching the other channels for a note.

Since they're already playing notes and carry a U parameter, it will quite happily accept either of them to make up the third note. And so the U parameter's condition is fulfilled and the note plays.

However, if we put in a line of Basic, as in Program VI, you'll notice that only the first two notes are played and that the third and fourth are left in the queues.

```
5 REM PROGRAM VI
10 SOUND &0101,-15,60,40
20 SOUND &0102,-15,76,40
25 FOR N=1 TO 4000:NEXT N
30 SOUND &0203,-15,88,40
40 SOUND &0200,-15,88,40
```

Enter one of the sound commands from the first two notes and you'll hear these left-over sounds along with the one you've entered.

Remember if you're getting funny effects it's probably because you've got some notes left in the queues. Get rid of them with Escape.

Finally, Program VII combines the synchronisation parameter U with the

```
10 REM PROGRAM VII
20 SOUND &201,-15,52,254
30 SOUND &202,-15,68,254
40 SOUND &203,-15,80,254
50 PRINT"Press key for next chord"
60 pause$=GET$
70 SOUND &0211,-15,60,254
80 SOUND &0212,-15,76,254
90 SOUND &0213,-15,88,254
100 PRINT"Press key for next chord"

110 pause$=GET$
120 SOUND &0211,-15,68,254
130 SOUND &0212,-15,84,254
140 SOUND &0213,-15,96,254
150 PRINT"Press key to end"
160 pause$=GET$
170 SOUND &0211,0,0,0
180 SOUND &0212,0,0,0
190 SOUND &0213,0,0,0
```

flushing parameter V, which we covered in the last article.

This allows us to play three chords in succession by pressing the key.

Notice that the final SOUND statements which flush the chords are synchronised to prevent a ragged ending, though I don't know who would be able to tell if they weren't!

Anyway, this is where I finish. The next article will cover the sound effects channel, which I've just been using in the editor's expenses program. I did it in my own time and sent him a bill. He made a rude noise.

- Can you write intelligible English?
- Can you create brilliant programs?
- Are you capable of working with a bunch of lunatics?

Yes, you've guessed – we need an editorial assistant at Micro User and Electron User!

Send your application, together with examples of your work to:

The Editor, Micro User, Europa House,
68 Chester Road, Hazel Grove,
Stockport SK7 5NY.

GAMES WANTED

"Everyone has got at least one novel inside him, and every BBC Micro owner has at least one original game waiting to be programmed." – Zen in the Art of Computer Programming.

So says our editor in his forthcoming book. Is he correct though? Have you got a games program locked away in your subconscious, just waiting to see the light of day?

If so, get in touch with us right away – we're only too willing to hear from you. And we've got our team of experts ready to help evaluate your work and add any necessary finishing touches.

Of course, if it's good enough, we shall want to include it in the pages of BBC Micro User. So send a copy of your original games program, on cassette or disc, to:

The Editor, Micro User, Europa House,
68 Chester Road, Hazel Grove, Stockport.

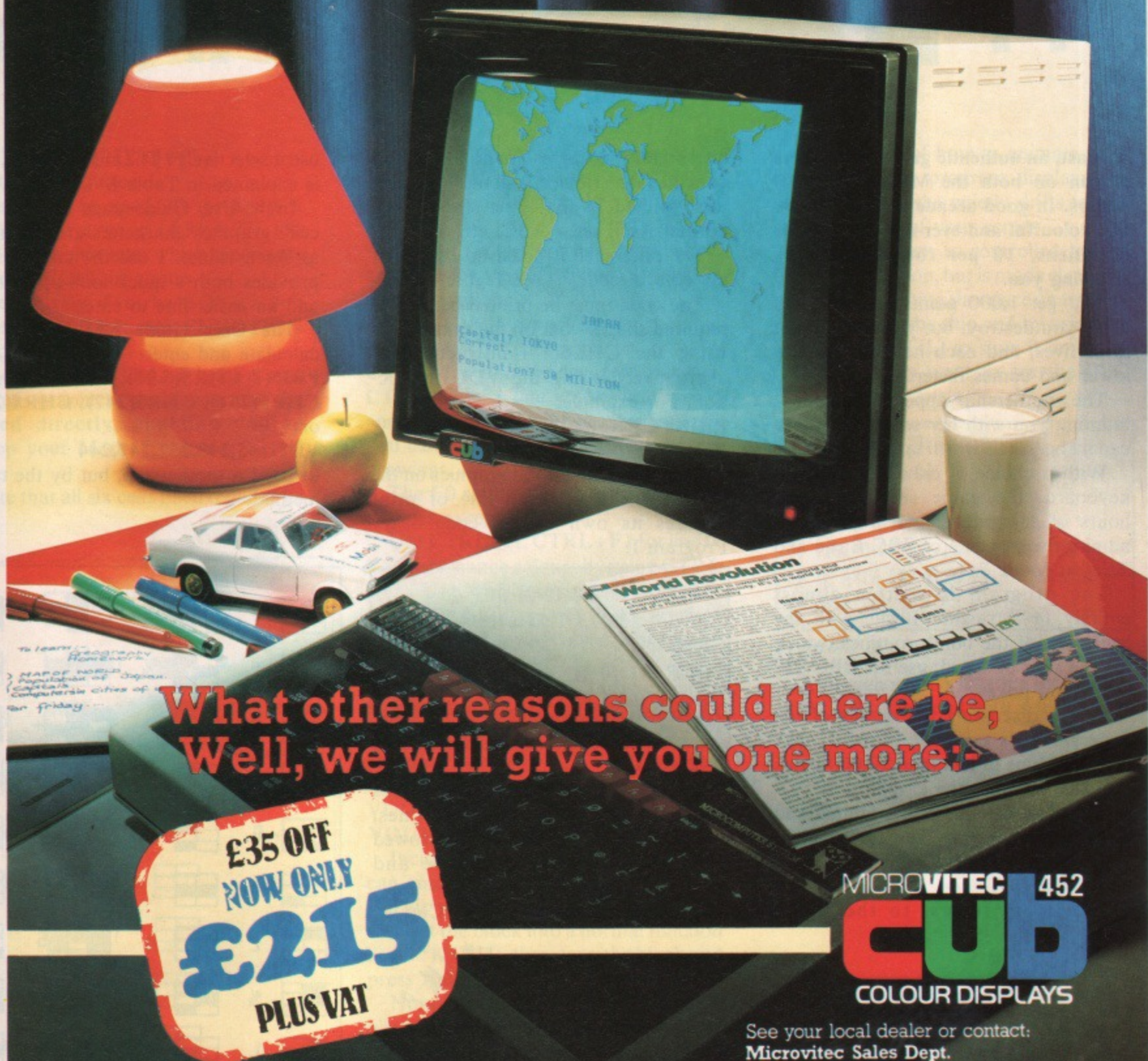
And please mark your envelope clearly "GAME".

*For the Brightest
and Best*

Microvitec Cub 452 is by far the largest selling colour display for the BBC microcomputer:-

WHY?

- * It is the only colour monitor approved and recommended by both Acorn and the BBC.
- * 95% of schools have chosen Cub 452 under the Department of Industry Micros in schools scheme.
- * Cub is designed and manufactured in the U.K.



**What other reasons could there be,
Well, we will give you one more:-**

**£35 OFF
NOW ONLY
£215
PLUS VAT**

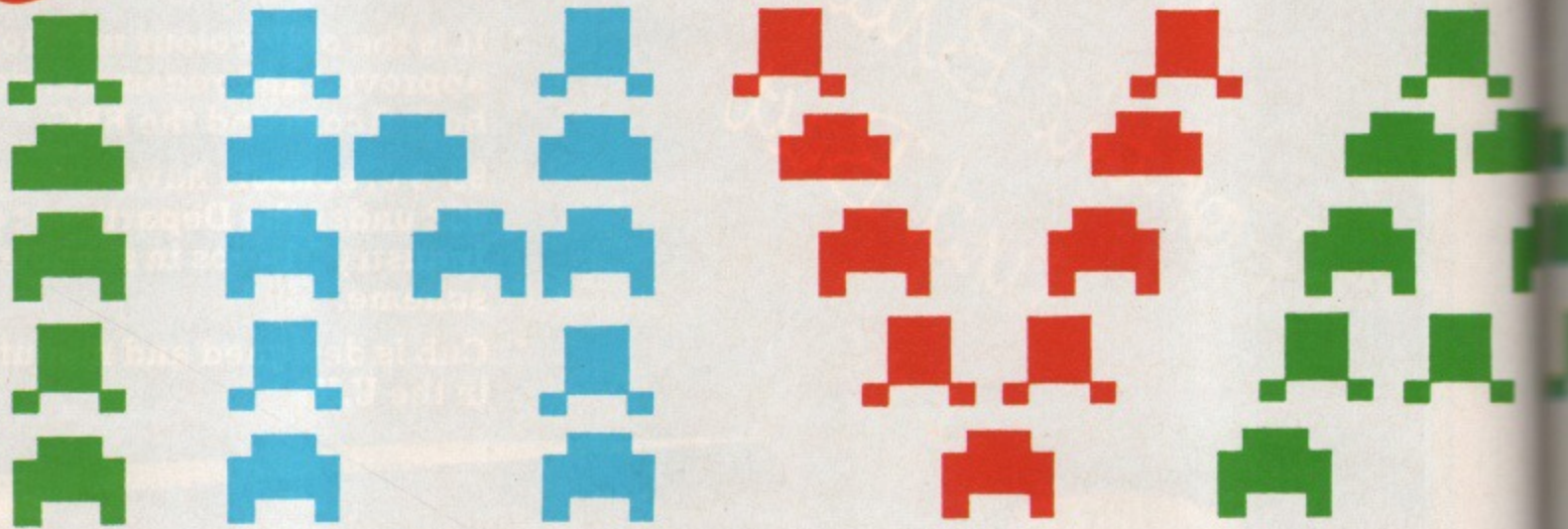
**MICROVITEC 452
CUB
COLOUR DISPLAYS**

The name to look for

See your local dealer or contact:
Microvitec Sales Dept.
Futures Way, Bolling Road, Bradford,
West Yorkshire BD4 7TU.
Telephone (0274) 390011. Telex 517717

Who said you can't write a good Invaders

Alien



AT last, an authentic game of Invaders to run on both the Model A and B micros. In good arcade style, there are five colourful and ever advancing rows of Aliens, 10 per row, mercilessly bombing you.

You get 1,000 points for each full wave you destroy, but you've only got three lives, and each new wave starts lower and comes faster.

The mothership appears randomly, taunting you with her song, but if you can hit her, she's worth up to 300 points.

With a choice of either joysticks or keyboard, the game should provide hours of enjoyment, and a chance to admire the wonders of BBC Basic and Teletext Mode 7.

The program is written almost entirely in "straight" Basic, with the exception of the bomb routines, which for the sake of speed, use the BBC "?" peeks and pokes.

Before discussing the details of the program, let's consider Mode 7. The program runs in less than 10,000 bytes and that includes the graphics.

Although the shapes are limited and chunky, they are very likeable, much in the same vein as the Ceefax and Oracle screens on TV.

In simple terms, to the Basic

interpreter the shapes are no more than concatenated (joined together) characters, printed in the same way as the normal Ascii set - ABC, etc.

The difference is achieved by use of the control codes - see Figure I.

The code must be printed before the required shape - but on the same line - using the CHR\$() instruction, or alternatively, using the VDU instruction. For example:

```
PRINTCHR$(&91)
VDU145
```

will both provide for red graphics on the rest of the line. Each line of print requires its own control code - try Program I:

```
10MODE7:FOR A=2 TO 24 STEP 2
20PRINT TAB(0,A)CHR$(&91)
30NEXT
40FOR A=1 TO 24
50PRINTTAB(A,A)"x{xt"
60NEXT
```

Program I

As you can see, the first loop places the control code in alternate lines, resulting in a mothership (borrowed from the game) on one line and gobbledygook on the next.

What about gobbledygook? Can we

use it selectively? The answer is yes, and is explained in Table I.

In the User Guide (page 155) the "six cell" graphics characters are explained as Ascii values. I use the table, which provides both a quick look-up method and an easier line to enter.

The User Guide would have you calculate and enter:

```
PRINT CHR$(&91); CHR$(248);
CHR$(251); CHR$(247); CHR$(244)
```

or:

```
VDU145,248,251,247,244
```

to print a mothership, but by the table method:

Decimal	-145 - Hex	&91	producing red	graphics
146	&92	"	green	"
147	&93	"	yellow	"
148	&94	"	blue	"
149	&95	"	magenta	"
150	&96	"	cyan	"
151	&97	"	white	"

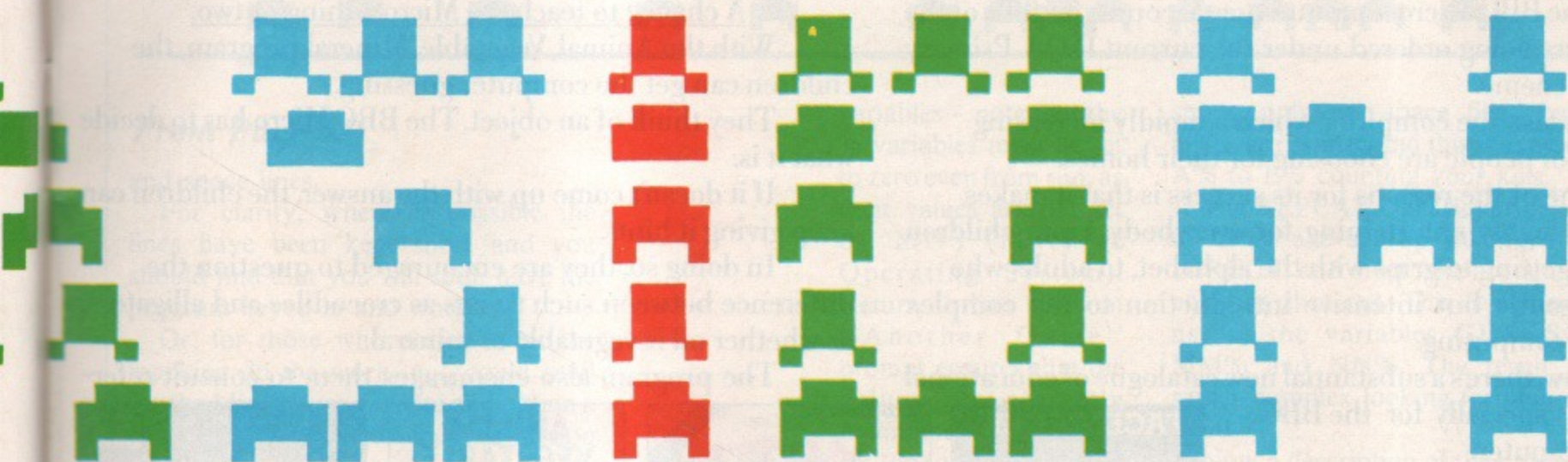
Figure I



!	a	P	q
"	&	'	,
\$	*	+	-
(	2	3	4
0	b	c	d
-	,	.	:
f	4	5	r
%	d	e	<
)	8	9	l
1	h	i	t

Table I

rs program in Mode 7? TOM BLACKBURN has done it!



PRINTCHR\$(&91)"x½wt"
is all that is required.

The table is used by printing a graphic control code (&91-&97) followed by the character which represents the required cell, in quotes.

Alternatively, if you have OS 1.2, you can use the CTRL plus FUNCTION keys procedure.

By depressing CTRL+F1, for example, red graphics characters can be entered directly, enabling you to develop your Mode 7 graphics in real time.

Note that all six cells filled requires its

own PRINT or VDU statement – **PRINTCHR\$(255)** or **VDU255** – copied into a function key as defined below.

For fun, set function key F0 as below, and by using the CTRL key to move the cursor position:

- CTRL+H** = 1 space left
- CTRL+I** = 1 space right
- CTRL+J** = 1 line down (40 spaces)
- CTRL+K** = 1 line up (40 spaces)

and the keyboard with the caps lock off, you can create simple pictures and line drawings.

The F0 setting gives red graphics on all lines except line 0.

Use CTRL+H, CTRL+F1 for line 0. You can change colours by using CTRL plus FUNCTION keys as you wish, but you must not overwrite character 0 of each line, nor any of your colour change characters.

I doubt if Mode 7 will turn you into a computer Picasso, but it's all in the best possible taste!

Function key F0

```
*KEY0 CLS:F.A=0 TO 23:
VDU145,10,8:N.: F.A=0 TO 23:
VDU11:N.IM
```

Incidentally, to fill all six cells, you can enter direct VDU 255.

This will simply print a block. You then set the block into a normal function key – *KEY 1 – then copy the block and press Return.

Now function key 1 will display the block whenever pressed.

You must remember that the alphabet is lower case to print graphics. The upper case alphabet is printed as normal in the selected colour.

Finally, in preparation for the real McCoy, try Program II. It is a

demonstration of how to animate your characters. The program displays the mothership, as she quietly drifts to rest at the bottom of your screen.

Her movement is controlled by the FOR-NEXT loop, but is made clear and realistic by printing the space characters before moving the ship and by using the REPEAT-UNTIL, to slow it down.

If you really want to see the BBC Basic moving, delete line 50.

```
10 MODE7:VDU 23;8202;0;0;0;
20 FOR A=2 TO 18
30 B=B+RND(2)
40 PRINT TAB(B,A)CHR$(&91)"x½wt"
50 TIME=0:REPEAT UNTIL TIME=100
60 IF A=17 END ELSE PRINT TAB(B,A)" "
70 NEXT
```

Program II

Although it looks lengthy, the Basic is fairly well structured with a few REMs

	- x		- n		- w
	- /		- ll		- v
	- 7		- s		= 8FF or 255 / Set up a function key.
	- g		- y		= space
	- ;		- z		
	- k		- o		
	- =		- ?		
	- m		- ÷		
	- u		- ¾		
	- >		- ¼		



The BBC Micro can now give you children a private education.

The BBC Microcomputer now accounts for 80% of the computers being ordered under the current D.O.I. Primary School Scheme.

It's also the computer which a rapidly increasing number of people are choosing for their homes.

One of the reasons for its success is that it makes learning highly entertaining for everybody. From children who are getting to grips with the alphabet, to adults who want a gentle but intensive introduction to the complex world of computing.

Now, there's a substantial new catalogue of educational programs specially for the BBC Microcomputer.

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

Making faces without getting scolded.

With the new Facemaker program, your children can make over a million faces. It's like an identi-kit, allowing them to depict anyone they want. They start by choosing the eyes. Then they can choose the mouth, the ears, the nose, the facial outline and the hairstyle.

And if they really fancy dressing up, they can add earrings and hats.

In doing all this, they learn to read and spell, as well as developing their powers of description.

The money program, two games for the price of one.

Mr. T. is an engaging little figment of the microchip who can teach your children all the complexities of our coinage system.

His Money Box program has two games, each of which can be played at different levels.

In Money Match, the challenge is to collect a set of coins, matching them according to shape, size and value.

In Money Box, you can give your child and Mr. T. a helping hand to get all the coins on the screen into the box. (It's always different, because the coins on the screen are based on the small change you have to hand.)

A chance to teach the Micro a thing or two.

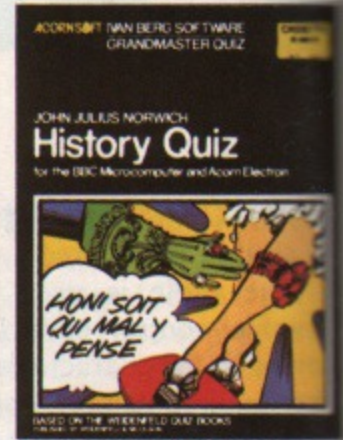
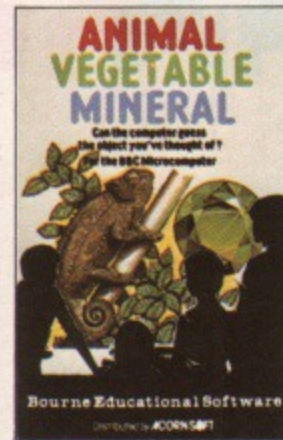
With the Animal, Vegetable, Mineral program, the children can get the computer guessing.

They think of an object. The BBC Micro has to decide what it is.

If it doesn't come up with the answer, the children can keep giving it hints.

In doing so, they are encouraged to question the difference between such things as crocodiles and alligators, or whether oil is vegetable or mineral.

The program also encourages them to consult refer-



ence books so that they can ask the computer increasingly tough questions.

Questions on Julius Caesar from J. Julius Norwich.

John Julius Norwich's History Quiz is one of the new BBC Micro Grandmaster quiz series which also covers theatre, crime and detection, music, science fiction and royalty.

On the history front, there are 300 brain-testing questions, covering all aspects of British history from Julius Caesar to Margaret Thatcher.

And to increase the educational value, Mr. Norwich has posed the questions from angles which will give a broader understanding of events.

For the full catalogue, clip the coupon.

There are thirty more new BBC Micro programs in Acornsoft's new catalogue.

For a free copy, complete the coupon, or telephone 0933-79300. Or ask your local BBC Micro dealer.

If you're not yet a BBC Micro owner, you can get full details of the computer at the same time.



To Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL. Please send me the new Acornsoft catalogue "At Home With The BBC Microcomputer."

I would also like details of the BBC Micro (tick)

Name _____

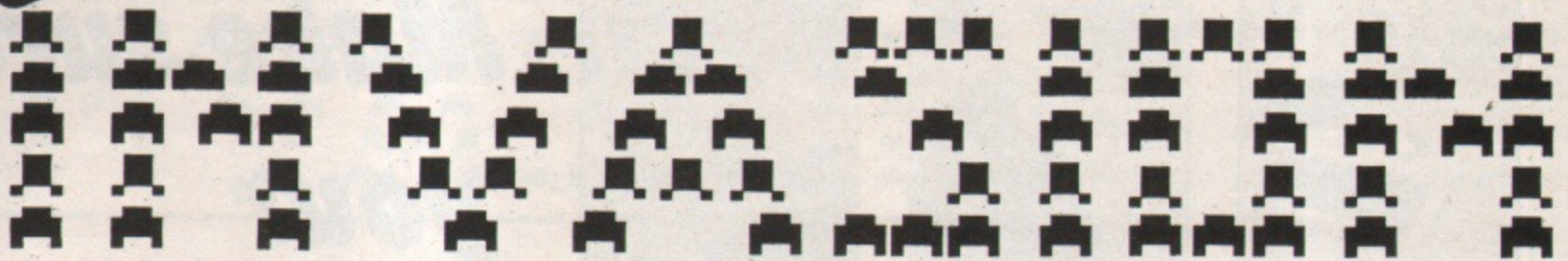
Address _____

Postcode _____



ACORNSOFT

Alien



From Page 65

and space lines.

For clarity, wherever possible the lines have been kept short and you should find that you will soon have the program keyed in and working.

Or, for those who prefer to let the machine do the work, you could send for the Micro User cassette and obtain a completely keyed and debugged version (see Page 137).

For the sake of speed, the program uses the % variables A to Z (yes, all of them), which in some instances saves up to 50 per cent of the time it takes an ordinary variable. A list of their uses is supplied.

The program is entered from RUN, and uses lines 10 to 180 to set up the working environment:

- Lines 10-40** define the ENVELOPES.
- Line 50** uses the ON ERROR routine to return the keyboard to normal and print the error number and line (ERR ERL). refer line.
- Line 60** *TV 255 drops the display 1 line - improves the display on most TVs.
- Line 70** sets mode and switches off the cursor.
- Line 80-90** set up all the arrays and displays the titles.
- Line 100** sets up the "Hall of Fame".
- Lines 110-150** sets the values of the

variables - note that the % variables must be set to zero even from run, as their values are not set by MOS (Machine Operating System). Return to line 80 from "Another Game" prompt ensures that the values are correctly maintained.

Lines 160-170 set the top lines of print (lives left, scores).

Line 180 set time and branch to the main loop.

The Main Loop - line 2000

To be absolutely correct, the main loop does not begin until line 2090, the intermediate lines being used from start and from each cleared screen to set up the battle scenario.

I let the machine do the donkey work in lines 1530 to 1930, using FOR NEXT loops to create the rows of aliens and bases.

As you can see, the string variables A\$ to E\$ are preset with the necessary gobbledygook in preparation for the magic control codes.

All processing is by PROCEDURE, apart from the main REPEAT UNTIL loop itself, which performs the routines and marches the invading hordes across your screen.

Before beginning the loop, the invaders are printed by lines 2000 to 2050 which display the aliens without the timing delays within the loop.

Note that for efficiency and thus to increase speed the more aliens you

shoot, only non-space filled rows of aliens are printed and this is achieved by A% to E% counting your kills.

The REPEAT UNTIL variables, T% to W%, are set up during PROC DIRECT, and must take account of the columns shot out. This is achieved by use of the variables GL%, SGL%, MM% and NN%. The result is the rather complex looking formula at line 2330.

Now a description of the procedures: **PROC DIRECT.** Sets up the REPEAT UNTIL variables T% to W%. The TT% array helps to ensure that only living aliens are displayed.

The values of T%, V% and W% are modified during the main loop to take account of fully destroyed columns.

Incidentally, the *3 in the formula is the two-character alien plus its space character. Also the values of 20 and 21 are used to restrict space line prints to a minimum.

PROCLINE1 to PROCLINE 5. Actual print of the aliens. They are held in the string arrays A\$ to E\$ and are concatenated into AP\$ to EP\$ by the FOR NEXT loops which use MM% and NN% for the left and right hand columns.

This ensures that the well used technique of shooting out the end columns is catered for.

Note again that for the sake of efficiency the concatenation is only carried out if any aliens in that row have been shot - AA% to EE% are the indicators.

PROC MOVE. Normal laser movement, achieved by either ADVAL if K% is set from PROCTITLE or the negative INKEY. The negative INKEY is the most efficient and responsive method of key detection and is highly suited to games programming.

Note that F% is checked for bullets in motion (F% > 0) before shoot detection. allowing for the COPY key or shoot button to remain depressed without slowing down the game.

Also the laser has a space character each side, providing smooth movement in one PRINTTAB instruction.

PROC SHOOT. First in a series of nested procedures, PROC SHOOT sets





March issue
 Beginners: guide to the keyboard. Build your own games paddle. Word processor review. Guide to text colours and graphics. BBC operating system, Part 1. How to avoid cassette loading problems. Deathwatch listing. Upgrade Model A to B at half the shop price. Shapes program. Bingo listing. Sorting routines. Test for function keys in machine code routines. Colour monitors, Part 1.



April issue
 Beginners: simple programming. Impressive graphics with Teletext Mode 7. Common copying errors revealed. How to draw multi-coloured lines. King Kong listing. BBC Operating System, Part 2. Colour monitor review, Part 2. Upgrade Model A to B, Part 2. Finding the ROM's action addresses. Binary code and how to use it. Disc formatter listing. Plus 8-page pullout for Basic programmers.



May issue
 Beginners: string variables. Pelmanism listing. Mode 7 animation, Part 2. Interfacing in the laboratory. How to generate vertical or even inverse text. Graphics course: triangles and rectangles. Build yourself a joystick. The Osbyte routine: full investigation. Air Strike listing. Anagrams listing. Structured programming, Part 1. How to make full use of the BBC's editing function.



June issue
 Beginners: Use of the INPUT statement. Editing course: LIST and LISTO. Structured programming, Part 2. Solve cassette problems. Build your own graphics digitiser. Hidden *FX calls. Guide to indirection operators. Single key memory display program. Space Pilot listing. Graphics course: text and graphics windows. Nomsim listing. Bring user defined characters to life. Speed chip review.



July issue
 Beginners: loops. Ten Pins listing. Editing course: the PRINT statement. Graphics course: creating sunburst effects. Structured programming, Part 3. How to use the user port to maximum effect. Space Pods listing. Wordwise review. Epson FX80 printer review. The BBC Micro as a sophisticated design tool. Hexadecimal highlights. How to edit with impunity, and fix that break key.



August issue
 Beginners: more help on loops. BBC Micro User's Manchester show reviewed. Animation, Part 1. BBC Buggy and Edinburgh Turtle reviewed. Techniques for switching from tape to disc. Structured programming, Part 4. Inside King Kong: case study of the popular game. Fruities listing. A guide to logical operators. Machine code routines to give Mode 7 colour. Build your own dual cassette system.



September issue
 Animation Part 2. Editing course: use of TAB. Turn your BBC Micro into a graphics terminal. Galactic Invaders listing. Structured programming, Part 5. Two new DFS and APTL Eprom blower reviewed. Control the outside world safely with your BBC Micro. Robin and Marian listing. Workshop: variable storage explained. Beebcalc investigated. Inside the Electron: Acorn's latest micro reviewed.



October issue
 Graphics: How to draw circles. Fishing. Structure, the last of the series. Format: We update the program. Make a light pen with Body Building Part 8. Editing: Print fields. The Hobbit reviewed. Workshop: Add joysticks to your games. Link Up: Join two BBC Micros. For... NEXT loops in Beginners' Part 7. Contour plotting program. Basic code, a computer communications language.



November issue
 Beginners: guide to character codes. Light Pen, more useful software. Forth ROM reviewed. Blackjack, a compulsive simulation of the card game. Putting Basic programs into sideways ROMs. Goblins, a fun packed enchanted journey. Body Building Part 9, projects for the Physics lab. The SOUND command explained, Part 1. Games design: improve your programs.

Make sure your **MICRO USER** collection is complete!

Back numbers
 are still
 available
 at £1.25 (incl. p&p)

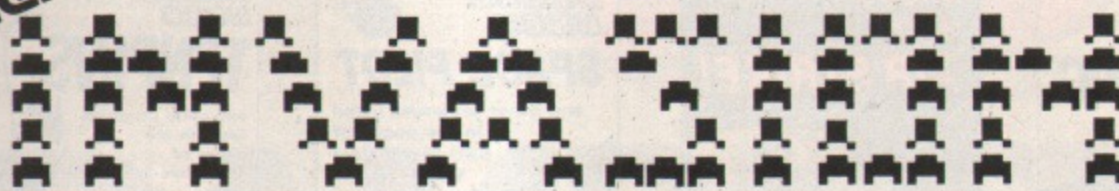
**ORDER FORM
 ON PAGE 137**



December issue
 Tower Bridge - ghostly encounters in the nation's capital. Paged Graphics: 6845 animation techniques. Character Definer an indispensable utility. Smartmouth reviewed. Sound explained, part 2. Body Building, a sound-to-pattern converter. Beginners, working with strings. Slow Down, alters pace of your programs. Graphics: User defined characters. Santa's Saucer and Christmas Card.



January issue
 Barrel Battle - an all action arcade game. Graphics, an easy to follow introduction to multiplane images. Noteplay, an entertaining musical utility. Body Building: add a DFS to your micro. Printing, Pixels, a multitone screen dump for Epson printers. Sound advice, flushing sound queues. Beginners, the use of TAB. Adventures, our regular column begins. Bits and Bytes investigates binary operations.



From Page 67

your laser bolt into action. Once fired, the laser is disabled by F% until you hit something or go out of range (line 0 on the screen). F% is the column position of the laser and thus the bullet.

PROCHIT. Moves the bullet up one line. Performs PROCBOMB in fairness to the aliens.

PROCHITA. Checks for a hit. Uses FNHIT to look at the correct screen position – not TUBE compatible. Four checks are involved:

1 – Hit your own base. Screen location value of either 255, 50, 120, 116, or 97.

2 – Hit a bomb. Screen location value 124.

3 – Hit the mothership – line value of 1 and screen location value < > 0 or 32 (space). In this case Perform PROCMHIT.

4 – Last < > 0 or 32 – hit an alien. Needless to say, perform PROCSCORE.

PROCMHIT. Hit the mothership. Plays a fanfare and gives a random score. Perhaps you might add a delay at this point to show more clearly the score value.

PROCSCORE. No guesses, looks after your score. Actually, it does a fair bit more. Logically, perhaps the most complex routine.

By using DIV and MOD it looks after the rows and columns of aliens – A\$ to E\$, A% to E% for the rows; B4% (1 to 10) for the columns.

It also checks a count of the aliens shot and gives you your “Cleared Screen” award. A little fanfare (perhaps the Close Encounters theme) would go nicely here. I’ll leave it to you.

PROCMSHIP. Moves the mothership by time delay. The more purist of you might wish to make her appearance even more random. As it is, she appears sometime after 10 seconds since she last got shot or disappeared – but from which side?

PROCBOMBS. This routine and its subsequent performs will kill you, well it does drop the aliens bombs!

By setting L% to the start position of the highest row of aliens at the beginning ($L\% = HIMEM + (2+Z\%) * 40$) we have the base location for bomb dropping.

HIMEM is the first screen location in this mode.

Z% is the start height depending on screens cleared.

$(2+Z\%) * 40$ gives the address of the first column of the highest line of aliens.

By using this method, we can direct and lower the bombs using the minimum of time-consuming arithmetic:

1. Random choice of one or two bombers.

2. Check A\$ to E\$ position to make sure an alien exists.

3. Add the correct screen location values; 80 characters for each line of aliens plus the following line of spaces.

4. Poke – or to be precise $?B2\%(J\%) = 97$ – which means print a bomb below the chosen alien. Note that PROCLOWER uses the formula described in PROCBOMBS to check for a hit and blank out bomb and lower bomb one line.

PROCBOMBED removes a life and, if necessary, ends the game.

PROCTITLE is the first routine performed, prints the introduction and checks for joysticks. Note the interesting use of RIGHTS\$ to display the title. **PROCFAME** of course, sets up your rank by FOR NEXT loops.

Overall, the flow of the program is governed by the way the main procedures are performed.

This potentially allows much scope for experiment – changing the frequency of the performs will change the responses and movement of the various characters.

For the adventurous, the laser bullets routines could be changed to use PEEKs and POKEs or even assembler routines – the assembler equivalent of ? is only a STA to a specified address.

I’ve described the program in detail in a hope that it may be helpful by providing an insight into games programming.

The Mode 7 graphics prove to be more than useful and the techniques used in Invaders could equally well be used in Galaxian, Centipede – even Gorf type games.

In the meantime, I wish you luck. Get keying, and enjoy yourself.

Listing starts on Page 127

Variables Used

A%	=	Count of aliens shot – top line
B%	=	Count of aliens shot – second line
C%	=	Count of aliens shot – third line
D%	=	Count of aliens shot – fourth line
E%	=	Count of aliens shot – fifth line
F%	=	Position of base for bullets (column)
G%	=	Position of bullets (row)
H%	=	Height of aliens
I%	=	General loop count
J%	=	General loop – specifically used in random routines and small loops
K%	=	Joysticks
L%	=	Screen position in map terms
M%	=	General loop
N%	=	Position in base – movement routines
O%	=	FNHIT calculation – column
P%	=	FNHIT calculation – row
Q%	=	Mothership movement (direction +1 -1)
R%	=	Used to define which alien characters are printed
S%	=	Mothership markers
T%	}	Main loop counts – defines direction of aliens – TT% array helps.
U%		
V%		
W%	}	Result of FNHIT (=FNHIT) – checks for bullet hits
X%		
Y%	=	High score
Z%	=	Lower position of aliens after clearing screen
MM%	=	Start of alien string count – increases the prints per line as the columns are cleared (left hand side)
NN%	=	End of alien string count – used as MM% from right hand side
LI%	=	Used as go to variables in SCORE – defines which alien was hit
AA%	=	Indicators for changes to alien lines
EE%	=	Alien lines
AP\$ to	=	Concatenated alien lines
EPS	=	Concatenated alien lines
B4%	=	Alien column counts
(1 to 10)	=	Result of row calculation – which alien was hit?
F3	=	Result of row calculation – which alien was hit?
GL%	}	Additional variables used to continue the leftward movement of the aliens if complete columns have been destroyed.
SGL%		

BBC MICRO USER



Deathwatch

and 24 other programs listed in the pages of BBC Micro User Vol. 1, No. 1.

March Issue
DEATHWATCH, a superb arcade game **BINGO**, clever uses of the randomise function; **BUBBLESORT** routines; **TESTS** function keys in machine code. **0.1 COLOUR** and **GRAPHICS ROUTINES**: create a kaleidoscope of screen designs.

BBC MICRO USER

KING KONG



and 22 other programs listed in the pages of BBC Micro User Vol. 1, No. 2.

April Issue
KING KONG, rescue girls from the Empire State Building before killing Kong. **NIM**, a structural game of strategy. **TOKENS**, unravel the Basic ROM; **FORMATTER**, an essential disc utility; **DISASSEM**, a full machine code disassembler.

BBC MICRO USER

AIR STRIKE!



and 33 other programs listed in the pages of BBC Micro User Vol. 1, No. 3.

May Issue
AIR STRIKE, a fast and furious arcade game; Test your mental powers with **PELMANISM**; **ANAGRAMS**, the word game. **CHARACTER**, generate vertical and inverted text. **TELETEXT**, animation in Mode 7. **BEEB**, two joystick exercises.

THE MICRO USER

SPACE PILOT




and other programs listed in the pages of BBC Micro User Vol. 1, No. 4.

June Issue
SPACE PILOT, lost in space you must fight off repeated attacks from alien life forms. **NOMISM**, you are a nomadic herdsman desperately trying to eke out a living on the plains of Africa. **COLOURFUL CHARACTERS PLUS** other listings from the June issue.

THE MICRO USER

TENPINS




and other programs listed in the pages of The Micro User Vol. 1, No. 5.

July Issue
TENPIN, a simulation of Tenpin Bowling; **SPACEPODS**, beat the alien hordes; **CUP**, Exciting 3D graphics techniques **TEST** and **STEADY**, programs to accompany the Beeb Body Building Course. **BREAKFIX**. Don't let Break destroy your precious variables!

THE MICRO USER

FRUITIES



and other programs listed in the pages of The Micro User Vol. 1, No. 6.

August Issue
FRUITIES, driven by strange urges you climb the ladders of adventure to risk all in the gardens of unearthly frights. **ANIMATION**, a suite of programs that really bring your screen alive; **CASDISC**, the machine code downloader for your disc system; **MODE 7** colour routines.

THE MICRO USER

Robin and Marian



and other programs listed in the pages of The Micro User Vol. 1, No. 7.

September Issue
ROBIN & MARIAN, rescue Maid Marian from the Sheriff of Nottingham. **GALACTIC INVADERS**, an exciting arcade game. **DFS BENCHMARKS**, 14 DFS test programs. **ANIMATION**, new techniques. **TERMINAL**, connect a BBC Micro to a mainframe.

AT LAST!
You can now get Micro User programs on disc as well as on cassette

Since we started our highly successful cassette service to readers we have been inundated with requests to supply each month's programs on disc.

Now it's happened!
 We've even incorporated an automatic menu downloader. Just boot up the disc, make your choice from the menu, and away you go!

And all for £6.75 a disc, including post and packing.

Of course, our very popular cassette tapes of the month's programs are still available. The price for these is unchanged - £3.75 a cassette, including post and packing.

ORDER FORM ON PAGE 137

THE MICRO USER

FISHIN'




and other programs listed in the pages of The Micro User Vol. 1, No. 8.

October Issue
FISHING, a compulsive day's angling. **JOYKEY**, convert programs to joystick. **PENTEST** and **BELLRINGER**, for Micro User light pens. **CONTOURS**, an educational program. **LINK** BBC Micros to each other. **PLUS** all the listings from the first Electron User.

THE MICRO USER

Goblins and Blackjack




and other programs listed in the pages of The Micro User Vol. 1, No. 9.

November Issue
GOBLINS, an enchanted journey. **BLACKJACK**, the casino favourite. **CHARGE** and **PENDULUM**, Body Building Course part 9. **SIDEWAYS**: programs in ROMs. **PENDRAW**, a light pen sketching program. **PLUS** all the programs from the second Electron User.

THE MICRO USER

Tower Bridge



and other programs listed in the pages of the Micro User Vol. 1, No. 10.

December Issue
TOWER, rescue London's treasure **SANTA**, help Father Christmas deliver his presents. **VDU 23**, an invaluable character defining utility. **PAGED**, the listing from our paged graphics article. **PLUS** all the listings from the third issue of Electron User.

THE MICRO USER

Barrel Battle

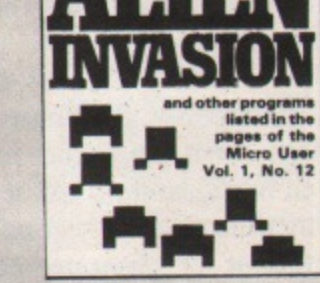


and other programs listed in the pages of the Micro User Vol. 1, No. 11.

January Issue
BARRELS, an all-action arcade game. **NOTEPLAY**, an entertaining musical utility. **DUMP1** and **DUMP2**, multitone screen dumps. All the programs from our **SOUND**, **BEGINNERS'** and **GRAPHICS** articles **PLUS** 12 programs from the fourth Electron User.

THE MICRO USER

ALIEN INVASION



and other programs listed in the pages of the Micro User Vol. 1, No. 12.

February Issue
INVASION, the classic arcade game. **FROGS**, fun for all the family. **ENGVGEN**, a logic game. **BALANCE**, a number learning program. **KEY**, single key entry for the BBC Micro **PLUS** nine other programs from The Micro User.

ALLIGATA THE SOFTWARE
WITH BITE
BRINGS YOU

DAMBUSTERS

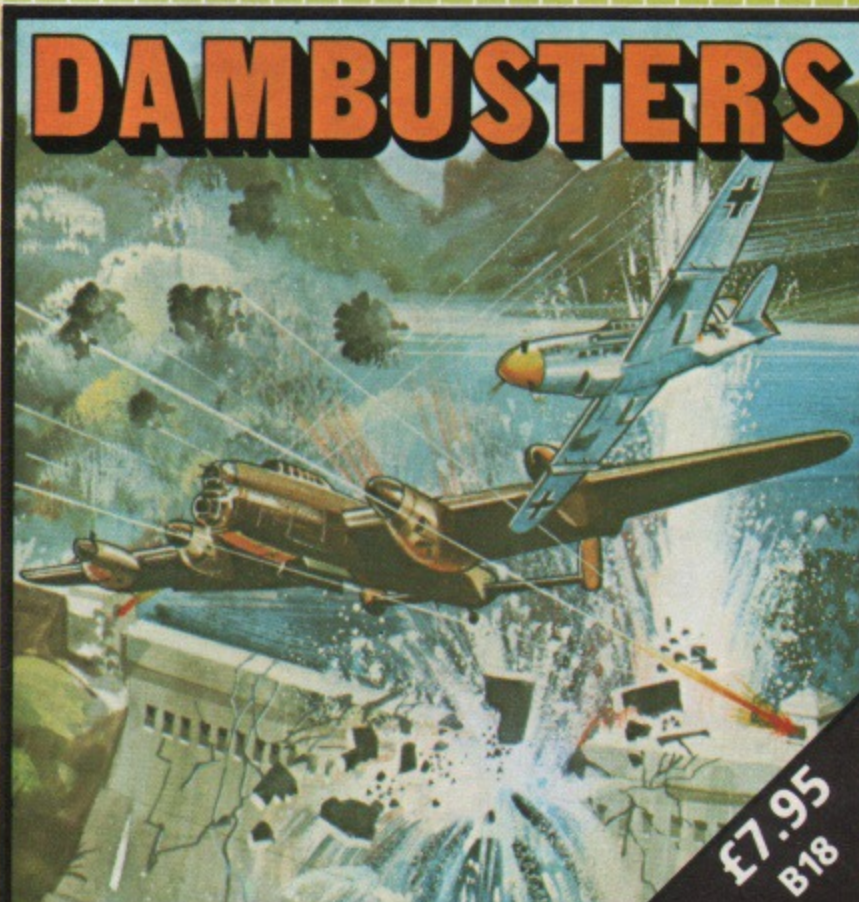
THE
DEVASTATING
NEW GAME
FOR
BBC (Model B)

Alligata presents a superb range of software products that are designed specially for you. Games that cleverly combine full machine code and high resolution, full colour graphics to create hours of fun and excitement. And utilities that have been developed to open new doors and help get the best from your BBC (Model B) micro. If it's to be outstanding quality and amazing value for money then Alligata has to be your choice.

Send a stamped addressed envelope for our full colour catalogue which gives details of the complete range.

WRITE OR PHONE
YOUR ORDER TODAY!

also available from all
good software stockists.



Harried by night-fighters, bombarded by heavy anti-aircraft fire pilot your bomber through the treacherous valley and deliver the revolutionary bouncing bomb on its path of destruction.

£7.95
B18

FREE
COMPETITION
WIN A TRIP
TO GERMANY

The highest scoring player on Dambusters will win a free holiday in Germany accompanied by a friend. Full details and entry form are available with every Dambusters program. So hurry, get your copy today and start practising.

ALSO AVAILABLE

B19 NEANDERTHAL MAN £7.95
Relive the dangers of primitive man – whilst foraging for food for your family you've only a spear to protect your family from the prehistoric monsters.

B07 LUNAR RESCUE £7.95
Land your moon buggy and rescue a precious cargo, destroying all opposition on the way; finding your way back to the mother ship start again against greater odds.

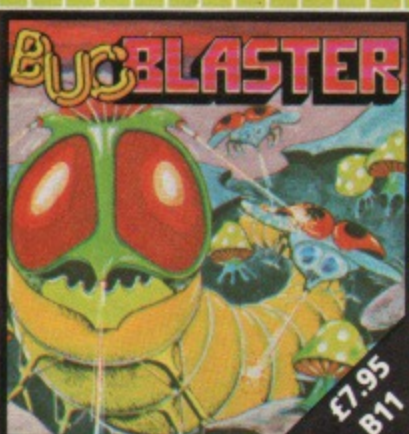
B12 PRIMARY ART £7.95
Create a picture to be proud of – place pre-programmed shapes in any position, any size or any colour. Features free-hand drawing and animation effects.

B03 DMON £7.95
Disk **£11.95** ROM **£19.95**
A superb machine code monitor and disassembler available on BBC. Features: Full disassembler with ASCII dump, full hex dump with ASCII, reads any ROM, edits any byte of RAM, and many more.



Fight your way through four action packed levels of attack from the menacing phoenix and battle armed eagles, before you can blast to destruction the heavily armoured and strongly defended Eagle Empire.

£7.95
B16



A superb action packed arcade special. A really fast implementation of the splendid 'centipede.' Features include spiders, mushrooms, centipedes and the mushroom poisoning scorpion affectionately known as 'Brian.'

£7.95
B11



Qualify in under 60 seconds for the race of a lifetime – fantastic speeds, death-defying manoeuvres and a narrowing circuit – an exacting challenge for a future world champion.

£7.95
B15



The ideal opportunity to improve your technique in a sophisticated program where the computer bids and plays the other three hands.

£9.95
B20



Alligata Software Ltd. 178 West Street,
Sheffield S1 4ET. Tel: (0742) 755005

Despatch is normally made on receipt of order and should reach you within 7 days.

INDICATE PROGRAMS REQUIRED
B18 B16 B11 B15 B20 B19 B07 B12 B03

I enclose cheque/PO* for £: _____ Charge my Access/Visa £* _____
Card No. _____ Signature _____
Name _____
Address _____

*payable to Superior Systems Ltd., 178 West Street, Sheffield S1 4ET
*allow 75p for post and packaging.

LVL COMPUTERTOWN

Whether its your first computer or whether you're already an enthusiast, LVL COMPUTERTOWN offers you the quality of service you expect from experts. If you invest money, you go to a bank or a broker - a specialist who can guide and advise you on the best return for your capital. At LVL COMPUTERTOWN we're specialists too. We're there to help guide you through the micro maze, keep you up to date on innovations, help you get the best value for money, whether your computer is for you, your children or your business. Your computer can change your life - make sure you change it for the better: Come and talk to the experts and move into micros with LVL COMPUTERTOWN



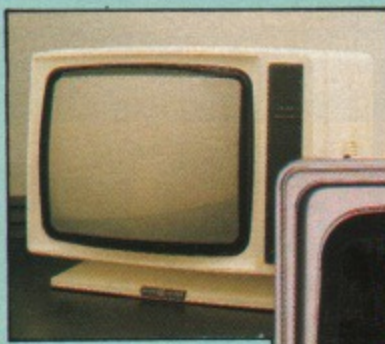
A REFLECTION OF SUPERIORITY

(WHICH EVER WAY YOU LOOK AT IT).

£39.95

The Bell & Howell/LVL Computer Compatible Data Recorder.

- Automatic Level Control
- Automatic Tape Stop
- Tape Counter
- Remote Motor Control.



MONITORS



SABA 14" COLOUR MONITOR/
COLOUR TV.

£274.45

MICROVITEC 14" Colour Monitor
£247.25

BBC MICROCOMPUTER

- MODEL A £299
- MODEL B £399
- MODEL B with ECONET £446
- MODEL B with DOS £469
- Model B with DOS & ECONET
..... £516



DECCACOLOUR

14" Colour Monitor
£247.25

SANYO

12" Green Screen
£102.35

PRINTERS



£503.70



£734.85

EPSON FX-80

An astonishing 160 characters per second, proportional spacing, quick forms tear-off, superscripts, subscripts, dot addressable graphics and down loadable character set.

TRI-WRITER

* IT'S A PORTABLE COMPUTER TERMINAL!

* IT'S A LETTER QUALITY COMPUTER PRINTER

* IT'S A FULL FEATURE ELECTRONIC TYPEWRITER

SOFTWARE

DESIGNED FOR THE BBC MICROCOMPUTER

LANGUAGES

LISP £16.85
FORTH £16.85

GAMES

Monsters £9.95
Snapper £9.95
Planetoid £9.95
Arcade Action £11.90
Rocket Raid £9.95
Meteors £9.95
Arcadians £9.95
Sliding-Block Puzzle £9.95
Cube Master £9.95
Starship Command £9.95
Snooker £9.95
Super Invaders £9.95
Hopper £9.95
Colditz £9.95
Doctor Who £10.00
White Knight II £10.00
Missile Base £9.95
Draughts & Reversi £9.95

ADVENTURES

Philosophers Quest £9.95
Castle of Riddles £9.95
Countdown to Doom £9.95
Sphinx Adventure £9.95

GENERAL

Desk Diary £9.95
Creative Graphics £9.95
Graphs & Charts £9.95
Tool Box £21.00
Record Keeper £13.80
Magic Garden £9.95

EDUCATIONAL

Business Games £9.95
Tree of Knowledge £9.95
Peeko Computer £9.95
Algebraic Manipulation £9.95
Word Sequencing £11.90
Missing Signs £11.90
Number Balance £11.90
Word Hunt £11.90
Density Circuit £11.90
Chemical Analysis £13.80
Chemical Structures £13.80
Jars £11.90
Vu-Type £16.10

BBC

The Computer Book ... £6.75
The Book of Listings ... £3.75
30hr. Basic £5.95
Beyond Basic £7.25
The Friendly Computer . £4.50
Sound & Graphics £7.95

GENERAL

Programing for the BBC . £8.95
Advanced User Guide . £12.95

ACORN

Creative Graphics £7.50
Graphs and Charts £7.50
Forth Book £7.50
Lisp Book £7.50
View Guide £2.50
Into View £2.50
BCPL User Manual ... £15.00

ALL PRICES
INCLUDE
VAT.

The items featured represent a very small selection from our vast product range.

Further information of both product and services available can be obtained by telephoning or visiting your nearest LVL Computertown Dealer.

CHESHIRE

C-TECH SOFTWARE
184, Market St.

HYDE

Cheshire
061 366 8223

* COMPUTER CITY
78, Victoria Rd.

WIDNES

Cheshire
051 420 3333

* OAKLEAF COMPUTERS
100, Boughton

CHESTER

0244 310099

CUMBRIA

* THE COMPUTER SHOP
56/58 Lowther St.

CARLISLE

Cumbria
0228 27710

ESSEX

A.C.L.
1, Northmoll

GRAYS, ESSEX

0375 79834
BROADWAY MUSIC
AND VISION
Woodford Green

ESSEX

01 504 7500

GREATER MANCHESTER

* LOMAX
8, Exchange St.,
St. Annes Square.

MANCHESTER

061 832 6167

WORC'S

SPURTREE COMPUTING
LTD.
Council Buildings,
Teme Street,

TENBURY WELLS,

Worcestershire
0584 811353/811304

MERSEYSIDE

* THORNGUARD
46, Pensby Rd,
HESWALL
The Wirral,
Merseyside
051 342 7516

NOTTS'

* BASIC BUS. SYS.
Trent Boulevard

WEST BRIDGFORD

Nottingham
0602 819713

S P ELECTRONICS

48, Linby Rd.

HUCKNALL

Notts.
0602 640377

LEASALINK VIEWDATA Ltd
230, Derby Rd.

STAPLEFORD

Notts.
0602 399484

OXFORD

ABSOLUTE SOUND
AND VIDEO (Oxford) Ltd.
19, Old High St. Headington

OXFORD

0865 65961

AVON

K & K COMPUTERS

32, Alfred Street,
WESTON

SUPERMARE

Avon
0934 419324

COLSTON COMPUTER
CENTRE LTD,
The Colston Centre,
11, Colston Ave.,
BRISTOL
0272 276619

WARWICKSHIRE

CARVELL
9, Bank St.
RUGBY
Warwickshire
0788 65275

WEST MIDLANDS

RICHARD MORRIS
523, Bearswood Rd.
Smethwick

WARLEY

021 429 1161
JBC MICRO SERVICES
200 Earlsdon Ave.,
Nth. Earlsdon

COVENTRY

0203 73813

WILTSHIRE

WILTSHIRE MICRO
CENTRE
Unit 6,
Central Trading Estate,
Signal Way,
Old Town,
SWINDON
0793 612299

BUCKS'

HI-VU ELECTRONICS
38, Church St. Wolverton

MILTON KEYNES

Bedford
0908 312808

SUSSEX

C.J.E. MICROS
78, Brighton Rd.

WORTHING

West Sussex
0903 213900

ISLE OF WIGHT

EXCELL
4, Foreland Rd.

BEMBRIDGE

Isle of Wight
098 387 2578

YOUR
LOCAL



DEALER

HEREFORD

KEMPSONS
26, St. Owen St.,
HEREFORD
0432 273480

KENT

KENT MICRO
57, Union St
MAIDSTONE
Kent.
0622 52784

GRAVESEND

COMPUTERS
39, The Terrace,
GRAVESEND
0474 50677

NORTHANTS'

M A ELECTRICAL
7, High St.
IRLINGBORO
N'Hants
0933 650133

LEICESTER

PERCY LORD & SON
63, Blaby Rd.
WIGSTON
Leicester.
0533 785033

LINCOLNSHIRE

* OAKLEAF COMPUTERS
121, Dudley Rd.
GRANTHAM
0476 70281

LONDON

CANNONBURY RADIO
185 Upper St.
ISLINGTON N1
London
01 226 9392

PAUL ELECTRICAL

250/2, Grand Drive,
Raynes Park,
LONDON SW20
01 542 6546

WOODS RADIO

257, Lavender Hill,
Battersea,
LONDON
01 228 1768

LONDON

01 228 1768

SALOP

MEDLICOTT BROS
53, Mardol
SHREWSBURY
Shropshire
0743 3060

SUFFOLK

S J EMERY & CO.
10, Market Place
BUNGAY,
Suffolk
0986 2141

IRELAND

EVERYMAN COMPUTER
SERVICES
BALLYMONEY
Co-Antrim
N. Ireland
026 56 62658

NEWBURN

ELECTRONICS
BALLYCARRY
Co.-Antrim,
09603 78330

STAFFS

J W BAGNALL
18, Salter St.,
STAFFORD
0785 3420

KIRKLANDS

City Rd., Fenton.
STOKE ON TRENT
0782 415787

COMPUTERAMA

59, Foregate St.
STAFFORD
0785 41899

HASLEMERE COMPS

25, Junction Place,
HASLEMERE
Surrey
0428 53850

P & H ELECTRONICS

5, The Parade,
Reading Road,
YATELEY
Surrey.
0252 - 877 222

* Spectrum Members

LANCASHIRE

* P V MICROS
38A Water St.
ACCRINGTON
Lancs.
0254 36521

Home & Business

Computers Ltd.
54, Yorkshire Street,
OLDHAM
061 633 1608

Home & Business

Computers (RCH) Ltd.
73, Yorkshire Street,
ROCHDALE
0706 344654

WALES

BUCON
18, Mansel St.
SWANSEA
0792 467980

S.I.R.

91, Whitchurch Rd.
Cyncoed
CARDIFF
Wales
0222 621813

THE COMPUTER SHOP

41, The Hayes,
CARDIFF,
Wales.
0222 26666

SCOTLAND

COMMSCOT
30 Gordon St.
GLASGOW
041 226 4878

NORTH LAND

NEWTONS
Main St.
SEAHOUSES
0665 720307

EXPERIENCE THE VORTEX!

the invasion continues



We continue the invasion this month with our latest and most exciting release yet. Have you the courage to enter the VORTEX? – You'll need all your senses and co-ordination tuned to perfection to avoid being fragmented by asteroid storms or vaporized by aliens. Each second you remain intact, your velocity will continue to increase as the vortex draws both you and all the surrounding debris into it's clutches. The point is inevitably reached where even your super human reactions are too slow to avoid collisions with asteroids, and your ship is destroyed with a blinding flash and a cascade of radioactive particles. This is definitely our best game yet, from the author who created Gunsmoke, 3D Bomb Alley and Attack on Alpha Centauri. VORTEX uses keyboard or joysticks, with the option of sound effects and a pause control. (Seat belts recommended but not included!) The true three dimensional illusion will captivate your senses, as you come face to face with the VORTEX: A 3D space voyage for the BBC micro model B for just £7.95 on cassette or £11.95 on disc.

Other programs available for the BBC Micro Model B:- Cassette £7.95 inc. Disc £11.95 inc.

GUNSMOKE



"... the graphics are excellent and the whole thing well designed."
 "... a game for the family – simple, but enjoyable"
 THE MICRO USER

3D BOMB ALLEY



"This is a very addictive game and is good value for money"
 BEEBUG

ATTACK ON ALPHA CENTAURI



"The game features some of the best and most unusual graphics yet for the BBC micro"
 BEEBUG



Send a S.A.E. for details or ask your local dealer for a demonstration.
 Our software is available from more than 500 retail outlets in the UK, including W.H. Smith, HMV, all Spectrum Group shops and most good dealers.

We also offer a rapid mail-order service by writing to:
 Software Invasion, 50 Elborough St., Southfields, London SW18 5DN.



Let's make arrays work for you



By **PETER DAVIDSON**

AN array is a way of storing several connected variables, whether numeric or string. It is much easier to access an array element (that is one variable within the array) than it is to access one variable out of several ordinary variables that have not been connected in the form of an array.

To illustrate this, let us first consider a badly written program (Program I) which is intended to print out a telephone number when a person's name is typed into the computer:-

```

10 INPUT requiredname$
20 IF requiredname$ = "FRED"
   THEN PRINT 545 27364
   :GOTO 10
30 IF requiredname$ = "JANE"
   THEN PRINT 485 4849
   :GOTO 10
40 IF requiredname$ = "JIM"
   THEN PRINT 475 9398
   :GOTO 10
50 IF requiredname$ = "JACK"
   THEN PRINT 455 9989
   :GOTO 10
60 PRINT "NOT THERE"
   : GOTO 10
    
```

Program I

Although it works, it has several faults which we will now try to improve.

- Line 10 will generate a question mark on the screen, with no explanation as to what it is for.
- Lines 20 to 40 are very similar. It should be possible to find a way to achieve the same result without the repetition (imagine a program written like this containing 1,000 names!).
- Telephone numbers contain spaces. These cause problems in the printout

when they are printed as shown in this program.

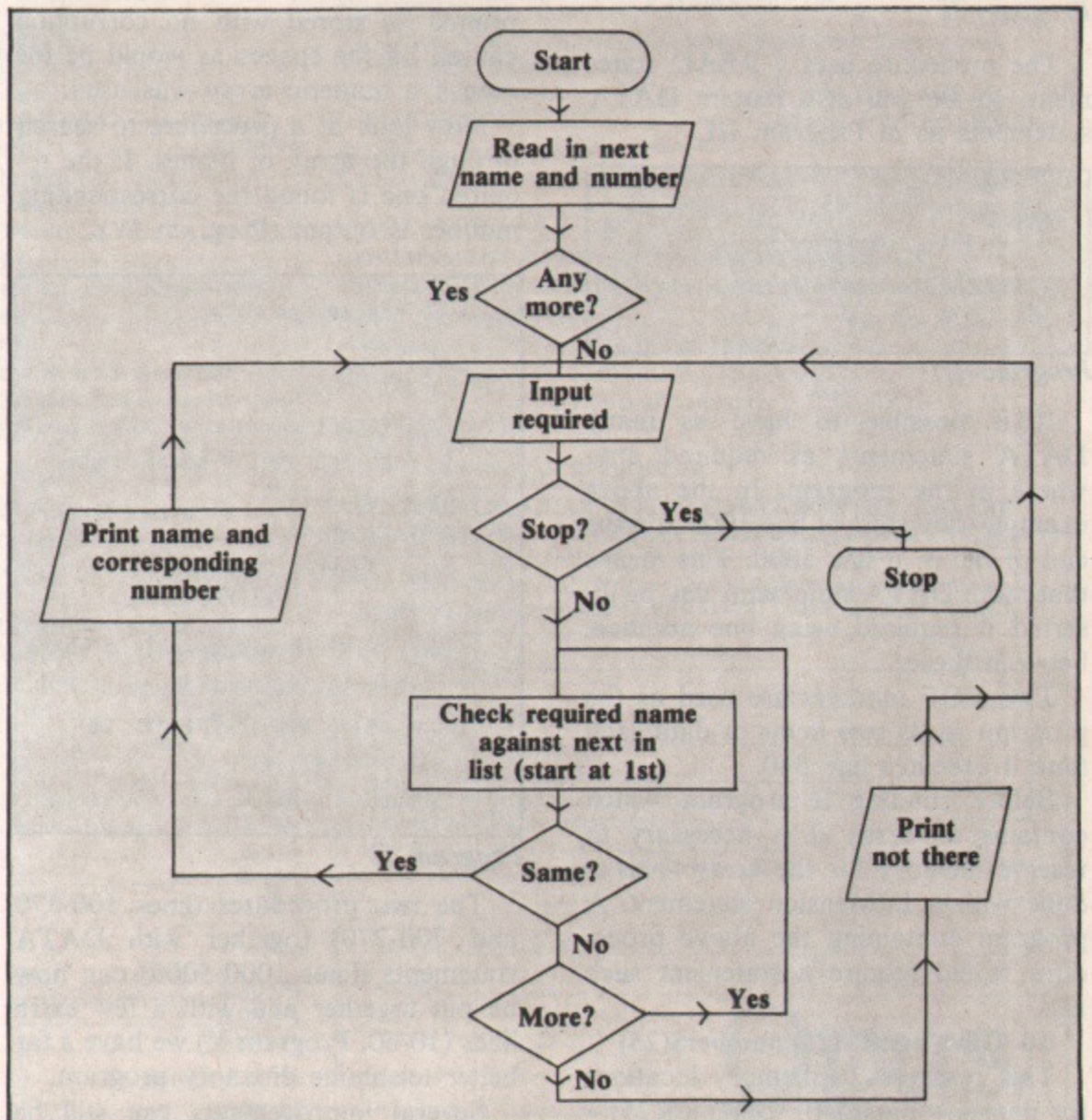
- There is no way to stop the program (except using ESCAPE or BREAK).
- It is very difficult to add new names to the directory.

It must be realised that the use of a computer as a telephone directory is

not of practical use – it is quicker to use the book. But it is an easy application to understand and illustrates the use of arrays quite clearly.

Below is a flowchart showing some of the requirements of a better directory program.

Rather than use several separate variables, this time we shall use a one dimensional array. This means that we



From Page 75

use a single variable name followed by a subscript (which is just a number in brackets).

For example, instead of using firstname\$, secondname\$, and thirdname\$ as variable names we can use name\$(1), name\$(2), and name\$(3). The advantage of this method is that all three can be referred to as name\$(N) and the required one accessed by setting the variable N to the correct value.

Obviously it is much easier to go beyond three variables using this method than by using a completely new name each time.

Let us start by looking at a procedure for setting up two one-dimensional arrays, one of names and one of numbers as in Program II.

```
500 DEF PROCinput
510 count=0
520 REPEAT
530 count=count+1
540 READ name$(count),number$(count)
550 UNTIL name$(count)="EOF"
560 total=count-1
570 ENDPROC
```

Program II

The procedure uses a READ statement, so we will also require DATA statements as in Program III.

```
1000 DATA FRED,545 27364,JANE,485
4849,JIM,475 9398,JACK,455
9989
5000 DATA EOF,EOF
```

Program III

It is possible to have as many DATA statements as required anywhere in the program. In the above example they start at line 1000 and the end of file is at line 5000. This means that more DATA statements can be inserted if required using line numbers between these.

Two EOF markers are used as the program reads two items of data each time it executes line 540.

Before running a program which contains an array it is necessary to reserve memory for the array. This is done with a DIMension statement. A program containing the above procedure would require a statement such as:-

```
10 DIM name$(25),number$(25)
```

This reserves 26 memory locations for names - name\$(0) to name\$(25) -

name\$(1) I FRED	number\$(1) I 545 27364
name\$(2) I JANE	number\$(2) I 485 4849
name\$(3) I JIM	number\$(3) I 475 9398
name\$(4) I JACK	number\$(4) I 455 9989
name\$(5) I EOF	number\$(5) I EOF
I	I
I	I

Figure 1

and 26 locations for numbers. The procedure shown will not use location 0 but swopping lines 530 and 540 could cure this. The same effect can also be achieved if a variable is used in the DIMension statement, such as:

```
5 N=25
```

```
10 DIM name$(N),number$(N)
```

The above procedure and DATA statements will set up the two required arrays in the memory and also a variable (total) storing how many names and numbers are in the arrays. The arrays can be pictured as in Figure 1.

If we search through the array of names and find the required one, the corresponding telephone number will have the same subscript and can be accessed directly.

It should be noticed that a string array has been used to store the numbers. This means that they will be printed as stored with no corruption caused by the spaces as would be the case if a numeric array was used.

Now look at a procedure to search through the array of names. If the required one is found the corresponding number is output (Program IV).

```
700 DEF PROCsearch
710 count=0
720 REPEAT
730 count=count+1
740 IF requiredname$ = name$(count)
THEN FOUND=TRUE
ELSE FOUND=FALSE
750 UNTIL FOUND OR count=total
760 IF FOUND
THEN PRINT requiredname$"s phone
number is "number$(count)
ELSE PRINT requiredname$" is
not in the list"
770 ENDPROC
```

Program IV

The two procedures (lines 500-570 and 700-770) together with DATA statements (lines 1000-5000) can now be put together and with a few extra lines (10-60, Program V) we have a far better telephone directory program.

Several improvements can still be

made to this program, one simple one being a tidy up of the output. This is left as an exercise for the reader (use CLS and TAB).

```
10 DIM name$(100),number$(100)
20 PROCinput
30 REPEAT
40 INPUT "Whose number is required"
.requiredname$
50 PROCsearch
60 UNTIL requiredname$="STOP"
```

Program V

Of the five faults found in the first program, the latter program corrects the first four and improves the last. The names are still contained in the program, but are now in DATA statements and so are quite easy to change. The cure for this is to store the data on tape or disc.

The arrays we have looked at so far are one dimensional, but it is possible to use more than one dimension.

In the above program we could replace the two one dimensional arrays (name\$(X) and number\$(X)) by one two dimensional array, which we could call info\$(X,Y) where X will be the number of names and phone numbers and Y will be a 1 or 2 (1 corresponding to a name and 2 corresponding to a number).

The "picture" that you can use of a two-dimensional array is shown in Figure II.

info\$(1,1)	info\$(1,2)
FRED	545 27364
info\$(2,1)	info\$(2,2)
JANE	485 4849
info\$(3,1)	info\$(3,2)
JIM	475 9398
info\$(4,1)	info\$(4,2)
JACK	455 9989
info\$(5,1)	info\$(5,2)
EOF	EOF

Figure II

To use a two dimensional array in

From Page 75

your program the following changes are required (Program VI).

```
10 DIM info$(100,2)
540 FOR N=1 TO 2
  :READ info$(count,N)
  :NEXT
550 UNTIL info$(count,1)="EOF"
740 IF requiredname$ = info$(count,1)
  THEN FOUND=TRUE
  ELSE FOUND=FALSE
760 IF FOUND
  THEN PRINT requiredname$"s phone
  number is "info$(count,2)
  ELSE PRINT requiredname$" is
  not in the list"
```

Program VI

There are advantages to both methods. The two one dimensional array method has the advantage that name\$(20) obviously refers to the twentieth name and number\$(20) to the twentieth number. This is much clearer than info\$(20,1) and info\$(20,2).

On the other hand a two dimensional array uses less memory, and if more items are stored – for example, address, date of birth, occupation – all that is required is to change the limits of the FOR . . . NEXT loop in line 540 and use a loop in line 760.

All the relevant information about a person whose name is typed in would then be printed out. But note that the DATA will also need corresponding changes.

Finally we present a program which prints out sentences, missing out a word (or group of words). Although the present data is nursery rhymes, other data can easily be substituted. The program uses three one dimensional arrays:

START\$(NUMBER)
MIS\$(NUMBER)
FIN\$(NUMBER)

A random number is chosen and the corresponding elements of the first and last array are printed out, together with stars corresponding to each letter of the middle one.

If a word is typed in correctly, a congratulation message is chosen at random from the three messages in the one dimensional array CONGRAT\$(NUMBER).

If an error is made the message is

taken from the two dimensional array ERRMSG\$(NUMBER1,NUMBER2), where NUMBER1 corresponds to the number of attempts at the question and NUMBER2 is chosen at random so that one of three different messages is printed out at random, making nine different messages possible.

To modify this program the following line numbers are easily changed:

780 . . . the number of sentences in the data.

800 . . . the title.

1000 onwards . . . the sentences. These are entered in three parts with commas around the word(s) that you want missing out.

Note that if your sentence contains commas, quotes must be put around that part of the sentence.

820 to 960 . . . the messages. REM statements show which are error and which are congratulations.

```
1 REM ***MISSING WORDS***
2 REM ***PETER DAVIDSON 2/84***
10 MODE 7
20 *FX11,0
30 VDU 23;8202;0;0;0;
40 PROCINITIALISE
50 PROCINSTRUCTIONS
60 RIGHT=0
  :PROCHEADING
  :PROCTITLE
70 PRINT TAB(0,14)CHR$(RND(7)+128)
  "HOW MANY QUESTIONS DO YOU REQUIR
  E"
80 PRINT CHR$(RND(7)+128)"(TYPE
  A NUMBER AND PRESS RETURN)";
  :INPUT MAX
  :IF MAX=0
  THEN 70
90 GUESNO=0
100 REPEAT
110 QUESNO=QUESNO+1
120 PROCSELECTSENTENCE
130 PROCINPUTCHECK
140 UNTIL QUESNO=MAX
150 PROCHEADING
  :PROCTITLE
  :PRINT TAB(0,15)CHR$(RND(7)+128)
  "YOU GOT "STR$(RIGHT)" RIGHT
  (FIRST TIME) OUT OF "STR$(MAX)
160 PRINT TAB(0,20)CHR$(RND(7)+128)
  "DO YOU WANT ANOTHER GO? (Y OR
  N)"
170 IF GET$="Y"
  THEN 50
  ELSE END
180 DEF PROCINITIALISE
190 READ POSSIBLE
200 READ TITLE$
210 DIM START$(POSSIBLE),MIS$(POSSIBL
  E),FIN$(POSSIBLE),ERRMSG$(3
  ,3),CONGRAT$(3)
  :X=RND(-TIME)
220 FOR IX=1 TO 3
  :FOR JX=1 TO 3
  :READ ERRMSG$(IX,JX)
  :NEXT JX,IX
230 FOR IX=1 TO 3
  :READ CONGRAT$(IX)
  :NEXT
240 FOR IX=1 TO POSSIBLE
  :READ START$(IX),MIS$(IX),FIN$(IX)
  :NEXT
250 ENDPROC
260 DEF PROCINSTRUCTIONS
270 PROCHEADING
280 PROCTITLE
290 PRINT TAB(0,9);CHR$(130)"THE
  COMPUTER WILL PRINT A SENTENCE"
300 PRINT CHR$(130)"WITH A WORD
  MISSING. YOU MUST TYPE IN"
310 PRINT CHR$(130)"THE MISSING
  WORD"
320 PRINT
  :PRINT CHR$(134)"THE MISSING
  WORD WILL BE SHOWN BY THE"
330 PRINT CHR$(134)"CORRECT NUMBER
  OF STARS AND YOUR"
340 PRINT CHR$(134)"ANSWER WILL
  APPEAR AS YOU TYPE IT"
350 PRINT
  :PRINT CHR$(129)"YOUR SCORE
  WILL BE GIVEN AT THE END"
360 PRINT
  :PRINT CHR$(131)"PRESS A KEY
  WHEN YOU ARE READY TO START"
370 A=GET
380 ENDPROC
390 DEF PROCSELECTSENTENCE
400 NUMBER=RND(POSSIBLE)
```


PROGRAM POWER MICRO POWER

NEMESIS

AN EXCITING NEW BBC MICRO PROGRAM FROM BRITAIN'S LEADING SOFTWARE HOUSE



From the depths of space come Earth's deadliest adversaries. Shoot down the convoys of vengeful Vogons as they hurtle through space, bouncing off the debris, to ram your shuttlecraft. Keep an eye out for the Chargers, Crushers and the cursed Crawler.

Another challenging machine code game...

ONLY £7.95



The following top titles are available for both the BBC Micro and Electron:- Killer Gorilla £7.95/ Moonraider £7.95/Bandits at 3 o'Clock £6.95/ Croaker £7.95/Felix in the Factory £7.95/ Felix and the Fruit Monsters £7.95/Chess £7.95/ Escape from Moonbase Alpha £7.95/Draw £9.95/ Swoop £7.95/Intergalactic Trader £8.95/ Positron £6.95/Cybertron Mission £7.95.

All prices inclusive of V.A.T.
Mail Order: Please add 55p per order P. & P.

WE GUARANTEE THAT ALL OUR ADVERTISED PROGRAMS HAVE BEEN COMPLETED AND ARE READILY AVAILABLE.

Showroom: Northwood House North Street LEEDS LS7 2AA Tel: (0532) 458800
Mail Order: 8/8a Regent Street LEEDS LS7 4PE Tel: (0532) 683186 Or: 696343

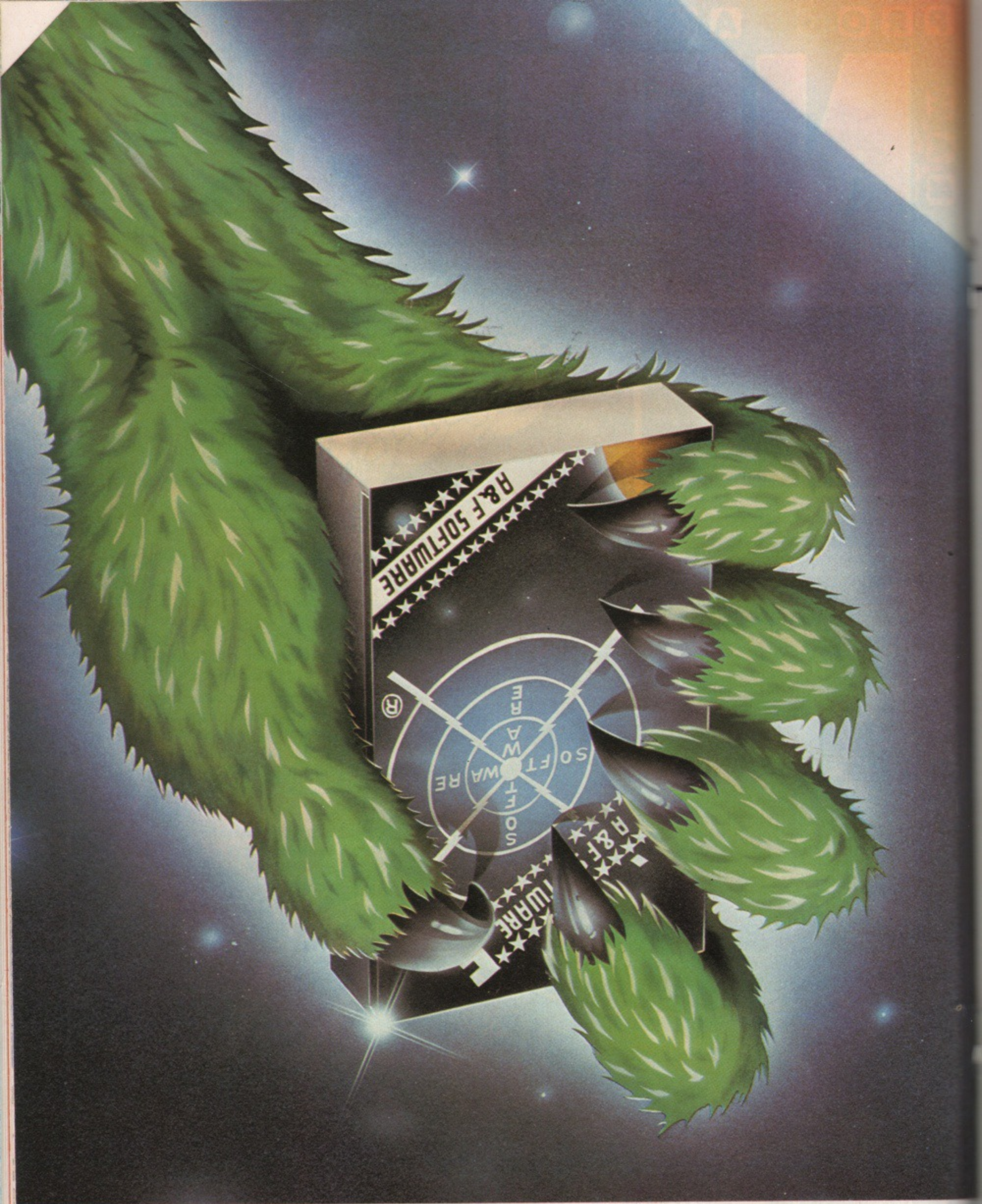
WRITTEN ANY PROGRAMS? WE PAY 20% ROYALTIES!

SPECIAL OFFER Deduct £1 per cassette when ordering two or more.

WE STOCK THE BBC MICRO, ELECTRON, MEMOTECH MTX 500, COMMODORE 64, ORIC-1 AND SPECTRUM.

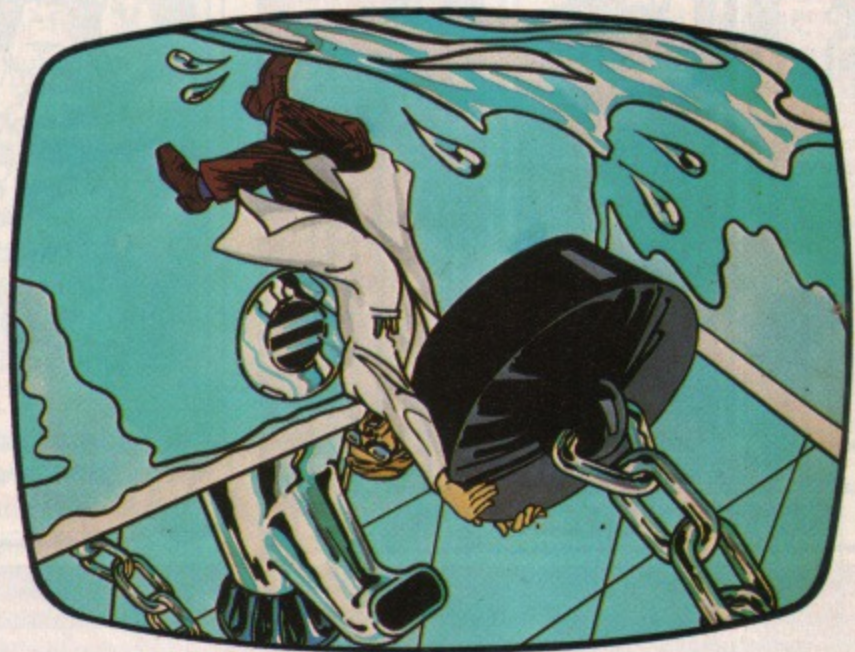
B.B.C. MICRO AND ELECTRON PROGRAMS CAN BE OBTAINED FROM SELECTED BRANCHES OF W.H. SMITH, JOHN MENZIES, BOOTS, HARRODS, ALL GOOD DEALERS, OR DIRECT FROM MICRO POWER.

MICRO POWER

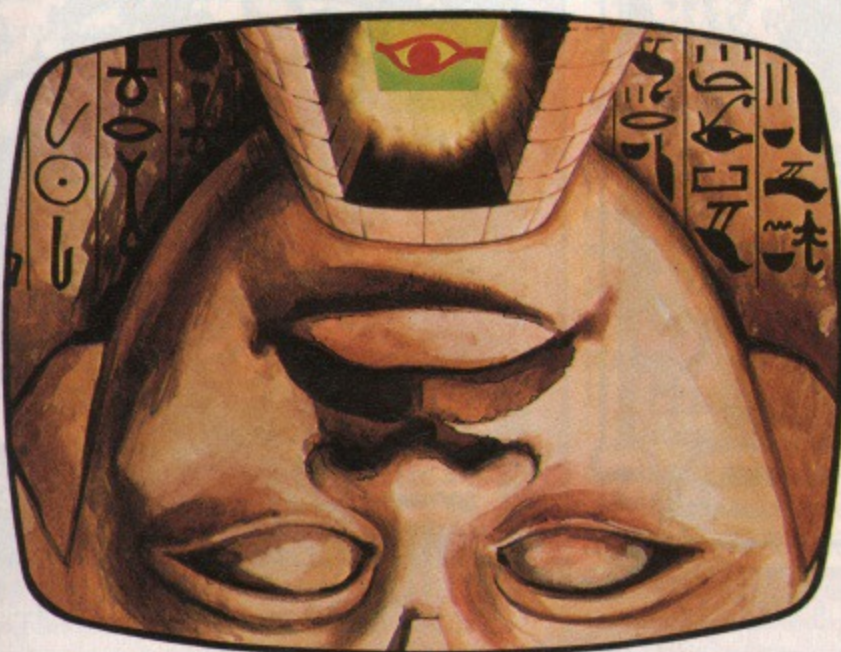


A&F Software turns y

your world upside down



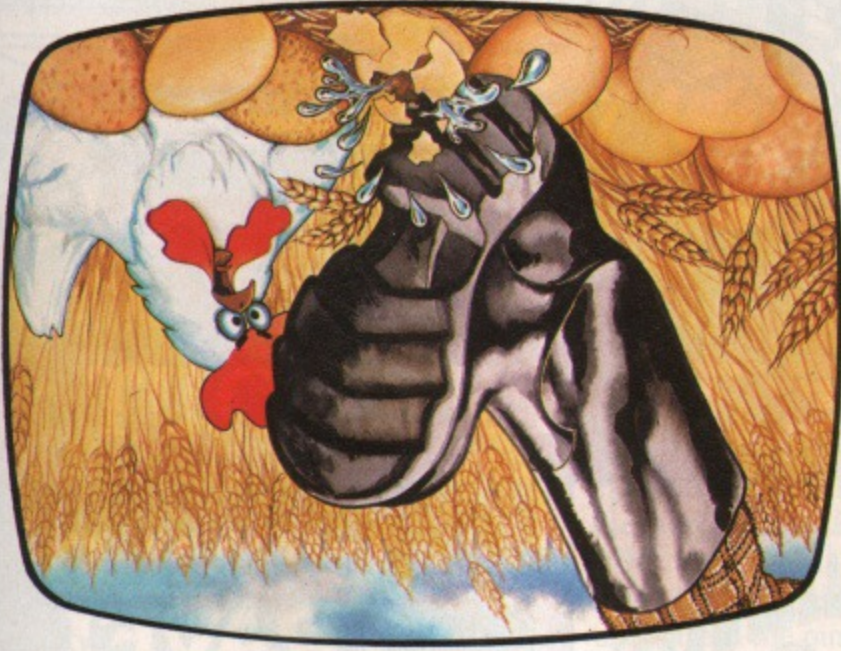
SHRINKING PROFESSOR £7.90 ADVENTURE
 GAME You're only an inch high, how are you going to survive in the garden with all those monstrous spiders, ants and other giant horrors. The crystals do it.



PHARAOHS TOMB—£7.90 ADVENTURE
 GAME Pick up the gold but don't be scared penniless by the mummy. Be quick—it's in real time, so work out those magic words.



CYLON ATTACK—£7.90 REAL-TIME 3
 DIMENSIONAL SPACE BATTLE Enemy cyllons on your long-range, off screen radar. Fire the high energy laser bolts when they come in range. Protective Shields against their missiles. Back to the mothership to refuel and then into CYLON action again.



CHUCKIE EGG—£7.90 A FARMYARD ARCADE
 STYLE GAME Collect 12 eggs and some corn to finish the screen—but watch out, there are some nasty ducklings chasing you!

- CYLON ATTACK £7.90 REAL TIME 3D SPACE BATTLE
- CHUCKIE EGG £7.90 FARMYARD ARCADE STYLE GAME
- PHARAOHS TOMB £7.90 ADVENTURE GAME
- SHRINKING PROFESSOR £7.90 ADVENTURE GAME
- BOUNCER £7.90 ARCADE STYLE GAME
- HOWSZAT £6.90 1—2 PLAYER CRICKET
- HORROR CASTLE £7.90 ADVENTURE GAME
- PLANES £7.90 ARCADE STYLE GAME

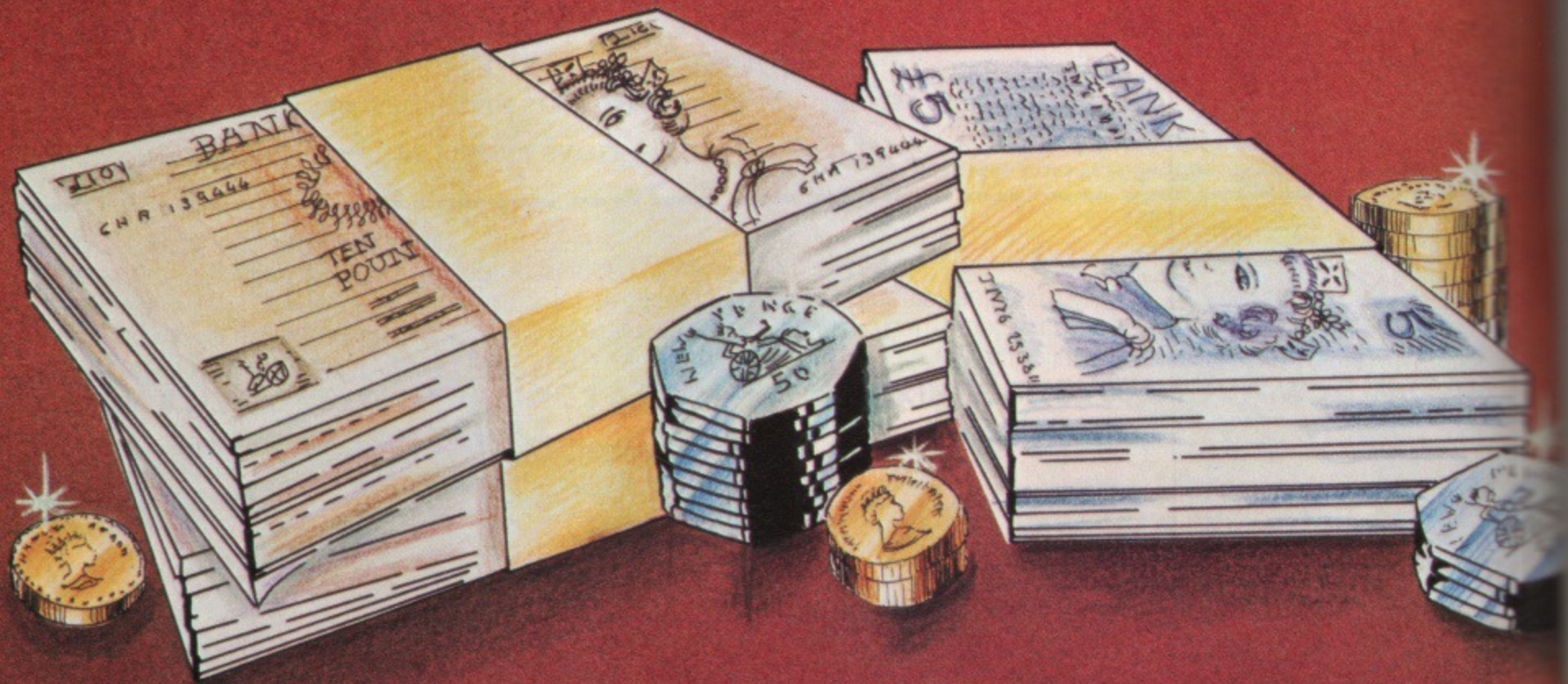


Available from W.H. Smiths, John Menzies and all leading computer stores.
 Direct from mail order dept. Tel: 0706 341111
 Total Cheque/P.O. enclosed or credit card No. _____
 Name _____
 Address _____

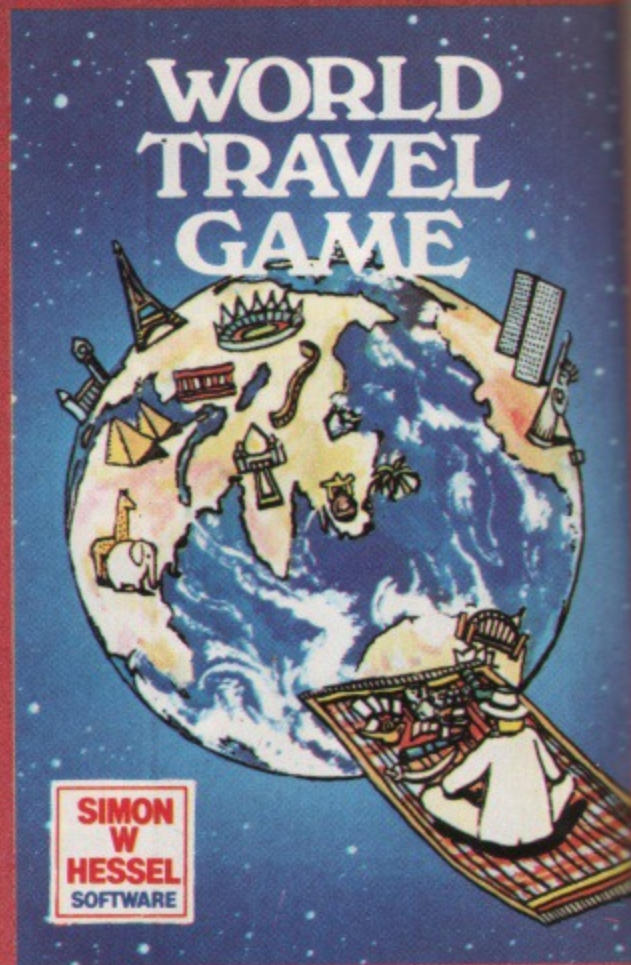
A & F SOFTWARE Unit 8,
 Canalside Industrial Estate,
 Woodbine Street, East, Rochdale,
 Lancs OL16 5LB. Tel: 0706 341111



WHAT WOULD YOU DO WITH ALL THIS?



HERE'S A CHANCE TO FIND OUT



Ever thought you could run the country better? Here is your chance as Prime Minister (of the party of your choice), you have to guide the country through its social and economic ills for five years. Then put yourself up for re-election.

£6.95*

Have you ever wondered what you would do if you came into some money? Would you be able to invest it and watch it grow, or maybe start a small business and become a millionaire? With Inheritance you have the chance to find out.

£5.95*

A game for 1 or 2 players. Your aim is to obtain six souvenirs from six different countries and return to London intact, in the shortest possible time. Keep your head and try to avoid hijacks, bankrupt airlines, bad weather, thieves, car breakdowns, strikes and other problems inherent in World Travel.

£5.95*

All three in special presentation pack £17.95

Available at good computer shops or direct from: Simon W. Hessel Software

24 hour despatch.

*30p p&p on single games.

UNLIMITED GUARANTEE

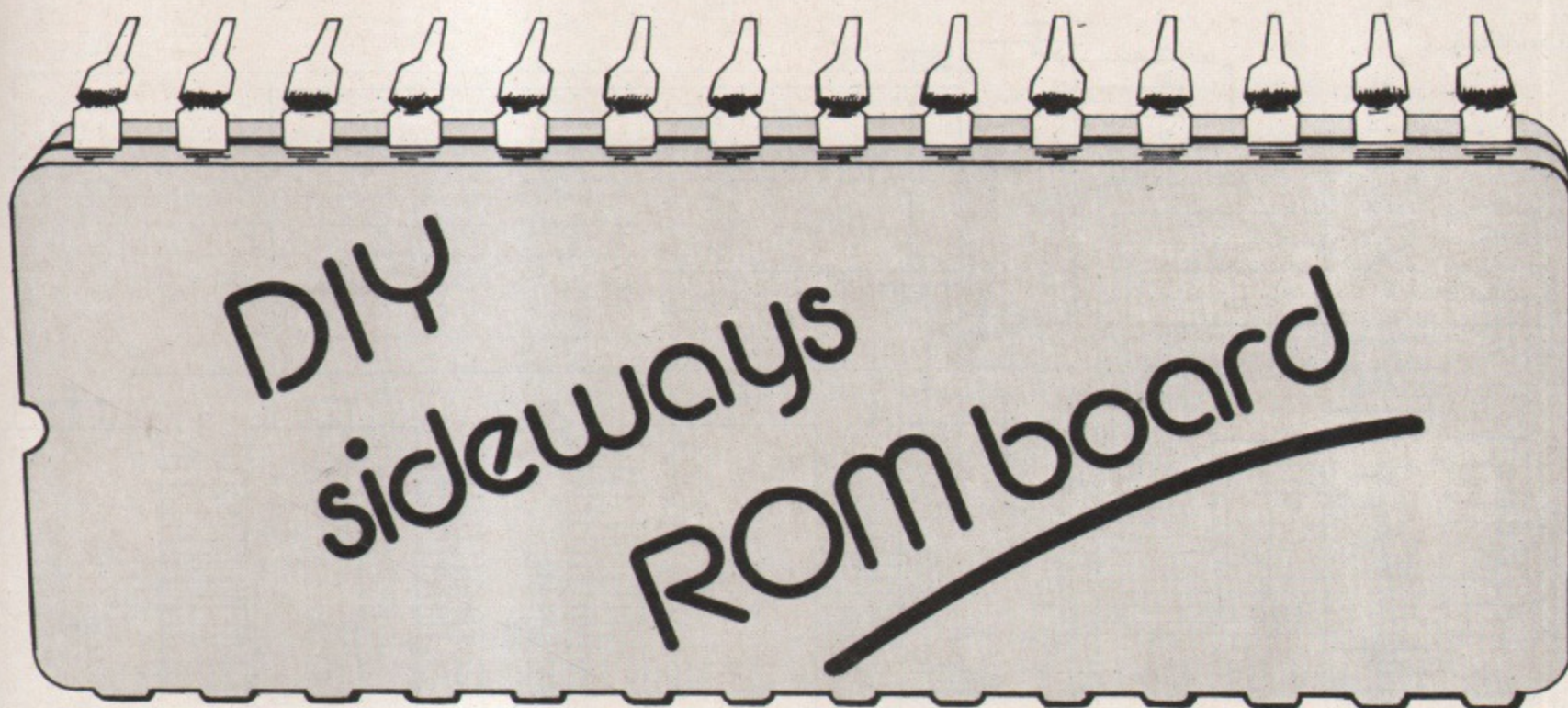
BBC
32K

GREAT BRITAIN LIMITED
INHERITANCE
WORLD TRAVEL GAME

FINANCIAL GAMES

SIMON W. HESSEL SOFTWARE,
15 LYTHAM COURT,
CARDWELL CRESCENT, SUNNINGHILL,
BERKSHIRE, ENGLAND.

BBC
32K



ONE of the most powerful features of the BBC Micro is its ability to give you instant software via the sideways ROMs.

Unfortunately, you can soon run out of spare sockets for them, so at *The Micro User* we've come up with our own do-it-yourself sideways ROM board. Now you can have up to 16 sideways ROMs in your micro, simply and cheaply.

We've also included the circuit for a RAM board which may be used to develop ROM software or to store data or machine code programs which can be loaded into the RAM from cassette or disc, and called from Basic. This increasing the amount of user memory available to up to about 44k.

The RAM board may be combined with the ROM extender board, or used as a stand-alone unit.

Note that when the ROM extender board has been connected all paged ROMs must be moved from the BBC board onto the ROM board. The operating system ROM should, of course, be left where it is.

In the BBC Micro the number of the ROM currently selected is held in a four bit latch (IC 76), bits 0 and 1 being decoded by IC 20 to provide the four "select" signals for the onboard ROMs.

This extender board uses a 74LS154 to decode all four latch outputs into the 16 ROM select lines.

All the address and data lines are buffered to reduce the loading on the computer's address and data buses.

The RAM board is very straightforward, consisting of eight 6116 2k RAM chips, with a 74LS138 being used

By
MIKE HARRISON

for address decoding.

Most of the signals to drive the extender board are taken from one of the now vacant ROM sockets on the BBC board via a 28-way DIL header plug, the few remaining signals being taken from the pins of IC 76, IC 77 and S21.

These connections may be made by soldering wires to the appropriate IC pins, or alternatively the connections may be made to the pins of wire-wrap type IC sockets, which can then be plugged into the sockets for ICs 76 and 77, and the ICs replaced in the wire-wrap sockets.

A connection is required to S21 (south), and this can be made by soldering a wire to the small exposed metal part of the jumper joining the south-east and south-west pins of S21.

The circuit diagrams of the ROM and RAM boards are shown in Figures I and II on Page 84 and 85

Several methods may be used to construct this unit.

The masochistic reader may like to design a printed circuit board for it or, alternatively, Veroboard or one of the various Eurocard type boards may be used, but this would require an enormous amount of interwiring.

The Road-Runner wiring pen system was used for the prototype, as this is a very easy and quick way of making a large number of connections between IC sockets.

Unfortunately it is also quite easy to

make mistakes, especially if you forget that the IC pin numbers are reversed left to right when looking at the underside of the board.

A few minutes spent drawing the pinouts of all the ICs with the pins reversed – that is, pin 1 becomes pin 28 etc. – can save a lot of time and avoid mistakes messy to correct.

The prototype ROM extender and RAM was built on two boards – a square-pad type Eurocard for the 15 ROM sockets and the 74LS154, and a Vero Microboard for the bus buffers and RAM chips. (The ROM card was a very tight squeeze.)

Whichever method of construction is used, it should be remembered that the power supplies to all the chips should be well decoupled, and this may be achieved by connecting a 0.05 or 0.1 micro farad capacitor between the +5v and 0v pins of each chip.

If a wiring pen is used to build the ROM or RAM boards, the wiring to the +5v and 0v pins of all the chips should be done with thicker wire than that used in the wiring pen, or several strands of wiring pen-type wire.

It is strongly recommended that turned-pin type IC sockets are used for the ROMs because normal sockets tend to become unreliable or intermittent after several insertions of the ICs and, when they are soldered in, solder can sometimes "wick up" into the contacts, making them less reliable.

Although turned-pin sockets are considerably more expensive than ordinary ones, they will make the unit a lot more reliable.

DIY sideways ROM board

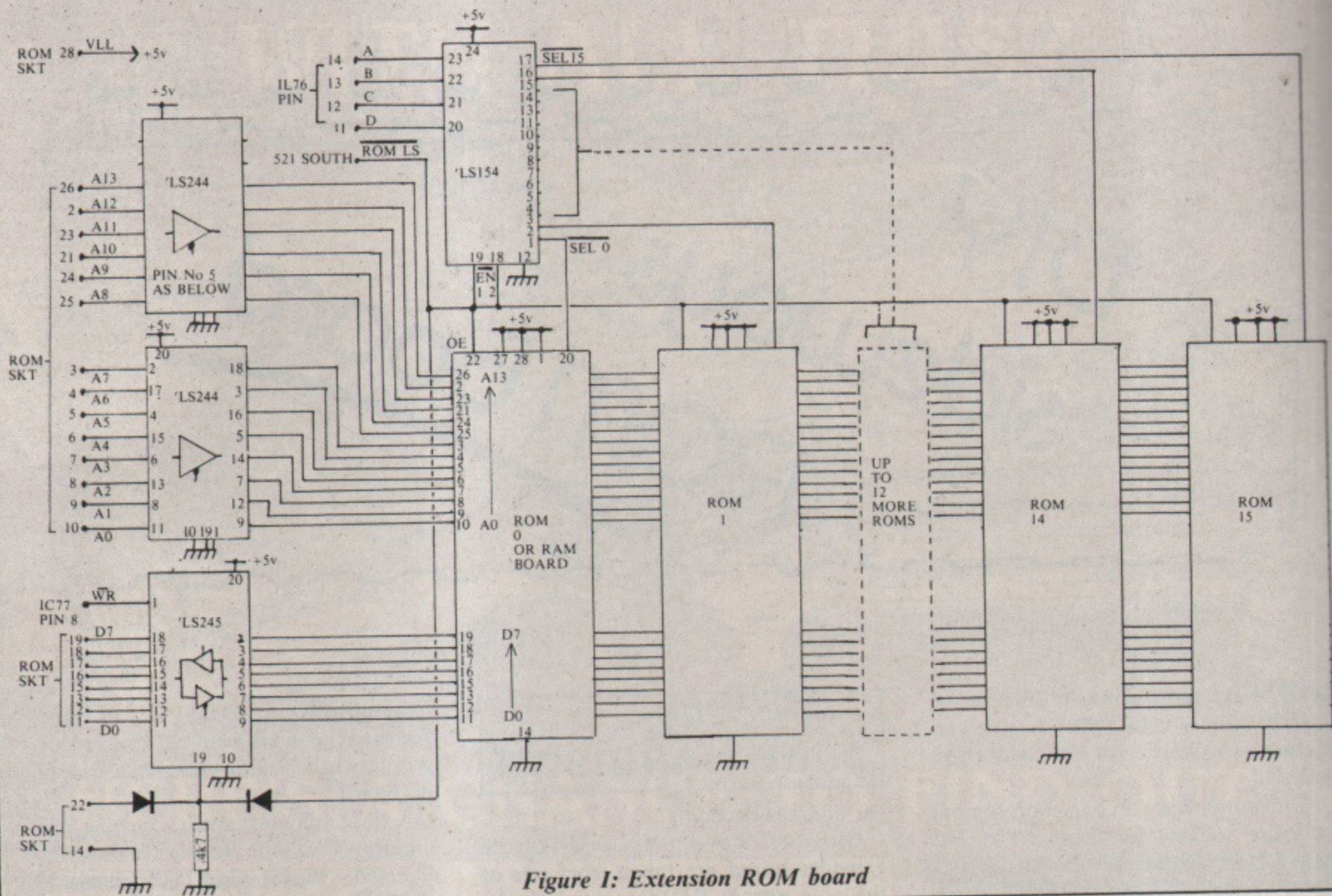


Figure 1: Extension ROM board

HARDWARE AND SOFTWARE

Micro-Aid

FOR THE BBC MICRO

SOFTWARE - Programs that are guaranteed to run! Save hours of work and worry with these utilities, educational & business programs on cassette or disc.

102	CASHBOOK	Double entry 4 columns with accounts & analysis	£11.95	B	520	BANNER	Print giant text and graphics on paper for displays	£3.95	A/B
102d	CASHBOOK	Full disc version. 1200 items on 100k disc	£19.95	B	521	BIGLETR	Print as above on screen/paper with screen dump	£5.95	A/B
103	LEDGER	Complements CASHBOOK with ageing & analysis	£11.95	B	600	FORTH	79 FORTH second language ROM	£34.74	B
105	MAILING	Holds 218 addresses. Alpha & post code sorts, searches, any label format, delete, add and amend	£11.95	B	601	LOGO-FORTH	Advanced Turtle Graphics Language ROM with FORTH	£57.50	B
106	PAYROLL (W or M)	In 2 parts to handle weekly or monthly (state which) PAYE & NI for 100 employees. Fully supported	£24.95	B	602	PASCAL-T	Structured language ROM with compiler-interpreter	£57.50	B
107	MEMO-CALC	Database/Calcsheet with up to 255 columns, string or numeric data, sorts, searches, calculations.	£12.95	B	603	XCAL	Computer Assisted Learning ROM for presentations	£65.00	B
201	GAMES 1	5 Card, Minefield, Darts, Pontoon & Mr. Midon	£5.95	B/E	605	WORDWISE	Superb fast & easy to use wordprocessor in ROM	£33.95	B
202	STOCKMARKET	Exciting world of Stocks and shares, 1-4 players	£5.95	B/E	606	CDUMP	Screen dump, 8 colours, suitable for GP700A	£12.95	B
301	HANGMAN	Word game in English, French, German, Italian, Spanish	£7.95	B	607	GDUMP	Screen dump ROM, 8 shades, 8 sizes and windows	£17.95	B
302	DISTANCES	Three graphic maps of U.K., EUROPE & the WORLD. Calculate the distance between any 2 places	£4.95	B/E	608	DISKDOC	ROM for disk problems in format, search, files etc.	£27.50	B
303	FLAGS	98 full colour flags of the world with questions	£4.95	B/E	608	GRAPHICS	NEW ROM for Sprites, LOGO, circles, fill etc.	£27.50	B
304	STATPACK	Statistics package giving over 30 results	£9.95	B	700	BOOKS	Various titles for the BBC Micro from C15 Computer quality tapes packed in 10's	£6.95	
305	GRAPH	Produce varied graphs & charts of functions	£7.95	B	801	CASSETTES	MEMOREX: SS/SD 40/80T	£19.95	
306	FRENCH	New audio visual computer way to learn a language	£7.95	B	810	5.25" DISCS	MEMOREX: SS/DD 40/80T	£20.95	
307	SPELL-CHECK	Add to WORDWISE. 15000 words in 12 dictionaries	£17.95	B	900	SEIKOSHA	GP700A 7 COLOUR 30 shade dot matrix printer 50cps	£369.00	
504	PROCAID	includes SEARCHBAS to search a BASIC program and alter it, PROCVAR to list variables in a BASIC program & PROCFLUSH to clear resident integers in RAM	£3.45	A/B	901	EPSON RX-80 T/F	Superb. 100cps with Tractor & Friction feed	£275.00	
505	UTILITY-A	Our best selling tape includes PROCAID, DEFCHR to design & display graphic characters, SORTM/C a very fast machine code numeric sort, SORTBAS the undisputed fastest BASIC sort routine	£5.95	A/B	902	EPSON FX-80	Magnificent. 160cps, 6 founts, graphics, F/T Roll	£365.00	
					910	DISC DRIVES	Slimline 3" or 5 1/4" 100k - 800k Japanese. Format disc, cable and excellent manual. From	£189.00	
					915	DISC UPGRADE	Double & Single Density available in one system	£77.50	
					920	VDU STAND	Stainless Steel Support protects your micro	£19.95	
					930	GREEN VDU	12" Green Monitor, cream sloping front case	£79.95	
					931	COLOUR VDU	JVC 14" Colour Monitor 370 x 470 pixels	£179.95	
					950	SAT-16 MPU	16 bit 68000/68701 stand alone computer from	£570.00	

ADD VAT TO ALL PRICES EXCEPT BOOKS.

ADD £1.75 FOR PROGRAMS ON 40 OR 80 TRACK DISC. NO POST CHARGE IN UK. MOST PROGRAMS AVAILABLE ON MICRONET 800.

Send for our free brochure for more information before parting with your money.

Micro-Aid (MU)

25 Fore Street, Praze, Camborne, Cornwall TR14 0JX
Tel: 0209-831274

MICROBYTE SOFTWARE

3D Space Ranger



For
BBC
32K

£7.95

- SUPERB 3D GRAPHICS.
- FIVE DIFFERENT LEVELS OF PLAY.
- ALL MACHINE CODE GAME.
- BATTLE THROUGH SPACE ATTACKS.
- AVOID HURLING ASTEROID BELTS.
- SKIM OVER THE DEATH STAR SURFACE.
- DESCEND INTO THE TRENCH.
- BATTLE WITH ATTACKING ANDROIDS.
- YOUR MISSION - DESTROY THE DEATH STAR ... AND THEN ESCAPE!



ER*BERT

Fast and funny, it's Herberts Cubic Domain! You must help him avoid his unwanted guests.
BBC or Electron: **£7.95**



PINBALL

The original arcade table game. Superb graphics and sound.
BBC or Electron: **£5.95**

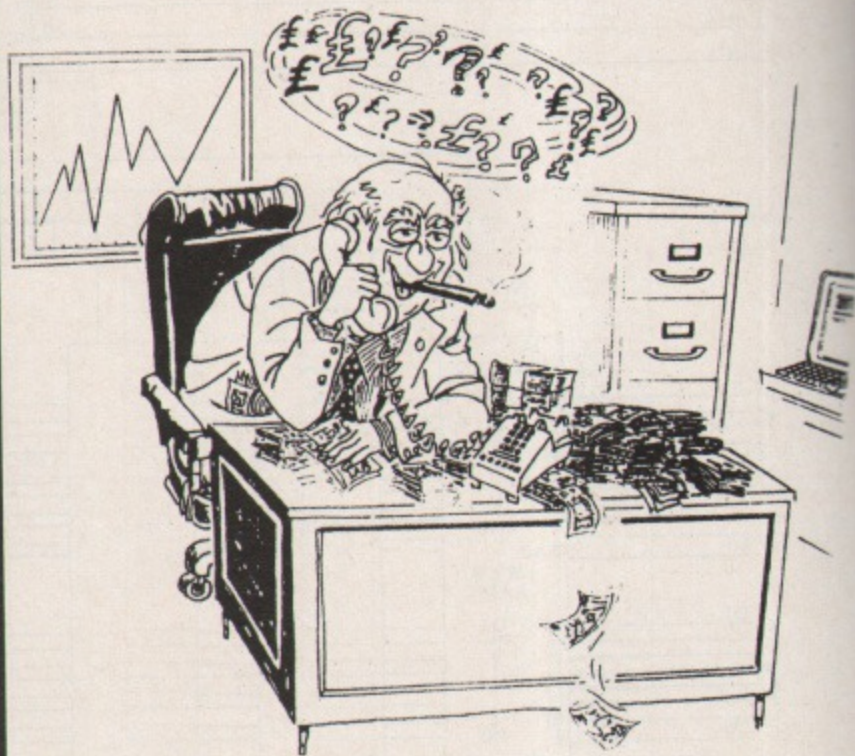
REVERSI BBC or Electron:
£5.95



Orders to:
MICROBYTE SOFTWARE (M2)
FREEPOST
NEWQUAY TR7 2BR.
NO STAMP NEEDED IF POSTED IN U.K.
All prices include Post & Packing.

Dodgy Dealer

"You'll be hard pressed to find a better business game for the BBC Micro than this grand effort" - (TV Choice Nov. 1983)



A captivating game emulating the real business world. As boss of a small manufacturing company, you are required to make executive decisions to enable your company to survive and even prosper in the face of strong competition.

The game is dynamic: the more your skills improve the greater the competition becomes. **£6.50**

★★★★★★★★★★★★★★★★★★★★

One of the biggest attributes that a computer has is the capability to sort vast amounts of information. But have you ever wondered how a computer carries out the sorting process?

SORT ANIMATOR

is the first in the Computer Tutorial series by OIC, explaining visually and in detail how a selected variety of sorts work.

Also includes routines that can be used in your own programs. **£6.50**

★★★★★★★★★★★★★★★★★★★★

All products supplied on cassette for the BBC B.1.2 o/s
All prices include VAT & P+P

The complete OIC product range will consist of:

Text games	Early learning
Adventure games	Computer tutorial
Graphics games	Tools & utilities
Business applications	

Products available soon for the
Electron CBM 64 VIC 20 Spectrum

WATCH PRESS FOR ANNOUNCEMENTS

Products available from your local computer store or direct from:

OIC Ltd., Dept. OPD/TMU3, FREEPOST, Camberley,
Surrey GU15 4BR.

Dealers/Distributors

Contact Richard Edwards on (0344) 773229

MACRO SAVINGS FOR MICRO USERS

DELIVERED TO YOUR DOOR *
£239.50
NO EXTRAS



14" STANDARD RESOLUTION COLOUR MONITORS

- MATCHING BBC COLOURS
- RELIABLE 12 MONTH WARRANTY
- 40-64 CHARACTERS ● DOT PITCH 0.63mm
- FULLY COMPATIBLE WITH MOST COMPUTERS
- LOW POWER CONSUMPTION ● BRITISH MANUFACTURE

INCLUDING VAT, DELIVERY* & PACKING **£239.50**

UNIVERSAL COMMUNICATIONS
COMPANY LTD.

ROYD NOOK, ROYDSTONE ROAD,
BRADFORD, WEST YORKSHIRE



DELIVERED TO YOUR DOOR* **£125.95**
NO EXTRAS



5 1/4" DISC DRIVE SHUGART SA450 DSDD BBC COMPATIBLE FLOPPY DISC SYSTEM

COMPLETE WITH:

- PROFESSIONAL ALUMINIUM CASE
- RIBBON CABLE TO CONNECT TO BBC MICRO
- POWER CABLE TO CONNECT TO BBC MICRO
- 40 TRACK DOUBLE SIDED DOUBLE DENSITY 400K
- MANUAL AND FORMATTING DISC

INCLUDING VAT, DELIVERY* & PACKING **£125.95**

Also available:

BBC COMPATIBLE LOW POWER DUAL DISC SYSTEM

ALL FEATURES AS ABOVE
INCLUDING VAT, DELIVERY* & PACKING **£225.95**

5 1/4" CONTROL DATA FLOPPY DISCS

SS SD	48 TP1	£16.75
SS DD	48 TP1	£17.75
DS DD	48 TP1	£20.50
SS DD	96 TP1	£22.00
DS DD	96 TP1	£23.00

FULL RANGE IN STOCK

FILL IN THE ORDER FORM AND SEND IT WITH REMITTANCE TO:-

Universal Communications Company Ltd., FREEPOST Roydnook, Roydstone Road, Bradford, W. Yorkshire BD3 7BR.

DESCRIPTION	QTY	PRICE	TOTAL
14" STANDARD RESOLUTION COLOUR MONITOR		239.50	
5 1/4" DISC DRIVE SYSTEM		125.95	
5 1/4" DUAL DISC SYSTEM		225.95	
5 1/4" CONTROL DATA FLOPPY DISCS			
SS SD 48 TP1		16.75	
SS DD 48 TP1		17.75	
DS DD 48 TP1		20.50	
SS DD 96 TP1		22.00	
DS DD 96 TP1		23.00	
TOTAL PAYABLE			

NAME

TITLE

COMPANY

ADDRESS

POST CODE:

I enclose a cheque/P.O. for a total of £
made payable to U.C.C. Ltd.

PLEASE ALLOW AT LEAST 10 DAYS FOR DELIVERY

* DELIVERY TO ANY ADDRESS IN U.K.

National Micro

DATA STORAGE

A data cassette recorder that perfectly matches the BBC Micro.

£34.74

Carriage £2.50

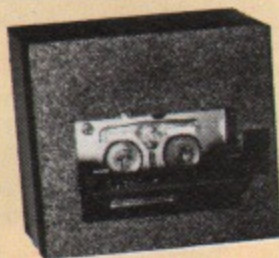


Fully compatible with the BBC Micro and specifically designed for data saving and loading, the Pye data cassette recorder (with free power pack and BBC lead) is guaranteed to end your data storage and retrieval problems.

A low cost answer to high speed data retrieval!

£135.00

Carriage £3.50



Are you frustrated by your cassette system but find the disc drive alternative too costly? Then what you need is The Hobbit.

The Hobbit is a high quality, ultra fast, fully automatic micro cassette drive specially designed for the BBC Microcomputer. It reads and writes data at 7500 Baud - more than sufficient for most needs and about seven times faster than a cassette recorder. It has a proper directory, like discs and a file space of 101k. All this, for approximately half the price of a disc system.

Cumana disc drives

Including integral power supply

Cumana CS50 100 100k Single (40 track) **£215.00**
 Cumana CD50A 200k Dual (40 track) **£347.83**

Pace Slimline disc drives

Pace PSD1 100k Single **£185.00**
 Pace PSD2 200k Single **£235.00**
 Pace PSD3 400k Single (40/80 track, switchable) **£345.00**
 Pace PDD1 200k Double (40 track) **£338.00**
 Pace PDD2 400k Double (40 track) **£449.00**
 Pace PDD3 800k Double (40/80 track, switchable) **£610.00**

All the above drives are cased in metal to prevent interference and data loss.

Carriage on disc drives £7.00

Upgrade your BBC Micro into a complete business machine with the

Torch Z80 Disc Pack

Gives a massive 800k of storage and a Z80 second processor enabling you to access a wide range of CP/M compatible software.

Order now and you'll be given more than £1,100 worth of free software: Perfect Writer (word processing), Perfect Speller (spelling checker), Perfect Calc (spreadsheet), Perfect Filer (database), Comanex business management game, and the Torchnet networking system.

PLUS £1,100 of free software! £730

High-quality discs from BASF

Single sided, single density
 (box of 10) **£16.09**
 Double sided, double density
 (box of 10) **£26.04**
 Blank data cassettes (box of 10) **£4.35**

Disc utilities

If you're upgrading to disc you must get **Replica**. It enables you to easily transfer your existing cassette programs to disc and stores 8-10 programs. Both 40 and 80 track versions are available (please state which you require). Fully compatible with the Amcom DFS. **£8.65**

A comprehensive utility providing a number of essential facilities is **The Key**. This multi purpose disc enables you to back up existing discs (including most of the protected ones), retrieve deleted files and edit your own discs. State whether you require the 40 or 80 track version. **£11.26**

SOFTWARE

We stock games from all the major software houses. Below are some of our best sellers:

ACORNSOFT

Sphinx Adventure **£8.65**
 Philosophers Quest **£8.65**
 Castle of Riddles **£8.65**
 Countdown to Doom **£8.65**
 Rocket Raid **£8.65**
 Arcade Action **£10.35**
 Snapper **£8.65**
 Monsters **£8.65**
 Arcadians **£8.65**
 Business Games **£8.65**
 Snooker **£8.65**
 Missile Base **£8.65**
 Starship Command **£8.65**

NEW! NEW! NEW! NEW! NEW! NEW!

Hopper **£8.65**
 Hop the frog to safety through a variety of dangers. Complete with music and full sound effects.
 JCB Digger **£8.65**
 You are in charge of a JCB, which can move in four directions and dig holes to trap the attacking Meanies.
 Carousel **£8.65**

Personal shoppers can obtain the products advertised on these pages from the following retail stores:

Stockport Micro Centre
 4/6 Brown St., Stockport,
 Greater Manchester.
 Tel: 061-480 0539

Wilmslow Micro Centre,
 62 Grove Street.,
 Wilmslow, Cheshire.
 Tel: 0625 530891

A&F

Painter **£8.00**
 Frogger **£8.00**
 Planes **£8.00**
 Howzat **£8.00**
 Shrinking Professor **£8.00**

DIGITAL FANTASIA

Golden Baton **£8.95**
 The Time Machine **£8.95**
 Arrow of Death Pt 1 **£8.95**
 Arrow of Death Pt 2 **£8.95**
 Escape from Pulsar 7 **£8.95**
 Circus **£8.95**
 Feasibility Experiment **£8.95**
 Wizard of Akryz **£8.95**
 Perseus and Andromeda **£8.95**
 Ten Little Indians **£8.95**

COMPUTER CONCEPTS

Snake **£6.91**
 Android Attack **£7.78**

We have a wide range of educational programs for use in the home as well as at school.

This is just a selection:

ACORNSOFT

Sentence Sequencing (8-12 yrs) **£10.35**
 Word Sequencing (7-12 yrs) **£10.35**
 Two programs to assist in the development of English, involving the altering of words and sentences to form logical phrases within a time limit set by the supervisor. Twenty results can be stored.
 Tree of Knowledge (6-12 yrs) **£8.65**
 Allows the building up of data about objects for the computer or child to guess.
 Missing Signs (8-10 yrs) **£10.35**
 Number Balance (8-10 yrs) **£10.35**
 Two mathematical programs capable of testing different levels of ability.

BES

World Wise (7-15 yrs) **£7.80**
 Build up information on geography and then define questions to distinguish between different entries.
 Word Hang (5-13 yrs) **£7.80**
 Hangman, using a built vocabulary of 250 words, or add your own.
 Animal/Vegetable/Mineral (7-13 yrs) **£4.95**
 Data can be stored and reused if required.
 Happy Numbers (4-6 yrs) **£7.80**
 For young children, this program allows you to learn numbers from 1 to 9. All entries are recorded to help identify problems.
 Timeman One (4-6 yrs) **£7.80**
 Teaches children to tell the time.

H&H SOFTWARE

Signals and Magic (8-12 yrs) **£8.50**
 An entertaining program to teach addition, subtraction and multiplication.
 Early 1, 2 and 3 (5-7 yrs) **£6.50**
 English programs in varying degrees of difficulty.

MICRO POWER

World Geography (12-15 yrs) **£5.95**
 Capitals and populations of most countries of the world.
 Where (12-15 yrs) **£5.95**
 A geographical program to test students' knowledge of rivers, towns and mountains in Britain. The program also measures response times and gives user friendly messages throughout.



WELL, the commissioners of the European Economic Community have done it again! With a stroke of genius that makes us gasp with astonishment they have decided that they can take the cost of running the community's art galleries, currently 3 million Euro-daubs, and reduce it to a mere 2.9 million Euro-daubs.

The Euro-daub, by the way, is the community's international currency of arts subsidy and is approximately equivalent to seven French francs or three German alberts.

The only snag is that to instal the proposed automatic system will cost the equivalent of six million Euro-daubs, and thus it will take until AD 2043 to repay the investment.

That is not, of course, counting the cost of retraining the staff and paying a high technology bonus to the members of the Allied Union of Boilermakers and Curators.

To make matters even worse, they have decided to implement the Dive Eclair Automatic Picture System. This is well known to be the cheapest – but will it do the job?

For those of you who do not know the history of that master entrepreneur, Dive Eclair, I will relate a little about him.

Dive started out making low-fi units for the home enthusiast. He did this by advertising them as fi units of greater altitude and when the money had rolled in he then sat down and actually designed them.

One of the main selling points was their extraordinarily small size, and not many people know that Dive used to scour the Belgian Congo (as it then was) for tribes of very small pigmies to do his design and manufacture.

Like all successful businessmen Dive

began to diversify his product range. It was here that he scored his biggest success which brought him into the public eye. You see he managed to find some Eskimos stupid enough to buy snowballs from him.

The idea of prefabricated snowballs caught the public's imagination, and the major broadcasting corporations collaborated to make a series of programs, "Making the Most of Your Snowballs".

They also decided that there should be a standard snowball to go with the programs and asked for tenders.

Unfortunately for Dive Eclair he did not get the contract, although he

By MIKE COOK

maintains, and quite rightly, that a lot of people would have liked to throw his balls.

Instead the contract went to a rival company, Oaktree Snowballs Ltd. They are perhaps best remembered for their excuse for late delivery, which has become a bureaucratic standard in a remarkably short time.

For those of you unfamiliar with it, it is: "Our subcontractors, Ferruncle, are having trouble with the ULA".

The genius of this line was later uncovered when ULA was found to stand for Unexpected Late Arrival.

This gave Dive little pleasure however as he reckoned he could have come up with something even better on the grounds that he has had more practice.

Undaunted by this setback, Dive's talent for homing in on the more gullible and weakminded section of the

population led him inevitably to receive a huge contract from the EEC. This was to develop the Automatic Picture Gallery.

The idea was that a lot of time spent putting pictures into frames and then taking them out could be saved if the whole process was automated.

All you would need to do was to press a frame's number on a keyboard and the picture in it would automatically be removed.

Dive took this simple idea and adapted it so that you could not only clear an exhibition but also set one up with no extra controls. This, like most of his ideas, was very clever.

Unfortunately, like all of his ideas, it was not quite clever enough. What he did was to incorporate the idea of interdependent controls.

He first developed these on his low-fi units where altering the bass control would also effect the treble. Likewise altering the treble control would also effect the volume and so on.

In his new venture the idea was taken one step further. Pressing any of the picture frame numbers would remove the picture from the frame, but would also reverse the state of nearby frames, thus eliminating the need for a remove/place switch on the console.

This saving, however, made the unit very difficult to operate.

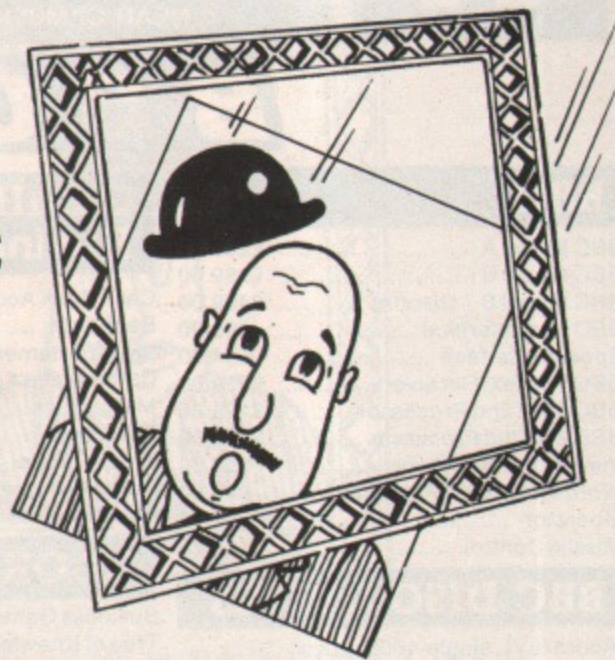
The commissioners do not want people to know how difficult this is to use, but at the same time must be seen to be doing something about training.

So they have come up with a computer simulation of the gallery that they hope will never be run by anybody. In order to achieve this they have decided to publish the program as an error-free listing.

It has long been known that an error



The EEC Automatic Picture Gallery



free listing is one of the safest ways of protecting a program from being run.

You see, if you add errors people can negate their effect by the errors they introduce themselves. Only with an error-free listing will the newly introduced errors be able to flourish.

The lines that the commissioners are hoping nobody will be able to type in are lines 150 and 410. These contain strings of blank spaces and you must type in exactly the right number for the program to run – they need nine spaces in each line.

Don't worry, just because I have told you about this doesn't mean that nobody will get it wrong. After all, who reads the *words* in a computer magazine anyway?

There are two exercises for which the simulator can be used. One is clearing all the frames, and the other is filling the frames.

Of the two, the first is the easier but the controls operate the same way whichever exercise you are doing. The pictures in the corners, the centre and the middle of each row affect the surrounding pictures in various ways.

To help you in this simulator the red-faced bureaucrats in the portraits wear different coloured bowler hats to give you an indication of how they will affect the adjacent pictures.

Also, if a bureaucrat is out of a frame he gets quite flushed. Those of you without a colour monitor can best operate this simulator by going out and buying one. Second best is to note the shades of grey.

In any event the position of the pictures determine how they will behave, so not to worry.

Watch for a subtle effect in the exercise where you have to fill up all the frames. If all the frames surround-

ing the centre are included then the centre frame will look like it is also included.

The way to tell if it is not included is to see if the bureaucrat is ashen faced. If so there is no frame in that position.

When an exercise is set up you will be told the least number of key strokes (turns) that can be used. It takes a real expert to do it in this few, so do not get discouraged.

Remember that only if a picture is present can you press the key to remove it. If you press a key and there is no picture the only effect will be to add one to the number of turns you have had.

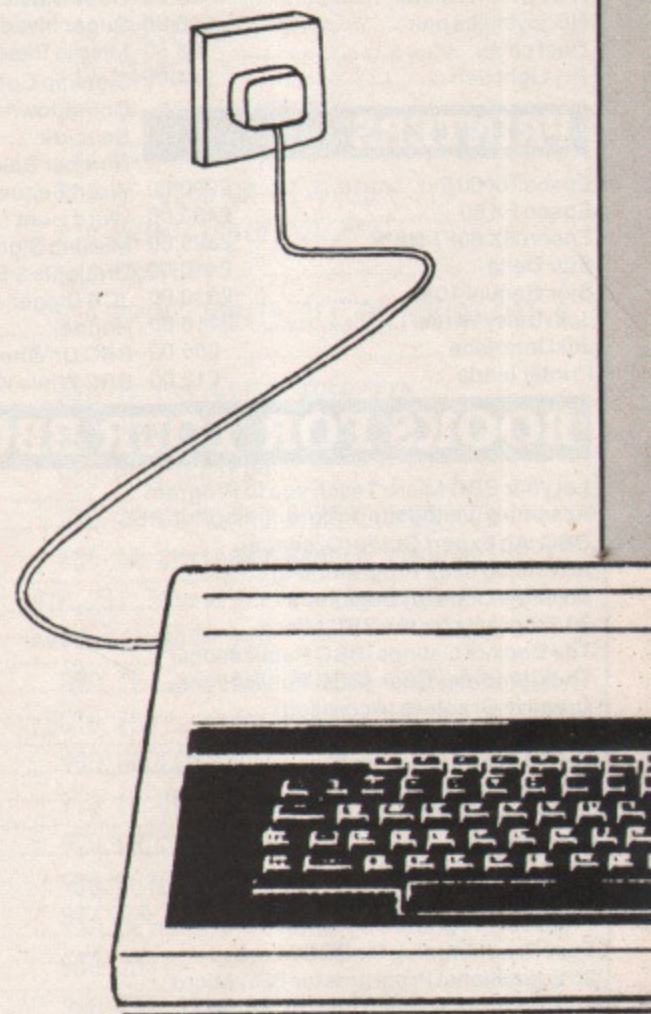
Also, just to catch you out, if you leave your finger on the key too long the auto repeat facility will make your score mount even faster.

When one of the technocrats was asked how the program worked I was told it was all held together by string, but I think that should have been strings!

In any event, it is far too tedious to explain, even assuming anyone would bother to read it. However if you do not want to see a red-faced bureaucrat, and think that green is a colour more likely to reflect their experience, then replace the number 145 in line 140 with 146. There, that should ensure even more errors!

Those of you with sharp eyes will have noticed that line 30 in the program is not needed at all. It has to be included, however, to help reduce the Common Market's envelope mountain.

Finally, be forewarned. This is a very difficult gallery to operate and should ensure that Dive Eclair receives another Beans Award for Industry. At least that's what beans do for me!



**Listing starts
on Page 93**

p&h

p&h electronics Ltd

5 THE PARADE, YATELEY
NEAR CAMBERLEY, SURREY

TEL: YATELEY 877222

BBC 'B'
IMMEDIATE
DELIVERY
BBC 'A'

BBC MICRO CENTRE

SOFTWARE FOR YOUR BBC MICRO

BBC

BBC Model A	£299.00
BBC Model B	£399.00
BBC Model B + Disc/Int	£469.00
BBC Disc Interface	£95.00
Speech Interface	£54.00
BBC Teletext Receiver	£220.00
BBC 6502 2nd Processor	£195.00
BBC Z80 2nd Processor	£290.00
View Word Processor	£59.00
Word Wise Word Processor	£45.00
Liberator	£9.95
Missile Control	£9.95

BBC DISC DRIVES

Acorn/LVL single 100K drive (expands to double)	£265.00
Acorn/LVL dual 100K drive	£389.00
Pace single 100K drive	£210.00
Pace 200K drive	£250.00
Pace dual 100K drive	£370.00
Pace 40/80 switchable	£365.00
Pace dual 40/80 track switchable double sided drive 800K	£670.00
Cumana 100K slim	£210.00
Cumana dual 100k slim	£375.00
Torch dual 400K Z80 + 64K disc pack	£897.00

ACCESSORIES

Cassette Decks BBC compatible with counter	£29.00
Without counter	£25.00
HG cassette leads	£4.50
HG joysticks pair	£16.50
Dust cover	£5.50
RH Light pen	£44.00

PRINTERS

Epson RX 80T	£290.00
Epson FX 80	£430.00
Epson RX 80FT NEW	£325.00
Star Delta	£410.00
Star Gemini 10X	£310.00
Juki Daisy Wheel	£410.00
Juki Interface	£55.00
Printer leads	£12.00

BOOKS FOR YOUR BBC MICRO

Let your BBC Micro Teach you to Program	£6.45
Assembly Language Programming for BBC	£8.95
BBC: An Expert Guide (Granada)	£6.95
Advanced 6502 Programming	£10.25
Machine Code for Beginners	£5.95
30 Programs for the BBC Micro	£4.95
The Book of Listings (BBC Publications)	£3.75
The Computer Book (BBC Publications)	£6.75
Creative Graphics (Acornsoft)	£7.50
Graphs and Charts (Acornsoft)	£7.50
Forth Manual (Acornsoft)	£7.50
Lisp Manual (Acornsoft)	£7.50
Advanced 6502 Interfacing	£11.00
Programming the 6502	£9.95
6502 Software Design	£11.50
Programming and Interfacing the 6502	£14.40
Practical Programming for BBC and Atom	£5.95
Easy Programming for BBC Micro	£5.95
35 Educational Programs for BBC Micro	£6.95
Further Programming for BBC Micro	£5.95
Programming for BBC Micro	£6.50
Learning to use the BBC Micro	£5.95
Basic Programming on the BBC Micro	£5.95
21 Games for the BBC Micro	£5.95
30 Hour BASIC	£5.95
BBC Micro Revealed	£7.95
Games BBC Micro Play	£6.95

GEMINI Business/Games

Cash Book Acc.	£95.00
Beeb Calc	£19.95
Inv. & Statements	£19.95
Commercial Acc.	£19.95
Mailing List	£19.95
Database	£19.95
Stock Control	£19.95
Home Accounts	£19.95
Word Processor	£19.95

ACORNSOFT

Business Games	£9.95
Tree of Knowledge	£9.95
Peeko - Computer/Manual	£9.95
Algebraic Manipulation	£9.95
Creative Graphics Cassette	£9.95
Graphs and Charts Cassette	£9.95
Desk Diary/Manual	£9.95
Lisp Cassette	£16.85
Forth Cassette	£16.85
Philosophers Quest	£9.95
Sphinx Adventure	£9.95
Castle of Riddles	£9.95
Monsters	£9.95
Snapper	£9.95
Planefold	£9.95
Arcade Action	£11.90
Rocket Raid	£9.95
Meteors	£9.95
Arcadians	£9.95
Sliding Block Puzzles	£9.95
Cube Master	£9.95
Super Invaders	£9.95
Missile Base	£9.95
Starship Command	£9.95
Countdown/Doom	£9.95
Snooker	£9.95
Number Balance	£9.95
Word Sequencing	£9.95
Word Hunt	£9.95
Missing Signs	£9.95
Draughts & Reversi	£9.95
JCB Digger	£9.95
Hopper	£9.95
BBC Dr Who	£9.99
BBC White Knight II	£9.99

MICROPOWER

Moonraider (B)	£7.99
Swoop (B)	£7.99
Alien Destroyer (B)	£7.99
Galactic Commander (B)	£7.99
Timetrek (B)	£7.99
Laser Command (B)	£7.99
Spacemaze (B)	£6.85
Astro Navigator (B)	£5.70
Maze Invaders (B)	£5.70
Startrek	£5.70
Filer	£10.30
Constellation (B)	£6.85
Disassembler	£6.85
Micro Budget	£6.85
Killer Gorilla (B)	£7.99
Croaker (B)	£7.99
Chess (B)	£7.99
Footer (B)	£7.99
Labyrinths of Lacoshe (B)	£7.99
Adventure	£7.99
Painter (B)	£6.85
Cowboy Shootout (B)	£6.85
Munchyman	£6.85
Caveman Adventure	£6.85
Seek	£6.85
Eldorado Gold (B)	£6.85
Roulette (B)	£5.70
Reversi 2 (B)	£5.70
Wall (B)	£5.70
Draw	£10.30
Where	£6.85
Chemistry	£6.85
World Geography	£6.85
Junior Math Pack	£6.85
Physics	£6.85
Moon Base Alpha	£7.99

MONITORS

Microvitec 14" colour	£240.00
Fidelity RGB	£225.00
Fidelity RGB + CTV	£235.00
Sanyo 12" green monitor	£89.00

SUPPLIERS
TO EDUCATION
AUTHORITIES FULL
SERVICE SUPPORT
WITH SYSTEM
UPGRADE

BUG BYTE

Space Pirates	£8.00
Space Warp	£9.00
BBC Dragon Quest	£11.50
BBC Fruit Machine	£5.50
BBC Chess	£8.00
BBC Backgammon	£8.00
BBC Multifile	£15.00
Space Invaders	£7.50
Galaxy Wars	£7.50
City Defence	£7.50
Synthesizer	£9.50
Sea Lord	£7.50

SUPERIOR

Galaxians	£7.95
Centipeds	£7.95
Invaders	£7.95
Space Fighter	£7.95
Alien Dropout	£7.95
Fruit Machine	£7.95
Frogger	£7.95
Road Runner	£7.95

ELECTRON SOFTWARE

Snapper	£9.95
Meteors	£9.95
Starship Command	£9.95
Monsters	£9.95
Chess	£9.95
Draughts & Reversi	£9.95
Moonbase Alpha	£7.95
Killer Gorilla	£7.95
Moon Raider	£7.95
Felix Fruit Monsters	£7.95
Felix in the Factory	£7.95
Swoop	£7.95

ACORN
ELECTRON
£199.00

FAST MAIL SERVICE—SAME DAY DESPATCH ON ITEMS IN STOCK

MAIL ORDER COUPON

Please send me:

1	4
2	5
3	6

I enclose cheque /P.O. for

Or please debit my Access/Barclaycard/Visa* (delete as applicable)

Card Number _____ Expiry date _____

Name _____

Address _____

Telephone _____

P&H ELECTRONICS LIMITED

Unit 3 · Hogwood Lane · Finchampstead · Berkshire RG11 4QW

CARRIAGE COSTS - Micro's, Monitors, Disc Drives, Printers £7

Books, Cassette Decks, Leads, Software 50p each item.

ACCESS, BARCLAYCARD VISA ORDERS WELCOME

CREDIT FACILITIES

Instant credit up to £1,000. Deposit 10%.



VISA



B2

EEC Automatic Picture Gallery listing



From Page 91

```

10 REM EEC AUTOMATIC GALLERY M.K.Co
ok
20 ENVELOPE 1,25,16,12,8,1,1,1,10,-
10,0,-10,126,50
30 ENVELOPE 2,2,2,-2,2,10,20,10,1,0
,0,-1,126,100
40 DIM TX(9),TY(9),F$(9),P$(9)
50 DIM G0$(9),CS$(9),TRY(9),FS$(9)
60 REM SET UP FRAMES
70 R$=CHR$(10)+STRING$(13,CHR$(8))
80 T$=STRING$(11,CHR$(255))
90 FOR N=1 TO 9
100 READ TX(N),TY(N),C
110 F$(N)=CHR$(31)+CHR$(TX(N))+CHR$(
TY(N))
120 F$(N)=F$(N)+CHR$(255)+T$+CHR$(25
5)+R$
130 FOR K=1 TO 5
140 IF K=3 THEN C=145
150 F$(N)=F$(N)+CHR$(255)+CHR$(C)+
"+CHR$(151)+CHR$(255)+R$
160 NEXT
170 F$(N)=F$(N)+CHR$(255)+T$+CHR$(25
5)
180 NEXT
190 MODE 7
200 PRINT
210 PRINT TAB(13,2),CHR$(141);"THE E
EC"
220 PRINT TAB(13,3),CHR$(141);"THE E
EC"
230 PRINT" AUTOMATIC ART GALLERY SI
MULATOR"
240 REM SET UP THE PORTRAITS
250 R$=LEFT$(R$,10)
260 P$=""
270 FOR N=1 TO 9
280 TX(N)=TX(N)+2
290 TY(N)=TY(N)+1
300 NEXT

```

```

310 FOR N=1 TO 5
320 FOR K=1 TO 9
330 READ T
340 P$=P$+CHR$(T)
350 NEXT
360 P$=P$+R$
370 NEXT
380 REM SET UP BLANK PORTRAITS
390 PB$=""
400 FOR K=1 TO 5
410 PB$=PB$+" "+R$
420 NEXT
430 FOR N=1 TO 9
440 READ G0$(N)
450 NEXT
460 PRINT:PRINT
470 PRINT"Remove portraits by typing
their number"
480 PRINT"Regretably adjacent frames
are changed"
490 PRINT
500 PRINT"Type Q to QUIT an exercise
"
510 PRINT:PRINT
520 PRINT"EXERCISE 1 YOU CLEAR THE F
RAMES (EASY)"
530 PRINT" LEAVING THEM AL
L EMPTY"
540 PRINT
550 PRINT"EXERCISE 2 YOU FILL ALL FR
AMES (HARD)"
560 PRINT" AND LEAVE NOTHI
NG OUTSIDE"
570 PRINT" THE BUREAUCRAT
IS WHITE"
580 PRINT" WHEN OUT OF HIS
FRAME"
590 PRINT
600 PRINT "WHICH EXERCISE ";
610 GAME=GET AND 15
620 PRINT GAME
630 GAME=(GAME-1) EOR 1

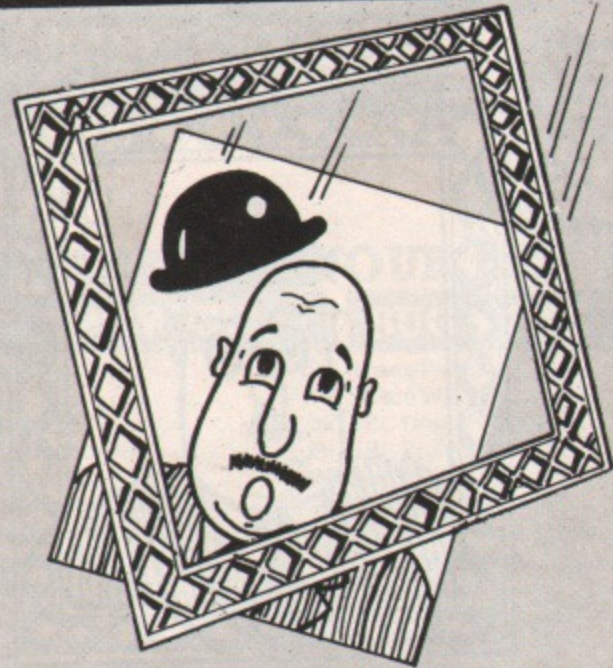
```

```

640 IF GAME=0 OR GAME=1 THEN 680
650 PRINT"I CAN SIT IN THIS LOOP ALL
DAY"
660 GAME=0
670 GOTO 600
680 PRINT"DO YOU WANT SOUND ";
690 A=GET
700 S=TRUE
710 IF A=78 THEN S=FALSE
720 PRINT CHR$(A)
730 IF A=78 THEN SD=1 ELSE SD=0
740 REM START OF GAME
750 PROCPOSE
760 PROCSETUP
770 G%=GET
780 IF G%=81 THEN 750
790 G%=G% AND 15
800 IF G%<1 OR G%>9 THEN 770
810 PRINT TAB(0,22),"
820 TN=TN+1
830 PRINT TAB(10,21),TN,TAB(23,21),G
%
840 IF CS$(G%)=0 THEN 770
850 PROCDIS(G%)
860 PROCTESTEND
870 IF JM=0 AND GAME=1 THEN 770
880 IF JM=1 AND GAME=0 THEN PRINT TA
B(0,23),"***** YOU BLEW IT *****
*****":GOTO 770
890 IF JM=1 AND GAME=1 THEN PROCWIN
:GOTO 750
900 PROCCMXEND
910 IF JM=0 THEN 770
920 PROCWIN
930 GOTO 750
940 DEF PROCTESTEND
950 JM=1
960 FOR AZ=1 TO 9
970 IF CS$(AZ)=1 THEN JM=0
980 NEXT
990 ENDPROC

```


EEC Automatic Picture Gallery listing



From Page 93

```

1000 DEF PROCDIS(N%)
1010 LOCAL AZ,TZ
1020 FOR AZ=1 TO LEN(GO$(N%))
1030 TZ=VAL(MID$(GO$(N%),AZ,1))
1040 IF CS%(TZ)=0 THEN PROCON ELSE PR
OCDOFF
1050 CS%(TZ)=CS%(TZ) EOR 1
1060 NEXT
1070 ENDPROC
1080 DEF PROCDOFF
1090 IF S THEN PROCSSOFF
1100 PRINT TAB(TX(TZ),TY(TZ)),PB$
1110 ENDPROC
1120 DEF PROCON
1130 IF S THEN PROCSON
1140 PRINT TAB(TX(TZ),TY(TZ)),P$
1150 ENDPROC
1160 DEF PROCSON
1170 SOUND 1,0,49,8
1180 SOUND 1,1,149,20
1190 SOUND 1,-15,245,1
1200 SOUND 1,0,49,1
1210 REPEAT
1220 UNTIL ADVAL(-6)=15
1230 ENDPROC
1240 DEF PROCSSOFF
1250 SOUND 1,0,49,8
1260 SOUND 1,-15,49,1
1270 SOUND 1,0,49,1
1280 REPEAT
1290 UNTIL ADVAL(-6)=15
1300 ENDPROC
1310 DEFPROCPOSE
1320 FOR K=1 TO 9
1330 TRY(K)=0
1340 FS%(K)=GAME
1350 CS%(K)=0
1360 NEXT
1370 IF GAME=1 THEN 1470
1380 FT=RND(8)
1390 REPEAT
1400 REPEAT
1410 K=RND(8)
1420 UNTIL FS%(K)=0
1430 FS%(K)=1
1440 CS%(K)=1
1450 FT=FT-1
1460 UNTIL FT=0
1470 TRY=RND(8)+1
1480 MINT=TRYT
1490 REPEAT
1500 REPEAT
1510 N=RND(9)
1520 UNTIL TRY(N)=0 AND CS%(N)=0
1530 TRYT=TRYT-1
1540 TRY(N)=1
1550 PROCTURN(N)
1560 PROCJAM
1570 UNTIL TRYT=0 OR JM=1
1580 MINT=MINT-TRYT
1590 ENDPROC
1600 DEFPROCJAM
1610 JM=1
1620 FOR AZ=1 TO 9
1630 IF TRY(AZ)=0 AND CS%(AZ)=0 THEN
JM=0
1640 NEXT
1650 ENDPROC
1660 DEF PROCCMXEND
1670 JM=1
1680 FOR K=1 TO 9
1690 IF FS%(K)=1 AND CS%(K)=0 THEN JM
=0
1700 IF FS%(K)=0 AND CS%(K)=1 THEN JM
=0
1710 NEXT
1720 ENDPROC
1730 DEF PROCTURN(N%)
1740 LOCAL AZ,TZ
1750 FOR AZ=1 TO LEN(GO$(N%))
1760 TZ=VAL(MID$(GO$(N%),AZ,1))
1770 CS%(TZ)=CS%(TZ) EOR 1
1780 NEXT
1790 ENDPROC
1800 DEF PROCSETUP
1810 TN=0
1820 CLS
1830 FOR K=1 TO 19
1840 VDU 151,10,8
1850 NEXT
1860 FOR K=1 TO 9
1870 IF FS%(K)=1 THEN PRINT F$(K)
1880 IF CS%(K)=1 THEN PRINT TAB(TX(K)
,TY(K)),P$
1890 NEXT
1900 IF GAME=1 THEN PRINT TAB(11,19),
"CLEAR THE GALLERY" ELSE PRINT TAB(10,
19), "SET UP THE GALLERY"
1910 PRINT "1 2 3          TURN
FRAME"
1920 PRINT "4 5 6"
1930 PRINT "7 8 9"
1940 PRINT "          CAN BE DONE IN
";MINT;" TURNS"
1950 ENDPROC
1960 DEF PROCWIN
1970 PRINT TAB(0,23), "CONGRATULATIONS
PLEASE HIT ANY KEY";
1980 A=GET
1990 ENDPROC
2000 DATA 1,0,147,13,0,149,25,0,147
2010 DATA 1,6,149,13,6,150,25,6,149
2020 DATA 1,12,147,13,12,149,25,12,14
7
2030 DATA 160,160,248,252,252,252,244
,160,160
2040 DATA 240,255,255,255,255,255,255
,255,240
2050 DATA 160,160,247,255,175,255,251
,160,160
2060 DATA 160,160,183,175,175,175,235
,160,160
2070 DATA 160,160,163,163,255,163,163
,160,160
2080 DATA 1245,213,3256,471,52864,639
2090 DATA 7458,879,9658

```


mw systems OFFER YOU

A FULL RANGE OF FLOPPY DISC SYSTEMS FOR THE BBC MICRO

- Disc Drive Units** are cased in high quality steel boxes, finished in a matching BBC colour.
- All Units** come complete with manual, formatting disc and appropriate cables.
- Optional Power** supply available for Dual 400K.
- All Single Units** can be upgraded to a double unit.
- All Equipment** is covered by a full 1 year warranty.



800K
for only
£399

MWS 800K (1.6MB) at Double Density.
DUAL DRIVES from Toshiba.
These drives are double sided/double density and are 40/80 Track Switchable.



400K
for only
£233

MWS 400K (800K at Double Density).
SINGLE DRIVE from TOSHIBA.
This drive is also double sided/double density and is 40/80 Track Switchable.

mw systems Ltd.

Matrix House
Lincoln Road
Cressex Industrial Est.
High Wycombe
Bucks
Tel (0494) 450341

ORDER FORM

All prices are exclusive of VAT.
All Systems are ex-stock
and are despatched by
next day delivery service.



**NEW PRODUCT
RELEASE**

200K
for only
£159

MWS 200K.
A SINGLE DRIVE from SEIKO.
This drive is double sided/single density.

Please send me the following items	Quantity	£
Dual 400K Drive Unit (800K) at £399		
Single 400K Drive Unit at £233		
Single 400K Upgrade at £220		
Single 200K Drive Unit at £159		
DFS fitted at £95		
DFS unfitted at £85		
Optional Power Supply for Dual System at £35		

Please debit my
Access/Barclaycard/Amex/Diners

Card No.

I enclose a cheque for £..... made payable to
MW Systems

Delivery £10.00
Sub Total

VAT at 15%

TOTAL £

Name _____ Company _____

Address _____

Tel No _____

I'VE been kept busy this month, looking at two rather nice adventures from Level 9, *Snowball* and *Colossal Cave*, and Ian Watt's book, *Creating Adventure Programs on the BBC Micro*.

Let's start with the games.

BOTH *Snowball* and *Colossal Cave* are massive. *Colossal Cave* has about 200 rooms (70 more than the original) and *Snowball* has 7,000 – but that's mainly done by a clever trick.

In order to handle the vast amount of text in the messages Level 9 has invented an "a-code". How this works they have not revealed, but it must depend on the redundancy of letter and word association.

For example, the letter Q is always followed by the letter U, the most common trigrams (three letter associations) are THE AND THA ENT ION FOR NDE HAS and NCE and, even more remarkable, the fact that 10 words – the, of, and, to, a, in, that, it, is and I – account for over a quarter of English text.

The result is impressive – long, detailed descriptions come up quickly and, almost word for word, are identical to the original *Colossal Cave* text.

Another advantage of the a-code is that it makes it almost impossible to cheat by trying to look at any part of the program.

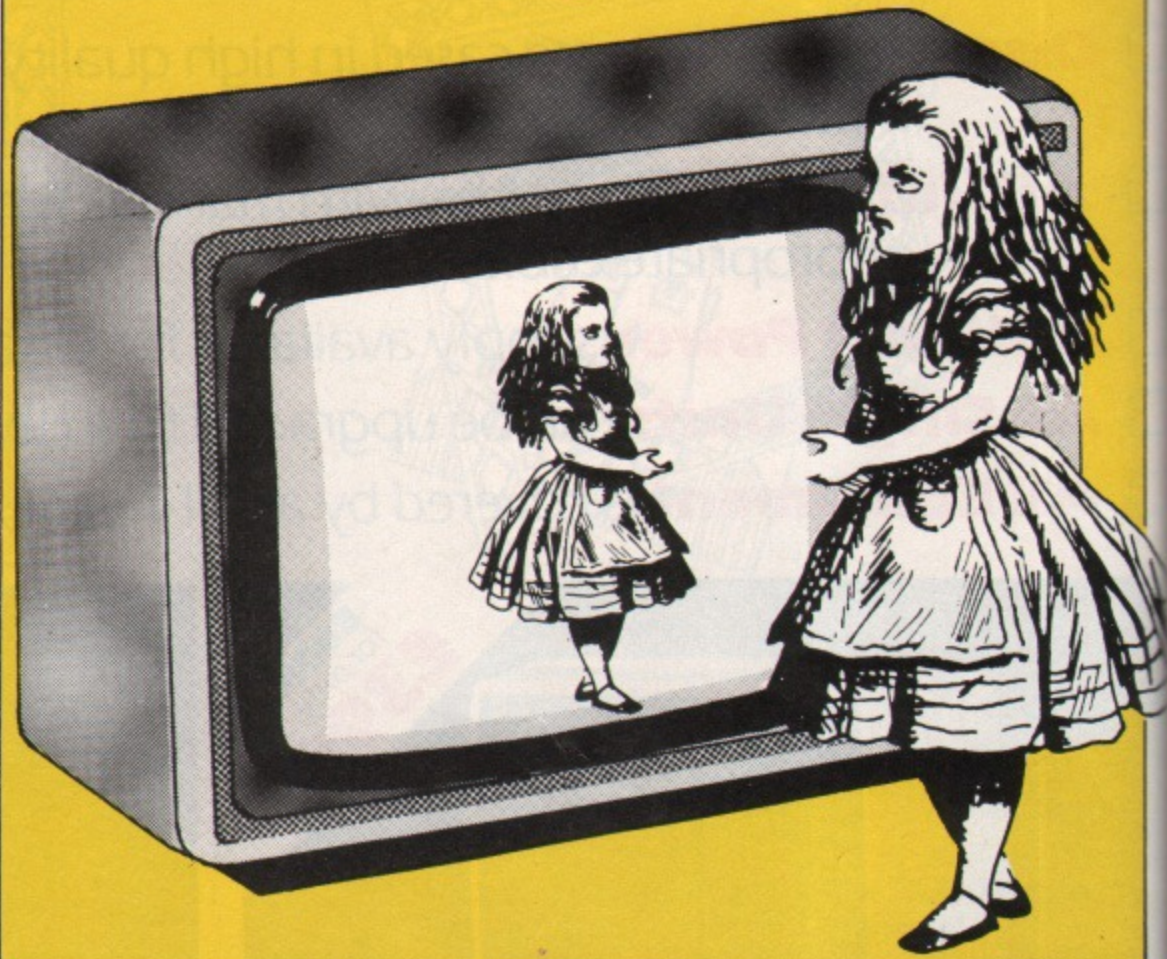
In *Snowball* you wake up in a coffin aboard an enormous interstellar spaceship which has a problem – it is falling into a sun and you are the only person who can save it and the two million passengers it carries.

If you don't take this responsibility very seriously you can actually look in all the two million coffins (one in particular in the Green/Green Green Orange room) but this does take some time and you have to keep dodging some nasty robots.

There are no treasures to collect in



Alice through the VDU



Our monthly foray into Adventure games

this adventure and the way you find out if you are "getting warmer" is to ask for your score after some problem or on reaching a difficult location.

After about three hours I had a fairly good idea what the spaceship looked like (a demountable disc pack was probably the inspiration) and obtained 350 points out of a possible 1,000.

To do this I had got together a spacesuit, obtained a welding lance (how, I can't remember – it required a lot of paper shuffling with two bureaucratic robots so I SAVED the position and don't intend to go near them again) and was outside the ship with a gun and a lamp.

Unfortunately I hadn't sorted out how to get an LL9 battery for the lamp or how to get a spanner – they might be in the DROID STORES but getting in there seemed to be a matter of timing with the DUSBOT.

So here I currently am at the south of the ship. I can see lights to the south where the engines must be but it's another "twisty little maze" which I think I can solve (though rather slowly) by dropping things and then feeling for them.

I've run out of air twice and it's going to be a long haul.

A twisty little maze was one of the

great inventions of Crowther and Woods in the original *Colossal Cave*.

In order to appeal to those who have already got their 350 points in the cave (and been carried off by the jubilant elves) Level 9 has made some tricky alterations and extensions.

The COINS and the FOOD have been moved but, even more testing, you can now only carry four objects, so you can't clear out the cave in just three trips any more.

The old complication of fighting off the psychopathic dwarfs made me adopt a new strategy of dropping the treasures at Y2 and (eventually) shifting them out of the cave with the lamp off.

If you don't do this then the dwarfs and the pirate can waste so much time that your lamp will run out.

I have always preferred to clear out the far end of the cave first and leave the Platinum Pyramid till last. Here the programs differ, because the instant I got the Pyramid the cave began to close and I was unable to get out of the room (let alone the cave) and sort out the last point in Witt's End.

So the cave closed with most of the treasures at Y2 and the new "final problem".

Level 9 has been a lot fairer here because you are given a good hint about

how to start solving this new ending.

However, once you take the hint the cave begins to flood with water and you are faced with mapping another "twisty little maze", and this time you have to keep doing a RESTORE to a SAVED position about every 10 moves else you drown.

Level 9 estimates that it will take the average player two weeks to solve Snowball, with four weeks for Colossal Cave. As you can see I have solved neither of them because I haven't had the time to slog through the two new mazes.

Whenever you reach a maze you have, essentially, to discover a password made up from known letters (usually N,S,E,W,U and D) but of unknown mix and length.

Dropping objects and seeing (or feeling) them again tells you that the last direction you chose was wrong. This speeds up the solution but you still have to solve the maze by trial and error and the fewer objects you have the longer it will take to discover the pathword.

Now in the old Colossal Cave you could carry just enough objects to mark your trail from the start to the exit of the Pirate's maze and this was also the longest trail, so it was quite fair to expect people to solve it.

However, the Level 9 version, by restricting the player to only four objects, makes the Pirate's maze very much harder to solve. This new water maze, with its limited time for exploration before you have to RESTORE, reduces the game to almost random guessing (unless I've missed something).

So what I propose to do is reveal the pathword of the Pirate's maze but, for those who still want to solve the problem themselves, I have used the following program to encode the solution:

```

10 INPUT LINE hint$
20 FOR P=LEN(hint$) TO 1 ST
EP -1
30 char$=MID$(hint$,P,1)
40 IF char$="." THEN PRINT
" "; ELSE PRINT CHR$(ASC(char$
)+P-32);
50 NEXT P

```

and the coded result is:

M BD QG <;CGFE6 4B@5; *4 @*:,74

Incidentally, decoding this message requires rather more than changing +P-32) to -P+32) in line 4 - that is, 40 of the encoder.

I also propose to offer an adventure solving service to any readers who are



stuck. Send in the name of the game and your query and we will publish a selection of them, inviting other readers to send us the answer (in clear preferably, and don't be clever with leading spaces). These answers will then be published in the above code.

I don't think adventure publishers should object to this proposal. In fact it might be a good idea for them to provide a similar service.

And, by the way, could any reader tell me how to get through the Snowball web and the drowning maze? Sorry to be so boring, but I don't play these games for fun.

Finally a plug for Level 9. These games are superb value for money and set a new level for adventure writers which many amateurs will find impossible to compete with.

Two other Level 9 Adventures are currently on sale and a sequel to Snowball is promised. Buy them all, and it should take about six months to sort them out.

And if all this questing has given you the urge to write your own games, you might wish to consult Ian Watt's Creating Adventure Programs on the BBC Micro.

Buyers of this book - published by Interface and Addison Wesley - will have an immediate problem to solve on the second page: "All rights reserved. No part of this publication may be reproduced . . . in any form . . . without prior written permission of the publisher".

This is a very strong *caveat emptor*, and yet the book is only value for money

if the buyer (or his kids) can and is prepared to type in the programs listed in the book because, although the three adventure listings have obviously been carefully prepared, the supporting text is full of misprints, waffle and errors.

I had the impression that the author had spent 90 per cent of his time on the programs and then dashed off the book as quickly as possible, having never even seen the proofs.

I disagreed immediately with the foreword by Tim Hartnell, who says: "Once you've mastered the tricks of the adventure writing trade which are revealed in this book . . ."

Actually Watt doesn't claim that he will reveal (all) the tricks. In fact he makes it quite clear that his games are rather limited in that they only accept simple VERB OBJECT commands.

He also limits how many objects you can carry, which is reasonable, but also limits how many objects can be dropped in a "room".

Now a "room" in an adventure can be the middle of a desert so this restriction is not reasonable. Watt states that twisty mazes (that is, GO NORTH then GO SOUTH and you're not back



If I gave your son a BBC Micro for Christmas, it was the best present you've ever had!



Because you could run your business for little more than the cost of his games!

STOCK CONTROL, INVOICING SALES & PURCHASE LEDGERS all at an incredible £30* each—on disk—and we guarantee them to work.

Software For All's first-class range of Business Programs will do all your paperwork chores efficiently and cost-effectively—because they have been thoroughly tested before release so

▷ **Stock Control:** Gives full control of your stock lines. Issues, Receipts, Adjustments, Stock Updates, Stock Valuation, Reorder Reports and full Stock Listings.

▷ **Sales Ledger:** Full updating of clients' accounts. Aged Debtors' Analysis—aids credit control. Statements, VAT Summary, Ledger Cards, Daybooks, Invoices, Credit Notes, Receipts and Journals.

you can be sure they won't let you down. And at prices realistic enough to interest any businessman, however small.

Briefly, here's what they'll do:

▷ **Invoicing:** Integrates with stock—calls up items automatically. Rapid, simple to use, high-quality Invoice print. Many useful features including Credit Notes.

▷ **Purchase Ledger:** Full updating of suppliers' accounts. Creditors' Schedule, Remittance Advices, VAT Summary, Daybooks, Invoices, Credit Notes, Payments and Journals.

SOFTWARE FOR ALL

BUSINESS PROGRAMS

Software For All Business Programs are widely available at reputable BBC and Acorn Dealers throughout the country. But if you have any difficulty obtaining them, please contact us direct and we'll be pleased to advise you.

* £30 on disk, £20 on cassette. Prices exclusive of VAT.

SOFTWARE FOR ALL

72 North Street, Romford RM1 1DA
Telephone 0708 60725 Dealer enquiries welcome

From Page 97

in the same place) "is a poor technique in programming" and then admits even poorer technique.

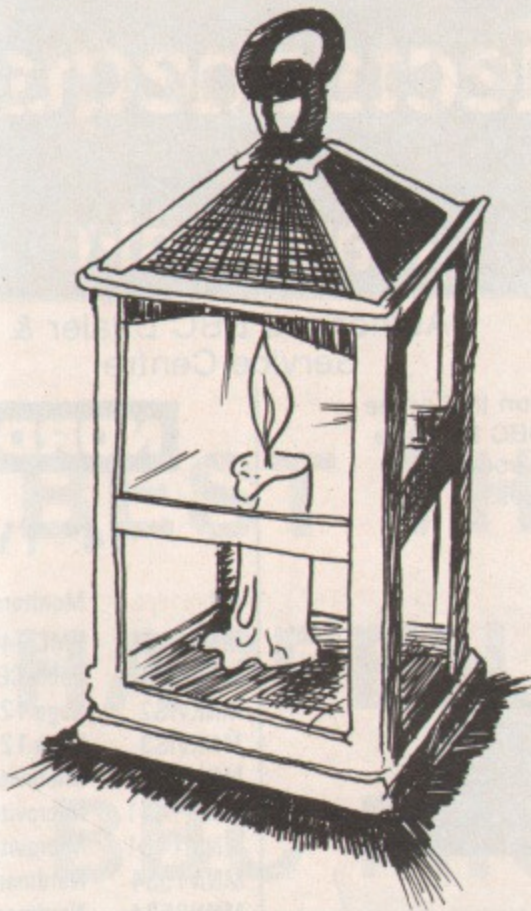
Actually "twisty little mazes" do send me round the bend because, without a listing, they are often a boring slog to solve, but I will leave them, and their solution, to another review.

All of the adventures are based on "logical maps" – they can be drawn in two dimensions with no overlapping passages.

In Chapter 2 he presents a simple example in order to describe his techniques for laying out such maps, their contents and how the program "understands" the commands, moves between the rooms and manipulates the objects.

If you have no idea how to do this yourself then this chapter is well worth reading, but you have to be careful because there are at least five spelling mistakes in the text, numerous errors in the lines of program that you are invited to type in (after, I presume, you have obtained permission from the publisher) and strange sentences like (bottom of page 29):

"When writing programs, full instructions are necessary in most cases, since anyone loading a certain



program would be able to work out the basis of the program without too much confusion" which (even replacing the "would" with "should") caused me much confusion.

Some of the errors in the program lines are amusing because the poor typesetter has obviously become utterly baffled by his task.

For example he uses inverted commas for string double quotes thus "..." and hasn't a clue what to use when he meets a single quote – see Page 25 where the poor man eventually just mixes them randomly and also makes two errors with the full stop.

Fortunately this is all about adventures, so it's up to you, the reader, to sort out what you should really type.

Although I have seen far worse ways of laying out a map and its connections I don't particularly like Watt's technique either.

He associates the four ways out of a room (N,S,E and W only – again an odd restriction) with four offsets which can be positive, negative or zero.

If a non-zero direction is chosen then the new room number = old room number + offset.

Much simpler to understand and expand is the form:

```
1001 DATA "You are in Room 1 -- ",2
,0,0,0
1002 DATA "You are in Room 2 -- ",3
,-1,0,0
```

This could simulate a portcullis or a rockfall etc. preventing you from returning South to Room 1 until you did

something, for example PULL LEVER or THROW DYNAMITE.

Such a command, if acceptable, would set an "override" in one of four variables allowing a negative direction to be taken.

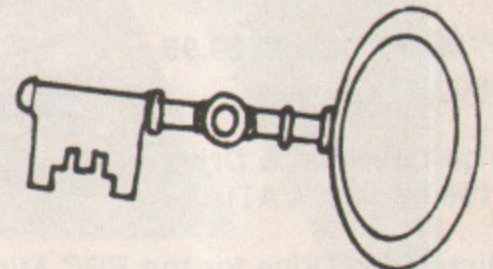
I give the above alternative to show that there is nothing sacrosanct about Watt's techniques. He freely admits this himself, and encourages the reader to develop his own ideas and techniques.

Chapters three and six contain two adventures which could be CHAINED into one large game and then be comparable to many adventures selling in the shops for about £10.

A bonus is that Watt discusses how to convert his programs to other micros, an important skill for anyone with pretensions to being a programmer.

You must always be wary of the text (by Page 61 the typesetter has even given up using anyspacesinsentences) but at this stage most people should just type in the programs from the listings.

Chapter seven discusses possible improvements for adventures of the



future and is surprisingly unimaginative – mere mechanical improvements with Space Invader overtones.

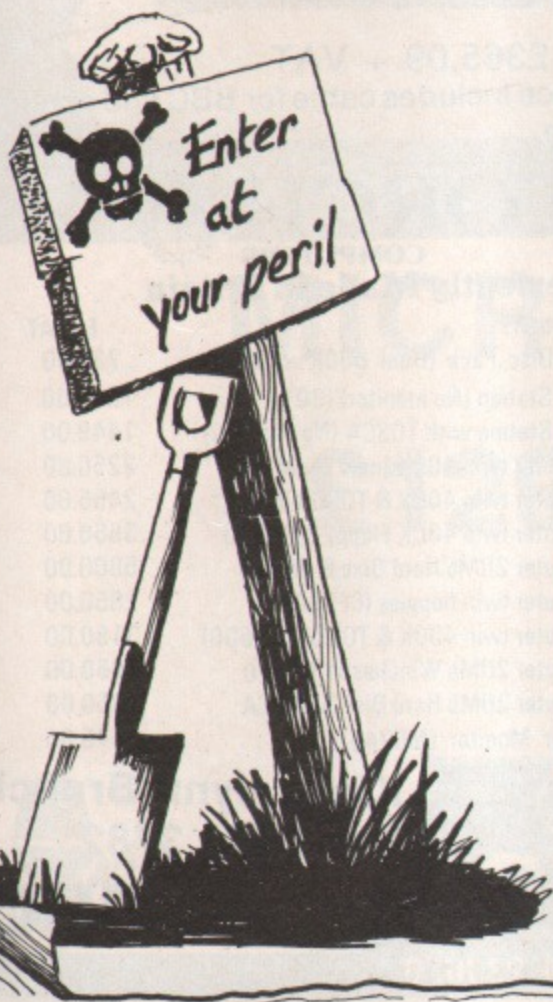
Chapter eight invites you to write your own adventure from a rough plan and plot, but anyone capable of performing this exercise would be better employed designing their own story.

And finally there are two appendices and solutions to the three adventures.

If you intend to type in the games I would suggest that you Sellotape these pages shut because it's more fun to solve the problems from the listings.

As an incentive, why not try to beat the number of moves that Watt gives in his solutions to the three games (62, 185 and 170)?

All in all a book that is full of ideas and enthusiasm for the subject and, ironically, should inspire many people to write much better adventures.



Electronequip

in
Hampshire

SPECIAL OFFERS
PHONE FOR DETAILS

Authorised BBC Dealer &
Service Centre

"We would like to apologise for any confusion that arose from our December advertisements. The BBC B's were sold at full price with £20.00 in discount vouchers redeemable against future purchases."

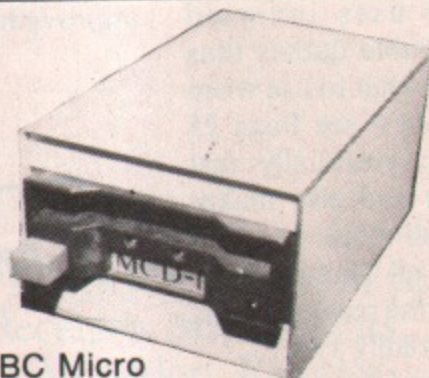


Electronequip is an authorised Acorn service centre and has been an Acorn dealer since the introduction of the Atom. Our demonstration facilities include 20 station Econet and Torchnet systems.

Ref.	BBC Micros	Ex VAT	Inc VAT
ANB01	BBC Model B Micro Computer	348.26	399.00
ANB02	BBC Model B with Econet Interface	389.14	446.00
ANB03	BBC Model B with Disc Interface	409.14	469.00
ANB04	BBC Model B with Disc & Econet Interface	450.01	516.00

3" Micro Disc £129.95
(inc. VAT)

Disc Interface & Drive
£198.95 (inc. VAT)



Micro Disc Drive for the BBC Micro

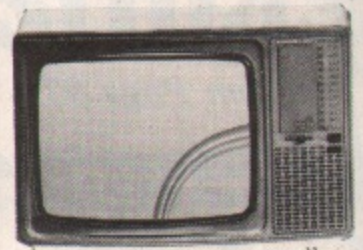
The Micro disc drive offers a method of low cost quick access to programs. The drive is essentially a small version of a 5 1/4" disc drive and offers similar features to the larger drive. The data is stored on a 3" disc, this is enclosed in a protective hard plastic cassette which features a write protect switch. The micro drive requires the standard Acorn disc interface, but a new disc filing system rom. Acorn DFS may be exchanged for the micro DFS for £12.00. The new micro disc filing system allows 60 files per disc surface and it can read and write to Acorn DFS discs. Thus if a 5 1/4 inch and a micro floppy were connected on the same cable files could be transferred between them.
Capacity: 80.64 K bytes Transfer Rate: 125kbit/s

TRADE ENQUIRIES WELCOME
Access & Barclaycard Accepted
Large Stocks - 24 Hour Despatch
Carriage 50p to £3.50



Electronequip

36-38 West Street, Fareham, Hants (0329) 230670



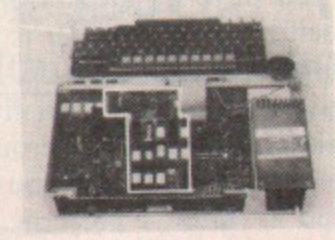
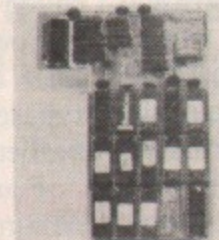
NORDMENDE

14" TV/Monitor £217.00 + VAT

Ref.	Monitors	Ex VAT	Inc VAT
MNB1401	BMC 1401 Colour Monitor	225.00	258.75
MNCE370A	Cable CE 370A Colour RGB Monitor	199.00	228.85
MNKVIS2	Kaga 12" RGB Monitor Vision II (Medium)	285.00	327.75
MNKVIS3	Kaga 12" RGB Monitor Vision III (Hi)	399.00	458.85
MNM1431	Microvitec 1431 14" Colour Monitor (BBC)	215.00	247.25
MNM1441	Microvitec 1441 High Res 14" BBC Monitor	440.00	506.00
MNM1451	Microvitec 1451 Medium Res 14" BBC Monitor	325.00	373.75
MNN1534	Nordmende 14" TV/Monitor	217.00	249.55
MNN3534	Nordmende 14" TV/Monitor with remote control	234.00	269.10
MNN4430	Nordmende 20" Prestige TV/Monitor remote	417.00	479.55
MNN4432	Nordmende 22" Prestige TV/Monitor remote	458.00	526.70
MNN4437	Nordmende 27" Prestige TV/Monitor remote	512.00	588.80

SIDEWISE

SIDEWISE FITTED



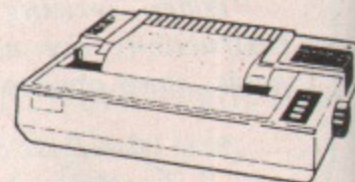
"SIDEWAYS" rom board for BBC Micro.
No soldering required £38.00 + VAT

EPSON

RX-80 £263.12 + VAT

FX-80 £365.09 + VAT

Printer price includes cable for BBC and screen dump rom.



TORCH 
COMPUTERS
Perfectly Made in Britain

Ref.	Torch Computers	Ex VAT	Inc VAT
TDZ8DP	Torch Z80 Disc Pack (Dual 800K + Z80)	730.00	839.50
TC301	Torch Work Station (No monitor) (301)	1244.00	1430.00
TC303	Torch Work Station with TOSCA (No monitor)	1449.00	1666.00
TC401	Torch Computer twin 400K (new style)	2250.00	2587.50
TC403	Torch Computer twin 400K & TOSCA (grey)	2455.00	2823.75
TC68000	Torch Computer twin 400K Floppy & 68000	3550.00	4082.50
TC68020	Torch Computer 20Mb Hard Disc & 68000	5900.00	6785.00
TCF500	Torch Computer twin floppies (CF500)	2950.00	3392.50
TCFS500	Torch Computer twin 400K & TOSCA (CH500)	3150.00	3622.50
TCH520	Torch Computer 20Mb Winchester CH520	5650.00	6497.50
TCHS520	Torch Computer 20Mb Hard Disc & TOSCA	5850.00	6727.50
TMC240	Torch Colour Monitor (MC240)	575.00	661.25

Kings Lynn Branch
Tel: 0553 3782

BBC 

Electronequip in Hampshire

THE BEST THING TO HAPPEN TO THE BBC MICRO



MICRO DISC DRIVE

£129.95 (inc. VAT)

(Available ex-stock now)



Electronequip



36-38 West Street, Fareham, Hants (0329) 230670

SIMONSOFT SPRITES VERSION 2 £12.95

INCREDIBLE SPRITES ROUTINE THAT
INCORPORATES EVERY SPRITE FACILITY YOU
COULD ASK FOR

SIMONSOFT SPRITES allows you to define up to 12 different sprite designs each of which can contain all 16 Mode 2 colours. Each sprite may have up to 3 clones, resulting in a maximum of 48 SPRITES on screen at any one time. All sprites including the clones may be moved independently with both speed and direction of every sprite easily controlled from your own BASIC program. Lightning speed is achieved by machine code routines accessed from your BASIC. A sprite moving along by just one pixel at a time may cross the screen 41 times in 20 seconds. Faster movement is possible if the sprite moves more than one pixel at a time. Each sprite has two images for 'left' and 'righthanded' pixels resulting in extremely smooth sprite motion. The two images may be defined separately allowing animation of any or all sprites. Sprites may be defined from one pixel in size to sprite blocks or 'Super-sprites'. Super-sprites may be moved as one single sprite, using just two integer variables.

All sprites cross screen boundaries automatically, and 'old' sprites are deleted automatically when a sprite moves to a new position. Each sprite may also be removed temporarily or permanently off the screen while a program is being run. All sprites may cross over background or other sprites without disrupting either.

HIT FLAGS may be switched on from BASIC, notifying the user whenever there is a sprite collision and identifying the sprite numbers involved. Each sprite may be enlarged/reduced in size during the running of the program - you can make your sprites loom up at you out of the screen.

Once you have written your program, you may SAVE/LOAD it as a whole with the sprite routine and defined sprites. A user manual and a demonstration game and listing are included. Please specify if you wish to transfer SIMONSOFT SPRITES to disc. (SIMONSOFT SPRITES may be used in commercial programs).

DON'T OPT FOR ANYTHING LESS

SUPER FRUIT £5.95 Full feature, as shown in BBC Micro User Show. The graphics of this game are being used to demonstrate the BBC's capabilities in a number of showrooms.

Both programs available now from:

**SIMONSOFT, 25 Tatham Road, Abingdon, Oxon.
OX14 1QB. Telephone: (0235) 24140**

THE LONDON SOFTWARE COMPANY PRESENTS

QUALITY BBC PROGRAMS MAKE YOUR BBC WORK FOR YOU

HOME FINANCE PACKAGE - A superb accounts program designed for the home - packed with every accounting procedure the householder needs. The best value package on the market - ONLY £7.95

MUSIC PACKAGE I - A stunning program designed to fulfill the BBC's true musical capacity - ONLY £8.95

MEGAPEDE - HEXHOPPER - PHOENIX

ARCADE ACTION PAC TWO: ONLY £9.95

TURBO - CENTIPEDE BREAKOUT - 3-D MISSILE
COMMAND

ARCADE ACTION PAC ONE: ONLY £9.95

ADVENTURE PAC: ONLY £9.95

ADVENTURE ONE: Discover your quest in life with this adventure designer for the normal intelligent humanoid.

ADVENTURE TWO: Stretch your intellect in this brilliant continuation of ADVENTURE ONE, placing you in an alien craft. Can humanoid intelligence overcome the aliens?

All prices are inclusive: Postage and packing is
FREE.

Rapid despatch service and no quibble cassette replacement. All our cassettes are professionally recorded.

Cheque/PO to:

**THE LONDON SOFTWARE COMPANY,
19 Cloister Gardens, Edgware, Middlesex
HA8 9QJ.**

We give generous royalties for quality software

Gateways to the World Outside

The CST PROCYON opens a lot of doors to your BBC microcomputer - lifting it right out of the "home computer" league. The CST PROCYON provides full IEEE 488 interface, enabling your BBC micro to operate professional plotters and printers, frequency counters, voltmeters, disc drives etc, and to communicate with other IEEE-ported machines, such as Commodore, Sirius, Osborne, Hewlett-Packard or Tectronix computers.

The CST PROCYON comes with a highly efficient IEEE filing system, supplied in EPROM, and responds to any high level language, including LISP, FORTRAN, FORTH, APL and BASIC. A specially-written Commodore data-exchange routine, allows you to link your BBC micro to CBM machines and disc drives.

At 70k bytes of information per second, the CST PROCYON channels data quickly and efficiently between up to sixteen devices, responding to standard system commands as well as specialised filing instructions. Its capabilities are fully documented in a straightforward but comprehensive manual.

Isn't it time you started taking your BBC micro seriously?

- Full multiple controller implementation
- Extensive "HELP" facilities
- Interactive debugging
- Visual Display of operating status
- Internal switched and socketed power supply
- Comprehensive error checking and indicating

The CST PROCYON from
Cambridge Systems Technology
30 Regent Street, Cambridge
Tel: (0223) 323302

ENQUIRIES FROM DEALERS WELCOME



Please send further details on the CST PROCYON IEEE Interface

Name
Address
Tel. MU3

STAR PRODUCTS FROM PACE!

★**TOOLSTAR**—AN ESSENTIAL UTILITY FOR THE BBC MICRO

This exciting new toolkit ROM offers many extra facilities and will significantly reduce program development time. The new commands offered by Toolstar are:

★ **FIND**

Search a BASIC program for all occurrences of the specified string (mixed tokens/ASCII), and list all lines with string highlighted.

★ **OPEN**

Smart renumber parts of a BASIC program.

★ **FKEY**

Display what is behind function keys in a format suitable for on-screen editing.

★ **RESET**

An unforgettable new!

★ **DFORMAT**

Format a disc to the Acorn standard with any number of tracks within the capabilities of the Drive.

★ **REPLACE**

Selective replacement of one string by another in a BASIC program, including wild card options.

★ **FLIST**

List a 'Bad Program' with suspicious areas highlighted.

★ **FIX**

Repair a 'Bad Program' then list it.

★ **CONV**

Convert between Decimal, Hexadecimal

and Binary in any combination.

★ **DVERIFY** Verify a disc.

★ **DLOAD**

Load the data from the specified sector on a disc to memory.

★ **EXTEND**

Expands the Toolstar to encompass RAM based utilities which then automatically appear under the ★ **HELP** command. This feature ensures that Toolstar is capable of future expansion.

★ **DSAVE**

Save the data from memory to a specified area on the disc.

The following commands are directed at the whole machine memory and complement the BBC micro's assembler:

★ **MROM**

All the M (Memory) commands can be directed at the specified paged ROM. eg. BASIC, DFS, TOOLSTAR, WORDWISE, etc.

★ **MDUMP**

Hexadecimal/ASCII dump of memory with on-screen editing.

★ **MSEED**

Fill the specified memory area with any value.

★ **MCOMP**

Compare memory areas and list those where memory contents are not the same.

★ **MBRK**

Installs a serial BRK handler giving CPU register and stack displays together with program counter and paged ROM value when BRK occurred — can be used in machine code or BASIC.

★ **MDIS**

Full feature disassembler with parallel ASCII display. Features include automatic labelling of Acorn O.S. calls and vectors, and on-screen editing.

★ **MFIN**

Search memory for all occurrences of specified machine code/ASCII string.

★ **MCOPY**

Smart memory copy from one area to another.

★ **MCRC**

Calculate a Cyclic Redundancy Check for the specified memory area.

Any or all of the above commands can be used from within a BASIC program. This allows the user to develop many powerful utilities (ie. disc doctor etc.)

Also included are ★ **HELP** menus with a list of the above commands and their correct syntax.

Toolstar comes complete with a most comprehensive manual including many program examples.

ONLY £34.00 inc. VAT.

★**COMMSTAR**—ROM BASED INTELLIGENT COMMUNICATIONS FACILITY

Commstar is a unique intelligent communications facility, developed by Andy Hood, for the BBC micro. It will allow communication with other computer users and allow access to Prestel and other large data bases throughout the world via a suitable modem.

Commstar is extremely flexible, allowing full configuration of the RS 423 (RS 232) part of the BBC micro, full XON/XOFF protocol, and 'safe' file transfer by the use of enhanced 'Christiensen' protocols.

All commands are easily accessed from a main menu from which it is a simple matter to toggle into 'chat' mode (and vice-versa).

Menu options available are:

B — Copy to buffer on/off: All input from the host may be copied into a memory buffer which is approx. 23K in mode 7.

L — Load buffer from current filing system file for transmission to modem.

S — Save buffer to current filing system file for 'browsing' later.

V — View current buffer contents on screen — display speed may be varied, or paused with optional dumping to printer.

T — Toggle screen mode: normally

mode 7, 80 columns available in mode 3.

O — Output buffer to modem — speed may be varied to suit particular modem speeds.

M — Issue any MOS command from within COMMSTAR eg. *FX8,3 (ie set RS423 baud rate).

C — Exit menu to 'chat' mode to allow conversational access to bulletin boards.

W — Wipe buffer prior to use of other buffer commands if necessary.

E — Echo on/off — set echo on when using host terminals which do not provide an echo.

X — Toggle XON/XOFF protocol.

R — Reset buffer pointers.

I — Initialise RS423 port for word length, parity and stop bits.

F — File transfer using XMODEM protocols. High integrity via use of enhanced 'Christiensen' protocols.

Commstar also contains its own software clock in memory which is useful in displaying length of log-on time etc.

Details of the above products can be obtained from your nearest BBC dealer or direct from:



PACE

PACE
92 NEW CROSS STREET,
BRADFORD BD5 8BS.
Tel: (0274) 729306 Telex: 51564

**A joint presentation by
The Micro User & Electron User**

Don't miss the great new for the Electron

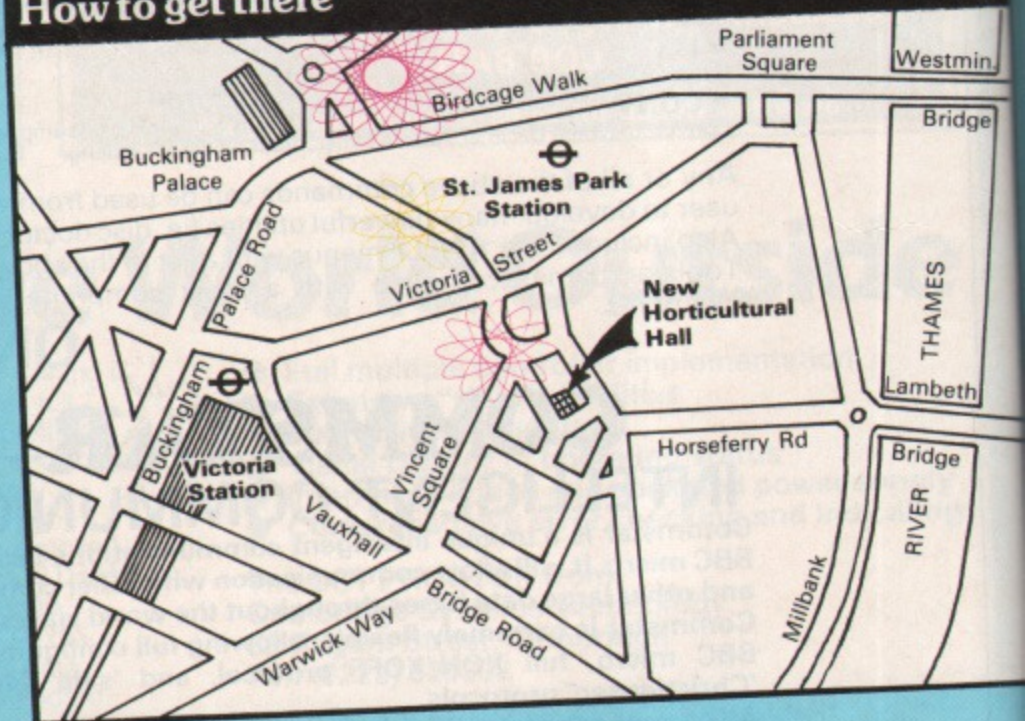
Here's your big chance to catch up on all that's been happening recently in the fast-developing world of the Electron and BBC Micro. And there's so much new to excite and intrigue you ...

NEW programs from the fertile minds of Britain's leading software writers - games galore, plus a growing number of new packages for teachers and for industrial and business users.

NEW hardware add-ons that expand even more the power and versatility of your micro.

Electronics wizards regard both the Electron and the BBC Micro as a challenge to their ingenuity. Their latest creations on display at the Electron and BBC Micro User Show will astound and delight you!

How to get there



**VOUCHER
WORTH
£1**

This voucher is worth £1 per person off the normal admission price of £3 (adults) and £2 (children) (Valid for a maximum of 4 people)

Electron & BBC Micro User Show

10am - 6pm, Thursday, 29 March
10am - 6pm, Friday, 30 March
10am - 6pm, Saturday, 31 March
10am - 4pm, Sunday, 1 April

New Horticultural Hall
Greycoat Street, London SW1

School and College Groups

Entry only £1 per student if bookings are made in advance. Send your cheque (made payable to Database Publications) and SAE to:

Electron & BBC Micro User Show
68 Chester Road, Hazel Grove
Stockport SK7 5NY
Tel: 061-456 8383

at Spring show of all that's
and BBC Micro



**ELECTRON &
BBC MICRO
USER SHOW**

New Horticultural Hall

(Westminster Exhibition Centre)

**Thursday to Sunday,
March 29 to April 1**

Cylon Attack *A&F Software*

ISN'T it always the same? The mother ship carrying urgently needed supplies to Earth is attacked and you're the only interceptor pilot on board.

They're swooping out of space, wave after relentless wave, determined to stop the ship getting through.

Well, an interceptor pilot has to do what an interceptor pilot has to do, so within seconds you're launching into space.

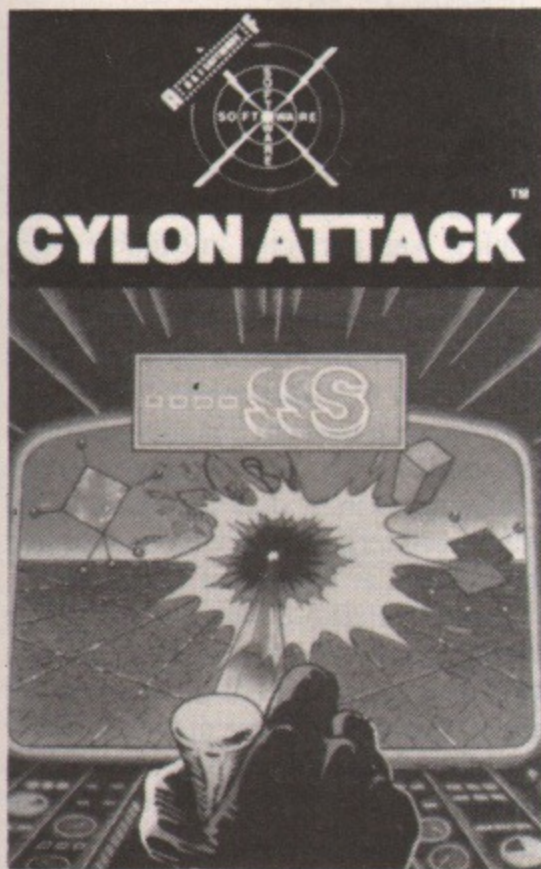
Away from the safety of the mother ship you have to destroy as many of the enemy as you can before your shields give way or your fuel runs out.

Your eyes search the long range scanners for a glimpse of the Cylons before they swoop to attack, curving and weaving to avoid your defence systems.

That's the scenario for Cylon Attack, the compulsive new game from A&F. You play the part of the interceptor pilot, struggling to get the Cylon ships in your sights so your lasers can lock on to them.

The screen of your micro becomes the view from the cockpit of the interceptor. Ranged around it are the instruments which show you the state of the lasers, your fuel, your rates of turn and spin, and a long range radar scanner.

Unlike some games this scanner isn't just decoration but really does help you



Intercept the 3D aliens and save planet Earth

to track down and destroy the enemy.

The 3-D effect has to be seen to be believed. The aliens loom out of deep space, growing larger as they close to attack distance.

Also there are funny things out there in outer space! I wonder who's in the telephone box that floats past the cockpit?

The game is excellent, with lots more features than can be described here. The graphics leave most other games standing. And, as usual from A&F, the instructions are simple but thorough.

They also give you the option of saving the high score in a special table and will pay £200 to the person who has the highest genuine score by the end of March, 1984.

The only real problem is that I can't find anything about it to criticise. I've seen it entrance people who normally despise computer games.

It really is that good, and sets a new standard for action games set in space. Thoroughly recommended.

Trevor Roberts

Get your specs on!

3 Deep Space *Postern*

WOULDN'T it be nice to be able to create games in real three-dimensional space instead of on a boring, flat, two-dimensional television or monitor screen?

Just imagine what a future version of Space Invaders might be like, with the alien craft advancing from far out in deep space as your own short range strike craft weave in and out through the asteroid belt preparing for the last defence...

Unfortunately, we are still waiting for

3-D TV and the closest we have come so far is to fool the brain into thinking that it is viewing a 3-D scene which is in fact made up of two superimposed images, one for each eye.

A necessary part of the deception is for the viewer to wear a pair of specially tinted glasses, usually with one blue and one red lens.

This is what Postern Software have attempted to do for the BBC computer with a simpler version of the scenario that I imagined earlier, entitled 3 Deep Space.

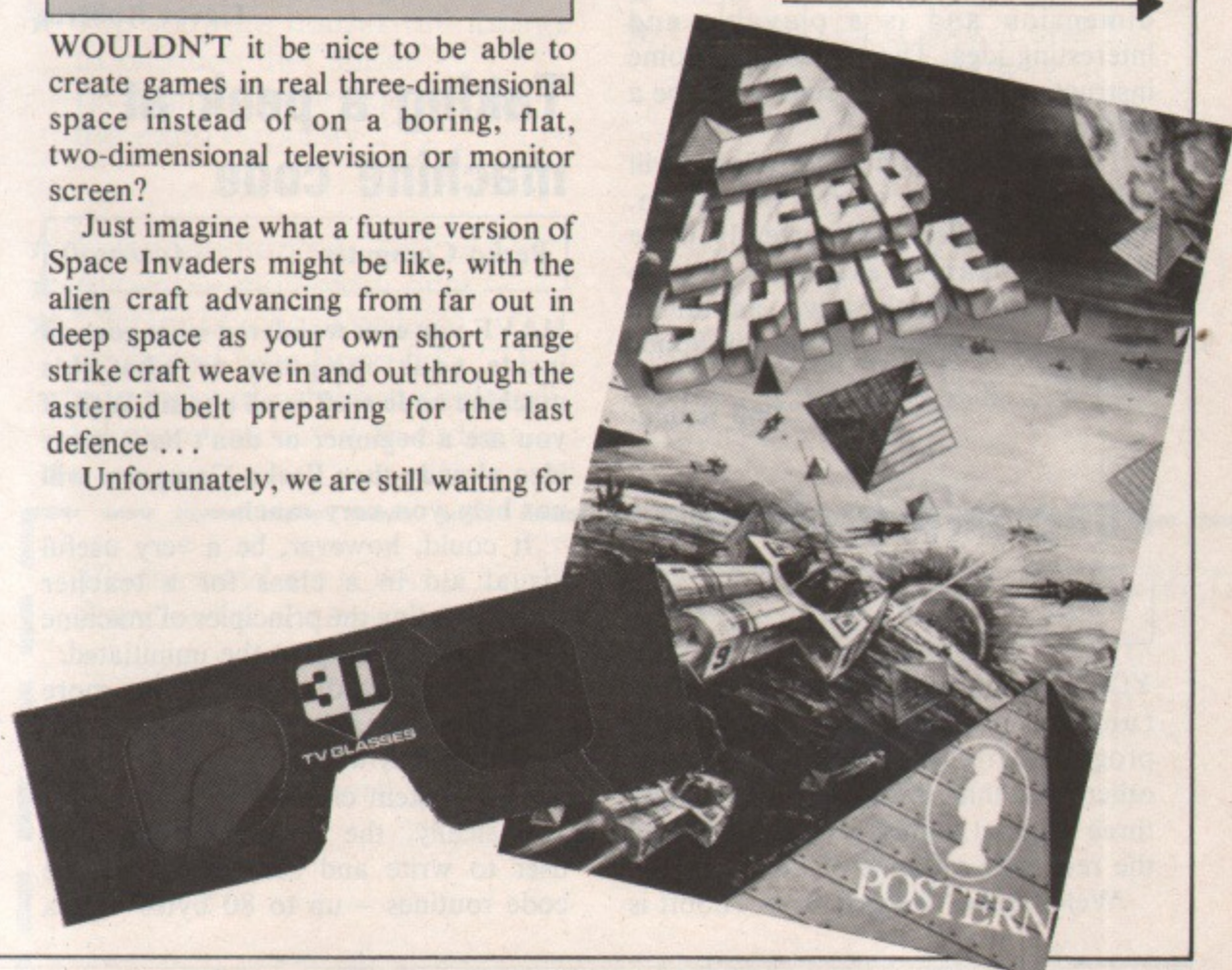
The game is supplied with one pair of 3-D glasses, so while it is being played only the person at the keyboard can see the correct stereoscopic image.

As far as I could see - no pun intended - this seemed to make the bystanders even more anxious to play!

It is important that this game is played on a colour TV set or monitor, otherwise the 3-D effects would not be visible.

The scene is the surface of the home planet, on which, to enhance the three dimensional effect, two rows of pyramids recede into the depths of your television.

In the foreground, a few other, less



From Page 107

discernible, objects are visible. Above these, and to the left, your own craft is positioned, ready to defend against the approaching waves of aliens.

These advance in twos and threes from the opposite side of the surface, very much like Space Invaders turned on its side.

However, this game is in 3-D, remember, so you have the added complication that the alien craft can move in and out across the planet surface as well as towards you.

That is, they move in and out of the television as well as moving from right to left.

To combat the alien movements you, too, can move in a similar fashion and of course you are armed with the obligatory laser which is used to shoot down the approaching ships.

You should avoid their ships, as you're destroyed if a collision occurs.

If things get too hectic you could always use one of your limited supply of smart bombs to clear the screen of the marauding invaders and give yourself a brief respite.

In the early stages of the game, the aliens appear as diamond shaped craft which harmlessly fly past if you do not shoot them down.

These are then followed by successively more aggressive ships, beyond which, I'm afraid, I've not progressed.

I think that the game represents the first commercial step into the third dimension and is a playable and interesting idea. The provision of some instructions on how to play would be an enhancement!

I don't believe that 3 Deep Space will take the games world by storm, however, as there are currently more enjoyable games available in two dimensions, which have advanced beyond the ageing concept of Space Invaders.

Phil Rubini

Penguin's problems

Pengo

H.Soft

YOU'D think by now people would be running out of ideas for games programs. In fact someone told me the other day that there were only really three original games programs and all the rest were variants of them.

Well maybe "Pengo" from H.Soft is

the fourth, because it's certainly different from any others I've seen.

The idea is that you have control of a cute little penguin called Pengo who lives in a maze of ice cubes. The problem is that he's not alone.

There are some rather unpleasant creatures called Snobeas who enjoy eating the ice cubes. They also vary their diet with the odd Pengo or two!

The poor little bird has to run around the maze, dodging the Snobeas and hiding behind ice cubes. As they're eating the ice cubes this gets quite difficult after a while.

Happily, it's not all one-sided as Pengo can push an ice cube over a Snobee and freeze it.

And, if an unwary Snobee gets too close to the edge of the maze, Pengo can stun him by pushing on the side of the walls.

I know that the story line doesn't make all that much sense. But who cares when the game's as much fun as Pengo?

The graphics and sound are outstanding and the game gives you the choice of using the keyboard or joysticks.

You can also freeze the program — no joke intended — while you go off to have a cup of coffee and calm down.

It's fast and furious, the sort of game that keeps you having "just one more go" while someone is telling you that it's their turn.

If you want an arcade game that's original and entertaining, with a lovable penguin thrown in for free, then Pengo is the one for you.

Trevor Roberts

Taking a peek at machine code

Peeko-Computer

Acornsoft

HAVE you ever wondered what goes on inside your computer or what this machine code stuff is all about? Well, if you are a beginner or don't have some idea already then Peeko-Computer will not help you very much.

It could, however, be a very useful visual aid in a class for a teacher demonstrating the principles of machine code programming to the uninitiated.

It is also handy for someone more experienced, enabling the user to try out short routines without having to suffer endless system crashes.

Basically, the program allows the user to write and run short machine code routines — up to 80 bytes — of a

ACORNSOFT EDUCATION

Peeko-Computer

for the BBC Microcomputer Models A and B

READY	LDA # 4				RUN					
	ACC 0	CARRY 0	ZERD 0							
L	0	1	2	3	4	5	6	7	8	9
0	7	0	2	4	7	6	9	7	9	4
1	1	6	8	7	7	2	2	5	7	1
2	9	7	2	7	7	1	8	7	2	6
3	7	3	1	7	7	4	5	7	2	7
4	7	1	6	7	4	4	7	2	6	7
5	9	9	3	1	7	7	8	5	0	5
6	2	3	6	5	7	9	9	1	0	0
7	0	0	0	0	0	0	0	0	0	9

simple numerical nature and see their display on the screen.

The program is available on cassette or disc. I tried out the cassette version, which was up to Acornsoft's usual high standard of packaging and ease of use.

The pack consists of a short loader program, the main program (about 5k), five short demonstration files and a 21 page instruction manual.

All programs and files loaded perfectly every time and it was very easy to create, save and load one's own pseudo machine code routines.

I say pseudo machine code because some of the 20 assembler mnemonics available in the program — 10 of which can be used at any one time — were not identical to the 6502 instruction set as used by the BBC and all were given an arbitrary decimal code.

In fact this program avoids hexadecimal altogether, which may not be a bad idea for the beginner but it does mean having to learn machine code "properly" all over again.

The routines described in the booklet all worked very well indeed and the display was perfectly intelligible on a black and white TV as well as in colour.

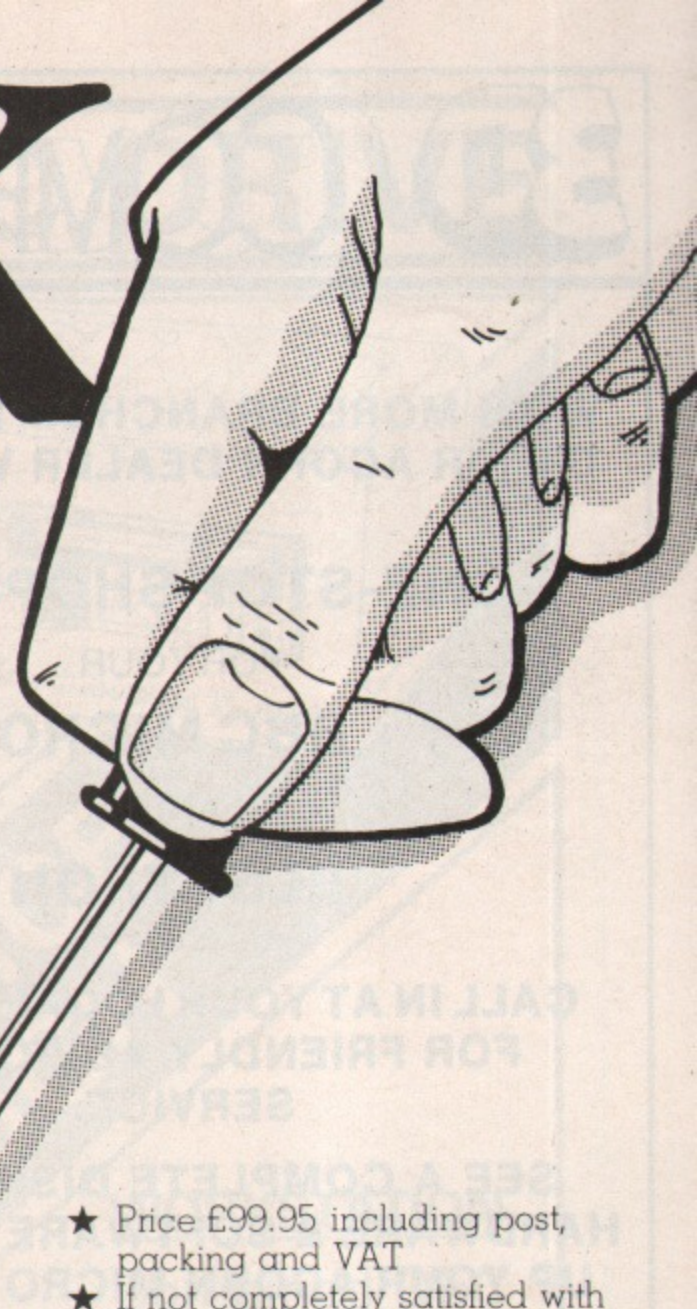
The user can single step through a routine and watch the results appear, as well as run it in fast mode.

A warning though: Scanning through the code with the cursor can be confusing as individual instructions are often misinterpreted, giving unexpected mnemonics at the top of the screen.

Overall, Peeko-Computer should be useful to instructors and those already knowing what machine code is all about, though the latter may well prefer one of the fully blown monitor programs with more facilities that are available for the same price.

Mike Mahon

Add 20K to your BBC micro in five minutes



- ARIES-B20 -

Features

- ★ Adds 20K of useable RAM to your BBC Micro
- ★ Run programs up to 28K long in ANY SCREEN MODE
- ★ Extra memory can be used directly from BASIC I and II, VIEW 1.4, FORTH, LISP, and many other existing programs
- ★ ARIES-B20 is compatible with all correctly written BBC Micro software, on cassette, disc, sideways ROM or cartridge
- ★ Don't be deceived: this product is unique - no other expansion unit has these capabilities
- ★ Complete compatibility - ARIES-B20 uses only documented MOS facilities
- ★ Fitted in 5 minutes using only a screwdriver
- ★ Simply plugs in inside the case
- ★ No soldering or cutting
- ★ (Unlike some add-on products) will cause no damage to your

- ★ BBC Micro - can be removed at any time
- ★ Incredibly simple to use
- ★ Patent applied for
- ★ Designed in Cambridge by BBC Micro experts
- ★ Top quality manufacture
- ★ Unquestionably the most important add-on ever produced for the BBC Micro
- ★ Top software houses are racing to produce the "super-programs" made possible by the extra capacity
- ★ 1 year guarantee.
- ★ Available mail-order only
- ★ Official purchase orders accepted from bona-fide educational establishments, all other trade cash-with-order

- ★ Price £99.95 including post, packing and VAT
- ★ If not completely satisfied with your purchase, we will refund your money in full providing you return the ARIES-B20 in good condition in its original packaging within 14 days

Machine requirements:

- ★ BBC Micro model B
- ★ MOS 1.2 or later
- ★ Plugs into CPU socket and 1 sideways ROM socket

Also available IEEE-488 interface.
Coming soon: Compatible ROM expansion board.

How to Order:

Send cheque or postal order made payable to: Cambridge Computer Consultants Ltd and forward to:
Cambridge Computer Consultants Ltd, FREEPOST, Cambridge CB1 1BR.
Telephone Cambridge 0223- 210677

Please send me (Qty).....ARIES-B20(s) at £99.95 (incl. p.p. & VAT)
I enclose a cheque/postal order made payable to
Cambridge Computer Consultants Ltd for £.....
Signed.....
Name (block letters).....
Address.....
..... Post Code.....

MULTI Cambridge Computer Consultants Ltd, FREEPOST Cambridge CB1 1BR
Telephone Cambridge 0223-210677

3D COMPUTERS

THE HOME COMPUTER
SPECIALISTS

Easy Parking at all branches

TOLWORTH
230 Tolworth Rise South,
Tolworth, Surbiton
Surrey KT5 9NB
Tel: 01-337 4317

SUTTON
30 Station Road,
Belmont, Sutton,
Surrey SM2 6BS
Tel: 01-642 2534

EALING
114 Gunnersbury Avenue,
Ealing, London W5 4HB
Tel: 01-992 5855

LUTON
1 Manor Road,
Caddington,
Luton, Beds LU1 4EE
Tel: (0582) 458575

MILTON KEYNES
Unit 1, Heathfield,
Stacey Bushes,
Milton Keynes MK12 6HP
Tel: (0908) 317832

NEWBURY
26 Stanley Road,
Newbury,
Berks RG14 7PB
Tel: (0635) 30047

WITH MORE BRANCHES THAN ANY
OTHER ACORN DEALER WE OFFER

ONE-STOP SHOPPING

FOR YOUR
BBC MICRO
AND
ELECTRON

CALL IN AT YOUR LOCAL BRANCH
FOR FRIENDLY ADVICE AND
SERVICE.

SEE A COMPLETE DISPLAY OF
HARDWARE & SOFTWARE TO BUILD
UP YOUR ACORN MICRO SYSTEM

SOFTWARE
PROGRAM POWER
BUG-BYTE
SUPERIOR SOFTWARE
A & F
SIMON HESSEL
MOLIMERX
ALLIGATA
ACORNSOFT

PERIPHERALS
DISCS SINGLE/DUAL
TORCH Z80 DISCS
CUMANA DISCS
PRINTERS
JOYSTICKS
MONITORS
B & W/COLOUR
LIGHT PENS
BBC BUGGY

Large range of books,
diskettes, cassettes and
printer paper always in
stock.

VISION

SOFTWARE

COPYFILE II: Allows the user to prepare personal backup copies of virtually all BBC micro tape software. £5 incl.

COPYFILE II is able to backup:-

- **LOCKED** as well as normal programs
- **FULL SIZE** programs (up to &6E blocks)
- **MULTIPLE PART** programs

NB. Users must not infringe any copyrights.

- EDUCATIONAL -

LINEAR REGRESSION: Analyse up to 100 X,Y data pairs with full editing, calculation of best fit to a straight line giving slope, Y intercept and probability value. Graphical output. Interpolation of Y values.

GROUP STATISTICS: Calculate mean and standard deviation on 10 groups of up to 100 data pairs. Compare groups using Students t test to give t.

PATTERNSEARCH Non-linear curve fitting: Calculates the least-squares best fit to non-linear data. The program can be configured to any function (e.g. exponential, hyperbolic) and provides full graphical display of fitting process.

FILER: Prepares and edits common data files for the educational programs described above. Note that these programs above can all read FILER data files.

Cassette £7 incl. Disc £9 incl.

All four programs on disc at the special price of £25 incl.

Mail order to: **VISION SOFTWARE, 1 Allington St., Liverpool. L17 7AD.**

and selected retailers.

TAPE TO DISC? THEN YOU NEED

DISC EXECUTOR

Disc Executor is a sophisticated disc utility, designed for the BBC micro, which allows you to transfer almost all of your tape software to disc. Disc Executor will handle 'Locked' programs and allows you to load full length adventure type programs (up to &6E blocks, i.e. from &E00 to &7C00) from disc in seconds rather than minutes.

Your program is then run from a menu with the program title up to 20 characters in length. Up to 10 programs can be saved onto each Disc Executor purchased with up to 9 parts per program. Disc Executor is extremely simple to use and requires no knowledge of the operating system or the DFS. Rather than moving programs in memory, Disc Executor provides its own DFS routines making it an extremely powerful utility program.

Fully compatible with the Acorn, Watford and AMCOM DFS. Buying a disc drive no longer means that you have to discard your tape software.

Disc Executor is supplied on Verbatim Datalife discs and comes with full instructions.

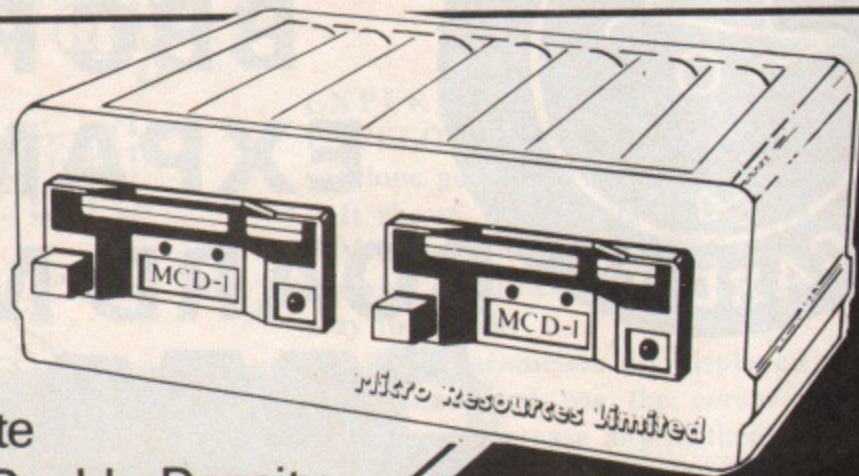
40 tracks: £11 incl. 80 tracks: £12.50 incl.

N.B. Once the disc is full either programs must be deleted or a new disc purchased from us.

3 inch MICRO DISC DRIVE

ORDER NOW!

3" Micro Disc Drive for the BBC Model B



- ★ Compact Full Enclosed Diskette
- ★ 100K Single Density 200K Double Density
- ★ Includes Utility Formatting Disc
- ★ Standard 3"/5¼" Compatible EPROM Supplied
- ★ Extra Disc sent free on returning old Acorn DFS EPROM
- ★ Easy Single Plug in Conversion Instructions
- ★ Single Drive upgradable to dual for only £99.00

**£99 DISC DRIVE PRICE
BREAKTHROUGH**

WORKSTATION

Combined DEC VT52 and Tektronics Emulator ROM for the BBC Model B.

The Menu offers choice of Baud Rate set-up, three Terminal Types or ASC11 File Transfer to and from Floppy Disks - Useful to Access Remote Database via Modem.
£46.00

Up to £10,000 Reward for marketable systems Software/Hardware i.e., Emulators, Disc Handlers, Operating Systems, Interfaces, etc., for Z80, 6502, and 6809 Processors.



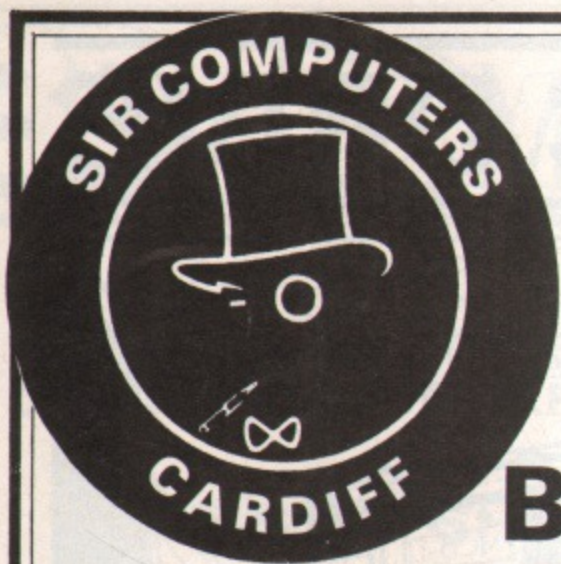
Disk Drive Unit on its own unboxed	£99.00
Complete Single Drive boxed with cables, EPROM, utility disc	£149.00
Complete Dual Drive boxed with cables, EPROM, utility disc, free disc	£248.00
Single 3" 100K disc £4.95 Pack of 5 100K disc's	£19.95
Cabel Colour Monitor 14" screen RGB	£199.50

Telephone: Worthing (0903) 213174

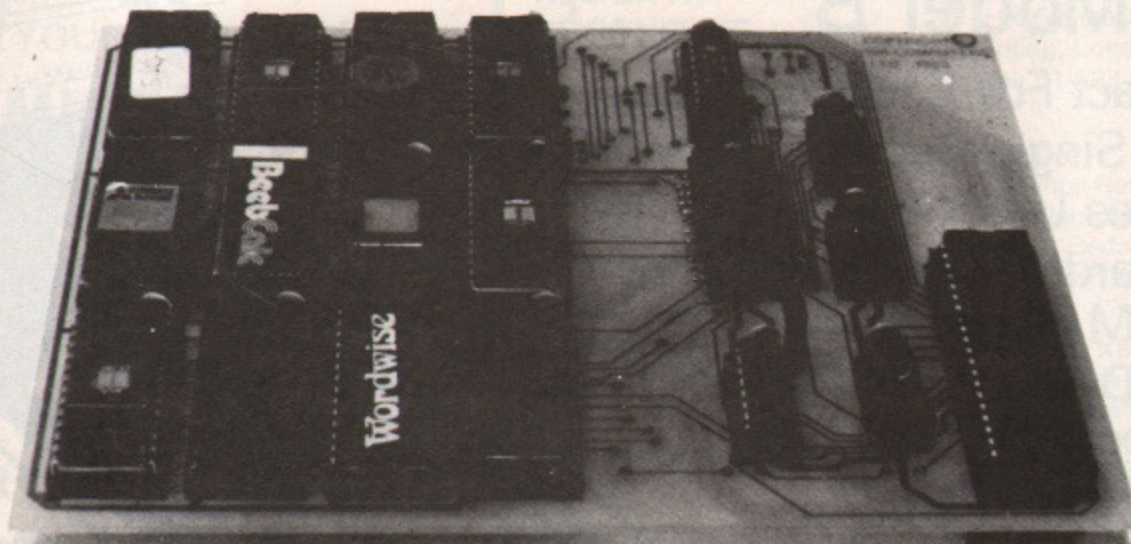
Micro Resources Limited

Southfield House, 11 Liverpool Gardens, Worthing, Sussex BN11 1RY

★ Prices Include U.K. carriage and VAT at 15% ★



SIR BBC ROM EXPANSION BOARD MODEL 2



THE ROM BOARD FOR THE BBC MICRO – NOW WITH RAM!

**NEW
IMPROVED
FACILITIES!**

- ★ 12 extra ROM sockets complement those already provided by the micro to allow up to 256K ROM space.
- ★ Four of these sockets can support either ROM or Static RAM (up to 16K maximum RAM).
- ★ The Model 2 board allows switching between multiples of 2K, 4K, 8K or 16K ROM/RAM.
- ★ Fully buffered design.

**NOW
EVEN EASIER
TO FIT!**

- ★ NO soldering, plug-in design.
- ★ Fits easily inside BBC case.
- ★ Plugs into CPU socket via short flexible connector.
- ★ Improved plug design allows the Model 2 board to connect securely to any type of BBC CPU socket with no harm to micro or board.
- ★ Board is held in place by sturdy supports.
- ★ Full instructions provided.

SIR BBC ROM EXPANSION BOARD MODEL 2: PRICE £40.00 + VAT

We also stock a complete range of BBC Micro peripherals and software, many at unbeatable prices! The following are just a small sample:

BBC MICROCOMPUTER	PRINTERS	DISC DRIVES
BBC Model B £399.00	Dot Matrix:	Single 100K £199.00
BBC Model BD £469.00	Epson FX-80 £399.00	Dual 100K £349.00
	Epson RX-80 £275.00	Dual 400K £669.00
	RX-80 F/T £289.00	TORCH Z80 DISC PACK: (Now with
MONITORS	Shinwa CP-80 £263.35	FREE £1000 worth of
Sanyo B/G £85.00	Daisywheel:	software!) £839.50
Microvitec RGB £229.00	Juki 6100 £399.00	

All our prices are inclusive of VAT unless stated otherwise.

Postage & Packaging:

Please add £1 P&P (small items: ROM Boards, etc.); £10 P&P (large items: Printers, Monitors, etc.).

ACCESS/BARCLAYCARD TELEPHONE ORDERS WELCOME.

SIR COMPUTERS LTD.

91 Whitchurch Road, Cardiff, CF4 3JP.

Telephone: (0222) 621813



Effortless way to experiment with sounds

By **ANDREW REYNOLDS**

EXPERIMENT with the effects of ENVELOPE on SOUND with our Mode 7 envelope generator.

It shows you all the parameters of the SOUND and ENVELOPE commands allowing you to change them with ease and play the result.

All the parameters are displayed on the screen and you use the cursor keys to increase or decrease any of them.

Pressing the S key will play the sound and pressing A will get rid of it if it bores you, or drives the rest of the family mad.

The rest is up to you. Have fun!

VARIABLES AND PROCEDURES

Lines:		
130	PROCsound	Plays sound displayed.
180	PROCkey	Determines which key is pressed.
270	PROCdirection	Which way to move the arrow.
520	PROCupdown	Which way to increment parameter.
1280	PROCsetup	Sets up and prints screen layout.
1480	PROCinit	Sets all the variables at start of program.
1560	PROCinstruct	Sets first screen, and asks if instructions are required.

VARIABLES

ENVELOPE variables: T%, P11%, P12% P13%, PN1%, PN2%, PN3%, AA%, AD%, AS%, AR%, ALA%, ALD%

SOUND variables: C%, A%, P%, D%
 OX%, OY% Old co-ords of arrow.
 X%, Y% Co-ords of arrow.
 arrow\$ Three character shapes to make up arrow.
 choice% Position of arrow
 val\$ Value of the parameter determined by choice%.

All other variables are for working loops.

Soundshaper listing

```

1 REM*** Sound Experimenter ***
2 REM*** By A.J.Reynolds ***
3 REM*** For THE MICRO USER ***
10 MODE7
20 PROCinstruct:CLS
30 *FX4,1
40 PROCinit:PROCsetup
50 VDU23;11;0;0;0;0
60 REPEAT
70 *FX15,1
80 Z=INKEY(100)
90 IFZ>0 PROCkey:PROCdirection
100 UNTIL FALSE
110 END
120 *****
130 DEFPROCsound
140 ENVELOPE1,TX,P11Z,P12Z,P13Z,PN1Z
,P12Z,PN3Z,AAZ,ADZ,ASZ,ARZ,ALAZ,ALDZ
150 SOUNDZX,AZ,PZ,DZ
160 ENDPROC
170 *****
180 DEFPROCkey
190 IFINKEY-26 choiceZ=choiceZ-1:IF
choiceZ<1 choiceZ=17:ENDPROC
200 IFINKEY-122 choiceZ=choiceZ+1:IF
choiceZ>17 choiceZ=1:ENDPROC
210 IFINKEY-58 PROCupdown(1)
220 IFINKEY-42 PROCupdown(-1)
230 IFINKEY-66 SOUND&0011,0,0,1:SDUN
D&0010,0,0,1
240 IFINKEY-82 PROCsound
250 ENDPROC
260 *****
270 DEFPROCdirection
280 OXZ=XZ:OYZ=YZ
290 ON choiceZ GOSUB 340,350,360,370
,380,390,400,410,420,430,440,450,460,4
70,480,490,500
300 PRINTTAB(OXZ,OYZ);CHR$137;" "
;
310 PRINTTAB(XZ,YZ);CHR$136;CHR$149;
arrow$;
320 ENDPROC
330 *****
340 XZ=1:YZ=5:RETURN
350 XZ=7:YZ=5:RETURN
360 XZ=12:YZ=5:RETURN
370 XZ=17:YZ=5:RETURN
380 XZ=22:YZ=5:RETURN
390 XZ=27:YZ=5:RETURN

```


Soundshaper listing

From Page 113

```

400 X%=32:Y%=5:RETURN
410 X%=3:Y%=12:RETURN
420 X%=8:Y%=12:RETURN
430 X%=13:Y%=12:RETURN
440 X%=18:Y%=12:RETURN
450 X%=24:Y%=12:RETURN
460 X%=29:Y%=12:RETURN
470 X%=6:Y%=22:RETURN
480 X%=11:Y%=22:RETURN
490 X%=16:Y%=22:RETURN
500 X%=21:Y%=22:RETURN
510 *****
520 DEFPROCupdown(inc%)
530 ON choice% GOSUB 580,620,660,700
,740,780,820,860,900,940,980,1020,1060
,1100,1140,1180,1220
540 IFLEN(val%)<4 REPEAT:val%=" "+va
l%:UNTILLEN(val%)=4
550 PRINTTAB(X%+1,Y%+1)val%:PRINTTA
B(X%+1,Y%+2)val%:
560 ENDPROC
570 *****
580 T%=T%+(inc%)
590 IFT%>127 T%=127
600 IFT%<1 T%=1
610 val%=STR$(T%):RETURN
620 PI1%=PI1%+(inc%)
630 IFPI1%>127 PI1%=127
640 IFPI1%<-127 PI1%=-127
650 val%=STR$(PI1%):RETURN
660 PI2%=PI2%+(inc%)
670 IFPI2%>127 PI2%=127
680 IFPI2%<-127 PI2%=-127
690 val%=STR$(PI2%):RETURN
700 PI3%=PI3%+(inc%)
710 IFPI3%>127 PI3%=127
720 IFPI3%<-127 PI3%=-127
730 val%=STR$(PI3%):RETURN
740 PN1%=PN1%+(inc%)
750 IFPN1%>255 PN1%=255
760 IFPN1%<0 PN1%=0
770 val%=STR$(PN1%):RETURN
780 PN2%=PN2%+(inc%)
790 IFPN2%>255 PN2%=255
800 IFPN2%<0 PN2%=0
810 val%=STR$(PN2%):RETURN
820 PN3%=PN3%+(inc%)
830 IFPN3%>255 PN3%=255
840 IFPN3%<0 PN3%=0
850 val%=STR$(PN3%):RETURN
860 AA%=AA%+(inc%)
870 IFAA%<-127 AA%=-127
880 IFAA%>127 AA%=127
890 val%=STR$(AA%):RETURN
900 AD%=AD%+(inc%)
910 IFAD%<-127 AD%=-127
920 IFAD%>127 AD%=127
930 val%=STR$(AD%):RETURN
940 AS%=AS%+(inc%)
950 IFAS%<-127 AS%=-127
960 IFAS%>0 AS%=0
970 val%=STR$(AS%):RETURN
980 AR%=AR%+(inc%)
990 IFAR%<-127 AR%=-127
1000 IFAR%>0 AR%=0
1010 val%=STR$(AR%):RETURN
1020 ALA%=ALA%+(inc%)
1030 IFALAX%<0 ALAX%=0
1040 IFALAX%>126 ALAX%=126
1050 val%=STR$(ALAX%):RETURN
1060 ALDX%=ALDX%+(inc%)
1070 IFALDX%<0 ALDX%=0
1080 IFALDX%>126 ALDX%=126
1090 val%=STR$(ALDX%):RETURN
1100 CZ%=CZ%+(inc%)
1110 IFCZ%<0 CZ%=0
1120 IFCZ%>1 CZ%=1
1130 val%=STR$(CZ%):RETURN
1140 AZ%=AZ%+(inc%)
1150 IFAZ%<-15 AZ%=-15
1160 IFAZ%>1 AZ%=1
1170 val%=STR$(AZ%):RETURN
1180 PZ%=PZ%+(inc%)
1190 IFPZ%<0 PZ%=0
1200 IFPZ%>255 PZ%=255
1210 val%=STR$(PZ%):RETURN
1220 DZ%=DZ%+(inc%)
1230 IFDZ%>255 DZ%=255
1240 IFDZ%<1 DZ%=1
1250 val%=STR$(DZ%):RETURN
1260 *****
1270 *****
1280 DEFPROCsetup
1290 RESTORE1330:FORz4%=1TO8:READz1%,
z2%
1300 FORz3%=0TO1
1310 PRINTTAB(0,z1%+z2%);CHR$141;CHR$
(z2%);
1320 NEXT,
1330 DATA0,129,3,130,6,129,10,130,13,
129,17,129,20,130,23,129
1340 RESTORE1360:FORz1%=1TO3:READz2%
1350 PRINTTAB(0,z2%);CHR$136;CHR$149;
:NEXT
1360 DATA5,12,22
1370 RESTORE1390:FORz%=1TO8:READz1%,z
2%,z%
1380 FORy%=0TO1:PRINTTAB(z1%,z2%+y%);
z%:NEXT,
1390 DATA13,0,"ENVELOPE 1,"
1400 DATA5,3,"T PI1 PI2 PI3 PN1
PN2 PN3"
1410 DATA5,6,"1, 0, 0, 0, 0,
0, 0,"
1420 DATA6,10,"AA AD AS AR AL
A ALD"
1430 DATA7,13,"0, 0, 0, 0, 0
, 0"
1440 DATA15,17,"SOUND"
1450 DATA10,20,"C A P D"
1460 DATA10,23,"1, 1, 0, 1"
1470 *****
1480 DEFPROCinit
1490 N5=1:T%=1:PI1%=0:PI2%=0:PI3%=0:P
N1%=0:PN2%=0:PN3%=0:AA%=0:AD%=0:AS%=0:
AR%=0:ALAX%=0:ALDX%=0
1500 choice%=1:arrow%=CHR$184+CHR$163
+CHR$228
1510 CZ%=1:AZ%=1:PZ%=0:DZ%=1
1520 X%=1:Y%=5:OX%=3:OY%=5
1530 PRINTTAB(3,Y%)arrow%;
1540 ENDPROC
1550 *****
1560 DEFPROCinstruct
1570 CLS
1580 FORy%=0TO1:PRINTTAB(0,1+y%)CHR$1
41;CHR$132;CHR$157;CHR$131;SPC7;"SOUND
EXPERIMENTER.":NEXT:PRINTTAB(10,4);C
HR$129;"By:- A.J.Reynolds."
1590 FORy%=0TO1:PRINTTAB(6,14+y%)CHR$
141;CHR$129;"Do You want Instructions?
":NEXT
1600 *FX15,1
1610 REPEAT:y%=GET:UNTILy%=89ORy%=78
1620 IFy%=78:ENDPROC
1630 CLS
1640 PRINT'TAB(5);"This program is d
esigned to aid"" the selection of EN
VELOPE and SOUND"" statements."
1650 PRINT;CHR$132;CHR$157;CHR$130;SP
C12;"OPERATION."
1660 PRINT'TAB(5)"Use the LEFT and R
IGHT cursor keys"" to move, the arro
w Left and Right."
1670 PRINTTAB(5)"Use the UP and DOWN
cursor keys to"" Increase or Decreas
e the parameter."
1680 PRINTTAB(5)"The 'S' Key to play
the displayed"" parameters."
1690 PRINTTAB(5)"The 'A' Key to Abort
."
1700 PRINTTAB(5)"When you have found
a particular"" combination You need.
Make a note of"" ALL the red displa
y."
1710 PRINT'TAB(1);CHR$129;"ENVELOPE1,
T,PI1,PI2,PI3,PN1,PN2,PN3,"CHR$129;"
AA,AD,AS,AR,ALA,ALD"
1720 PRINTTAB(1);CHR$129;"SOUNDC,A,P,
D"
1730 PRINT'("<any key>...");
1740 *FX15,1
1750 y%=GET:ENDPROC

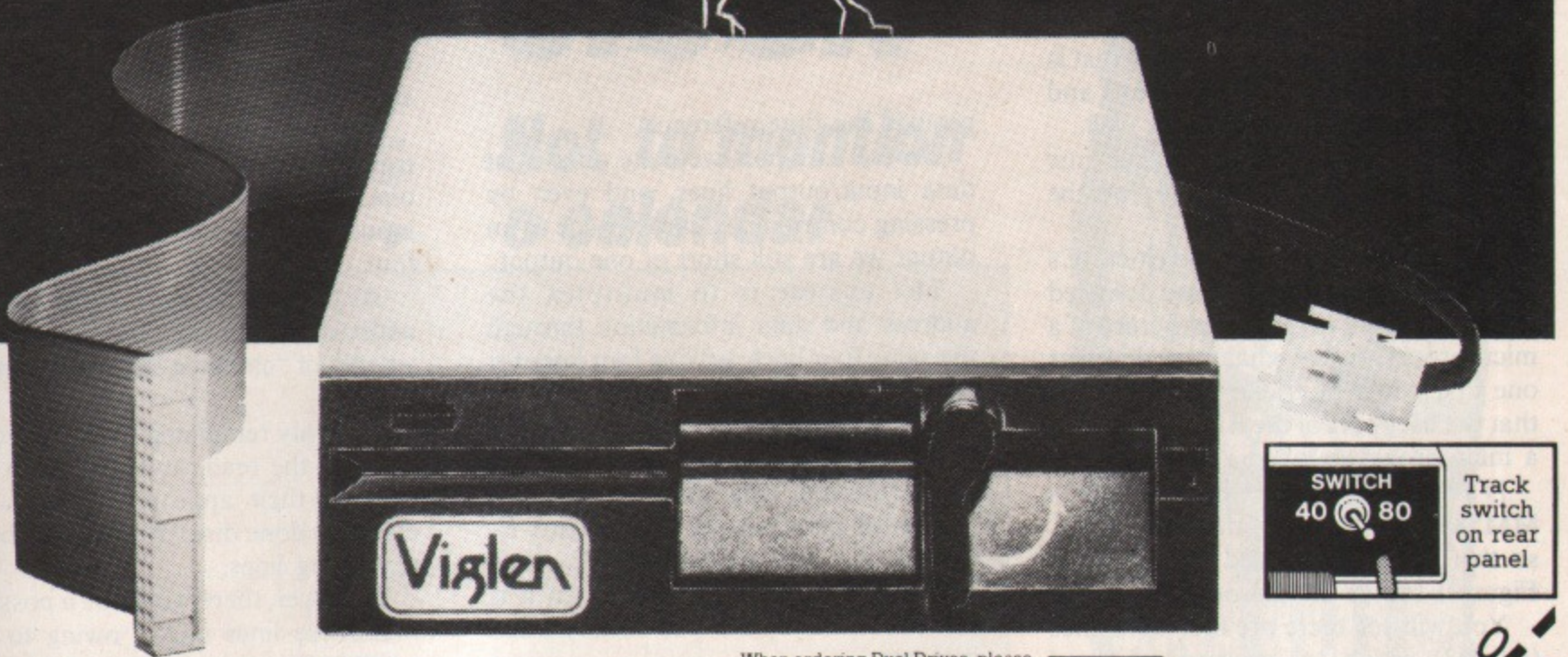
```

This listing is included in this month's cassette tape offer. See order form on Page 137.

Put an end to inefficient, slow cassette tape storage



Speed your data access with a TEAC disk drive from Viglen



Replacing your cassette with a disk drive means Data Access in less than 5 seconds! If you are looking for a guaranteed disk drive that's fully compatible, at a price that includes VAT, Formatting Disk, User Manual, Case and Leads, then just look at our all-inclusive prices!

When ordering Dual Drives, please state which layout you prefer, A or B.



TEAC 55 Slimline Drives

SINGLE DRIVES CASED		Incl. VAT	Excl. VAT	DUAL DRIVES CASED	
40 TRACK 100K	£166	£144.35	40 TRACK 200K	£320	£278.26
40 TRACK 200K	£230	£200.00	40/80 TRACK SWITCHABLE 400K	£402	£349.57
40/80 TRACK SWITCHABLE 200K	£199	£173.05	40/80 TRACK SWITCHABLE 800K	£498	£433.04
40/80 TRACK SWITCHABLE 400K	£249	£216.52	DFS KIT	£95	£82.60
			Disc Filing System 100% Acorn Compatible		
			Power Supply Unit	£36.80	£32.00

- These drives are fully compatible with other computers and can be still used should you change your computer for another type.
- Orders welcomed from Educational Establishments and Government Departments.

Mitsubishi Drives

	Incl. VAT	Excl. VAT
400K SINGLE DRIVE	£245	£213.04
800K DUAL	£435.85	£379
800K AND POWER SUPPLY	£458.85	£399

How to order

By post: To purchase any of the items simply fill in the coupon with your requirements. Enclose your Cheque/P.O. or use your Access/Barclaycard. Please make cheques payable to: VIGLEN COMPUTER SUPPLIES and post to above address. Allow seven days for delivery and add £8.00 carriage, package and insurance on all items.

By telephone: Ring (01) 843 9903. Credit Card holders (Access/Barclaycard only) can purchase by telephone. Please give Card No., Name, Address and the items required.

Viglen

COMPUTER SUPPLIES

Unit 7 Trumpers Way
Hanwell W7 2QA
Tel: (01) 843 9903

Full Twelve Months Guarantee

Please send me the following items:

I enclose Cheque/P.O. for £

I prefer to pay by ACCESS/BARCLAYCARD* Card No:

Signature

Name

Address

Unit 7, TRUMPERS WAY, HANWELL, W7 2QA

Layout A or B*
*Delete as necessary



Trouble with the BBC Micro's built-in timepiece is that it has such a shocking memory...

It's high

THE pots were flying in the Cook household. I had committed the heinous crime of forgetting a birthday. The accusation was hurled, "You spend so long staring at that micro, it's a pity it couldn't remind you".

"There's a thought", I mused, and this caused a temporary loss of concentration which allowed a cold wet dish cloth to strike me on the back of the neck.

The BBC Micro already has a real time clock built into it. The only trouble is that every time the computer is switched off, it forgets what time it is.

Also a time given in hundredths of a second is not very user-friendly. What is needed is a clock that never stops and that can remember the date as well.

So I set to it, designing a real time clock/calendar add-on board for the user port.

There are several real time clock ICs on the market, all of them are designed to be connected to the bus structure of a microprocessor, so what I needed was one that could be tricked into thinking that the user port of the BBC Micro was a microprocessor bus.

National Semiconductor's MM58174A was the prime candidate, so the design was based on this chip. Figure I shows the pin-out of this IC.

You will see there are four data lines (D0-D3) which are used to read and write data to the chip. Also, there are four address lines (A0-A3) which are used to specify which register in the chip to read and write to.

In addition there is a read line (\overline{RD}), a write line (\overline{WR}) and a chip enable (\overline{CE}). The chip enable is an input that turns the device on so that it is ready for data transfer.

The bar over the top of the name indicates that a logic zero is required in order for the line name to be true.

For example, the chip is only enabled when the \overline{CE} line is at logic zero. When this line is a logic one the chip is not enabled.

This useful convention is very widely used and informs you instantly what polarity of signal is needed.

The other lines of this device supply it with power, signal an interrupt and enable the quartz crystal to be added to

THE BEEB BODY BUILDING COURSE

PART 12

provide the time reference.

On the user port we have only eight data input/output lines, and even by pressing control line 2 into service as an output we are still short of one output.

The answer is to multiplex the address and data information through the same four lines, leaving four lines for the control lines.

This requires the address information to be written to a latch just before we access the real time clock IC.

The full circuit is shown in Figure II. IC2 is the real time clock IC. It is powered from the computer when it is turned on, and by a Nicad battery when it is not.

Diode D1 prevents this battery from trying to power the whole computer when it is switched off. Remember, current can only flow one way through a diode. When the computer is turned on, the battery is trickle-charged through

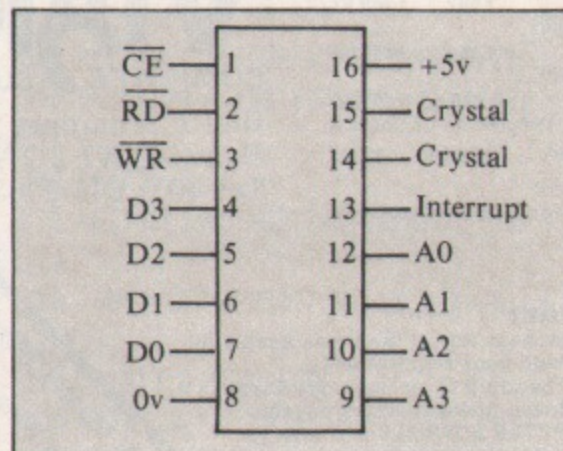


Figure 1: Pinout of the MM58174A real time clock

resistor R1 which limits the current about 1mA.

Diode D2 provides a low resistance path when the battery is powering the clock. The quartz crystal is attached to pins 14 and 15, and a small trimmer (variable capacitor) provides fine adjustment of the time keeping.

The data input/output connections are taken to the least significant four bits of the user port. These lines are also taken to IC1, a four-bit latch.

A latch is a circuit which takes a snapshot of the logic levels on its input and preserves them on its output. The event which triggers the snapshot for this IC is the rising edge of the clock signal (pin 9).

So, whenever this line makes the transition from a logic zero to a logic one, whatever is on the latch's four inputs is frozen and transferred to its four outputs.

As these outputs are connected to the address lines of the real time clock IC we talk of "clocking the address into the latch".

The only remaining function required is to set the read, write and chip select lines to their appropriate levels. This could be done directly by using the four remaining lines.

However, there would be a possibility that these lines might, owing to other software running, get themselves into a state where the real time clock was being told to read and write at the same time.

This is obviously a chip-destroying combination and so IC3 is used to make sure this can never happen.

This IC is a decimal decoder: when any decimal number is applied (in binary form) to its inputs, the corresponding output goes low.

For example, suppose the combination 0110 were applied to the inputs, then output number six would have a logic zero on it and all the other outputs would have a logic one on them.

Thus this IC ensures there is never a Read signal and a Write signal present at the same time. The cost of this protection is very small and so I thought it worthwhile to incorporate it.

The chip enable is connected directly to bit 7, and not through IC3, as it needs to be held low at the same time as a

MIKE COOK joins the Time Lords

When you had a

real time clock

**Not to mention
a calendar**

Read or Write signal.

The transistor in this signal path is to isolate the real time clock from the computer's user port.

If this were not included then, when the computer was switched off, this line would present a low impedance to earth effectively enabling the real time clock chip.

But as the power is off, this chip is being supplied by the battery at a reduced voltage, which is known as the "power down" mode.

In this mode you cannot read or write to the chip. With the chip enable connected to earth (low) in this mode, the time is remembered but not updated.

I must confess I only found this out when I made the first prototype, as the data sheets made no reference to the

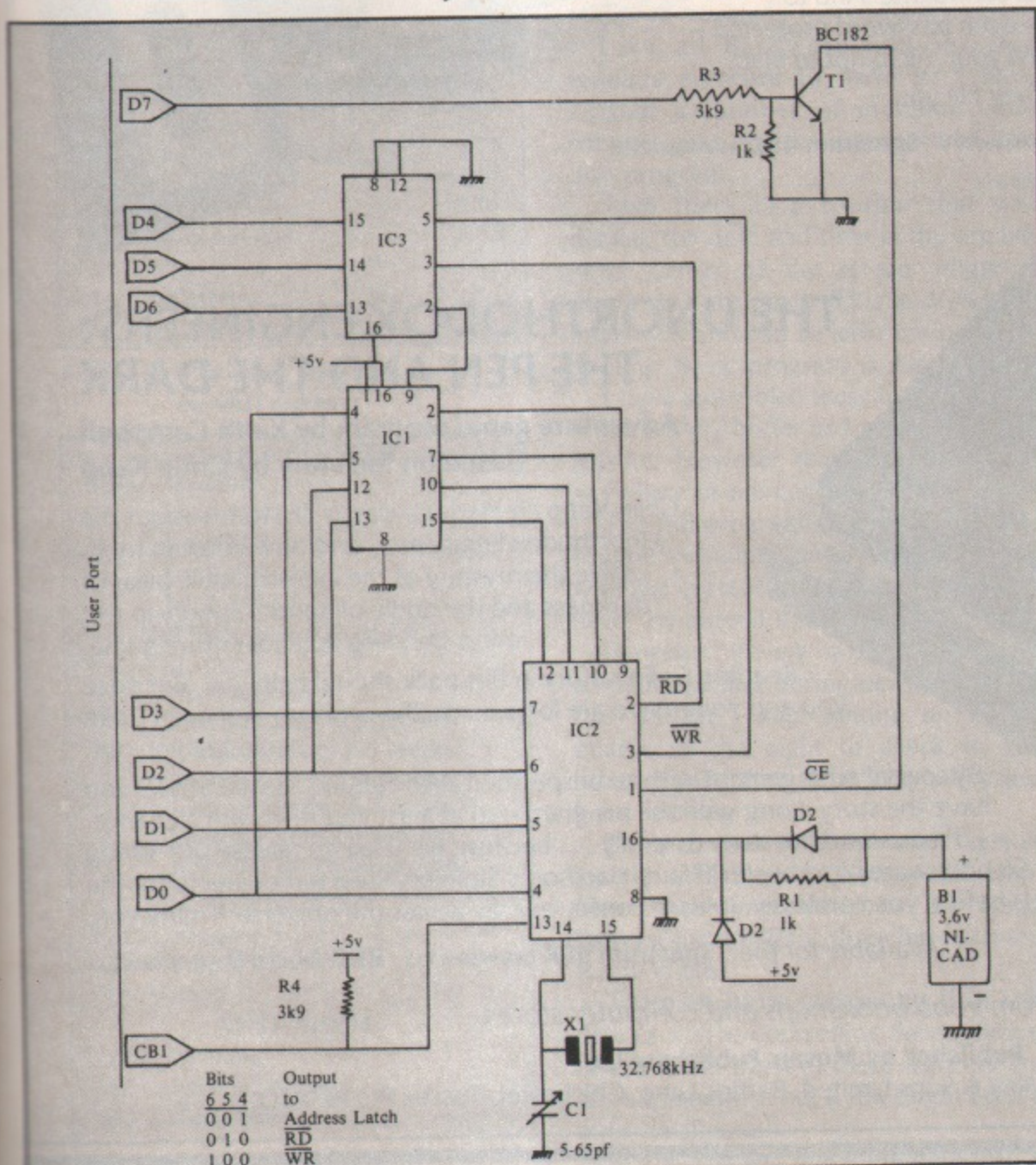
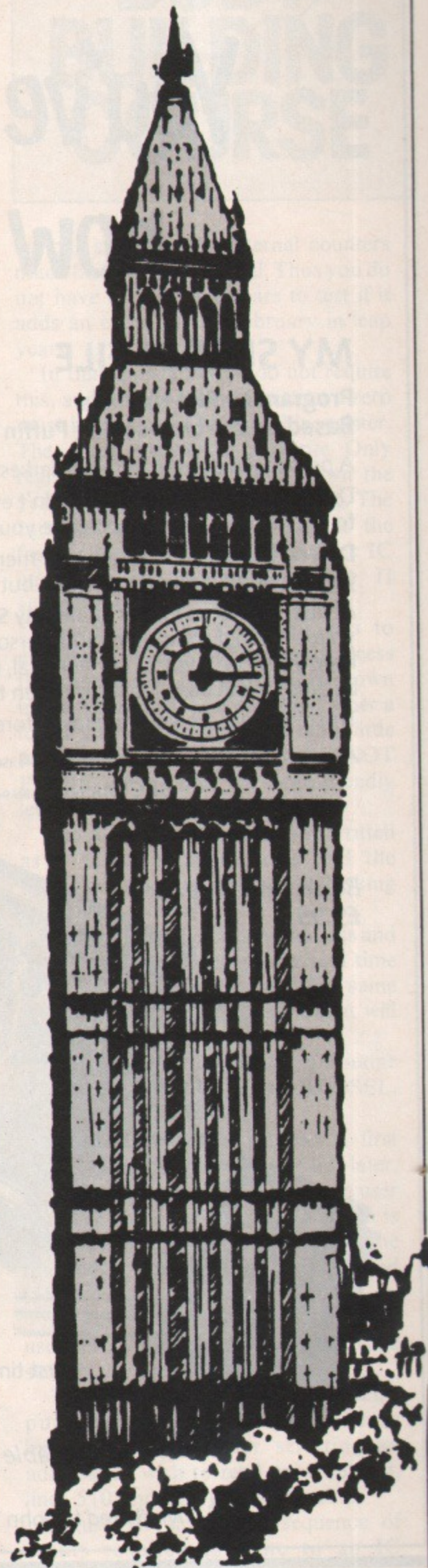


Figure II: The real time clock circuit

MOSAIC

MOSAIC

You've read the game... now play the book...

MY SECRET FILE

Program by Phil Nathans

Based on the best-selling Puffin book by John Astrop

A personal database for your darkest thoughts.

Do you have secrets you wouldn't even confide to your closest friend? Let alone your family?

Do you have secrets about your friends and family you wouldn't confide to anyone but yourself?

At last, you're no longer alone. **My Secret File** turns your personal computer into a personal confidante. And to keep your confidences confidential, it's even password protected – because these days, you can't even trust your micro not to blab.

Trust no-one: file your friends before they file you.

Available for the: **Commodore 64** ISBN 946855 30 7 **Spectrum 48K** ISBN 946855 35 8
BBC Micro B ISBN 946855 40 4

Book/cassette pack
£9.95



Book/cassette pack
£9.95



THE UNORTHODOX ENGINEERS: THE PEN AND THE DARK

Adventure game program by Keith Campbell
Based on the story by Colin Kapp

Colin Kapp created the classic SF stories about the Unorthodox Engineers – and now you can try to solve the mystery of the indestructible pillar of darkness and the riddle of contra-energy in this mind-bending text adventure game.

Reading Colin's story in this pack should help you. But once you and your micro are locked into the problem, not even Colin could get you out.

By special arrangement with an unspecified alien culture, Mosaic will let you have the story along with the program – so at least you're in with a chance.

Please read the story carefully . . . because we'd like to release our Spring SF bookware blockbuster (Harry Harrison's *Stainless Steel Rat* on micro for the first time!) before you carelessly unleash contra-energy across the universe. Thank you.

Available for the: **Spectrum 48K** ISBN 946855 15 3 **BBC Micro B** ISBN 946855 20 X

Available from good bookshops and computer stores.

Published by Mosaic Publishing Ltd



Marketed by John Wiley & Sons Limited, Baffins Lane, Chichester, Sussex PO19 1UD

BOOKWARE

THE BEEB BODY BUILDING COURSE

From Page 117

problem. It took several hours of head scratching to work out why the time was the same after switching on as it was on powering down.

At one stage I was going to incorporate this as a feature. Have you noticed that most "features" are really design errors?

This project could then have been entitled "An elapsed time indicator", measuring how long the computer had been switched on to give an indication of when maintenance was due.

Also, when the board was disconnected from the computer it proceeded to update the time normally, so it was ideal as a rental meter as well. Those of you who want this "feature" should just leave out the transistor.

The two resistors in the base circuit of

the transistor are to stop the same effect occurring when the computer is switched off but the disc drives are turned on.

When this happens, about one volt is present on this user port line which would be sufficient to turn the transistor on if it were not for R2 and R3 (I didn't know about that either before this project).

The real time clock IC is capable of generating an interrupt signal, so this is connected to control line one.

All the components plus a printed circuit board are available in Body Build Pack No. 9. (See Page 122.)

To connect this to the computer you need a ribbon cable with two IDC (Insulation Displacement Cable) sockets which are available as Body Build Pack No. 2.

Details about connecting the cable to the sockets were given in the July 1983 issue of *The Micro User*. Pack No. 9 simply requires soldering up, remembering to place the ICs and diodes the right way round.

The component reference numbers are printed on the board, so you can't really go wrong.

Like all hardware add-ons this requires software to drive it. I have written a number of machine code routines that may be incorporated into any program.

Also there is a routine that will display the date and time in the top left hand corner of the screen whatever mode you are using. This is driven by interrupts and can be left running while another Basic program is running.

I have assembled these routines to sit in the RS432 buffer as I seldom use this feature. However they may be placed anywhere in memory.

The full program also incorporates a routine to enable you to set up the clock with the correct time. Once set, it need never be altered again.

However, having said that, my wife complained that during development of this project I kept getting up in the middle of the night to check it was keeping good time. That's my story and I am sticking to it!

Table I shows the internal register locations of the real time clock chip. Note that some locations are Read Only, some are Write Only but most are Read/Write.

These locations contain the time and date as well as controlling the operation of the clock. Most of these registers are self-explanatory, but a few might need a little clarification.

Register 0 will place the chip into a test mode. This will feed clock pulses to

various stages of the internal counters much faster than is normal. Thus you do not have to wait four years to test if it adds an extra day to February in leap years.

In this application we do not require this, and so for normal operation a zero must be written in bit 3 in this register. The years register is a Write Only register. It is used to count down the years until a leap year comes along. The Interrupt register is used to set the frequency while the real time clock IC generates an interrupt. Table II summarises these registers.

Essentially, the computer has to generate a sequence of pulses to access these locations. The program is shown in the listing and, as it contains rather a lot of machine code it will need a little more explanation than most. DO NOT PANIC (please note the large friendly letters).

The machine code portion is written as a series of subroutines and the operation is best understood by looking at these separately.

As mentioned before, the address and data information sent to the real time clock chip are passed over the same lines, so we need a subroutine that will select an address.

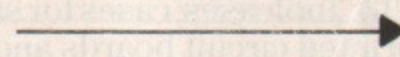
Lines 300-420 contain a subroutine to do just this: it is called REGSEL, short for Register Select.

The address to be latched is first salted away on the stack for use later, and lines 320 and 330 make all the user port lines outputs. Then the address is recovered from the stack (340) and the four most significant bits are cleared (350).

Bit 4 is set to one (360) and sent to the user port. Then bit 4 is cleared (380) and sent to the user port.

The effect of this is to give the latch a pulse and so store the address information. As, after selecting an address we wish to read or write to it, lines 510 and 520 enable the chip.

Figure III shows the sequence of events required to write to an IC



Register	Contents	Read or Write	Page Zero
0	Test mode/run	W	-
1	Tenths of seconds	R	&70
2	Units of seconds	R	&71
3	Tens of seconds	R	&72
4	Units of mins	R/W	&73
5	Tens of mins	R/W	&74
6	Units of hours	R/W	&75
7	Tens of hours	R/W	&76
8	Units of days	R/W	&77
9	Tens of days	R/W	&78
10	Day of week	R/W	&79
11	Units of months	R/W	&7A
12	Tens of months	R/W	&7B
13	Years	W	
14	Stop/start	W	
15	Interrupt	R/W	

Table 1: The real time clock internal registers

YEAR REGISTER	
Value	Meaning
8	Leap year
4	Leap year + 1
2	Leap year + 2
1	Leap year + 3
INTERRUPT REGISTER	
Value	Meaning
0	No interrupts
1	Interrupt after 0.5 second
9	Interrupt every 0.5 second
2	Interrupt after 5.0 seconds
10	Interrupt every 5.0 seconds
4	Interrupt after 60 seconds
12	Interrupt every 60 seconds
START/STOP	
Value	Meaning
0	Stop
1	Start
TEST MODE	
Value	Meaning
0	Normal running
8	Test mode

Table 2: Special registers in the real time clock

48K
SPECTRUM

BBC
Micro
Model B

Regardez!

LANGUAGE LEARNING AIDS FOR FRENCH, GERMAN & SPANISH

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

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

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

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

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

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

Available from dealers, large stores or mail order.

Also Available "THE SPANISH TUTOR"

Kosmos Software

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



Kosmos Software, 1 Pilgrims' Close, Harlington, Dunstable, Beds LU5 6LX.

Please supply the following programs for the computer B2
(BBC/SPECTRUM) (Prices include postage & packing)

The French Mistress Level A @ £9.95 The French Mistress Level B @ £9.95
The German Master Level A @ £9.95 The German Master Level B @ £9.95
The Spanish Tutor Level A @ £9.95 The Spanish Tutor Level B @ £9.95

Mr/Mrs/Miss.....

Address.....

Post code.....

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

BBC MICRO COMPUTER CASES BY ANTLER.



Antler, the foremost name in British luggage announce the D618 - BBC micro computer case:- External dimensions 22" x 16" x 6" deep (560mm x 450mm x 150mm)

* High impact quality rigid ABS shells give excellent wearing characteristics and protection. * High density foam interiors with hard wearing black brush nylon. * Exclusive hardened aluminium box girder frame with radius corners for additional strength. * Steel toggle locks with lever action draw the frame tightly together. This with the tongue and groove frame protects against dust and moisture. * Double handles bolted through the frame provide a strong secure anchorage. * Cases carry after sales service and 2 years guarantee covering materials and faulty workmanship.

INTERIOR LAYOUT

Interior has profile cut foam to provide a firm grip to the computer, tape machine and 9 cassettes. Hand grip access slots for easy insertion and withdrawal of equipment. Foam protection beneath equipment.

Separate spacious compartment with

rigid securing top for leads, 4 block 13A connector, extras - manuals, books or cassettes, plus others.

SPECIALIST CASES DIVISION
manufacturers a range of ABS cases -

VIZ: Toolcases, cases for samples and sales display, carrying disc packs, printed circuit boards and many others.

 ANTLER THE BEST OF BRITISH LUGGAGE


£49.90 + £2.50 carr.
(incl. VAT)

Contact us for your particular needs and further information.
Gordon Ashworth - Manager, Specialist Cases Division,
Antler Ltd, Bury, Lancs. BL9 9EF Tel: 061-764 5241.

Name.....

Company.....

Address.....

 Phone No.

OF PALL MALL

From Page 119

location. This is typical of the timing diagram for many microprocessor components, so it will be quite educational if you can follow what is happening.

The subroutine to write to a register is contained in lines 430-530. The location is assumed to be in the accumulator and the value to be written is in the X index register.

The subroutine first calls the register-select subroutine which we first looked at. Then it transfers the value to be written into the accumulator and cleans it up (450, 460).

Bits 6 and 7 are set (470) to enable the chip and activate the write line. The write line is then de-activated (490) and finally the chip is disabled.

Using this subroutine, we can write to any IC location in the real time clock.

Most of the time however, we wish to read the time from the clock. The subroutine JUST1 (200-290) will read just one location in the IC.

This subroutine assumes the address has been selected and the chip enabled by the REGSEL routine before it is entered.

It first makes the four least significant bits of the user port into inputs (200, 210) and then activates the read line on the IC (220).

It then gets the data (240) and stores it into the Y index register (260). It then "cleans up" the signals by de-activating the read line and disabling the IC.

In order to read all the time and date values, subroutine REGREAD (100-190) transfers all the relevant registers into page zero memory.

The memory may then be examined by use of the indirection instructions. This is useful if you require any part of the time or date in numeric form.

Table I shows the page zero locations where each register is stored. For most applications, the date will be most useful in the form of a string. This is stored starting at a memory location represented by the variable DATE.

Thus it can be accessed by the string indirection operator. For example the command:

PRINT \$DATE

will print the string containing the date.

This string is updated by calling the UPDATE subroutine in lines 770-940. This takes the values stored in page zero and converts them into Ascii values (900).

They are then stored in the string previously set up in lines 1410-1430. For simplicity, this only updates the time and not the day and date. So if you

are burning the midnight oil you could be misled.

The subroutine DISTIME is used to display this string in the top left-hand corner of the display.

Using the operating system call, it first gets the current position of the cursor and stores it on the stack (540-600). Then the cursor is moved to the top of the screen (610) and the string is printed (620-690).

The cursor is then restored to its original position (700-760). The printing routine used will go directly to the screen and will not be directed to the printer if it is switched on.

All the previous routines can be called explicitly from your program, but it is possible to make the real time clock IC generate an interrupt at intervals and use this to automatically display the time and date.

This should be used with caution, as some of the machine-operating system calls made are not fully re-entrant.

This means that, if the interrupt occurs while the computer is executing one of these routines and the interrupt routine calls the same routine, the computer will get its under-garments in a twist.

The only time I have seen this happening is when trying to edit a line with the real time clock display on.

The subroutine IRQSR (interrupt request service routine) will handle all the interceptions of any interrupt generated, and take the appropriate action if it is the real time clock causing it.

The main task of dealing with the real

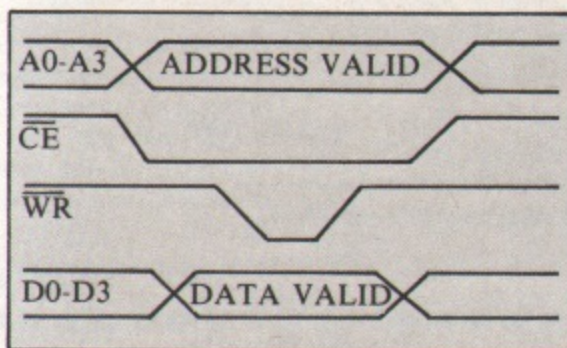


Figure III: Write cycle waveforms

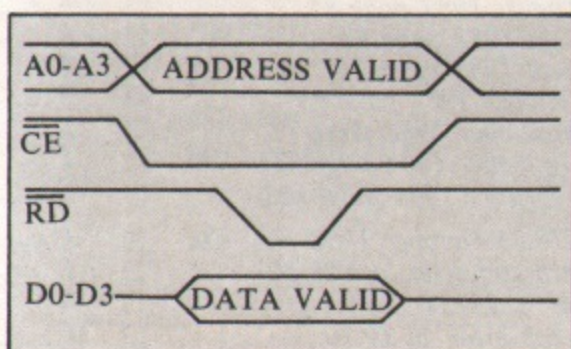


Figure IV: Read cycle waveforms

THE BEEB BODY BUILDING COURSE

time clock is handled in the subroutine START.

The interrupt is first cleared by writing a zero to the real time clock's interrupt register and then by reading it three times. (Don't ask me why, it just says that in the data sheet.)

The display is updated (1150) and the interrupt timer is set to generate another interrupt in half a second.

The real time clock is capable of timing to a tenth of a second. But I have not included this in the display as I am only updating the display every half a second.

It is possible to get the real time clock to interrupt at other time intervals by writing a different number to register 15, See Table II.

The rest of the program initialises memory locations needed by these machine code routines and programs two function keys to start and stop the automatic display.

Note that the call address is given in hex rather than as a variable name. This allows the program to be deleted and a new one run, and the keys will still work.

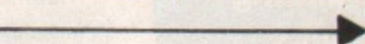
The procedure at the end of the program allows the initial setting of the clock (1560-2090). This need only be entered once as the time should be maintained after that.

However, when crossing international date lines and coping with the clocks going forwards and backwards it will need to be used. The year is needed to see if it is a leap year, but it cannot be read.

This program must be run once on power-up to initialise the computer. This could easily be called from a !BOOT file for those of you with discs.

If you have tape, remember it will only be necessary to run this program if you want to use the real time clock. If not, then just leave it attached, as the computer will be charging up its batteries.

A fine adjustment may be made on



From Page 121

the time keeping properties of this board by use of the small trimmer. If the trimmer is closed up (more of the two plates overlapping) then the clock will run slower, opened up it will run faster.

This adjustment is very fine and the effects will only be noticed over several days.

Having built the basic board and written the driving software, it can now be incorporated into your own programs.

Imagine a program that scans a data base and tells you of any birthdays in the coming week, or one that works out the number of shopping days to Christmas. (*Not another one already-Ed.*)

How about the ultimate in desk diaries that will store your appointments and remind you when to put your best suit on?

The computer could even be

programmed to give you cheery little messages if powered up on your birthday or on holidays, or inform you that you should be getting paid at double-time rate.

If you have a speech synthesiser fitted, you can have your very own speaking clock! Write in and tell me what you will be using it for and we will publish the best ideas and programs.

That's all for now, but watch out for something very different in our first anniversary issue.

Body Build Pack No 9 consists of:
IC1 74LS175 Quad edge-triggered latch; IC2 MM58174A Real-time clock; IC3 74LS42 Decimal decoder; D1 & D2 1N4148 diode; C1 5pf to 65pf variable capacitor; T1 BC182 transistor; R1 & R2 1k resistor; R3 & R4 3k9 resistor; X1 32.768kHz miniature watch crystal; B1 3.6v PCB mounting

Ni-Cad battery; 20 Way IDC straight solder tail plug; one printed circuit board; three 16-pin IC sockets.

Note - you will also need Pack No 2 or similar.

● You can order this pack and previous ones with the order form on Page 122.

THE BEEB BODY BUILDING COURSE

Beeb Body Building Clock listing

```
10 PRINT "The Beeb Bodybuilding
   Course"
20 PRINT "Feb 1984"
30 PRINT "HARDWARE REAL TIME CLOCK
   & CLANDER"
40 PRINT "By Mike Cook"
50 NVEC=&80
60 FOR A%=0 TO 2 STEP 2
70 P%=&A00
80 [
90 OPT A%
100 .REGREAD LDX #1
110 .LOOP TXA
120 JSR REGSEL
130 JSR JUST1
140 TYA
150 STA &6F,X
160 INX
170 CPX #13
180 BNE LOOP
190 RTS
200 .JUST1 LDA #&F0
210 STA &FE62
220 LDA #&A0
230 STA &FE60
240 LDA &FE60
250 AND #&F
260 TAY
270 LDA #&00
280 STA &FE60
290 RTS
300 .REGSEL
310 PHA
320 LDA #&FF
330 STA &FE62
340 PLA
350 AND #&F
360 OR A #&10
370 STA &FE60
380 AND #&EF
390 STA &FE60
400 LDA #&80
410 STA &FE60
420 RTS
430 .WRREG
440 JSR REGSEL
450 TXA
460 AND #&F
470 OR A #&C0
480 STA &FE60
490 AND #&8F
500 STA &FE60
510 LDA #&00
520 STA &FE60
530 RTS
540 .DISTIME
550 LDA #134
560 JSR &FFF4
570 TYA
580 PHA
590 TXA
600 PHA
610 LDA #30
   :JSR &FFBC
620 LDA #0
   :STA &7E
630 .MORE LDY &7E
640 LDA (&7C),Y
650 JSR &FFBC
660 INC &7E
670 LDA &7E
680 CMP #19
690 BNE MORE
700 LDA #31
710 JSR &FFBC
720 PLA
730 JSR &FFBC
740 PLA
750 JSR &FFBC
760 RTS
770 .UPDATE
780 JSR REGREAD
790 LDY #11
800 LDX #&76
810 .LOOP2 JSR COPY
820 JSR COPY
830 INY
840 CPX #&70
850 BNE LOOP2
860 JSR DISTIME
870 RTS
880 .COPY
890 LDA 0,X
900 OR A #&30
910 STA (&7C),Y
920 DEX
930 INY
940 RTS
950 .IROSR
960 LDA &FE6D
```

This listing is included in this month's cassette tape offer. See order form on Page 137.

Beeb Body Building Clock listing

From Page 123

```

970 ROL A
   :ROL A
980 ROL A
   :ROL A
990 BCC CONT
1000 TXA
   :PHA
1010 TYA
   :PHA
1020 LDA &FE6D
1030 OR A &&10
1040 STA &FE6D
1050 JSR START
1060 PLA
   :TAY
1070 PLA
   :TAX
1080 .CONT JMP (&80)
1090 .START
1100 LDA #15
   :LDX #0
   :JSR WRREG
1110 LDA #15
   :JSR REGSEL
1120 JSR JUST1
1130 JSR JUST1
1140 JSR JUST1
1150 JSR UPDATE
1160 LDA #15
   :LDX #1
   :JSR WRREG
1170 RTS
1180 .DATE
1190 J
1200 NEXT
1210 ?&7C=DATE MOD 256
1220 ?&7D=DATE DIV 256
1230 DATA Sun,Mon,Tue,Wed,Thr,Fri
   ,Sat
1240 DATA Jan,Feb,Mar,Apr,May,Jne
   ,Jly,Aug,Sep,Oct,Nov,Dec
1250 DIM DAY$(7),MONTH$(12)
1260 FOR A=1 TO 7
1270 READ DAY$(A)
1280 NEXT
1290 FOR A=1 TO 12
1300 READ MONTH$(A)
1310 NEXT
1320 PRINT "DO YOU WANT TO RESET THE
   CLOCK"
1330 A$=GET$
1340 IF A$="Y"
   THEN PROC_SETUP
1350 FOR B=1 TO 3
1360 AZ=15
1370 CALL REGSEL
1380 CALL JUST1
1390 NEXT
1400 CALL REGREAD

```

```

1410 T$=DAY$(?&79)+" "+MONTH$(?&7B)*1
   0 +?&7A)+" "+CHR$(?&78 OR &30)+
   CHR$(?&77 OR &30)+" "+CHR$(?&76
   OR &30)+CHR$(?&75 OR &30)+
   ":"+CHR$(?&74 OR &30)+CHR$(?&73
   OR &30)
1420 T$=T$+" "+CHR$(?&72 OR &30)+
   CHR$(?&71 OR &30)
1430 $DATE=T$
1440 IF (?&206=IRDSR MOD 256)
   AND (?&207=IRQSR DIV 256)
   THEN 1480
1450 ?&80=?&206
   :?&81=?&207
1460 ?&206=IRQSR MOD 256
1470 ?&207=IRDSR DIV 256
1480 ?&FE6C=?&FE6C AND &EF
1490 ?&FE6E=?&FE6E OR &10
1500 *KEY 0 CALL &AC4 1M
1510 *KEY 9 XZ=0
   :AZ=15
   :CALL &A411M
1520 PRINT "FUNCTION KEY 0 WILL START
   THE DISPLAY"
1530 PRINT "FUNCTION KEY 9 WILL STOP
   THE DISPLAY"
1540 PRINT "THE DISPLAY MUST BE STOPED
   FOR EDITING"
1550 END
1560 DEF PROC_SETUP
1570 REPEAT
1580 XZ=0
   :AZ=14
   :CALL WRREG
1590 XZ=0
   :AZ=0
   :CALL WRREG
1600 REPEAT
1610 INPUT "INPUT THE YEAR",YEAR
1620 IF YEAR < 1980
   THEN PRINT "LIVING IN THE DARK
   AGES THEN"
1630 UNTIL YEAR > 1979
1640 YEAR=YEAR-1979
1650 XZ=16
1660 REPEAT
1670 XZ=XZ DIV 2
1680 IF XZ=0
   THEN XZ=8
1690 YEAR=YEAR-1
1700 UNTIL YEAR=0
1710 AZ=13

```

```

   :CALL WRREG
1720 INPUT "INPUT THE MONTH NUMBER"
   ,MONTH
1730 IF MONTH < 1 OR MONTH > 12
   THEN 1710
1740 XZ=MONTH DIV 10
1750 AZ=12
   :CALL WRREG
1760 XZ=MONTH MOD 10
1770 AZ=11
   :CALL WRREG
1780 INPUT "INPUT THE DAY OF THE MONTH"
   ,DMONTH
1790 IF DMONTH < 1 OR DMONTH > 31
   THEN 1770
1800 XZ=DMONTH DIV 10
1810 AZ=9
   :CALL WRREG
1820 XZ=DMONTH MOD 10
1830 AZ=8
   :CALL WRREG
1840 INPUT "INPUT DAY NUMBER (SUNDAY=1
   )",DAYNUM
1850 IF DAYNUM < 1 OR DAYNUM > 7
   THEN 1830
1860 XZ=DAYNUM
1870 AZ=10
   :CALL WRREG
1880 INPUT "INPUT THE HOUR (24 HOUR
   MODE) ",HOUR
1890 IF HOUR < 0 OR HOUR > 23
   THEN 1870
1900 XZ=HOUR DIV 10
1910 AZ=7
   :CALL WRREG
1920 XZ=HOUR MOD 10
1930 AZ=6
   :CALL WRREG
1940 INPUT "INPUT NUMBER OF MINUTES
   PAST THE HOUR",MINS
1950 IF MINS < 0 OR MINS > 59
   THEN 1930
1960 XZ=MINS DIV 10
1970 AZ=5
   :CALL WRREG
1980 XZ=MINS MOD 10
1990 AZ=4
   :CALL WRREG
2000 PRINT
2010 PRINT DAY$(DAYNUM);" the ";DMONTH
   ;" ";MONTH$(MONTH)
2020 PRINT "TIME ";HOUR;":";MINS
2030 PRINT "IS THIS OK"
2040 A$=GET$
2050 UNTIL A$="Y"
2060 PRINT "PRESS SPACE BAR TO START"
2070 A$=GET$
2080 XZ=1
   :AZ=14
   :CALL WRREG
2090 ENDPROC

```

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July issue of The Micro User.

Computerama

GRUNDIG 14" TV/MONITOR

RGB input for a super clear display. The picture must be seen to be believed. We have not seen better colour on any dedicated monitor.



ORDER TODAY, we guarantee that you will not be disappointed. And remember, when you finish computing, just flick the switch and you have a super quality 14" colour TV - what better way to justify the expense to your wife or girlfriend!

Complete with lead for BBC for only

£289 inc VAT

Turn your BBC into a powerful business system with the **NEW TORCH Z80 Processor Board plus 64K memory plus FREE software valued at over £1,100.**

- ONLY £429 inc. VAT.

Software includes:

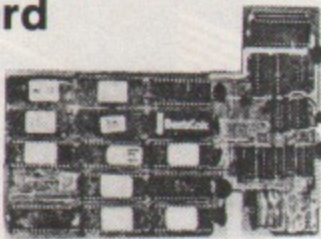
- * Perfect Writer
- * Perfect Speller
- * Perfect Calc
- * Perfect Filer
- * Torch Net
- * Commanex Business Games

Orders received before February 29th - will receive a copy of our enhanced utilities disc FREE.

HURRY - limited numbers available.

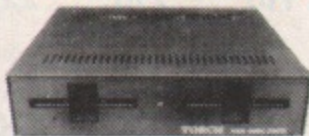
AT PL SIDEWISE Rom Expansion Board

- * Full sidewise Rom Expansion to 16 Roms
- * 16K Battery backed CMOS Ram option
- * No soldering required to fit sidewise
- * Plug-in-and-go construction - Mounts neatly inside the BBC machine.
- * Full buffering of address and data busses - prevents data bus loading problems associated with unbuffered boards.
- * Pin1 of on board sockets are connected properly - No spurious crashes due to this known fault on BBC
- * Existing sockets on BBC are usable. All eprom sockets are accessible without removing sidewise.



ONLY £43.70
+ £1.00 carriage

TORCH Z80 DISC PACK with over £1,100 of software FREE



NOW ONLY £835 inc. vat

Free carriage UK only

Software includes:

- * PERFECT WRITER * PERFECT SPELLER * PERFECT CALC
- * PERFECT FILER * TORCH NET * Comanex - The Interactive Management Game. Approved and used by leading management consultants. The TORCH Z80 DISC PACK is the most powerful BBC Disc upgrade available, it provides 800K of storage plus a Z80 Second Processor running Torch's own CP/M compatible operating system - over 200 packages now available - discs can also be used for storage under Acorn D.F.S. system.

Clip this ad to your order to receive free 40/80 T converter program.

BBC	INC VAT
Acorn Electron	199.00
BBC Model B	399.00
BBC Model B + DOS	469.00
BBC Disc Upgrade	97.00
BBC A-B Full Upgrade	69.00
BBC Teletext Receiver	225.00
BBC Z80 2nd Processor	289.00
BBC 6502 2nd Processor	299.00
DISC DRIVES	INC VAT
LVL Single x 100K Drive	265.00
LVL Expansion Drive	149.00
LVL Dual 100K	389.00
Pace Single 100K	212.00
Pace Single 40/80T D/Sided	368.00
Pace Dual 100K	388.00
Pace Dual 40/80T D/Sided	699.00
Torch Dual 400K Z80 Disc Pack	835.00
Pace 200K 40T D/Sided	270.00
Opus Single 100K	199.00

ORDER A COMPLETE SYSTEM - GET ALL LEADS FREE

MONITORS	INC VAT
Microvitec 14" Colour	247.00
Sanyo 14" Colour	286.00
Kaga 14" Colour M/Res	274.85
Kaga 14" H/Res	327.75
Kaga 14" VH/Res	458.85
Sanyo 12" Green	99.00
Kaga 12" Green	125.00
14" TV/Colour Monitor	289.00
Kaga 12" Amber	136.85
RGB-BBC - Kaga	8.00
PRINTERS	INC VAT
Epson RX80	308.00
Epson RX80FT *NEW	366.85
Epson FX80	425.00
Epson FX100 *NEW	569.00
NEC PC8023	348.00
Star DP510	289.00
Shinwa CP80	295.00
Juki 6100 Daisywheel	429.00
Smith-Corona TP1/E	389.00

MISCELLANEOUS	INC VAT
Sanyo DR101 Data Recorder	44.95
Cassette leads - all types	2.80
Acorn Joysticks	13.00
Quickshot Joystick (BBC)	19.95
Printer Cable (Parallel) 1.2 m	13.00
BBC Deluxe Cover	5.95
Light Pen	28.75
Data Cassettes 5 x C20	1.95
The Plug Power Filter	14.95
ROM SOFTWARE	
Wordwise	39.95
View	59.00
Disc Doctor	32.95
Termi (terminal emulator)	32.95
Graphics ROM	31.95
Gremlin	31.95
Pace D.F.S.	39.95
LVL Double Density Upgrade	89.95
ROM Expansion Board (ATPL)	43.75
System Spy	23.95
D.A. Screen Dump Utility	18.50
HCCS Forth	59.95
HCCS Logo Forth	87.50
HCCS Pascal	59.95
X-Cal ROM	74.50

BOOKS	NO VAT
Advanced User Guide (carriage £2)	12.95
30 Hour Basic	5.95
A.L.P. for BBC Micro	8.95
BBC Revealed	7.95
BBC Micro Disc Companion	7.95
Advanced Programming Techniques	7.95
Basic Programming on the BBC Micro	5.95
Creative Graphics	7.50
Graphs & Charts	7.50
Lisp Manual	7.50
Forth Manual	7.50
BCPL Manual	15.00
35 Educational Programs	6.95
30 Programs for BBC	4.95
Further Programs	5.95
100 Programs for the BBC Micro	6.95
Discovering BBC Machine Code	6.95
Easy Programming for the BBC Micro	5.95
21 Games for the BBC	5.95
BBC Disk Manual	1.95
The Book of Listings	3.75
The BBC Micro an Expert Guide	6.95
Introducing the BBC Micro	5.95
The Computer Book	6.75
Programming the BBC Micro	6.50
Further Programming the BBC Micro	5.95

ROM SOFTWARE	
Wordwise	39.95
View	59.00
Disc Doctor	32.95
Termi (terminal emulator)	32.95
Graphics ROM	31.95
Gremlin	31.95
Pace D.F.S.	39.95
LVL Double Density Upgrade	89.95
ROM Expansion Board (ATPL)	43.75
System Spy	23.95
D.A. Screen Dump Utility	18.50
HCCS Forth	59.95
HCCS Logo Forth	87.50
HCCS Pascal	59.95
X-Cal ROM	74.50

BOOKS	NO VAT
Advanced User Guide (carriage £2)	12.95
30 Hour Basic	5.95
A.L.P. for BBC Micro	8.95
BBC Revealed	7.95
BBC Micro Disc Companion	7.95
Advanced Programming Techniques	7.95
Basic Programming on the BBC Micro	5.95
Creative Graphics	7.50
Graphs & Charts	7.50
Lisp Manual	7.50
Forth Manual	7.50
BCPL Manual	15.00
35 Educational Programs	6.95
30 Programs for BBC	4.95
Further Programs	5.95
100 Programs for the BBC Micro	6.95
Discovering BBC Machine Code	6.95
Easy Programming for the BBC Micro	5.95
21 Games for the BBC	5.95
BBC Disk Manual	1.95
The Book of Listings	3.75
The BBC Micro an Expert Guide	6.95
Introducing the BBC Micro	5.95
The Computer Book	6.75
Programming the BBC Micro	6.50
Further Programming the BBC Micro	5.95

BOOKS	NO VAT
Advanced User Guide (carriage £2)	12.95
30 Hour Basic	5.95
A.L.P. for BBC Micro	8.95
BBC Revealed	7.95
BBC Micro Disc Companion	7.95
Advanced Programming Techniques	7.95
Basic Programming on the BBC Micro	5.95
Creative Graphics	7.50
Graphs & Charts	7.50
Lisp Manual	7.50
Forth Manual	7.50
BCPL Manual	15.00
35 Educational Programs	6.95
30 Programs for BBC	4.95
Further Programs	5.95
100 Programs for the BBC Micro	6.95
Discovering BBC Machine Code	6.95
Easy Programming for the BBC Micro	5.95
21 Games for the BBC	5.95
BBC Disk Manual	1.95
The Book of Listings	3.75
The BBC Micro an Expert Guide	6.95
Introducing the BBC Micro	5.95
The Computer Book	6.75
Programming the BBC Micro	6.50
Further Programming the BBC Micro	5.95

BOOKS	NO VAT
Advanced User Guide (carriage £2)	12.95
30 Hour Basic	5.95
A.L.P. for BBC Micro	8.95
BBC Revealed	7.95
BBC Micro Disc Companion	7.95
Advanced Programming Techniques	7.95
Basic Programming on the BBC Micro	5.95
Creative Graphics	7.50
Graphs & Charts	7.50
Lisp Manual	7.50
Forth Manual	7.50
BCPL Manual	15.00
35 Educational Programs	6.95
30 Programs for BBC	4.95
Further Programs	5.95
100 Programs for the BBC Micro	6.95
Discovering BBC Machine Code	6.95
Easy Programming for the BBC Micro	5.95
21 Games for the BBC	5.95
BBC Disk Manual	1.95
The Book of Listings	3.75
The BBC Micro an Expert Guide	6.95
Introducing the BBC Micro	5.95
The Computer Book	6.75
Programming the BBC Micro	6.50
Further Programming the BBC Micro	5.95

BOOKS	NO VAT
Advanced User Guide (carriage £2)	12.95
30 Hour Basic	5.95
A.L.P. for BBC Micro	8.95
BBC Revealed	7.95
BBC Micro Disc Companion	7.95
Advanced Programming Techniques	7.95
Basic Programming on the BBC Micro	5.95
Creative Graphics	7.50
Graphs & Charts	7.50
Lisp Manual	7.50
Forth Manual	7.50
BCPL Manual	15.00
35 Educational Programs	6.95
30 Programs for BBC	4.95
Further Programs	5.95
100 Programs for the BBC Micro	6.95
Discovering BBC Machine Code	6.95
Easy Programming for the BBC Micro	5.95
21 Games for the BBC	5.95
BBC Disk Manual	1.95
The Book of Listings	3.75
The BBC Micro an Expert Guide	6.95
Introducing the BBC Micro	5.95
The Computer Book	6.75
Programming the BBC Micro	6.50
Further Programming the BBC Micro	5.95

Using Floppy Disks with the BBC Micro	9.95
Creating Adventure Programs on the BBC	6.95
Games BBC Computers Play	6.95
Beyond Basic	6.95

WE ACCEPT INSTITUTIONAL EDUCATIONAL ORDERS

PROGRAM POWER	
Killer Gorilla	7.95
Chess B	7.95
Croaker	7.95
Danger UXB	7.95
Escape Moonbase Alpha	7.95
Felix in Factory	7.95
Felix & Fruit Monsters	7.95
Swoop	7.95
World Geography	6.85
Chemistry	6.85
Physics	6.85
Demon Decorator	6.85
Alien Swirl	7.95
Alien Destroyers	7.95
Moon Raider	7.95
Labyrinths of LaCoshe	7.95
Cybertron Mission	7.95
Zarm	7.95

SUPERIOR SOFTWARE	INC VAT
Colditz Adventure	7.95
Galaxians	7.95
Road Runner	7.95
Hunchback	7.95
2002	7.95
Pontoon	7.95
OPUS	INC VAT
Dogfight	9.95
KOSMOS	INC VAT
French Mistress Level A	9.95
French Mistress Level B	9.95
German Master Level A	9.95
German Master Level B	9.95

OPUS	INC VAT
Dogfight	9.95
KOSMOS	INC VAT
French Mistress Level A	9.95
French Mistress Level B	9.95
German Master Level A	9.95
German Master Level B	9.95

RING FOR LATEST PRICES, MANY REDUCTIONS EXPECTED

BBC/ACORN SOFTWARE	
Algebraic Manipulation	9.95
Arcadians	9.95
Business Games	9.95
Castle of Riddles	9.95
Creative Graphics	9.95
Countdown to Noon	9.95
Forth	16.85
Graphs & Charts	9.95
Hopper	9.95
Lisp	16.85
BCPL (Rom + Disc)	99.95
Missile Base	9.95
Meteors	9.95
Monsters	9.95
Peeko Computer	9.95
Planetoid	9.95
Rocket Raid	9.95
Snooper	9.95
Sphinx Adventure	9.95
Starship Command	9.95
Snapper	9.95
View	59.00
Speech Kit	55.00
Shirley Conran's Magic Garden	9.95
Personal Money Management	9.95
Draughts and Reversi	9.95
Wordhunt	9.95
White Knight II	10.00
Vutype	15.00
Tax Calc	20.00
Beyond Basic	10.00
Toolbox	21.00
Canyon	10.00
Record Keeper	15.00
Doctor Who	10.00

SOFTWARE INVASION	
3D Bomb Alley	7.95
Gunsmoke	7.95
Attack on Alpha Centauri	7.95
Vortex	7.95
VISIONS	
Snooper	7.95
Daredevil Dennis	7.95
PSION	
Saloon Sally	7.95
VuCalc	14.95
VuFile	14.95

MELBOURNE HOUSE	
The Hobbit	14.95

MELBOURNE HOUSE	
The Hobbit	14.95

MELBOURNE HOUSE	
The Hobbit	14.95

MELBOURNE HOUSE	
The Hobbit	14.95

MELBOURNE HOUSE	
The Hobbit	14.95

MELBOURNE HOUSE	
The Hobbit	14.95

CLARE	INC VAT
Graphkey	7.95
Replica II (disc only)	12.95
Graph Disc	12.95
Beeb-Synth	7.95
The Key (Disc Only)	12.95
Single Key Entry	4.95
Shadow/Inspector	7.95
State 40/80T for Discs	7.95

DR SOFT	
747 Flight Simulator	6.95
AMCOM	
Space Highway	6.95
GEMINI GAMES	
Missile Control	9.95
Liberator	9.95
Caterpillar	9.95
GEMINI	INC VAT
Cash Book Acc	95.00
Inv & Statements	19.95
Commercial Acc	19.95
Mailing List	19.95
Data Base	19.95
Stock Control	19.95
Home Accounts	19.95

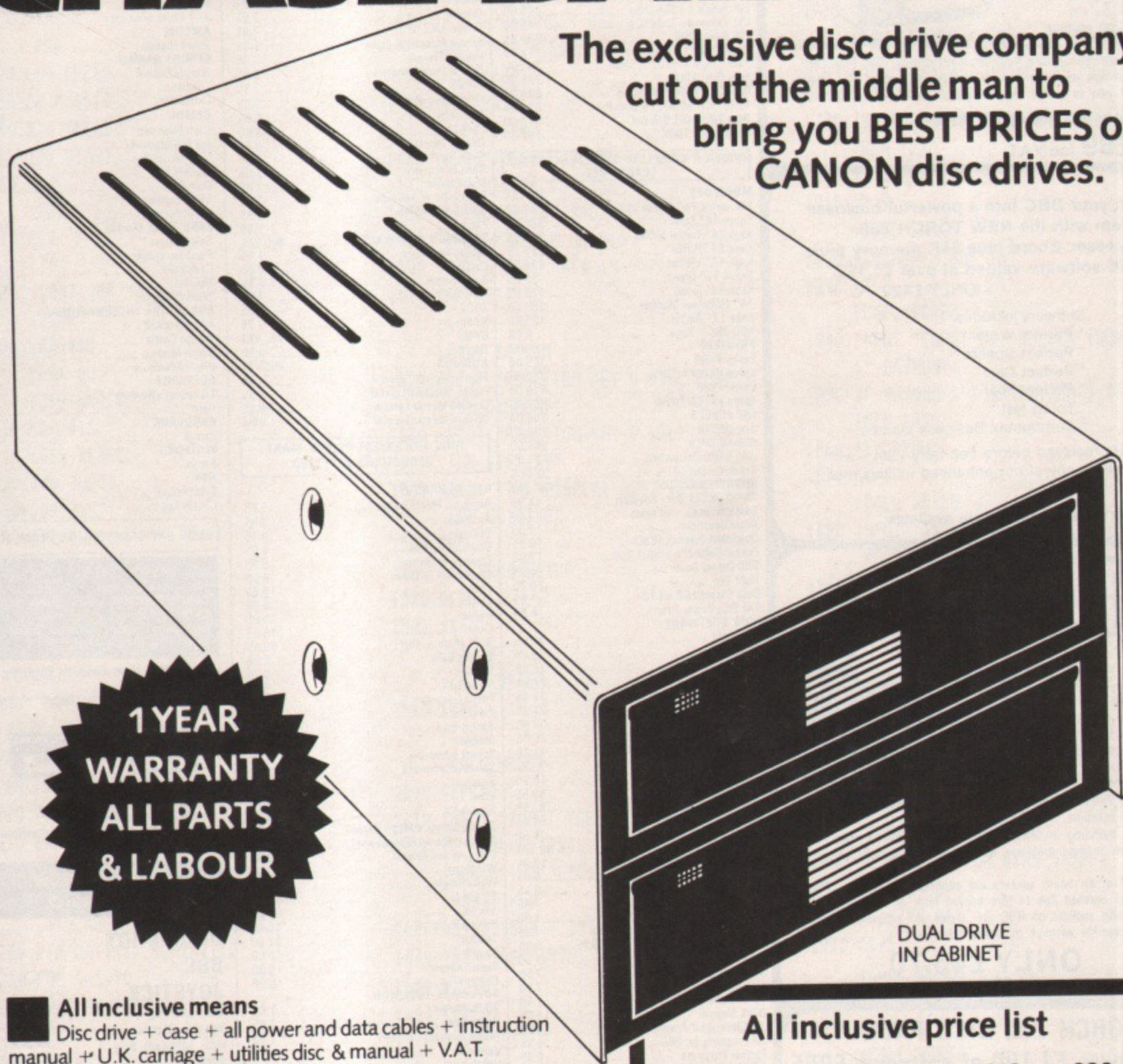
EASY TABS (Torch)	EXC VAT
--------------------------	----------------

**BBC
MICRO**

DISC DRIVES

CHASE DATA LTD

The exclusive disc drive company,
cut out the middle man to
bring you **BEST PRICES** on
CANON disc drives.



**1 YEAR
WARRANTY
ALL PARTS
& LABOUR**

All inclusive means
Disc drive + case + all power and data cables + instruction manual + U.K. carriage + utilities disc & manual + V.A.T.

Quality product
State of the art disc drives. E.g. Model 220 features: unique on-board switching that both reads **and writes** in 40/80 TK modes (selected mode indicated by two-colour LED on front panel).

Full service support
Our units come with a full 1 year warranty on parts & labour. Disc drive service is via the leading U.K. Independent Drive Service Company.

Send remittance (Cheque only please) with your order to:

CHASE DATA LTD

P.O. Box 6, Woking, Surrey GU21 4PB. (Tel: 0784 38487).

DUAL DRIVE
IN CABINET

All inclusive price list

MODEL	110	210	220
FORMATTED CAPACITY/DRIVE ON BBC	100K	200K	400K
SINGLE DRIVE IN CABINET	£170	£221	£263
DUAL DRIVE IN CABINET	£320	£409	£499

All units available with on-board power supply.
Additional cost: £25.

Alien Invasion listing

From Page 69

```

5 REM (c) The Micro User
10 ENVELOPE 1,5,0,0,0,6,3,3,127
  ,-5,-5,-5,120,60
20 ENVELOPE 2,1,-12,-1,-1,6,3,3
  ,127,0,0,-5,26,100
30 ENVELOPE 3,1,-26,-36,-45,255
  ,255,255,127,0,0,-127,80,0
40 ENVELOPE 4,1,0,0,0,0,0,0,127
  ,-1,-10,-10,100,20
50 ON ERROR GOTO 4340
60 *TV 255
70 MODE 7
  :VDU 23;8202;0;0;0;
80 DIM A$(20),B$(20),C$(20),D$(20)
  ,E$(20),B1%(3),B2%(3),B4%(10)
  ,AA$(3),AP$(2),A(13),TT%(5)
90 PROCTITLE
  :DIM NAME$(10),HSCORE$(10),HS(10)
  :YZ=0
100 FOR J%=1 TO 10
  : NAME$(J%)="....."
  :HSCORE$(J%)=1000
  :
  :NEXT
110 SCORE%=0
  :Z%=0
  :FOR J%=1 TO 10
  :HS(J%)=128
  :NEXT
120 AX=0
  :B%=0
  :CX=0
  :DX=0
  :EX=0
  :FX=0
  :GX=0
  :HZ=2+Z%
  :LX=HIMEM +((2+Z%)*40)
  :NX=0
  :RX=0
  :SX=0
  :TX=0
  :UX=0
  :VX=0
  :WX=0
  :F3=0
130 A1X=0
  :B1X=0
  :C1X=0
  :D1X=0
  :E1X=0
  :BOMBED=0
140 AAZ=1
  :BBZ=1
  :CCZ=1
  :DDZ=1

```

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July issue of The Micro User.

```

:EEZ=1
:LIVE%=0
150 FOR J%=1 TO 10
  :B4%(J%)=0
  :NEXT
160
170 MM%=1
  :NN%=10
  :GL%=1
  :SGL%=1
  :GR%=1
  :SGR%=1
180
190 CLS
  :PRINT TAB(10,0)SCORE%
  :AA$(1)="*"
  :AA$(2)="*"
  :AA$(3)="*"
200 PRINT TAB(0,0)CHR$( &96);AA$(1);
  " AA$(2);" AA$(3);CHR$( &87);
  TAB(22,0)"HIGH SCORE = ";YZ
210 ST=TIME
  :GOTO 1550
220
230 REM **** MOVE BASE AND FIRE
  LASER
240 DEF PROCMOVE
250 IF KX=1 GOTO 310
260 IF INKEY (-98) NX=NX-1
  :GOTO 360
270 IF INKEY (-67) NX=NX+1
  :GOTO 360
280 IF FX>0 GOTO 390
290 IF INKEY (-106) PROCSSHOOT
  :GOTO 390
300 GOTO 390
310 IF ADVAL (3)>42000 NX=NX+1
  :GOTO 360
320 IF ADVAL (3)<24000 NX=NX-1
  :GOTO 360
330 IF FX>0 GOTO 390
340 X=ADVAL (0) AND 3
  :IF X>0 PROCSSHOOT
350 GOTO 390
360 IF NX<1 NX=1
370 IF NX=36 NX=35
380 PRINT TAB(0,23)CHR$( &96);
  TAB(NX,23)" ~) "
390 *FX 15,1

```

```

400 ENDPROC
410
420 REM **** ALIENS BOMBS ****
430 DEF PROCBOMBS
440 IF B1%(1)+B1%(2) <> 0 PROCLOWER
  :ENDPROC
450 FOR J%=1 TO RND(2)
460 B1%(J%) = RND(NNZ-(MMZ-1))
470 IF B4%(B1%(J%)+(MMZ-1)) >=5
  GOTO 590
480 IF EX < 20 GOTO 530
490 IF DX < 20 GOTO 540
500 IF CX < 20 GOTO 550
510 IF BZ < 20 GOTO 560
520 GOTO 570
530 IF E$(B1%(J%)+MMZ-1) <> " "B2%(
  J%)=LX+360
  :GOTO 580
540 IF D$(B1%(J%)+MMZ-1) <> " "B2%(
  J%)=LX+280
  :GOTO 580
550 IF C$(B1%(J%)+MMZ-1) <> " "B2%(
  J%)=LX+200
  :GOTO 580
560 IF B$(B1%(J%)+MMZ-1) <> " "B2%(
  J%)=LX+120
  :GOTO 580
570 B2%(J%)=LX+40
580 B1%(J%)=((B1%(J%)*3)-1)+TZ
  :B2%(J%)=B2%(J%)+B1%(J%)
590 NEXT
600 B3=0
610 PROCLOWER
620 ENDPROC
630
640 REM **** DIRECT BOMBS ****
650 DEF PROCLOWER
660 FOR J%=1 TO 2
670 IF BOMBED=1 GOTO 790
680 IF B1%(J%)=0 GOTO 790
690 IF B3=0 B3=B3+1
  :GOTO 720
700 IF B3=1 AND B1%(2) > 0 B3=B3+1
  :GOTO 720
710 ?(B2%(J%)-40)=32
720 XZ=?(B2%(J%))
730 IF B2%(J%) < 32664 GOTO 750
740 IF XZ <> 0 AND XZ <> 32 PROCBOMBE
  D
  :PROCMOVE
  :GOTO 780
  ELSE GOTO 780
750 IF XZ=0 OR XZ=32 ?(B2%(J%))=124
  :B2%(J%)=B2%(J%)+40
  :GOTO 790
760 IF XZ=94 ?(B2%(J%))=32

```


Alien Invasion listing

From Page 127

```

:FZ=0
:GOTO 780
770 IF XZ=255?(B2Z(JZ))=97
ELSE?(B2Z(JZ))=32
780 B1Z(JZ)=0
790 NEXT
800 IF BOMBED=1 BOMBED=0
:GOTO 110
810 ENDPROC
820
830 REM **** HIT BY A BOMB ****
840 DEF PROCBOMBED
850 SOUND 0,2,4,25
860 PRINT TAB(B1Z(JZ)-1,23)CHR$(&91)
"~)"
870 NT=TIME
:REPEAT UNTIL TIME =NT+100
880 LIVEZ=LIVEZ+1
890 IF LIVEZ < 3 GOTO 930
900 PROCFAME
910 BOMBED=1
920 GOTO 980
930 AA$(LIVEZ)=" "
940 PRINT TAB(0,0)CHR$(&96)AA$(1)
" ";AA$(2) " ";AA$(3)
950 PRINT TAB(NZ,23) " "
960 NZ=1
:PRINT TAB(0,23)CHR$(&96)" ~)"
"
970 IF FZ>0 PRINT TAB(FZ,6Z) " "

980 FZ=0
990 ENDPROC
1000
1010 REM **** PROCLINE1 - LINE55
PRINT ALIENS
1020 REM **** AAZ TO EEZ = 2 WHEN
COLUMNS SHOT OUT, PRIOR TO
DIRECTION CHANGE.
1030
1040 DEF PROCLINE1
1050 TTZ(1)=TZ
1060 IF AAZ=0 GOTO 1100
1070 AP$=" "
1080 FOR MZ=RZ+GLZ TO RZ+NNZ
:AP$=AP$+A$(MZ)
:NEXT
1090 GOTO 1100
: IF AAZ=2 AP$=MID$(AP$,SGLZ
,31)+" "
1100 PRINT TAB(0,HZ)CHR$(&94);
TAB(TZ,HZ)AP$
1110 AAZ=0
1120 ENDPROC
1130
1140 DEF PROCLINE2

```

```

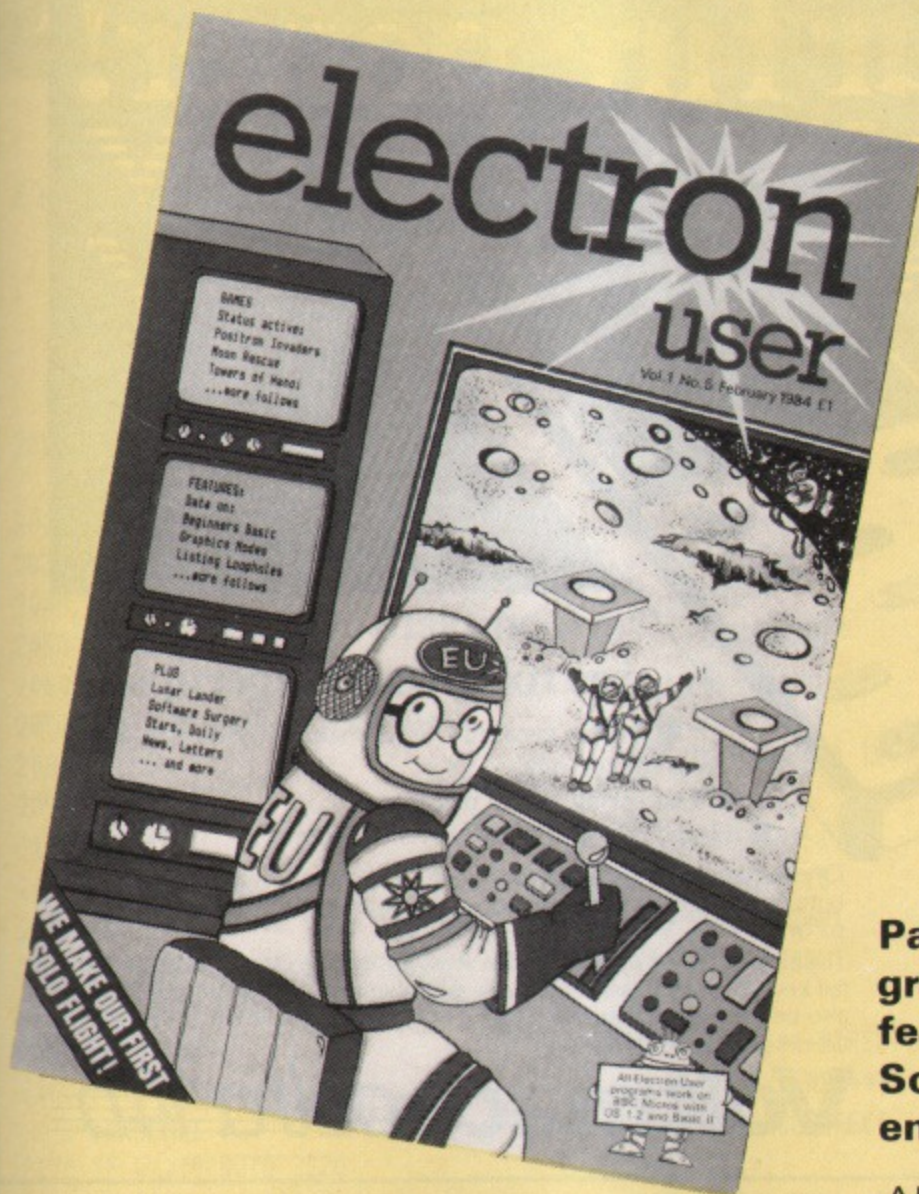
1150 TTZ(2)=TZ
1160 IF BBZ=0 GOTO 1200
1170 BP$=" "
1180 FOR MZ=RZ+GLZ TO RZ+NNZ
:BP$=BP$+B$(MZ)
:NEXT
1190 GOTO 1200
: IF BBZ=2 BP$=MID$(BP$,SGLZ
,31)+" "
1200 PRINT TAB(0,HZ+2)CHR$(&93);
TAB(TZ,HZ+2)BP$
1210 BBZ=0
1220 ENDPROC
1230
1240 DEF PROCLINE3
1250 TTZ(3)=TZ
1260 IF CCZ=0 GOTO 1300
1270 CP$=" "
1280 FOR MZ=RZ+GLZ TO RZ+NNZ
:CP$=CP$+C$(MZ)
:NEXT
1290 GOTO 1300
: IF CCZ=2 CP$=MID$(CP$,SGLZ
,31)+" "
1300 PRINT TAB(0,HZ+4)CHR$(&92);
TAB(TZ,HZ+4)CP$
1310 CCZ=0
1320 ENDPROC
1330
1340 DEF PROCLINE4
1350 TTZ(4)=TZ
1360 IF DDZ=0 GOTO 1400
1370 DP$=" "
1380 FOR MZ=RZ+GLZ TO RZ+NNZ
:DP$=DP$+D$(MZ)
:NEXT
1390 GOTO 1400
: IF DDZ=2 DP$=MID$(DP$,SGLZ
,31)+" "
1400 PRINT TAB(0,HZ+6)CHR$(&91);
TAB(TZ,HZ+6)DP$
1410 DDZ=0
1420 ENDPROC
1430
1440 DEF PROCLINE5
1450 TTZ(5)=TZ
1460 IF EEZ=0 GOTO 1500
1470 EP$=" "
1480 FOR MZ=RZ+GLZ TO RZ+NNZ
:EP$=EP$+E$(MZ)
:NEXT
1490 GOTO 1500
: IF EEZ=2 EP$=MID$(EP$,SGLZ
,31)+" "
1500 PRINT TAB(0,HZ+8)CHR$(&95);
TAB(TZ,HZ+8)EP$
1510 EEZ=0
1520 ENDPROC

```

```

1530 REM **** SET UP ALIENS IN PRINT
STRINGS PRIOR TO MAIN SECTION
****
1540
1550 FOR IZ=1 TO 10
1560 A$(IZ)=":e "
1570 NEXT
1580 FOR IZ=11 TO 20
1590 A$(IZ)="zu "
1600 NEXT
1610 FOR IZ=1 TO 10
1620 B$(IZ)="zu "
1630 NEXT
1640 FOR IZ=11 TO 20
1650 B$(IZ)=":e "
1660 NEXT
1670 FOR IZ=1 TO 10
1680 C$(IZ)=">m "
1690 NEXT
1700 FOR IZ=11 TO 20
1710 C$(IZ)="~)"
1720 NEXT
1730 FOR IZ=1 TO 10
1740 D$(IZ)="~)"
1750 NEXT
1760 FOR IZ=11 TO 20
1770 D$(IZ)=">m "
1780 NEXT
1790 FOR IZ=1 TO 10
1800 E$(IZ)="i6 "
1810 NEXT
1820 FOR IZ=11 TO 20
1830 E$(IZ)="g; "
:NEXT
1840
1850 PRINT TAB(0,20)CHR$(&92);
1860 FOR IZ=1 TO 4
1870 PRINT " x"CHR$(&FF)CHR$(&FF)
CHR$(&FF)"t ";
1880 NEXT IZ
1890 PRINT TAB(0,21)CHR$(&92);
1900 FOR IZ=1 TO 4
1910 PRINT " "CHR$(&FF)CHR$(&FF)
" "CHR$(&FF)CHR$(&FF)" ";
1920 NEXT IZ
1930
1940 REM **** PRINT BASE AT START
***
1950 PRINT TAB(0,23)CHR$(&96)" ~)"
"
1960
1970 REM **** PREPARE ALIEN DIRECTION
1980 PROCDIRECT
1990 IF RZ=10 RZ=0
ELSE RZ=10
2000 AAZ=1

```

Why should readers of The Micro User also subscribe to Electron User?

The answer's simple ...
LISTINGS!

Pages and pages of them. Games, graphics, utilities – plus regular features like Casting Agency and Sounds Exciting – all clearly defined to ensure you key in correctly first time.

ALL Electron User listings have been written so that they will also work without modification on a BBC Micro with OS 1.2 and Basic II.

If you have OS 1.2 with Basic I you may have to substitute certain semi-colons for commas. And if you have OS 1.0 or 0.1, you will find nearly all the programs will run without modification.

There's a special article in the February issue of Electron User describing any changes that may be necessary.



You should be able to get Electron User through your newsagent. But to make sure you do get a copy each month fill in the subscription form below.

SPECIAL OFFER!

FREE cassette of 26 programs from the first four issues of Electron User
– worth £3.75
– order NOW!

SUBSCRIPTION FORM – Please send me the next 12 issues of Electron User at the special introductory offer inclusive price of £12. Special offer applies to UK readers only. Overseas Airmail £30. Surface £15.

Name _____ Address _____
Card No. _____ Expiry Date _____
Signed _____
Payment: please indicate method (✓)
 Access/Mastercharge/Eurocard
 Barclaycard/Visa
 Cheque/P.O. made payable to Database Publications.

Send to: Database Publications,
FREEPOST, Europa House,
68 Chester Road, Hazel Grove,
Stockport SK7 5NY.
No stamp needed if posted in UK.

Increase your fire power!



More than just a joystick.

A superb joystick and a keypad for the price of either. Plus the software to integrate it into the computer's systems.

- ★ 12 Months Guarantee.
- ★ 7 day Money back Guarantee (on Hardware)

DELTA DRIVER on cassette or disc: Two programs on each cassette or disc. One diverts machine code programs from the keyboard to the joystick or keypad, with adjustable sensitivity on the joystick and will run on any O.S. The second program (needs O.S. 1.0 or later and an adaptor box) duplicates any keyboard keys on the keypads, in the operating system, so that it can become a numeric keypad or will take on the function keys.

DELTA 14b HANDSET £12.95 DELTA 14 b/I ADAPTOR BOX £13.95
DELTA DRIVER CASSETTE £5.95 or DISC £8.95 Prices include VAT and P & P.

Voltmace Ltd

PARK DRIVE, BALDOCK, HERTS. SG7 6EW.
 Tel: (0462) 894410

Callers welcome at the factory - Monday to Friday



Complete control at your fingertips.

- Nylon encased - Steel shafted joysticks with ball and socket joint
- Fast spring return to centre
- Graphite wiper linear potentiometers

One handset will work on it's own in the A/D port as a joystick and two fire buttons. Joystick is immediately compatible with ACORNSOFT and similar software.

The adaptor box joins together the analogue and the user ports to use the full keypad giving a total of 24 user definable keys. The adaptor box can also be used as a splitter for the A/d port to take two items at the same time, e.g. joystick and lightpen.

Voltmacedelta 14b

ADS. THE ULTIMATE IN PERIPHERALS FOR THE SPECTRUM, JUPITER ACE & BBC MICROCOMPUTERS

"Highest quality peripherals at the lowest possible prices" - that's the philosophy at Advanced Digital Systems. Our team of highly experienced designers use the very latest techniques to produce adaptable home computer peripherals - at a price you can afford.

- Boards are designed using CAD/CAM, giving a neat optimum layout.
- Gold plated connectors are used, wherever possible, to ensure good electrical contact.
- All products carry a 12 month guarantee.
- All units are "Plug in and go".

1 PRINTER INTERFACE 1
 Centronics Interface for the Sinclair Spectrum. £34.50 inc. VAT. Comes complete with approx 1 metre of cable, centronics plug and software.

- Software recognises LLIST and LPRINT enabling Print-outs direct from Basic. Also adaptable COPY routine for graphics printers.

2 PRINTER INTERFACE 2
 Centronics Interface for Jupiter Ace. £39.95 including VAT and Software.
 Same unit as the Spectrum Interface but with adapter card.

3 PERIPHERAL INTERFACE 3 - ZX ACE
 Package Using the adapter card and the Software supplied, the Sinclair ZX Printer can be connected to the Jupiter Ace. Special Introductory Offer £9.95 inc VAT.

4 PERIPHERAL INTERFACE 4
 ZX BBC Adapter £24.95 inc. VAT.
 Enables the connection of Sinclair Peripherals to the BBC Model B. First Software package included gives an amazingly cheap entry into printing on the BBC model B by allowing you to use the ZX Printer - ideal for listings. Please allow 28 days for delivery. Unit requires 1.2 Amp power supply: either the ZX P.S.U. or the equivalent available from us at £5.95 inc. VAT.



PRINTERS PRINT!

Advanced Digital Systems are now able to supply the following range of printers at amazing prices.

- | | | |
|-----------------|------------------------------------|---|
| EPSON | • FX 80 - £400 | • MX 100/3 - £453 |
| | • RX 80 - £278 | • FX 100 - £532 |
| | • RX 80FT - £306 | • TRACTOR FEED MECHANISM FOR THE FX 80 - P.O.A. |
| | • MX 80 T/3 - P.O.A. | |
| SEIKOSHA | • GP 100 A - £197 | • TEC BUSINESS PRINTERS - P.O.A. |
| | • GP 100 VC - £206 | |
| | • GP 250 X - £246 | |
| | • GP 700 A (colour printer) - £399 | |

MANNESMAN TALLY

- MT 80 with Parallel Interface £270
- MT 80 with Serial Interface £312

Prices include VAT and delivery by Securicor.

Please send me the items as ticked.
 I enclose cheque/order for Total
 (Include £1.00 for post and packaging).

Cheques payable to Advanced Digital Systems Ltd.
 Centronics Base Unit for Sinclair Spectrum £34.50 inc. VAT & Software
 Jupiter Ace Version Base Unit and Adaptor £39.95 inc. VAT & Software
 ZX Ace Adaptor and Software £9.95 inc. VAT
 1.2 Amp P.S.U. £5.95 inc. VAT
 ZX BBC Adapter Unit £24.95 inc. VAT and Software

- | | | | |
|---|--------------------------|------------------------------------|--------------------------|
| EPSON | <input type="checkbox"/> | SEIKOSHA | <input type="checkbox"/> |
| FX 80 - £400 | <input type="checkbox"/> | GP 100 A - £197 | <input type="checkbox"/> |
| RX 80 - £278 | <input type="checkbox"/> | GP 100 VC - £206 | <input type="checkbox"/> |
| RX 80FT - £306 | <input type="checkbox"/> | GP 250 X - £246 | <input type="checkbox"/> |
| MX 100/3 - £453 | <input type="checkbox"/> | GP 700 A (colour printer) - £399 | <input type="checkbox"/> |
| FX 100 - £532 | <input type="checkbox"/> | | <input type="checkbox"/> |
| MANNESMAN TALLY | <input type="checkbox"/> | MT 80 with Parallel Interface £270 | <input type="checkbox"/> |
| | <input type="checkbox"/> | MT 80 with Serial Interface £312 | <input type="checkbox"/> |
| PRINTERS - Inc. VAT & Delivery | | | |

Name _____
 Address _____

Advanced Digital Systems Ltd.

MANUFACTURERS AND DESIGNERS OF MICROCOMPUTER PERIPHERALS
 9 Bonchurch Road, PORTSMOUTH, Hampshire PO4 8RY. Telephone (0705) 823825.
 For International Enquiries (0705) 754160. Prestel Account No. 705-823825

Send order to ADVANCED DIGITAL SYSTEMS LTD., 9 Bonchurch Road, Portsmouth, Hampshire PO4 8RY.

Alien Invasion listing

From Page 128

```

:BBZ=1
:CCZ=1
:DDZ=1
:EEZ=1
2010 TZ=UZ
      :IF AZ<20 PROCLINE1
2020 IF BZ<20 PROCLINE2
2030 IF CZ<20 PROCLINE3
2040 IF DZ<20 PROCLINE4
2050 IF EZ<20 PROCLINE5
2060
2070 REM **** MAIN SECTION ****
2080
2090 TZ=UZ
2100 REPEAT
2110 TZ=TZ+WZ
2120 IF TIME -ST >= 1000 PROCMSHIP
2130 IF SZ>2 AND SX<33 PROCMSHIP
2140 IF EZ>19 GOTO 2170
2150 PROCLINE5
2160 PROCMOVE
      :PROCHIT
2170 IF DZ>19 GOTO 2220
2180 NT=TIME +10-(Z*3)
      :REPEAT PROCMOVE
      :PROCHIT
      :UNTIL TIME >=NT
2190 PROCLINE4
2200 PROCMOVE
      :PROCHIT
2210 IF SZ>2 AND SX<33 PROCMSHIP
2220 IF CZ>19 GOTO 2270
2230 NT=TIME +10-(Z*3)
      :REPEAT PROCMOVE
      :PROCHIT
      :UNTIL TIME >=NT
2240 PROCLINE3
2250 PROCMOVE
      :PROCHIT
2260 NT=TIME +10-(Z*3)
      :REPEAT PROCMOVE
      :PROCHIT
      :UNTIL TIME >=NT
2270 IF BZ>19 GOTO 2290
2280 PROCLINE2
2290 PROCMOVE
2300 PROCHIT
2310 IF AZ>19 GOTO 2330
2320 PROCLINE1
2330 NT=TIME +10-(Z*3)
      :REPEAT PROCMOVE
      :PROCHIT
      :UNTIL TIME >=NT
2340 NT=TIME +10-(Z*3)
2350 SOUND 3,2,HZ*2,5
2360 PROCHIT

2370 PROCMOVE
2380 IF SZ>2 AND SX<33 PROCMSHIP
2390 REPEAT PROCMOVE
2400 PROCHIT
2410 UNTIL TIME >=NT
2420 IF WZ=-1 AND TZ=1 IF B4%(GLZ)=5
      :SGLZ=SGLZ+3
      :GLZ=GLZ+1
      :TZ=TZ+3
      :AAZ=2
      :BBZ=2
      :CCZ=2
      :DDZ=2
      :EEZ=2
2430 IF WZ=1 AND TZ=VZ IF B4%(NNZ)=5
      :VZ=VZ+3
      :NNZ=NNZ-1
      :GOTO 2110
2440 UNTIL TZ=VZ
2450 GOTO 1980
2460
2470 REM **** DIRECTION AND HEIGHT
      OF ALIENS ****
2480 DEF PROCDIRECT
2490 SGLZ=1
2500 IF B4%(MMZ) =5 MMZ=MMZ+1
      :GOTO 2500
2510 IF B4%(NNZ) =5 NNZ=NNZ-1
      :GOTO 2510
2520 GLZ=MMZ
      :GRZ=NNZ
2530 IF VZ > 1 UZ=8+((MMZ-1)*3)+((10-NNZ)*3)
      :VZ=1
      :WZ=-1
      ELSE VZ=8+((MMZ-1)*3)+((10-NNZ)*3)
      :UZ=1
      :WZ=1
2540 FOR JZ=0 TO 8 STEP 2
2550 IF JZ=0 AND AZ<20 GOTO 2610
2560 IF JZ=2 AND BZ<20 GOTO 2610
2570 IF JZ=4 AND CZ<20 GOTO 2610
2580 IF JZ=6 AND DZ<20 GOTO 2610
2590 IF JZ=8 AND EZ<20 GOTO 2610
2600 GOTO 2620
2610 PRINT TAB(1,HZ+JZ) "
      "
2620 NEXT
2630 HZ=HZ+1
      :LZ=LZ+40
2640 IF AZ=20 A1Z=1
2650 IF BZ=20 B1Z=1
2660 IF CZ=20 C1Z=1
2670 IF DZ=20 D1Z=1
2680 IF EZ=20 E1Z=1
2690 IF EZ < 20 AND HZ=14 GOTO 2740

2700 IF DZ < 20 AND HZ=16 GOTO 2740
2710 IF CZ < 20 AND HZ=18 GOTO 2740
2720 IF BZ < 20 AND HZ=20 GOTO 2740
2730 IF HZ < 22 GOTO 2750
2740 JZ=1
      :B1Z(JZ)=NZ
      :PROCBOMBED
      :PROCBOMBED
      :PROCBOMBED
2750 ENDPROC
2760
2770 REM **** LASER FIRING ****
2780 DEF PROCshoot
2790 IF FZ > 0 GOTO 2830
2800 FZ=NZ+1
2810 GZ=22
2820 PROCHITA
2830 PROCHIT
2840 IF FZ = 0 GOTO 2860
2850 PRINT TAB(FZ,GZ) "^^"
2860 ENDPROC
2870
2880 REM **** CHECK FOR HITS ****
2890 DEF PROCHIT
2900 PROCBOMBS
2910 IF FZ=0 GOTO 2970
2920 PRINT TAB(FZ,GZ) " "
2930 GZ=GZ-1
2940 PROCHITA
2950 IF GZ < 1 FZ=0
      :GOTO 2970
2960 IF FZ > 0 PRINT TAB(FZ,GZ) "^^"
2970 ENDPROC
2980
2990 REM **** LOOK AT SCREEN POSITIONS
      FOR ALIEN OR LASER - GUN/BOMB
      ****
3000 DEF FNHIT(OZ,PZ)
3010 =?(&7C00+(PZ*40)+OZ)
3020
3030 REM **** HIT ROUTINE CONT. ***
3040 DEF PROCHITA
3050 XZ=FNHIT(FZ,GZ)
3060 IF XZ=0 OR XZ=32 ENDPROC
3070 IF GZ < 20 GOTO 3110
3080 SOUND 0,-10,0,1
3090 IF XZ = 255 PRINT TAB(0,GZ)
      CHR$( &92)TAB(FZ,GZ)*2"
      :FZ=0
      :ENDPROC
3100
3110 IF XZ=124 OR XZ=120 OR XZ=116
      OR XZ=50 OR XZ=97 PRINT
      TAB(FZ,GZ) " "
      :FZ=0
      :ENDPROC

```


MUSICSOFT

MUSIC SOFTWARE SPECIALISTS FOR
THE BBC 32K MICRO

★ THE SYNTH ★ (O.S. 1.0+)

"A very flexible and inventive program that's highly recommendable." (Dr David Ellis, E&MM, Oct 83)

- This 'synthesizer' program has features which to our knowledge are unique.
- ALTER RHYTHM. The rhythm of a recorded melody may be altered by tapping on a single key.
 - REPEAT. No need to play a phrase twice, great saving in space.
 - REAL TIME PLAYING. With alteration of volume, envelope and octave pitch as you play a note.
 - EDITING. Back and forwards whilst hearing the tune.
 - INPUT. May be hesitant or in correct time.
 - TIDY. 'Cleans up' inaccuracies of input on demand!
 - NUMBER OF NOTES. From 3000 for 1 channel to 1000 for 3, etc. Plus all that the other synthesizer programs do PLUS, IE sophisticated envelope editing (very easy), larger keyboard used (TAB to ↓ cursor). No secrets, user transparent.
 - PROGRAM HAS AUTOMATIC TRANSFER TO DISC. This is the program for the experimenter who wants to make HUMAN music rather than perform mathematical finger dexterity exercises.

THE SYNTH. Cassette & instructions only £8.75 inc. P&P.

★ MUSICTOOLS 1 ★ (all O.S.)

"Musicsoft also produce an excellent 'Musictools 1' cassette... all in all, rather good value" (E&MM, Oct 83)

- Five music utility programs on one tape.
- ORGAN. Play, store, replay faster, slower, exactly as played (!) or smoothed out. Unique rhythm-alter feature, low notes not mentioned in the 'Guide'.
 - TUNE GENERATOR. Creates a chord sequence, tune, quaver variations on the tune, displays a dynamic keyboard and notes on a stave as the tune is played (it LOOKS like music).
 - CLEFTOOL. Draws musical symbols in any size you wish (within reason! 26 sizes), all are put on a stave... Great for teaching.
 - DATA ENTRY, 3 PART TUNE PLAYER. Simple input from data, with a seasonal demotune.
 - ENVELOPE EXPLORER. A full envelope edit program. Display and alter all parameters with the cursors. Experiment with the sound power of your BBC Micro.
 - OVER 60 PROCEDURES to use in your own musical programs.

MUSICTOOLS 1 cassette & instructions £5.75 inc. P&P.

★ PIEMAN ★

"The best version of Simon I've seen, it goes so much further than most" (Quote by a rival software firm!) Recommended for Primary & Middle Schools. Not as simple as Simon! It develops into a fun set of ear cleaning and musical concentration games - from easy at infant level to impossible at graduation! Auto scoring.

PIEMAN cassette & instructions £5.75 inc. P&P.

All programs transfer easily to disc.
Cheques and official orders to:

MUSICSOFT, 12 Fallowfield, Amphill, Beds.
Telephone: 0525 402701

WE CAN IMPROVE YOUR LANGUAGE

French, German, Russian, Spanish
by
CARSONDALE



Educational Programs of the Highest Quality for the BBC Micro (32K) supplied on cassette.
(Electron users: write for details)

● IRREGULAR/ESSENTIAL VERB SERIES

Thousands of verb forms at your finger tips for all abilities.

- ★ Choose your level
- ★ Attractive colour formats
- ★ Full foreign characters
- ★ Multiple ways of use
- ★ Full documentation
- ★ English meanings
- ★ Reference and browse
- ★ Test with time limit

A truly remarkable achievement which allows you to study all those verb forms - an essential part of grammar.

IRREGULAR FRENCH VERBS: 150+ verbs, all non-compound tenses	£15.99
ESSENTIAL FRENCH VERBS: 80+ verbs, 5 tenses, retest, save test	£9.95
IRREGULAR GERMAN VERBS: 200+ verbs, 15 tenses!	£11.96
RUSSIAN IRREGULAR VERBS: 150+ verbs, optional stress, aspects	£17.49

● TEXT-FILL

In cooperation with D. Adshead, Birmingham University. Based on a most effective teaching method, these superb programs are ideally suited to the micro.

- ★ Highly addictive and effective
- ★ Upper and lower case foreign characters
- ★ 20 texts supplied
- ★ Enter your own texts, store them on tape or disc.

All prices include VAT
Add 50p p&p

Choose one of the supplied texts. It turns into hyphens and punctuation marks! Choose how much you wish to see, and fill in the blanks.

FRENCH TEXT-FILL: Also allows German and English texts	£9.95
RUSSIAN TEXT-FILL: Includes 10 advanced texts	£11.96
SPANISH TEXT-FILL: SAE for details.	NEW!

CARSONDALE ENTERPRISES LIMITED
44 Kingsway, Stoke-on-Trent, Staffs ST4 1JH.

ORION SOFTWARE

PROFESSIONAL PROGRAMS FOR THE MODEL B

SPACE TANK - "CURRENT BEST SELLER" £6.95
After your SPACE TANK has landed on the planet Orion, a series of alien tanks, surface hoppers, and spacecrafts will attack. How long can you hold out commander? This game makes use of the Beeb's fast scrolling ability. Can be used with either keyboard or joysticks. Top ten table. Pause option.

STAR HAWKS - £6.95
Can you stop the STAR HAWKS before they stop you? Slow work means the generation of more laser firing mutant hawks. Based on the games of Galaxian and Gorf. Can be used with either keyboard or joysticks. Top ten table. Pause option.

HORSES - "NEW" £6.95
Come on now, don't be shy, choose one of the six horses and let's see what you can do. How many of the fences can you complete at the Orion arena, especially with the clock ticking away? New riders can try one of the more docile horses while others may like to risk one of the more lively beasts! Can be used with either keyboard or joysticks. Top ten table. Pause option.

DESIGN £5.95
If you like watching your user defined characters run around the screen but are fed up with the time consuming mathematics, then DESIGN is for you! With DESIGN you can draw your characters on an 8x8 grid and let the machine do all the work. DESIGN's features include being able to recall characters for re-editing, displaying VDU 23 commands, and amendable cursor. All characters used in Orion Software programs are created using DESIGN.

HANGMAN £5.95
Let words become fun again with our three language, (ENGLISH, FRENCH, ITALIAN), version of the popular game of HANGMAN. There are 3 levels of play for each language. All words can be replaced or removed, and new ones can be added. HANGMAN comes with an instruction program giving full details for parents and teachers. Once running prying eyes cannot access the word lists!

EARLY YEARS 1 & 2 - "NEW" £7.95 each or £14.00 for both
These two packages are designed to help a young child with some of the concepts that life demands we have. The emphasis is on learning through fun. 'Times tables' are out and Fred the Frog is in! Topics covered include Subtraction, addition, recognition, colour, shapes, sizes, sounds/notes, co-ordination, distances, estimates, directions.

A) MICKEY THE MONKEY and his apple tree make subtraction fun.
B) COLOUR BLOCKS bring sizes and colours into perspective.
C) MERRY MUSIC turns the keyboard into a musical keyboard.
D) FUNNY FACES presents a line up, which one is the suspect?
E) FRED THE FROG needs co-ordinated help to get across the pond.
A) THE POND seems very active today.
B) SPEED is required to keep the cake on the conveyor belt.
C) DIRECTIONS seem to be needed by everyone in Orion village.
D) ORDER the items to set Fred the Frog free.
E) SID THE SPIDER needs some help to get out of the maze.

For children between 4-8 years of age.

Cheques/P.O.'s should be made payable to ORION SOFTWARE.
All prices are fully inclusive.

Dealer and other enquiries welcome
Orion software programs are now becoming available at local dealers. Due to demand, we are currently re-writing Orion software programs for use on the ELECTRON.

FREE with all orders is
our 3 level version of
NOUGHTS AND CROSSES!!!

MAIL ORDER ONLY.
ORION SOFTWARE,
11 Buttercup Close,
Romleighs Park,
Harold Wood,
Essex RM3 0XF.

Alien Invasion listing

From Page 131

```

3120 IF GZ=1 PROCMHIT
      :GOTO 3170
3130 IF GZ=0 FZ=0
      :GOTO 3170
3140 PRINT TAB(FZ-1,GZ) " "
3150 SOUND 0,1,4,10
3160 PROCSCORE
3170 ENDPROC
3180
3190 REM **** MOTHERSHIP ROUTINE
      ***
3200 DEF PROCMSHIP
3210 IF SZ>1 AND SZ<33 GOTO 3250
      ELSE QZ=RND(2)
3220 IF QZ=1 QZ=-2
      :SZ=33
      ELSE SZ=1
3230 IF ADVAL (-6) <> 0 SOUND 1,3
      ,255,75
3240 ST=0
3250 PRINT TAB(0,1)CHR$ (&95)TAB(SZ
      ,1) " x(wt "
3260 SZ=SZ+QZ
3270 IF SZ=1 OR SZ= 33 ST=TIME
      :PRINT TAB(0,1) "
3280 ENDPROC
3290
3300 REM **** HIT MOTHERSHIP ? ****
3310 DEF PROCMHIT
3320 *FX21,5
3330 FOR QZ=0 TO 555 STEP 7
      :SOUND 1,-15,QZ,0
      :NEXT
3340 MSCOREZ=(RND(3)*100)
3350 SCOREZ=SCOREZ+MSCOREZ
3360 PRINT TAB(10,0)SCOREZTAB(0,1)
      " "TAB(SZ,1);MSCOREZ;" "
3370 ENDPROC
3380
3390 REM ***** SCORING ROUTINE ****
3400 DEF PROCSCORE
3410 L1Z=(GZ-HZ)/2+1
3420 SCOREZ = SCOREZ+((10-(GZ-HZ))*10)
3430 PRINT TAB(10,0)SCOREZ
3440 F3=(FZ-TTZ(L1Z))
3450 IF F3 MOD 3 > 0 F3=((F3+((6LZ-1)*
      3)) DIV 3)+1
      ELSE F3=(F3+((6LZ-1)*3))
      DIV 3
3460 B4Z(F3)=B4Z(F3)+1
3470 FOR JZ=1 TO 2
3480 IF L1Z=5 GOTO 3560
3490 IF L1Z=4 GOTO 3550
3500 IF L1Z=3 GOTO 3540
3510 IF L1Z=2 GOTO 3530
3520 A$(F3)=" "
      :AZ=AZ+1
      :AAZ=1
      :GOTO 3570
3530 B$(F3)=" "
      :BZ=BZ+1
      :BBZ=1
      :GOTO 3570
3540 C$(F3)=" "
      :CZ=CZ+1
      :CCZ=1
      :GOTO 3570
3550 D$(F3)=" "
      :DZ=DZ+1
      :DDZ=1
      :GOTO 3570
3560 E$(F3)=" "
      :EZ=EZ+1
      :EEZ=1
3570 F3=F3+10
3580 NEXT JZ
3590 IF AZ+BZ+CZ+DZ+EZ=100 ZZ=ZZ+1
      :CLS
      :PRINT TAB(10,10)CHR$ (141);
      CHR$ (&81)ZZ*1000;" POINTS"
      :PRINT TAB(10,11)CHR$ (141);
      CHR$ (&81)ZZ*1000;" POINTS"
      :SCOREZ=SCOREZ+ZZ*1000
      :NT=TIME
      :REPEAT UNTIL TIME =NT+350
      :XZ=SCOREZ
3600 IF AZ+BZ+CZ+DZ+EZ=100 SCOREZ=XZ
      :GOTO 120
3610 FZ=0
3620 ENDPROC
3630
3640 REM *****
3650 DEF PROCTITLE
3660 PROCTUNA
3670 A$=" A L I E N I N V A
      S I D N "
3680 PROCTUNE
3690 FOR A=1TO 2
      :PRINT TAB(0,A)CHR$ (&84);
      CHR$ (157);CHR$ (&91);CHR$ (&88)
      :NEXT
3700 FOR A=4 TO 29
      :FOR B=1 TO 2
3710 PRINT TAB(4,B)CHR$ (141)RIGHT$(A$
      ,A);CHR$ (140)CHR$ (&89)"x(wt"
3720 NEXT
      :FOR AA=1TO 100
      :IF ADVAL (-6)=15 PROCTUNE
3730 NEXT
      :NEXT
3740 PRINT TAB(35,1) " "
3750 PRINT TAB(0,3)CHR$ (&91)
3760 FOR A=35TO 7 STEP -1
      :PRINT TAB(A,3) " x(wt "
      :FOR AA=1TO 100
      :IF ADVAL (-6)=15 PROCTUNE
3770 NEXT
      :NEXT
3780 PRINT TAB(7,3) " "
3790 REM SPACE INVADERS - APRIL 1983
3800 PRINT TAB(7,4)CHR$ (&91)"x(wt";
      CHR$ (&81) " = MYSTERY POINTS"
      :FOR AA=1TO 1000
      :NEXT
3810 PRINT TAB(8,6)CHR$ (&92)"zu";
      CHR$ (&84) " = 100 POINTS"
      :FOR AA=1TO 1000
      :NEXT
3820 IF ADVAL (-6)=15 PROCTUNE
3830 PRINT TAB(8,8)CHR$ (&93)"e";
      CHR$ (&83) " = 80 POINTS"
      :FOR AA=1TO 1000
      :NEXT
3840 PRINT TAB(8,10)CHR$ (&94)"^";
      CHR$ (&82) " = 60 POINTS"
      :FOR AA=1TO 1000
      :NEXT
3850 PRINT TAB(8,12)CHR$ (&95)">m";
      CHR$ (&81) " = 40 POINTS"
      :FOR AA=1TO 1000
      :NEXT
3860 PRINT TAB(8,14)CHR$ (&96)"g";
      CHR$ (&85) " = 20 POINTS"
3870 IF ADVAL (-6)=15 PROCTUNE
3880 PRINT TAB(8,16)"DO YOU HAVE JOYST
      ICKS? "
      :IF GET <> 89 GOTO 3900
3890 KZ=1
      :PRINT TAB(8,16)"USE JOYSTICK
      TO MOVE "TAB(8,18)"PRESS
      BUTTON TO FIRE LASER"
      :PRINT TAB(8,20)"PRESS BUTTON
      TO START"
      :GOTO 3930
3900 KZ=0
      :PRINT TAB(8,16)"Z KEY = LEFT
      "TAB(8,18)"X KEY
      = RIGHT"TAB(8,20)"COPY KEY TO
      FIRE LASER"
3910 PRINT TAB(8,22)"ANY KEY TO START"
3920 IF GET <>0 GOTO 3940
3930 X=ADVAL (0) AND 3
      :IF X>0 GOTO 3940
      ELSE GOTO 3930
3940 *FX 11,1
3950 ENDPROC
3960 DEF PROCFAME
3970 *FX15,1
3980 CLS
      :J=0
3990 IF SCOREZ<HSCOREZ(10) GOTO 4100
4000 IF SCOREZ>HSCOREZ(1) HS(1)=136

```


Alien Invasion listing

From Page 133

```

:J=1
:FOR J%=9 TO 2 STEP -1
:HSCOREZ(J%+1)=HSCOREZ(J%)
:NAME$(J%+1)=NAME$(J%)
:NEXT
:HSCOREZ(2)=HSCOREZ(1)
:NAME$(2)=NAME$(1)
:HSCOREZ(1)=SCOREZ
:GOTO 4050
4010 FOR J%=10 TO 1 STEP -1
4020 IF SCOREZ<HSCOREZ(J%) HS(J%+1)=13
6
:J=J%+1
:J%=1
4030 NEXT
4040 FOR J%=10 TO J+1 STEP -1
:HSCOREZ(J%)=HSCOREZ(J%-1)
:NAME$(J%)=NAME$(J%-1)
:NEXT
:HSCOREZ(J)=SCOREZ
4050 FOR J%=10 TO 11
4060 PRINT TAB(0,J%)CHR$(141)
CHR$(133)"CONGRATULATIONS, YOUR

SCORE IS RANKED "TAB(14,J%+3)
CHR$(141)CHR$(133)"NUMBER ";J
4070 NEXT
4080 *FX12,0
4090 INPUT TAB(8,18)"ENTER YOUR NAME
",NAME$(J)
:YZ=HSCOREZ(1)
4100 CLS
:FOR J%=0 TO 1
4110 PRINT TAB(8,J%)CHR$(133)
CHR$(141)"BEEB HIGH COMMAND"
4120 NEXT
4130 FOR J%=1 TO 10
4140 PRINT TAB(0,J%*2+1)CHR$(HS(J%))J
%;" ";HSCOREZ(J%);" "LEFT$(NAM
E$(J%),15)
4150 NEXT
4160 PRINT TAB(4,23)" SPACE BAR
FOR ANOTHER GAME"
:IF GET <> 32 GOTO 4160
ELSE GOTO 4170
4170 *FX11,1
4180 GOTO 110
4190 ENDPROC
4200 REM **** ARCADE JINGLE ***

4210 DEF PROCTUNA
4220 FOR I=1 TO 13
:READ A(I)
:NEXT
4230 DATA 4,20,32,52,68,80,100,116
,128,148,164,176,196
4240 ENDPROC
4250 DEF PROCTUNE
4260 FOR I=1 TO 4
4270 SOUND 1,4,A(RND(13)),8
4280 NEXT
4290 SOUND 2,4,A(RND(13)),4
4300 SOUND 2,4,A(RND(13)),4
4310 SOUND 3,4,A(RND(13)),2
4320 SOUND 3,4,A(RND(13)),2
4330 ENDPROC
4340 *FX12,0
4350 ON ERROR OFF
4360 END

```

This listing is included in this month's cassette tape offer. See order form on Page 137.



Eprom Programmer for the BBC Micro

This compact, elegant unit combines the following attractive features:

- high quality, low cost ● easy-to-use 28 pin zero insertion force socket ● free 2764 eprom containing programming software – no cassette loading problems ● menu driven software incorporating the following commands: program, testblank, save, checksum, verify, select eprom
- programs 2764 and 27128 eproms as used on the BBC Model B machine ● built-in voltage converter ● integral cable connects to user port; no other connection needed
- comprehensive documentation plus one year's guarantee

This product is available in quantity **NOW!**

Programmer and data sheet from Softlife Ltd.
87 Silvertown Way, London E16 4AH Tel: 01 474 0330

SPELLWISE

IS YORE SPELING REELY ATROSHUS?
Or is it just a littel bit off kei?
In either case you need
SPELLWISE.

NOW ON
DISC
AND TAPE

- * is a spelling checker for use with your BBC micro and WORDWISE word processor
- * is a DISC or tape based machine code program with comprehensive user manuals
- * contains an expandable dictionary of over 6000 words (disc) or 3000 words (tape)

SPELLWISE diligently checks every word in your text against the SPELLWISE dictionary. When it has finished you will be left with a list of words which are incorrectly spelt or not in the base vocabulary.

The program can be interrupted at any stage for inspection of the remaining word list and for the insertion of personal or specialist vocabularies. For this purpose software is included to enable you to create your own data files.

SPELLWISE comprises a set of one disc (or two tapes) plus a complete user manual. The tape version is limited to cassette recorders with motor control. SPELLWISE costs £12 on tape, £18 on disc and can be obtained from:—

DATAWARE FREEPOST SWINDON SN3 4BR

Array listing

From Page 78

```

410 START#=START$(NUMBER)
    :MIS#=MIS$(NUMBER)
    :FIN#=FIN$(NUMBER)
420 ENDPROC
430 DEF PROCINPUTCHECK
440 ANS$=""
    :CLS
    :TRYS=1
    :CORRECT=FALSE
    :PROCHEADING

450 PRINT
    :PRINT TAB(0,9)CHR$(RND(7)+128)
    "THIS IS QUESTION NUMBER "
    STR$(QUESND)
460 PRINT
    :PRINT CHR$(RND(7)+128)"THERE
    WILL BE A TOTAL OF "STR$(MAX)
    " QUESTIONS"
470 PRINT
    :PRINT CHR$(RND(7)+128)"ABOUT
    "TITLE$
480 REPEAT
490 ANS$=""
    :*FX21,0
500 PRINT TAB(0,20)CHR$(RND(6)+129)S
    TART$;CHR$(136)STRING$(LEN(MIS$
    ),"*")CHR$(137)FIN$
510 REPEAT
520 PART#=GET$
    :ANS#=ANS#+PART$
530 PRINT TAB(LEN(START$)+LEN(ANS$)
    +1,20)PART$
540 UNTIL LEN(ANS$)=LEN(MIS$)

550 IF ANS#=MIS$
    THEN CORRECT=TRUE
    : PROCWRITE(CONGRAT$(RND(3)))
    ELSE PROCERRROR
560 IF CORRECT AND TRYS=1
    THEN RIGHT=RIGHT+1
570 UNTIL CORRECT OR TRYS>3
580 ENDPROC
590 DEF PROCERRROR
600 PROCWRITE(ERRMSG$(TRYS,RND(3)))
610 TRYS=TRYS+1
620 IF TRYS>3
    THEN MESSAGE$="THE CORRECT ANSWER
    IS "+MIS$
    : PROCWRITE(MESSAGE$)
630 ENDPROC

640 DEF PROCWRITE(MESSAGE$)
650 PRINT TAB(0,18)CHR$(RND(7)+128)M
    ESSAGE$
660 FOR I%=1TO 8000
    :NEXT
670 PRINT TAB(0,18)STRING$(40," ")
680 ENDPROC
690 DEF PROCHEADING
700 CLS
710 VDU 131,157
    :PRINT
    :VDU 131,157,129,141;
    :PRINT TAB(10)"MISSING WORDS"
    :VDU 131,157,129,141;
    :PRINT TAB(10)"MISSING WORDS"
    :VDU 131,157;
    :PRINT
720 PRINT
    :VDU 135,157,133,136;
    :PRINT TAB(7)"BY PETER DAVIDSON"
730 ENDPROC
740 DEF PROCTITLE
750 PRINT
    :VDU 131,157,130;
    :PRINT TAB((34-LEN(TITLE$))/2)TI
    TLE$
760 ENDPROC
770 REM **THE FOLLOWING DATA IS
    THE NUMBER OF SENTENCES IN
    THE DATA
780 DATA 22
790 REM **THE FOLLOWING DATA IS
    THE TITLE
800 DATA NURSERY RHYMES
810 REM **THE FOLLOWING DATA IS
    3 ERROR MESSAGES PRINTED AT
    RANDOM AFTER FIRST ERROR
820 DATA THAT NOT RIGHT....TRY AGAIN
830 DATA YOU MADE A MISTAKE-HAVE
    ANOTHER GO
840 DATA WRONG! HAVE ANOTHER GO
850 REM **THE FOLLOWING DATA IS
    3 ERROR MESSAGES PRINTED AT
    RANDOM AFTER SECOND ERROR
860 DATA WRONG AGAIN! HAVE ANOTHER
    GO
870 DATA STILL NOT RIGHT...BUT HAVE
    ANOTHER GO
880 DATA ANOTHER MISTAKE - HAVE
    ONE MORE TRY
890 REM **THE FOLLOWING DATA IS
    3 ERROR MESSAGES PRINTED AT
    RANDOM AFTER THIRD ERROR
900 DATA WRONG AGAIN....LET'S MOVE
    ON
910 DATA YOU OBVIOUSLY DON'T KNOW
    THIS ONE
920 DATA THIS IS THE THIRD TIME
    BUT STILL WRONG
930 REM **THE FOLLOWING DATA IS
    3 CONGRATULATION MESSAGES PRINTE
    D AT RANDOM IF ANSWER IS CORRECT
940 DATA WELL DONE....YOU'RE RIGHT!
950 DATA CORRECT....YOU'RE VERY
    CLEVER
960 DATA CONGRATULATIONS! YOU GOT
    IT RIGHT
970 REM **THE FOLLOWING DATA IS
    THE SENTENCES THAT WILL BE
    USED
980 REM **REMEMBER TO CHANGE LINE
    780 IF YOU ADD MORE
990 REM **PUT COMMAS AROUND THE
    WORD THAT YOU WANT MISSED OUT
1000 DATA "BAA, BAA, BLACK",SHEEP
    ,HAVE YOU ANY WOOL
1010 DATA "DING, DONG","BELL,PUSSY'S
    IN THE WELL
1020 DATA "GEORGIE PORGIE","PUDDING
    ,AND PIE
1030 DATA HUMPTY DUMPTY,SAT,ON A
    WALL
1040 DATA THE MOUSE RAN,UP,THE CLOCK
1050 DATA I HAD A LITTLE,NUT,TREE
1060 DATA JACK AND,JILL,WENT UP THE
    HILL
1070 DATA JACK SPRAT COULD,EAT,NO
    FAT
1080 DATA THE.KING,WAS IN HIS COUNTING
    HOUSE
1090 DATA "LITTLE BOY BLUE, COME"
    ,BLOW, YOUR HORN
1100 DATA MARY HAD A,LITTLE,LAMB
1110 DATA OLD MOTHER HUBBARD WENT
    TO THE,CUPBOARD,""
1120 DATA "PUSSY CAT,PUSSYCAT","WHERE
    ,HAVE YOU BEEN
1130 DATA THE QUEEN OF,HEARTS,SHE
    MADE SOME TARTS
1140 DATA RIDE A COCK,HORSE,TO BANBURY
    CROSS
1150 DATA ROCK A BYE,BABY,ON THE
    TREE TOP
1160 DATA "RUB A DUB DUB","THREE
    ,HEN IN A TUB
1170 DATA SING A SONG OF.SIXPENCE
    ,"
1180 DATA THERE WAS AN OLD,WOMAN
    ,WHO LIVED IN A SHOE
1190 DATA "TWINKLE","TWINKLE,LITTLE
    STAR
1200 DATA "TOM, TOM, THE PIPERS"
    ,SON,""
1210 DATA WEE WILLIE WINKIE,RUNS
    ,THROUGH THE TOWN
1220 DATA YANKEE DOODLE,CAME,TO TOWN

```

This listing is included in this month's cassette tape offer. See order form on Page 137.

THE MICRO USER

A subscription will ensure you get your own personal copy **HOT OFF THE PRESSES** month after month for the next year.

Be one of the first to get each issue!

Every owner of a BBC Micro – and everyone thinking of buying one – needs to get Micro User every month. It's the biggest, brightest, most authoritative yet completely independent guide to a machine that has so much potential you will never tire of reading about its remarkable capabilities.

You can buy Micro User from your local newsagent or station bookstall. Or you can take out a 12 months subscription and have it delivered by post.



Copies of these back issues are still available at £1.25 each



Cassette tapes and discs of Micro User programs

Take out a year's subscription and have your cassette or disc posted to you each month. You can start your subscription from any issue to take advantage of this offer. Order on the coupon opposite.

TAPES
£3.75
each

DISC
£6.75
each

FREE

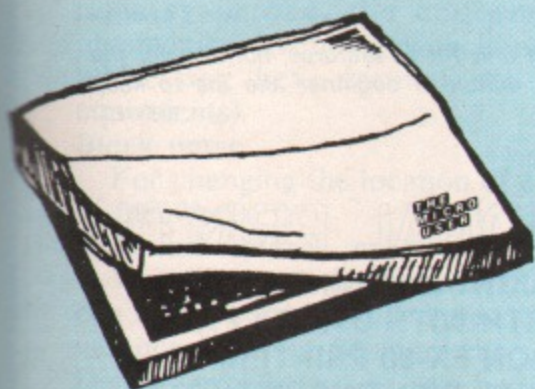
Cassette worth £3.75 if you subscribe NOW!

COMPLETE THIS COUPON TODAY



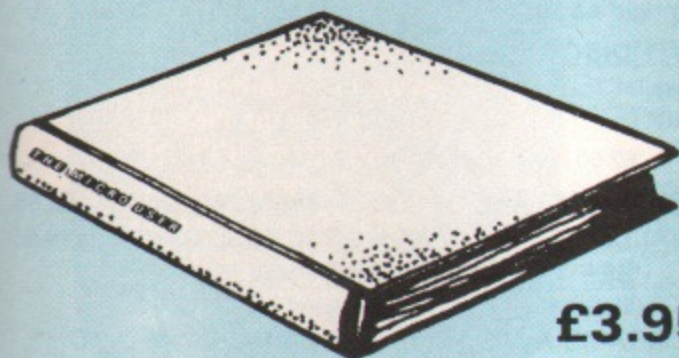
If you take out a subscription to Micro User you will receive completely free one of the monthly cassettes of Micro User listings. Choose which one you want from those illustrated below. This free gift is for a limited period, so subscribe now!

Your BBC Micro needs protecting!



£3.95

Keep your collection of Micro User complete with these handsome binders



£3.95

(UK)

ORDER FORM

All prices include postage, packing and VAT, and are valid to February 28, 1984.

Please enter number required in box

£ p

Micro User annual subscription

UK £12
 EIRE £13 (IR £16)
 Surface mail - Rest of world £18
 Air mail - Rest of world £30

Selected free cassette (month)
 Commence with issue **TOTAL** _____

Micro User back issues

March 1983
 April 1983
 May 1983
 June 1983
 July 1983
 Aug 1983
 Sept 1983
 Oct 1983
 Nov 1983
 Dec 1983
 Jan 1984

£1.25 UK
 Rest of world:
 £1.50 - Surface
 £2.50 - Air mail

TOTAL _____

Annual subscription for tapes and discs

£40 - Tape
 £70 - Disc
 (UK & Overseas)

Commence with (state month) **TOTAL** _____

Single copies of tapes and discs

£3.75 - Tape
 £6.75 - Disc

(UK & Overseas)

Deathwatch Mar 1983
 King Kong Apr 1983
 Air Strike May 1983
 Space Pilot Jun 1983
 Tenpin Jul 1983
 Fruities Aug 1983
 Robin & Marian Sep 1983
 Gone Fishin' Oct 1983
 Blackjack / Goblins Nov 1983
 Tower Bridge Dec 1983
 Barrel Battle Jan 1984
 Alien Invasion Feb 1984

TOTAL _____

Dust Covers

£3.95 - Deluxe

(UK & Overseas)

TOTAL _____

Binders

£3.95 - UK

£5.00 - Overseas

TOTAL _____

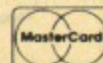
Payment: please indicate method (✓) **TOTAL** _____

Access/Mastercharge/Eurocard
 Barclaycard/Visa
 American Express

Card No. _____

Expiry Date _____

Cheque/PO made payable to Database Publications Ltd.



Name _____

Address _____

Signed _____

Send to: Micro User, FREEPOST, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

(No stamp needed if posted in UK)

Please allow 28 days for delivery

You can also order by phone or Prestel

Any of the goods listed here can be ordered by telephone. Micronet subscribers and other users of Prestel can also use the Prestel Mailbox.

Telephone:

061-480 0171

9am - 5pm

Prestel Mailbox

614568383

24 hours

Don't forget to quote your credit card number and give your full address

Now you can add the very latest 5¼ inch, half height disk drives from TEAC to your BBC Model 'B'.

SINGLE DRIVES

FD-55A-9409,	100KB,	40 TRACK S.S.	£182
FD-55B-9410,	200KB,	40 TRACK D.S.	£234
FD-55E-9411,	200KB,	80 TRACK S.S.	£217
FD-55F-9412,	400KB,	80 TRACK D.S.	£258

Powered by the BBC Micro; no additional power supply needed.



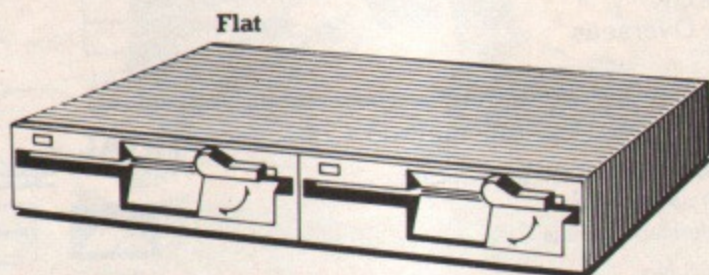
FEATURES

- ❑ LSI Circuitry
- ❑ Fewer mechanical parts
- ❑ Lower power consumption (4.9W)
- ❑ Metal case minimises RFI
- ❑ 12 Months warranty
- ❑ All cables supplied

ALSO AVAILABLE

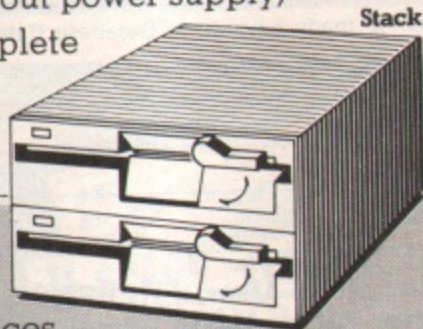
Enquire for full details of our range of TEAC Twin Drives.

TWIN DRIVES



Flat

From **£343** (without power supply)
From **£428** (complete with integral switched-mode power supply)



Stack

ORDERING

To order, add VAT to above prices and send your remittance. Alternatively, order by telephone quoting your Barclaycard/Access number. Carriage and packing free.

Enquiries from Dealers and Education Authorities welcomed.

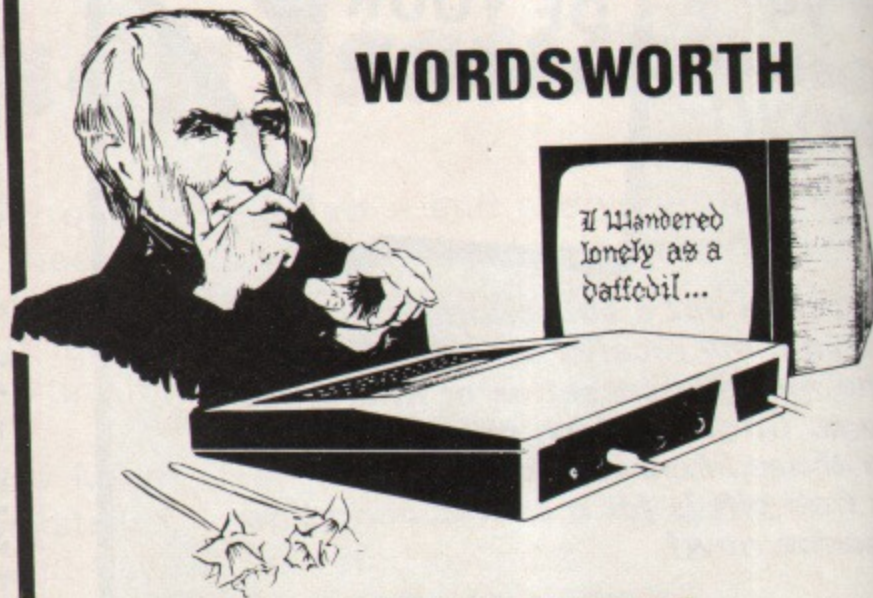
2a Green Street
Sandbach
Cheshire
CW11 9AX



MAIL ORDER MICROS

Telephone 0782 811711

WHICH **BBC WORD-PROCESSOR**
DOES **MAIL-MERGING**, GIVES YOU
AS MANY COPIES AS YOU WANT,
PRINTS **50 - PAGE DOCUMENTS**,
DOES WORD-COUNTING AND EVEN
ADDS UP FIGURES?



WORDSWORTH

WORDSWORTH

does all these things as well as the usual jobs. No need to buy separate mail-list programs or printer drivers, no need to pay three times the price for word-processors with fewer features! Compatible with Acorn or Watford DFS, Microwriter Keyboard and almost any printer.

'I have been responsible for the selection of several generations of applications software. I can recognise a well-written package and am very impressed with the performance and "user friendliness" of Wordsworth.'

— P. J. STANLEY

'I find it very useful, not only for its features, but also for the helpful prompts, which enable a beginner like me to keep on track.'

— R. BLEWETT

And now... PROPORTIONAL PRINTING

WITH STRAIGHT MARGINS, USING
WORDSWORTH WITH UTILITY 1 AND
AN EPSON FX-80 PRINTER.
PROPORTIONAL PRINTING WITH THE
JUKI DAISYWHEEL READY SOON.

Available from selected branches of W.H. Smith and good retailers, or from
IAN COPESTAKE, Dept. W15
23, Connaught crescent,
Brookwood, WOKING, Surrey GU24 0AN.
Telephone/Mailbox: 048674755

PRICES including MANUALS, VAT, P & P

WORDSWORTH DISC	40-TRACK	80-TRACK
including rigid A5 wallet	£22.71	£23.86
UTILITY 1 DISC		
without wallet	£8.62	£9.78
with wallet	£11.78	£12.94

★ £2.00 OFF IF YOU BUY BOTH AT ONCE ★

WORDSWORTH TAPE	£17.54	MANUAL ONLY	£2.88
DISC WALLET	£3.16	PACK OF 10 SSSDDISCS	£19.55

'SEE 10' DISC LIBRARY BOX £3.16
(the best design we have seen)

PROGRAMS AVAILABLE SOON ON 3-INCH DISC

EUROPE:- Prices as above
OUTSIDE EUROPE:- Please add £3.00 per item

This ROM saves programming time and effort

UROM 1.2
J and H Software

UROM is a general purpose utilities ROM by J and H Software.

The most noticeable feature is that there are no problems here with learning awkward syntax.

After typing in *UTILS the menu page is displayed, allowing you to select the required function.

In each of the routines there is a line at the bottom of the screen which gives the required responses.

The utilities provided are:

Memory dump

This displays the values of memory locations (in hex) along with their Ascii equivalents, in screenfuls of 16 rows of 8 bytes at a time.

Simple editing is possible by giving the address and the value that is to be placed there. Whilst screen dumps are formatted for display in Mode 7, the printouts are designed for use with an 80 column printer.

Disassembler

A simple disassembler giving the address in hex, the code in hex, mnemonics (including with immediate addressing hex, decimal and Ascii equivalents).

Block move

For changing the location of a block of memory.

Find and replace

Variable names and procedure names can be searched for and altered, but this will not work for Basic tokens.

Display user keys

A useful utility if you've programmed the function keys and want to know exactly what you typed in. It's a pity that it doesn't allow cursor editing of the

keys.

Set up user keys

This programs the user keys with a range of useful commands. Helpful, but they won't be everyone's first choice. More suited to the cassette user than the disc user.

Edit envelope

If you have problems with all the parameters of the ENVELOPE statement, you'll find this editor very useful.

Envelope

Shows the Basic statement corresponding to any current envelopes.

Define character

Although VDU23 is not as complicated as ENVELOPE, many will find the need for a character editor. A single 8 x 8 grid is displayed in Mode 7. Not so good for defining shapes which are composed of a number of different

characters.

Cure 'bad program'

Probably the single most useful facility to Basic programmers. There can't be many people who haven't come up against the Bad program message. If it can be recovered, this routine will.

6502 Monitor

A simple monitor which allows single step, skip instruction or continuous execution of machine code.

String search

Each time a searched for string is found it will print out the address of the start of the string.

UROM was one of the earlier utility ROMs to find its way onto the market. Although most of the functions performed are simple, they do save programming time and effort.

Jim Notman

A package to aid disc operation

Disc Doctor, version 1.05
Computer Concepts

THIS new piece of eprom-based software is from Computer Concepts, a firm already well known for their word processing package Wordwise.

My first problem was that the disc commands of Disc Doctor would not work with any of the numerous versions of the Amcom DFS (up to serial no. 7370) I have access to, nor the Watford DFS 1.00.

The newer 1.2 version of the Watford DFS does allow it to work correctly, but it shares some command names with Disc Doctor.

As the right hand ROM takes precedence, you'll need to decide which chip's commands you want, then make sure it is in a ROM socket towards the right of the other.

One lesson from this is that if you have any non-Acorn DFS, tell the dealer which ROMs are in your Beeb

and get some assurances from him before you buy!

If Disc Doctor is plugged into one of the sockets to the right of the DFS, then at switch-on or BREAK a Disc Doctor message is printed on the screen along with the DFS title. However if it is inserted into a socket to the left of the DFS, only the Basic and DFS startup messages appear.

Twenty new commands are available (see Page 140). Only 13 of these are directly applicable to the disc system, the other seven being general utilities.

Two of the commands, *FORM and *VERIFY, mean that you no longer need to use the utilities disc.

One of the most important disc utilities is a sector editor, which gives the facility to look at the value of every byte of a sector on a disc and change it if necessary. This is the *DZAP command.

The information is clearly displayed in teletext mode. Many other sector

UTILITIES 1.2

- A. Basic
- B. Memory dump
- C. Disassembler
- D. Block move
- E. Find and replace
- F. Display user keys
- G. Set up keys
- H. Edit envelope
- I. Envelope
- J. Define character
- K. Cure 'bad program'
- L. 6502 monitor
- M. String search

From Page 139

editors are in an 80 column mode, like mode 0, making it difficult, if not impossible – to read on a TV, especially a colour TV.

The display consists of eight columns of hexadecimal values with their Ascii equivalents.

Scrolling through the sector is controlled using the cursor keys, as in Wordwise.

The active location is shown by two arrows. An interesting feature I liked is that input to this active location can be entered in Ascii, decimal, hexadecimal or even binary.

Movement between tracks and sectors was easily accomplished using the CTRL and the left and right cursor keys. If any part of the sector is altered, trying to leave the sector will produce a SAVE (Y/N)? request.

My main dislike was the error handling. If Disc Doctor encountered a disc error on entry to a routine, it would simply report the error.

At other times an error message "ERROR:L" or "ERROR:S" appeared near the top of the screen with no other indication of what this meant, as there was no error number, nor any explanation in the documentation of these load or save errors.

In some error conditions the Beeb would "hang-up", control only being regained by pressing the BREAK key.

The most interesting command was *SEARCH.

With this command you can search for a specified string on the disc. The routine enters the *DZAP editor and the screen flashes through sectors until the string is found. The search can be continued simply by pressing the COPY key.

*RECOVER will load specified sectors into memory while *RESTORE can place a section of memory onto specified sectors.

*DOWNLOAD is used to load and relocate a program. This is most useful where software written for the cassette system (located at &E00) has to be transferred to a disc system (PAGE=&1900).

*DISCTAPE and *TAPEDISC are used as their names suggest for transferring files between the systems. The commands allow a number of files to be transferred in succession. This makes it easy to backup a disc to tape.

*JOIN will add a number of files together in one new file. Since very large files can now be created there is a *PARTLOAD command which can load a section of a file.

*MENU or Break+M saves you having to write a menu program. A simple screen is displayed with the disc title at the top and all the files from

```
DISC DOCTOR 1.05
DIS (<sta>) (<end>) (<ofs>)
DISCTAPE <afsp> (<afsp>)...
DOWNLOAD <fsp> (<adr>)
DSEARCH <str> <trk> (<trk><sct><drv>)
DZAP (<trk>) (<trk><sct><drv>)
EDIT (<key no.>)
FIND <str>
FORM <drv> <no. trks> (<stt>) (<S>)
JOIN <fsp> <afsp> (<afsp>)...
MENU (<drv>)
MOVE (<dest page>) (<src page>)
MSEARCH <str> (<adr>)
MZAP (<adr>)
PARTLOAD <fsp> <ofs> <ext> <adr>
RECOVER <trk> <sct> <sct> <adr> <drv>
RESTORE <trk> <sct> <sct> <adr> <drv>
SHIFT <src> <dest> <ext>
SWAP (<drv>)
TAPEDISC (<fsp>)...
VERIFY (<drv>) (<no. trks>) (<stt>)
```

The Disc Doctor commands

directories + and – preceded by a letter.

By simply pressing this letter, the program is loaded and run. (The + and – directories are used to denote Basic and machine code programs).

*SWAP is Computer Concepts' answer to the problem of only having a maximum of 31 files with the Acorn DFS. Their system allows a maximum of 60 files. The disc is effectively divided into two with the file information for the other half stored in a file called !!!!!!! Each half even has its own title. *SWAP moves between the two.

The problem with this method is that with a 40 track system 30 files only have 50k of storage space, so this system is only useful for discs of short files.

The other commands which make up this package are general utilities.

*DIS is a reasonable general purpose disassembler. The information displayed includes the address (in hex), mnemonics, code (in hex) and Ascii equivalent.

It would have been clearer if the operating system calls had been given as their official title rather than an address: OSWORD is far more easily recognised than &FFF1.

Disassembly takes place a line at a time after depressing a key. It also allows branches to be followed and printouts to be made.

*EDIT displays function key definitions so that they may be edited.

*FIND gives the line numbers of a string in a Basic program. Finding keywords is a little more awkward as it needs you to give a token value rather than typing in the keyword.

*MOVE changes the position of a

Basic program in memory so that it will start at a different page.

*SHIFT can move a block of memory from one location to another.

*MSEARCH looks for a specified string in memory.

*MZAP is very like *DZAP but is used as a memory editor. The screen is updated many times a second, so that looking through parts of memory where byte values are constantly changing, like page &2, you'll see a most interesting display.

Most of the commands were reasonably easy to use. Some numbers used in the commands default to decimal values, some to hexadecimal, which can be a little confusing at first.

However there is the ability to enter numbers in decimal, hex or any other base between 2 and 99!

The 39 page spiral-bound manual supplied with the software was clearly written and informative. One annoying omission from the documentation was that there was no indication of the memory (RAM) used by this package.

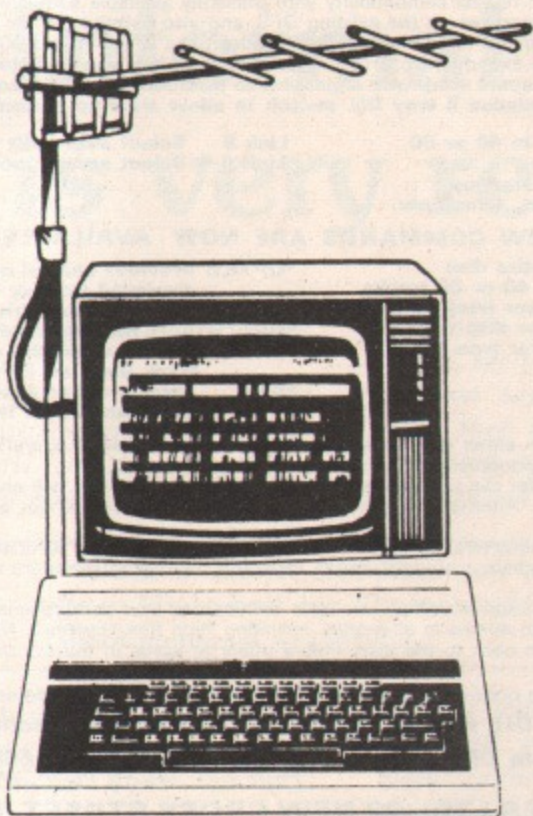
For instance zero page locations &70 to &8F are used so that using *MZAP to alter them can cause unpredictable effects.

I was surprised to see there was no BACKUP-like command which would cope with disc errors, as it is always simpler (and safer) to experiment with recovering information from a backup copy, rather than from the original.

To sum up, Disc Doctor should prove a most useful all-round utility for DFS users, although better error handling routines would make it an even more attractive package.

Jim Notman

Hoist your aerial aloft and get tips from the Oracle



Teletext Adapter

Acorn

TELETEXT is an information service that is offered both by the BBC and the IBA. They often use examples of it instead of the test card – the BBC provides Ceefax, and the IBA Oracle.

The information is transmitted in numbered pages which can be displayed one at a time on a suitable TV.

The signals for this service are digital and as such are obviously perfect for use with a computer.

The Teletext adapter, like most other add-ons for the BBC Micro was subject to delays.

Now that it's available and I've used one, I must admit that for someone who hasn't had access to any of the Teletext facilities before, it's addictive.

The adapter itself is in a box about half the width of the computer and is shaped to form a single unit with the micro.

At the rear are four small tuning knobs, an aerial socket and an on/off switch. The unit is powered from the mains and is connected to the computer via the 1 MHz bus.

The software that forms the TFS (Telesoft Filing System) comes in

eprom. Once inserted as default filing system the machine starts up with the message 'Acorn TFS'.

With TFS and DFS the OSHWM is &2A00, so the first thing to do was to find out how I could still use the computer when not using the TFS.

This is simply achieved by turning off the power to the Teletext unit and performing a hard BREAK. The message 'Acorn TFS no power' comes up and OSHWM is &1900 once again. Nice and easy, that!

Next step was getting down to use the

TFS. The first problem was that I didn't have an aerial. I live very close to a repeater and I normally just use a loop aerial on my TV.

One of the appendices in the manual gives two pages of information about Teletext reception and was very useful.

I ignored all this and fitted a simple internal UHF aerial and luckily everything was OK.

It would seem that to receive Teletext properly relies on a very "clean" TV signal so if you live in a fringe area for TV reception you could have difficulties.

A point to mention here is that you do need the relevant class of licence to receive Teletext even on a monitor, so if you don't own a TV or you've got a monochrome licence and a colour monitor it's going to cost you!

The TFS will operate in two main modes, the Terminal mode and the Telesoft mode.

In Terminal mode you have virtually all the facilities of an intelligent Teletext receiver at your disposal.

There is a tuning facility, pages can be linked, and pages can be stored to any other filing system available to the user.

An added extra is that you can also look at and load the computer programs that the BBC Telesoftware Service broadcast.

Telesoft mode is specifically for dealing with Telesoftware, although it does have commands in common with Terminal mode. Telesoft should be thought of as a read-only filing system.

The manual that comes with the adapter is excellent. It includes all the information that is necessary to use the system at any level, from assembler level to naive user.

There are also 23 pages of technical information for anyone interested in the complexities of Teletext. They make very interesting reading for someone who doesn't know anything about it.

All in all I enjoyed using this add-on. The only problems I can see are those of reception, but a well installed aerial should cure these.

At £225 it's a bit expensive for the home user, especially as there doesn't seem to be much Telesoftware available, although I suppose the service is in its infancy.

Alan Plume

Alan Plume

THIS LIGHT PEN ISN'T MEANT FOR DOODLING

Colour Lightpen

RH Electronics

THIS is the best light pen for the BBC Micro that I've seen so far. It is very well made and comes with a comprehensive 13 page manual.

The pen is metal with a red LED indicator to the rear. It is linked to an interface box via a screened cable which in turn plugged into the analogue socket of the computer.

The cassette supplied contains a machine code driver, procedures to set the light pen up for your particular TV or monitor, and three demonstration

programs.

One of these demonstrates how the pen hardware can operate in user-defined modes selected by software.

The only reservation I have about light pens using the 6845 CRTC is that only character resolution (in Mode 1) is possible.

This means that a light pen of this type is not really a drawing aid, but merely a way of interacting with a program without the keyboard.

To their credit, RH Electronics do point this out on page 1 of the manual, something that other light pen manufacturers do not do.

THE REAL AMCOM DISC FILING SYSTEM

One of its distinct advantages against the Acorn DFS is the speed in which it handles Random Access Files (refer Benchmark figures), consequently, it can load wordwise files in approximately half the time taken by the Acorn DFS.

PRINT 1000 numbers	9.8	Move PTR 1000 places	2.9
PRINT 100 strings	56.2	Write test relative file	51.0
INPUT 1000 numbers	5.7	Read test relative file	24.2
INPUT 100 strings	22.7	Write relative file backwards	81.0
BPUT 1000 bytes	4.5	Read relative file backwards	36.0
BGET 1000 bytes	3.4		

This independent disc filing system adds greater flexibility to your BBC Computer. It has two distinct modes which auto select on booting the system. Mode zero is the standard mode which retains compatibility with presently available software. Mode one, the extended mode, allows for sixty-three file names per disc, over 100% increase on the existing DFS, and also permits the file names to be up to fifteen characters in length, providing much greater scope for meaningful file names. In both modes page is set at &1500. This gives 10% more usable memory than Acorn's DFS, in modes 0, 1 and 2. If you already have a Disc interface fitted, it is very easy to upgrade, you simply remove the DFS Eprom and replace it with the Amcom DFS Eprom, if not then it is possible to purchase an entire Disc interface kit (consists of 11 I.C.'s) with this DFS track cutting is not required. **Also includes 8 way DIL switch to allow start up options to be set.** (see below).

Link 1 Determines if the system starts up in 40 or 80 tracks

Link 2 Select Acorn or Extended mode at start-up
Link 3 & 4 Selects type of drive ie. Shugart, Canon etc.

Link 5 Select auto-boot or not, on 'break'

Link 6-8 Select screen mode on start-up, ie. model 0 to 7 etc.

NINE NEW COMMANDS ARE NOW AVAILABLE

*Clear Quickly and easily erases a entire disc
*Format Formats drive 0 to 3 in either 40 or 80 tracks
*OPT2,n Alters the number of sectors per track to n
*OPT3,n Alters the number of tracks per disc to n
*OPT5,n Sets the start of the DFS buffer (see OPT7)

*OPT6,n Provides control over which part of the file spec. will be displayed ie. only display directory and program length, or just display drive and load address.

*OPT7,n Sets the length of the DFS buffer
*OPT8,n Double steps the disc drive to allow the reading of 40 track discs on 80 track drives

*SYS Selects either Acorn mode or Extended mode
Commands now include *Access

There is a built-in formatter which will format in either forty or eighty tracks in both modes of operation. This formatter also allows for user definable parameters to be included for the development of software protection. With this disc filing system a user definable buffer can be used while compacting the disc. This will enable disc compacting to be carried out without overwriting any programme in memory. Alternatively a new disc may be formatted without any resident programme being overwritten.

This DFS also allows for the use of wildcard characters, using either the # symbol for a single wildcard and the * character for multiple wild characters. (e.g. CHAIN "P*" could be used to chain a program called PRINTER as long as there are no other files whose names begin with P).

This DFS is totally compatible with Econet etc., and is complete with a utilities disc and comprehensive manual. The utilities disc contains many useful programmes including printer screen dumps in all modes, including High Res. (Epson & NEC 8023). It also has a nibble editor to scan discs, read data, edit them, and then write back to the disc. Plus a utility to assist in the transfer of cassette files to disc.

Available now direct from Pace or contact your local dealer.

Comes complete with disc, 8 way DIL switch, manual and full fitting instructions at £34 inclusive of VAT.

Also available as a complete Disc Interface Kit (including DFS) at £95 inclusive of VAT.

PACE SOFTWARE SUPPLIES LTD., 92 NEW CROSS STREET, BRADFORD BD5 8BS.



0274 729306



**SUPERB
REVIEW!**

AID at last!

Assembler Interactive Debug for the
BBC Micro with DUALSCREEN

**STOP PRESS . . . AID receives
superb review . . . see below**

AID has now established itself as the finest machine code monitor ROM for the BEEB. With its unique DUALSCREEN operation so far in advance of the competition, AID puts unprecedented debugging power into your hands. No other monitor can begin to tackle machine code graphics – something AID takes effortlessly in its stride! Beginner or expert, you cannot afford to be without DUALSCREEN AID.



LINCOLN Microsystems		ASSEMBLER INTERACTIVE DEBUG										
Status	PC	A	X	Y	S	MD12C						
Hour	1537	00	7	0	FD	000001						
Disc	1530	00	7	0	FD	000011						
PC +	1537	00	76	-	STA	76						
	1531	00	76	-	IMY							
	1530	01	76	-	LDR	476						.Y
B +	1534	00	03	-	RSE	1529						
	1536	00	01	17	-	LDR	1791					
	1539	00	77	-	STA	77						
B +	1538	00	00	-	LDR	00						.Y
	1530	01	76	-	LDR	476						
	1537	00	76	-	IMY							
	1540	00	43	17	C	IMY	1743					
B +	1543	00	76	-	IMY							.Y
	1544	01	76	-	LDR	476						

AID screen selected

Read what "The Micro User" thinks . . .

“My immediate impression of AID was that it was a very professional product . . . AID offers additional features far in advance of other monitors . . . I found it easy to use, particularly as the user guide is very thorough and accurate . . . I wish I had something like this when I first started dabbling in machine code . . . The last facet I explored was the DUALSCREEN facility, which is perhaps the pearl of the system . . . In conclusion, AID seems a must for the serious machine code programmer and a very useful learning aid for the novice. It is a highly professional product in every way and could prove to be the standard by which others are compared.” *“The Micro User” January 1984*

The most advanced machine code AID for the BBC Micro

**LINCOLN
Microsystems**

Dept DP1, 22 Lagan Walk
Peel Hall
Manchester M22 5WG



ROM
plus manual
(OS 1.2 required)

£28

p&p add
UK £1.50
Europe £3.00
Outside Europe
£4.50

MICROMAIL

Informal approach is very rewarding

AFTER staying behind many hours after the children had gone home from school, I decided to buy a BBC Micro of my own (1.2 OS but minus a disc interface).

I have bought all the back issues of *The Micro User* and spent hours reading and typing programs, probably learning more from my mistakes and working with a friend rather than wading through the *User Guide* or some of your more learned articles. (I was never much of a reader.)

I have particularly enjoyed loading or typing in programs and then altering them, such as by replacing entries requiring use of *Return* by using *GET\$*.

In a French vocabulary test, I added music at the beginning and end with a procedure, and programmed keys to add lines to skip past the music should the user choose the option of a silent quiz.

For the "counting" program (*Electron User*, November issue) I added a procedure including some of the sounds from "Sounds Exciting" to make the computer give a cheeky (though inoffensive I add) response should the user choose not to play once the program is loaded and running, and a line to ask if the user will press the space-bar to restart after having a go.

I found Tim Hartnell's "Personal Computer Handbook" helpful in getting into computing, providing simple listings

which could easily be manipulated.

As a dabbler I have enjoyed this informal approach. I hope you will continue in your excellent magazine to cater for

chemists or stationers – if they would rectify these difficulties on two separate occasions, when they were fitting the 1.2 operating system and latterly the speech synthesiser, and

like a traditional micro!

Don't forget that it has independent input and output serial buffers, and interrupts to prompt action when the buffers need attention. These would allow machines to be linked in a cheap asynchronous loop.

With only three wires between stations, carrying signal, ground and busy, you can use inexpensive audio connectors for the join.

A stereo jack-plug at one side for receive and a socket at the other for send meet the RS 423 DIN in the middle. Stretching and closing the loop simply needs through-wired stereo extenders.

With the OUT of one BBC connected to the IN of the next, the data would have to be sent in addressed, buffered packets to prevent a lock-up.

The addressing could be quite simple. If each block is preceded by two (three) bytes, then you could specify one, many or all of 16 (24) machines without complex decoding.

Just AND the address with your own, which has a single bit set. If not yours, then send the message on.

If yours, then clear that bit and send the message on. If both bytes of address come in as zero, then it has been all the way around and you can dump it after checking its survival.

To do this properly, of course, the I/O would need interrupt programming, but a cheap eprom should have ample capacity by using the facilities in the BBC's OS.

The important step is to standardise the network. I'd like to be able to type

IF you're a Prestel subscriber you can now write to Micromail by Electronic Mail. Our Mailbox number is 614568383.

the likes of me as well as those who fully understand the subject. – Michael Bowie, Norbury, SW16.

Pixel problem

CAN you help me solve a couple of problems which I have had with my BBC Micro since I bought it last year?

There are three small areas of the screen, approximately a pixel size each, which will not conform to the colours set up on adjacent locations.

And there is an occasional hiss on the speaker, similar to that obtained on a radio during a storm, which also seems to affect the picture.

I asked my local dedicated computer shop – not a

while I was advised that all was well when the machines were collected the problems persist. – David Rickwood, Tonbridge, Kent.

● Your machine is faulty. We had a similar one. The cause is probably either a RAM fault, 6845 fault or ULA fault.

Anyway – it's easily fixed. Take it back!

Cheaper links

I WAS very interested by your article on linking BBC Micros (*Micro User*, October). One to one (line) or one to several (star) networks are handy, but the software and hardware rapidly become too complicated using your scheme.

You're still using the BBC

for a business computer.

I've been in shops and seen the salesmen singing the Beeb's praises but once the price is mentioned the customer's usual response is "No thank you".

Features it may have, but an extremely over-priced value it also possesses in Australia. Maybe with a bit of luck, something might happen and the prices will drop.

Darren Fishman,
Victoria, Australia.

The Australian angle

FIRSTLY, I'd like to congratulate you on a great magazine, even if it is a bit slow in getting all the way out here. (It's mid-October and the August issue is not out yet!)

The *Micro User* has taken into account all levels of Beeb users and tailored the magazine accordingly. Good stuff!

Meanwhile, the BBC Micro remains at a ridiculously high price out here in Australia.

Converting to your pounds

sterling, here the BBC costs around £1,000, while a disc drive is around £600.

Comparing to Britain, the Beeb works out at least twice as expensive as in your country.

Instead of the BBC Micro competing against the likes of the *Spectrum*, *Atari*, *Commodore 64* etc, as in England, its price pushes it up into the *Apple II* market.

So in Australia you'd be shelling out the same money as

MICROMAIL

From Page 143

something like *LINK 11 to set up the system and state my address, then transmit data as if through *TAPE.

Both origin and target address(es) are put in the file name, and the intervening machines automatically (and invisibly) pass the blocks from receive to send buffers. The target(s) must amend the address, then copy the data to both the send and input buffers.

The simplest way to get the information into a program would be to check the *LINK status as part of the command loop, then INPUT any data in the queue. — Nik Kelly, Liverpool.

Fair enough!

AS a regular (and avid) reader of your magazine I looked forward to the London Fair with great anticipation.

Being a confirmed southerner who believes that all life stops at Watford (now extended to Cambridge) I was wondering what the inhabitants of wild and distant Stockport could put on for us in the big city.

Suffice it to say, I have now included it on my map of 'civilised spots outside London'!

When is the next Fair in London? — R. Southall, Surbiton, Surrey.

● You'll be pleased to know we're moving south again next month for the Electron & BBC Micro User Show. It opens on March 29. Read all about it on Pages 104-105.

Power packed

MY BBC Micro is an early Model A (Issue 3 board) which I have fully upgraded to a Model B in all respects except the

power supply.

I have also fitted the disc interface, my drive being driven from its own integral power supply.

Given that I still have the original Model A supply unit, how many sideways ROMs will it safely power? At present, apart from the OS 1.2, the DFS and the Basic chips, I have plugged in a word processing chip. And what about the speech chips? — M.T. Michaelides, The Netherlands.

● I don't know the answer. Put it this way — the one I've got at work powers all four. Mike Cook.

Dipping into disc storage

REGARDING your response to a letter from Simon Taurins in the October issue of *The Micro User*, there are inexpensive ways of using the disc storage facilities of the RML 380Z from a BBC Micro.

Firstly, there is a one BBC-RML link originating from David Benzie of the ITMA project at the College of St Mark and St John, Plymouth.

Secondly MACE, the West Midlands MEP Regional Centre, have devised a network system that uses the RML to

HAVING recently graduated to the BBC Micro I wish to contact other users via my computer and play games with distant opponents.

I would also be interested in downloading software and accessing data banks like teletext.

Could you please give details on whether a telephone line and modem is needed and the facilities offered.

The ones I have been considering are Econet, a teletext adaptor and Micronet.

Also if I have not taken up too

serve BBCs. Their address is: Four Dwellings School, Dwellings Lane, Quinton, Birmingham B32 1RT.

Further information on either should be available from any MEP Regional Centre. — Neil Stanley, MEP Regional Information Centre, Merseyside.

Suppressed display

I NOTE in the December issue of *The Micro User* a method to suppress display while using the printer. If one uses *FX 3,10 this disables the VDU driver and enables the printer without recourse to VDU 2 or CTRL B.

This instruction directs output to the printer only. *FX 3,0 redirects all output back to the TV.

I have not investigated the possibility that the *FX 3,10 (combining *FX 3,8 & *FX 3,2) may prevent control characters being sent to the printer. However if one is only interested in sending text then the above calls give the easier method. — Michael Swatton, Basildon, Essex.

● Thank you for your suggestions. Unfortunately, *FX 3,10 does seem to prevent sending control codes.

Long distance gamesmanship

MUCH room already I would like to know what the different LOAD/SAVE baud rates do apart from speeding up or slowing down program transfer. Does this mean it can communicate with other types of computer? — Martin Dimoglou, Colchester, Essex.

● Econet would not suit your purposes. Both Micronet and the BBC Teletext service allow you to download programs and access databases — Prestel and Ceefax respectively.

Micronet needs a modem plus telephone line. Teletext just

Speedy loader

THE article by Paul Beverley (October 1983 issue of *Micro User*) seemed to answer a problem experienced when running teacher training courses — how to load programs quickly with only one disc unit.

Initial trials were unsuccessful, though instructions were followed precisely. A rival magazine also featured a similar idea, again incompletely.

Falling back on the *User Guide*, I was able to use Paul's simple wiring diagram and the following programmed keys to successfully splurt programs:

```
*KEY 9 *FX8,6IM*FX3
.7IML.1*FX3IM
*KEY 0 NEWIM*FX7,6IM*FX
2,1IM
```

Using these keys, a program loaded from disc on the transmitting (Tx) machine (do not run in case function keys are redefined) can be running on the receiving (Rx) machine within seconds by pressing F0 on Rx and pressing F9 on Tx. The program lines now scroll on Rx.

When the "syntax error" message appears press Break, then OLD Return, RUN Return on Rx.

The cable can then be

needs the Acorn adaptor and a good television aerial.

As for the interactive games, people are busy working on this — see our Link-up article in the October issue of *The Micro User*.

The different baud rates do effect the rate of loading and saving programs. However, for technical reasons, the slower rates are less susceptible to "noise" — that is, interference — and so they're often used for long distance data transmissions where it's important that the data survives.

● **Want to write to Micromail? The address is: Micromail, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.**

transferred to a second Rx.

This method is almost as quick, and is subject to far fewer problems than the MACE system which uses a 380-Z as a server.

One immediate advantage of this arrangement is the preparation of cassette copies of disc programs on several different Rx computers. — Alan Shaw, Clitheroe, Lancs.

Basicode II network

I AM interested in making contact with people who use 300 baud modems together with the BBC Micro. In Holland we have a whole communication net between micros. Using Basicode II we can talk to many types of micros, including Apples, TRS 80s and Spectrums.

My address is: Hans Doeleman, Fuij 49, 1141CK, Monnickendam, Netherlands.

● Readers who would like to know more about Basicode II, the revolutionary computer language that enables micro to speak to micro, should see the article about it in the October issue of *The Micro User*.

Tape for her, too

I TAKE *The Micro User* and have been very pleased with what I have learned through its pages. I do however take issue with the wording of the advert for the Christmas tape. Why "in his stocking"?

For goodness sake why not say "in their stocking" and avoid compounding the prevalent idea that computing is for the male sex.

I'm not a particularly avid feminist but this really did irritate me as I'm doing my best to initiate my three daughters into the world of computers without giving them the idea

Structured for the birds!

ROY Atherton's letter in the November issue of *The Micro User* deplored the use of GOTO and GOSUB. Might I politely suggest he does both, more especially the latter, now Winter is here.

The BBC Micro is a tool as is, say, a pen, and it matters not whether the latter is a quill, fountain pen or ball point, nor whether the script is block print, joined Form 3 script, copperplate gothic, pharmaceutical/medico script or advanced scribble — as long as it does the job.

This yuk about "structured" programming is for the birds!

I have thousands of my own very good full colour programs which all work fantastically well, and they are all full of GOTO; GOSUB; ON . . . GOTO/GOSUB as well as

PROCX and FNX with or without recursive techniques.

But perhaps Mr Atherton is unaware of the fact that there is a limit (on the BBC Model B) to the recursions — approximately 2,000 — then Bang!

One must use the techniques available and to hell with elegance, which is a highly subjective term anyway.

The modern toilet is absolutely functional and elegant, but it remains for all to see and recognise at once as merely a glazed ceramic avocado green or blush pink privy and all the structuring in the world cannot alter that fact and all the structurings Mr Atherton refers to are ultimately fancy forms of GOTO and GOSUB. — J. Frank Hughes, Henllan, Denbigh.

I HAVE followed the great

GOTO controversy with some interest as I took my first faltering steps in programming in Fortran IV (I'm not really old, honest), where GOTO was a fairly sophisticated instruction.

It remains a valid instruction in Basic and has its uses. In particular, consider the structure "IF<condition>THEN<line number>". the execution of this is indistinguishable from "IF<condition>THEN GOTO<line number>".

The GOTO is implicit and thus is used by everyone, except only the most pompous of programming pedants.

It is time they admitted their feet of clay and got on with showing beginners how to programme clearly using all the instructions available to the best advantage of each. — Dr G.T. Freshwater, Lerwick, Shetland.

they're odd! — Janice Lee, Penarth, S. Glamorgan.

● Point taken — we normally catch these things before they go through. However, very few of the letters and articles we receive are from women and I doubt that the occasional use of an inappropriate pronoun is entirely responsible.

Disc Executor

WE would like to take the opportunity to reply to the misleading allegations made in your recent review of our tape to disc transfer program Disc Executor.

Disc Executor is compatible with Watford Electronic's DFS and will transfer all Acornsoft games to disc, including those which are locked.

According to our research

Acornsoft programs are the most popular. Disc Executor will also run those programs which have data files such as Acornsoft's Tree of Knowledge and Shirley Conran's Magic Garden.

It will transfer and run a large majority of the commercial software available at the present time including those from Program Power, Superior Software, A & F Software, Software Invasion, etc.

It will also allow full length adventures to be transferred to disc, something which can not be achieved using moving routines!

Disc Executor is designed to simplify the transfer of programs from tape to disc. It is intended for the person who has just upgraded to disc drives or simply doesn't have the time or expertise to write moving routines.

It does not move programs in memory but contains its own

DFS routines on disc which allow it to be completely independent of the disc workspace and allows programs such as Felix in the Factory to be loaded directly into memory.

Once the disc is full it is an easy operation to delete any of the programs. In this way Disc Executor can be used to transfer your favourite game of the month to disc and replace it with another whenever you become tired of it.

The response from the public to Disc Executor both at the BBC Micro User Show in London in December and from our mail order customers has convinced us that Disc Executor does what the user requires. — Stephen Green, Vision Software, Liverpool.

● There were no misleading allegations made in the review of Disc Executor and the product

MICROMAIL

sent in was accurately reviewed.

Let us state *Micro User's* position. If software houses wish to have their products reviewed in a satisfactory light, they should ensure that they send in a satisfactory version for review, rather than, as often happens, releasing a later, "enhanced" version.

We can only review products as they are, not as the vendor would like them to be.

In this case we are glad to say that the later version of *Disc Executor* does in fact support all the claims made in your letter, as do several enthusiastic users of your product who have contacted us since the review.

Hi-fi connection

I WOULD like to be able to connect my BBC Micro to my hi-fi and in doing so bypass the micro's internal amplifier. Is this possible?

I did read somewhere of two

terminals which may serve this purpose. Perhaps you would be able to advise regarding this matter. — A.G. McMahon, London.

● To judge by the number of queries we had on this at our London show, everyone wants to to this!

To obtain the signal you require for the external amplifier, simply take the feed from the link marked PL16 on the bottom left edge of the printed circuit board.

Hong Kong assembly

I HAVE obtained a copy of the August issue because I wanted the article on transfer from tape to disc. In the issue I found Colin Malone's letter about the origin of BBC Micros.

Please pass on to Mr Malone the fact that my BBC B was assembled in Hong Kong, that I bought it in Walton-on-Thames at the end of July and that I am expecting him to replace it with one built in the UK.

Which brings me on to the

BBC Micro and Weights and Measures and the sale of goods legislation.

Surely each new component, whether it is OS 1.2, Basic II or Main board 7, is the equivalent of admitting that the previously issued machines were in some way inadequate.

As such they should be replaced free of charge or the money returned. I can think of no other area where this would not apply.

How about some forthright comments and help on behalf of all BBC Micro purchasers? I believe you owe it to your loyal readers. — R.D. Jackson, Sevenoaks, Kent.

Time call

BECAUSE of children, etc, I am unable to take possession of "my" BBC Micro until after 9pm, and as a result I become carried away into the early hours of the morning. Trying to get up for work the following day is becoming a problem.

What I want to do is to program the Micro's internal clock to interrupt whatever I am

doing at, say, I am with the message:

"The time is now I am, Go to bed!"

I know it should be possible from what I picked up at the BBC Micro User Show in Manchester but I don't know how to do it.

Could you please tell me in absolute beginners language. I only have three weeks' experience. — Michael Pastore, Droylsden, Manchester.

● Your wish is our command. If you turn to Mike Cook's *Body Building* article on Page 116 you'll see a real time clock described.

Acacia Computers market a rather elegant desk diary that should more than fit the bill. We'll be carrying a full review soon.

Big bang

HELP! Anyone worked out an effective program for a nuclear explosion? — Alan Frost, Eastbourne.

● We are assured that the super-powers already have such a program well in hand.

And finally, with tongue firmly in cheek . . .

Slaving over a hot assembler

Dear Trev,

Don't be surprised if someday soon you read about me in your morning paper. The story will probably go along the lines that I'm helping police with their inquiries into the mysterious disappearance of my wife.

Certain tapes will no doubt have been removed from my house for expert examination.

It will all be because I'm trying to learn machine code. And Andrea isn't helping.

Normally I'd be tucked away in the spare bedroom out of sight but A.'s having it redecorated. She's hired a little man with an allergy to cheques who tells me that he's "got a video games machine" as well.

Anyway, me and my beeb are stuck down in the front room under A.'s all-seeing eye as I struggle through "Machine Code for Morons". And A. has started to Try To Take An Interest In Hubby's Hobby.

I swear I'm going to cancel those women's magazines. It's because of them

that all the time I've been slaving over a hot assembler, A.'s been there asking every kind of question but the ones I know the answer to!

My big mistake was to let out a shout of joy when I'd finally got my first machine code program to work. All it did was to print "HELLO" on the screen but to me it was a work of genius. Of course A. didn't see it that way.

"What's so good about that?" she asked.

"It's all done in machine code", I replied proudly.

"But why do it in machine code when you can do it in Banal or whatever it is you normally use?"

"Because it's faster", I said ignoring the dig.

"Faster!" she snorted, "It's taken you hours to do that".

Then, like the fool I so regularly am, I started to explain the basics of machine code. I told her how the BBC Micro's

built-in assembler saved me having to mess around with the op codes and made things that much simpler.

"But that's cheating!" she yelled. "It's not you that's doing the machine code, it's the micro".

With that she departed to the kitchen leaving me with the parting shot that all these registers and assemblies reminded her of school.

That was bad enough, but worse was to come. As I was plinging away on my micro I heard her singing the Hokey Cokey in the kitchen. Nothing wrong with that, of course, just a little eccentric.

No, it's not the song that's had me looking round for a blunt instrument that won't show fingerprints. It's the words she's singing to the tune:

You increment Y, you increment X,
And load the accumulator with zero zero hex . . .

I despair! Yours, Bob.

Next month in

THE MICRO USER

Will 1984 be the Year of the Disc?

Sales of disc drives for the BBC
Micro are soaring as more and
more users turn to this ultra-fast
and secure means of storage.

Next month's *The Micro User* focuses on the
disc drive revolution and tells you:

- WHAT a disc system is: an easy to follow description.
- WHY disc based storage can be the answer to many of your programming headaches.
- HOW to use your system to full effect: a thorough examination of the DFS commands, together with three invaluable utilities.

Whether you're at the stage of considering buying discs, or are already an experienced disc user, you'll find lots of interesting, useful information in the next issue of *The Micro User*.

Many regular readers of *The Micro User* have been complaining that their newsagent has run out of copies.

It's a problem we are urgently trying to sort out with our distributors. Meanwhile, you have two ways of making sure you don't miss YOUR copy each month:

- Place a regular firm order with your newsagent.
- Take out an annual subscription – and collect your free gift at the same time.

There's an order form on Page 137.

LOTHLORIEN

Adventure and action for Acorn



Johnny Reb

NEW
from
WARMASTER

There's still plenty of fight left in the Confederate South as each side selects forces to manoeuvre on a full-graphics battlefield. Play against the computer or challenge a friend to perfect your tactics and re-write American history.

BBC-B £6.95 ONE OR TWO PLAYERS

the Stolen Lamp

This new Lothlorien adventure game is played in an Arabian Nights fantasy. You have to retrieve the Emperor's stolen lamp and return, by magic carpet or camel, with as much treasure as you can. Beware the enchantress and the denizens of the Blue Lizard Cafe.

BBC-B £6.95 ONE PLAYER

With 'Warmaster', 'Actionmaster' and the new 'Adventuremaster', Lothlorien have justifiably earned a reputation as the mind stretchers.

Lothlorien add new titles every month and are always interested in hearing from programmers with first-class software.

Lothlorien games are available from most leading software specialists, or direct by post at no extra cost.

PARAS Your hand picked force has to capture a river crossing behind enemy lines in this all-graphics wargame. 10 levels of play.

BATTLEZONE 2000 Take on a computer-controlled battle machine in this futuristic wargame

ROMAN EMPIRE Building an army is only the start of an Empire-building campaign. Leadership, morale and fighting efficiency count for more. 3 levels of play.

CONFRONTATION A build-on base for non-nuclear conflict provides 2 players with scope to re-enact any 19th or 20th Century campaign. Cassette contains master program plus Stalingrad scenario.

Please send me (tick box)

<input type="checkbox"/> STOLEN LAMP	BBC-B £6.95	<input type="checkbox"/>	<input type="checkbox"/> BATTLEZONE 2000	BBC-B £6.95	<input type="checkbox"/>
<input type="checkbox"/> JOHNNY REB	BBC-B £6.95	<input type="checkbox"/>	<input type="checkbox"/> ROMAN EMPIRE	BBC-B £6.95	<input type="checkbox"/>
<input type="checkbox"/> PARAS	BBC-B £6.95	<input type="checkbox"/>	<input type="checkbox"/> CONFRONTATION	BBC-B £7.95	<input type="checkbox"/>

(1.2 operating system only)

I enclose a cheque/P.O. for £ _____ made payable to M.C. Lothlorien.

Please debit my Access A/C No. _____ Signed _____

Name _____ Address _____

Send to M.C. Lothlorien, Department B/2, 56a Park Lane, Poynton, Cheshire SK12 1AE.
Tel: 0625 876642

LOTHLORIEN the mind stretchers

Leigh Computer Systems

COMPUTERS

Sinclair 16K	£86.90
Sinclair 48K	£113.00
Dragon 32K	£145.00
Oric 48K	£113.00
Electron	£173.80
BBC 'B'	£346.95

PRINTERS

Oki Microline	£209.00
Epsom RX80	£225.00
Epson RX80FT	£260.00
Epson FX80	£335.00
Shinwa CP80	£225.00
Printer Cable	£8.50

DISC DRIVES

Single 100K	£165.00
-------------	---------

EPROMS

Sideways ROM Board	£38.00
2764's (each) P.O.A.	
27128's (each)	£15.50
(discount on volume)	

MONITORS

(all complete with lead)	
Cabel 14" colour	£190.00
Microvitec 14" colour	£197.00
TV Monitor	£207

ACCESSORIES

Disc Interface	£78.50
Upgrade A — B Spectrum	£57.00
16K — 48K	£19.95
Joysticks (analogue)	£15.00
Joysticks (self-centring)	£16.50

LARGE SELECTION OF SOFTWARE — TOO MANY TO LIST

£1.25 off 2 pro-rata for over 2

SAE for lists — state machine

ADD 80p carriage — small items

£7.00 carriage — large items.

ADD 15% VAT to total

36 Derby Road, Hinckley, Leicestershire LE10 1QF.
Telephone: 0455 612139

BRIDGE SOFTWARE

THE NIGHT SKY (for BBC micro Model B)

An observer's guide to the stars
visible from anywhere between 66°N and 66°S

Discover the fascination of the limitless heavens.

Create brilliant hi-res starcharts with
THE NIGHT SKY and your BBC micro

- Features over 1000 different stars
- 5 magnitudes distinguished
- 87 constellations identifiable
- Many millions of different skylscapes
- Sky colour indicates day, night or twilight
- Ideal for serious astronomers and novices alike
- Make your TV screen a mini planetarium

Trace the movements of the constellations
minute by minute, night by night

Send **£9.90** for cassette and Manual

Send s.a.e. for full list of our scientific
educational, graphics and games software for
Spectrum, ZX81 and BBC micro

Full money back guarantee.

Trade enquiries welcome



Dept BU, 36 Fernwood, Marple Bridge,
Stockport, Cheshire, SK6 5BE, England.

CARSON DEVELOPMENTS SPECIAL OFFER

WHILE STOCKS LAST

40 TRK SS at £100 DISKETTES

	WABASH	DATALIFE
40 Trk SS.SD	£14.00	
40 Trk SS.DD		£17.00
40 Trk DS.DD	£17.50	£24.00
80 Trk DS.DD	£23.00	£28.00

£1 post and packing; 3 or more boxes are post free; discount on quantity.

DISC INTERFACE KITS: Single density £85; double density £99; double density DFS £79.

DISC DRIVES

	Bare	Cased and cabled	Dual cased and cabled
40 Trk SS	£125	£140	£280
40 Trk DS	£155	£170	£350
80 Trk DS	£210	£220	£450
Power supply at	£40		

Format disc and user guide £5. Carriage on drives £10.

Please add VAT to all prices.
Dealer enquiries invited.



CARSON DEVELOPMENTS (MU)
84 Highfield Road, Romford, Essex,
RM5 3RU.

Telephone: 0708 27043

4

Emmanuel St.

Our *new* Personal
Computer Centre
specializing in
the BBC Micro
with complete support

we know computers

1 Business &
Professional
Tel: 0223 65335/4



Home &
Educational 4
Tel: 0223 358264

Cambridge Computer Store

1 & 4 Emmanuel Street, Cambridge



DO YOU WANT A WORD PROCESSOR FOR YOUR BBC OR A WORD PROCESSOR FOR YOUR BBC ?

Yes there is a difference between word processors and we can offer the best because it's the **FIRST PROFESSIONAL DISC BASED WORD PROCESSOR FOR THE BBC COMPUTER.**

The MERLIN SCRIBE uses the disc on your computer the same way that professional systems costing many hundreds of pounds do.

Until now any document you wished to create has been limited to the few pages which could be squeezed into your computer memory. This means the computer is really using the disc as if it were a cassette!

The SCRIBE can create documents far greater in size than the computer memory, and really uses the disc as it was intended to be used. SCRIBE automatically loads and offloads pages between disc and memory without you even knowing it's happening!

Amongst the many super features available are:

- * Optional 40 & 80 column screen format selection.
- * On screen formatting - you see it as it's printed INCLUDING UNDERLINING.
- * Right justify, word wrap, insert, delete, move copy & centre.
- * Document merge (will merge two documents into one from disc).
- * Addresses all four drive units allowed by your BBC disc system.

Plus many more professional features.

SCRIBE comes in ROM with five minute fitting instructions, printer utilities on disc and a comprehensive manual.

PRICE £59.95

Also MERLIN SCRIBE in ROM for cassette machines £29.95, and on tape £19.95. All prices include VAT. Post and Packaging 60p.

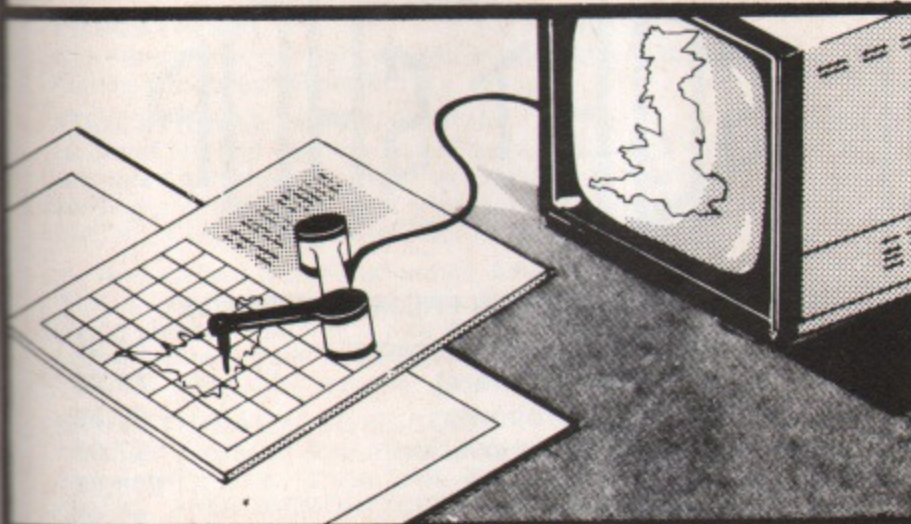


MERLIN COMPUTER PRODUCTS (BUCON LIMITED)
18 MANSEL STREET, SWANSEA, SA1 5SG. TEL (0792) 467980



Robot Plotter

£59.50
INC. VAT
CARRIAGE
£3.00



- ★ FOR BBC MICRO MODEL B CASSETTE OR DISC
- ★ ENABLES PICTURES TO BE DRAWN OR TRACED
- ★ WORKS IN ANY GRAPHICS MODE — COLOUR SELECTABLE
- ★ DESIGNED BY A TEACHER FOR EDUCATIONAL USES BY STAFF AND PUPILS
- ★ TRANSPARENT TABLET ALLOWS DIAGRAMS AND MAPS, ETC. TO BE COPIED
- ★ ROUTINE INCLUDED TO SAVE QUICKLY TO DISC OR CASSETTE
- ★ SCREEN DUMPS FOR EPSON AND SEIKOSHA PRINTERS
- ★ TRIED AND TESTED — DIRECT FROM THE MANUFACTURER

COMMANDS FOR:

- LINES
- CIRCLES
- RECTANGLES
- INFILLING
- COPY AND MOVE
- PRINT AT
- AS WELL AS TRACE MODE

Please send me

I enclose Cheque/P.O. for

or please debit my Access/Barclaycard

Name

AddressCode

GOVERNMENT AND EDUCATIONAL ESTABLISHMENT
OFFICIAL ORDERS WELCOME

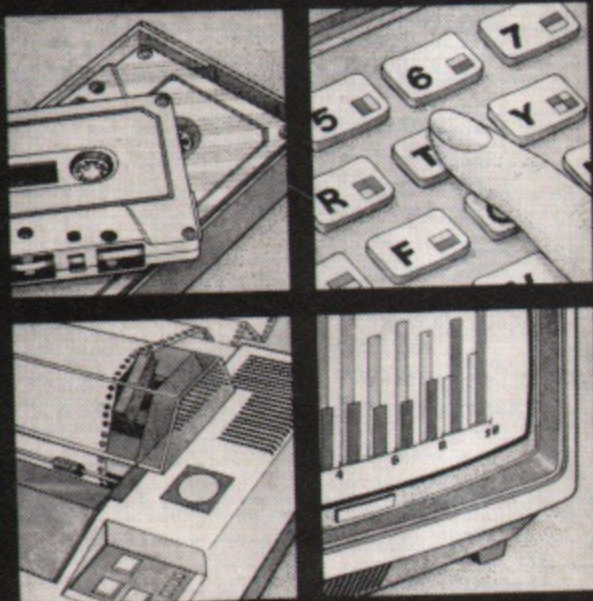


COMPUTER DEVELOPMENTS LIMITED

NATIONAL INDUSTRIAL ESTATE
BONTOFT AVENUE, HULL HU5 4HF
TEL: (0482) 448562.

Step by Step BASIC

BBC Micro/Electron edition ■ Richard Freeman



Step by Step BASIC

Richard Freeman

Here is an easy introduction to the BASIC of the BBC and electron micros. The book is specially planned around 35 sessions with your micro. Each session includes:

- Interesting keyboard activities to help you explore your micro.
- Demonstration programs.
- A full summary of all that you need to remember.
- A test yourself section with full answers.

All key ideas that you need are covered including colour, sound, graphics, animation, defining your own characters, sorting and filing.

From the very start you are shown how to use the best program structure techniques. There's not a GOTO in sight! Procedures are used from a very early stage.

The book also includes five useful appendices including a full pattern table for easy user-defined characters.

Book £5.95

Program tape £5.50

LIFELONG LEARNING

Dept MU1 55 Milton Road
Cambridge CB4 1XA

CITY OF SALFORD EDUCATION DEPARTMENT

Microcomputers in Schools Project

Applications are invited from Suppliers of Acorn (BBC Model) Microcomputers and associated peripheral equipment, for consideration for inclusion on a select list from whom tenders will be sought for the supply of such equipment to the Education Service.

It will be necessary for Suppliers to submit information in support of their application detailing quantities and availability and reference sources etc.

Closing date for receipt of applications:

2.00 p.m. Monday, 6th February, 1984

to be submitted to:

**The Chief Education Officer,
Education Department,
Chapel Street,
Salford,
M3 5LT.
Telephone: 061-832 9751 Ext. 231**

For the attention of the Supplies Officer

MATHS 'O' LEVEL

Pass that all important exam with the help of our self-test, multiple choice, revision program.

- Large database of questions – random selection for each test.
- End of test score, time – report, answer check.
- Cut-off option on 'time-up' you're marked on the number of questions completed.

SAE for further details.

For 32K BBC machine **£10.95**

Helowell
Software

157 Peters Road, Earley,
Reading RG6 1PG.

DISCOUNT SOFTWARE

FROM
SOFT SHOP

A FEW EXAMPLES FROM OUR RANGE

Andriod Attack (Computer Concepts)	£8.95
Centipede (Superior Software)	£7.95
Moonbase Alpha (Micropower)	£7.95
3D Bomb Alley (Software Invasion)	£7.95
LISP (Acornsoft)	£16.85
Snake Pit (Postern)	£7.95
Strato Bomber (IJK)	£7.50
Great Britain Ltd (Hessel)	£5.95
Bug Byte (Sea Lord)	£7.50
Digital Fantasia (Golden Baton)	£9.95

★ – SPECIAL OFFER – ★
★ **£1.25 OFF** ★
★ all cassettes (while stocks last) ★
★ Postage & Packing Free. ★

Send for our free catalogue which includes all the leading software houses.

Send catalogue requests and orders to:

SOFT SHOP, 78 Warren Drive, Hornchurch, Essex RM12 4QX.
Telephone: (04024 - 47722

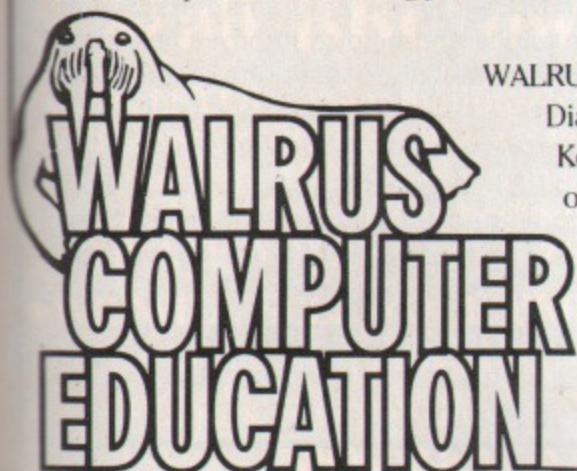
WALRUS COMPUTER EDUCATION

Don't leave your BBC Micro or Electron on the shelf. Use it – and a WALRUS home study course – to teach yourself structured programming.

STRUCTURED BASIC ON THE BEEB/ELECTRON

- ★ Specially designed for the beginner ★
- ★ Set out in ten lessons ★
- ★ Includes software cassettes with lots of educational programs ★
- ★ Assignments for tutor feedback ★
- ★ Comes in two teaching packs ★
- ★ Costs only £24 ★

To receive your first teaching pack, send cheque/PO for £24 to:



WALRUS Computer Education
Dial House, Laycock,
Keighley, W. Yorks.
or write for leaflet.



A NEW STAR IN COMPUTER SOFTWARE

INTRODUCING

MACHINE CODE TRACE

A POWERFUL TOOL FOR EXPERTS
INVALUABLE FOR BEGINNERS

PLUS FREE
DISSASSEMBLER

- Fully relocatable
- Breakpoint facility
- Single step
- Dual screens
- Error trapping
- Fast running mode
- Constant update and display of all registers
- Displays upto 20 memory locations
- Comprehensive 24 page user manual

ONLY
£13.50
incl. VAT & p&p

SHAPE TABLE DESIGNER/EDITOR

A GIANT LEAP TOWARDS FAST GRAPHICS

ONLY
£9.95

- Store and recall upto 128 shapes
- Size of shape limited by available memory
- Extremely powerful editing facilities
- Simple to use from BASIC or machine code

ALL PROGRAMMES USE ANY OPERATING
SYSTEM AND ARE DISC COMPATIBLE

QUASAR SOFTWARE LIMITED
6 Briars Lane, Maghull, Liverpool L31 6AR.

BBC/ELECTRON SOFTWARE QUALITY SOFTWARE PRODUCED BY PROFESSIONALS.

EDUCATIONAL

Our educational software is used in hundreds of schools and homes throughout Great Britain.

EDUCATIONAL 1 BBC/ELECTRON **£8.00**

Hours of fun and learning for children aged 5 to 9 years. Animated graphics will encourage children to enjoy maths, spelling and telling the time. The tape includes MATH1, MATH2, CUBECOUNT, SHAPES, SPELL and CLOCK.

... An excellent mixture of games, offering various levels of difficulty and speed of responses. Entertaining enough to keep young children's attention and, on the whole, well-designed enough to help them learn while enjoying themselves ...
Personal Software – Autumn 1983.

EDUCATIONAL 2 BBC/ELECTRON **£8.00**

Although similar to Educational 1 this tape is more advanced and aimed at 7 to 12 year olds. The tape includes MATH1, MATH2, AREA, MEMORY, CUBECOUNT and SPELL.

FUN WITH WORDS BBC/ELECTRON **£8.00**

Start your fun with alphabet puzzle in GUESS A LETTER. Continue your play as you learn about VOWELS, know the difference between THERE and THEIR and have games with SUFFIXES. After working so hard reward yourself with games of HANGMAN.

*** SPECIAL OFFER *** BUY ALL 3 CASSETTES AND DEDUCT £4.00

Add 50p per order for postage and packing.

Cheque/P.O. to.

GOLEM Ltd, Dept B,
77 Qualitas, Bracknell, Berks, RG12 4QG.
Telephone: (0344) 50720

For full catalogue giving details of games and utilities software for the BBC/ELECTRON apply to the above address.

BEASTY

An introduction to Microrobotics



What is a Servo?

A Servo is a precision geared motor with a feedback mechanism to give positional accuracy. The motor rotates through 100° and allows you to twist, turn, push, pull, lift, lower, open, or close almost anything. A range of Servos are available for almost any application.

What is the "Beasty"?

The Beasty is an interface which connects directly into the BBC Micro Computer. It enables the computer to accurately control up to four Servos. The Beasty comes complete with all connection cables and comprehensive instructions.

What about the Software?

The Beasty is supplied with a demonstration program on tape which allows sophisticated control of up to four servos directly from the keyboard, in BASIC or Assembler.

FOR DETAILS CONTACT YOUR DEALER

"Beasty"
49⁹⁵
Servos
13⁰⁰
inc VAT

COMMOTION
COMPUTER OPERATED MOTION

241 Green Street, Enfield, Middx. EN3 7SJ Tel: 01 804 1378

ELECTRON

BBC "B"

DIMAX STRUCTURED SOFTWARE

The policy of DIMAX is to produce well written BASIC programs that are not only enjoyable to play, but also provide good working examples of structured programming that can assist in the development of programming skills.

TAPE 1-SPACE TREK

A traditional computer game for those who like to plan their attack strategy rather than exercise their trigger finger. Entirely re-written to take advantage of the program structures and advanced facilities of the ELECTRON and BBC micros.

TAPE 2-TEN EDUCATIONAL GAMES

- Number Drop
- Letter Attack
- Mind Bender
- Simon
- Green Bottles
- Maths Code
- Capitals
- Line Judge
- Reverse
- Quest

Plus ANIMALS, a data file for Quest

A game that explores the relationship between objects by challenging the computer to guess what you are thinking of, is also included.

This tape also contains a listing of all the general purpose PROC/FNs used throughout our programs for easy incorporation into your own work.

Tapes £4.95 each (inc. P and P). £1 discount on each additional tape. From DIMAX Structured Programs, 15 Winchester Road, Northampton NN4 9AZ.

Please mention this magazine by name when ordering



GARLAND COMPUTING

35 DEAN HILL - PLYMOUTH - PL9 9AF. TELEPHONE: 0752 41287

NEW BBC RELEASES

LEARNING MATHS A series of programs for ages 9-12. Each package contains 3 to 4 programs, many with animations and entertaining games to help learn the principles of maths in school or at home. (Each Package £7.00)

Angles . Directed Numbers . Fractions . Co-ordinates and Lines . Symmetry . Motion Geometry . Sets . Elementary Statistics . Ratios

MUSIC TUTOR A unique and absorbing program which helps you to learn or create music. Notes can be entered in various ways, and the pitch and duration displayed on the screen on a treble clef. Other options allow you to play back, alter, make permanent copy and more. Full documentation (£10.95)

EDUCATIONAL GAMES Three programs which will provide fun for all the family and help to improve children's spelling, concentration or ability to estimate angles and distances. (Each £5.95)

Wordsquare . Pick-A-Pair . Sea-Battle

Prices include VAT and P&P. Available by mail order, or from selected computer stores and educational suppliers. Send for full details of our extensive range of educational software.

THE EDUCATIONAL SPECIALISTS

35 DEAN HILL . PLYMOUTH . PL9 9AF

TELEPHONE 0752 41287

CHAMPIONS!

Take your team from the 4th Division to the European Cup! Features 4 divisions, promotion, relegation, transfers, injuries, suspensions, weekly results and league tables, reserve team, crowd trouble, and all the fun, drama and frustration of managing a league club.

**BRITAIN'S GREATEST
FOOTBALL MANAGEMENT
GAME -NOW FOR THE
BBC MODEL B AND
ELECTRON - £6.95**



Clip the coupon, or just note your name, address and computer on the back of your cheque. We supply by return of 1st class post - average delay on our premises is three hours!

PEAKSOFT

7 Hawthorn Crescent
Burton-on-Trent

Yes, please rush my Champions! For my.....Computer

Name.....

Address.....

The BBC Micro Compendium



Jeremy Ruston, over 500 pages, £14.95
This book is a complete tutorial on advanced programming for the BBC Micro. Major topics covered include: assembly language programming; computer arithmetic, including full details of floating point algorithms; recursive programming; how to increase the vertical screen resolution to 512 pixels with no hardware modifications; an intelligent disassembler that can work out the areas of a program that are data.

The two most substantial sections cover a complete and carefully annotated disassembly of the BASIC ROM at the heart of the BBC Micro and the theory and practice of languages in general.

Also available: • LET YOUR BBC MICRO TEACH YOU TO PROGRAM £6.45 • PUTTING YOUR BBC MICRO TO WORK £4.95
36 CHALLENGING GAMES FOR THE BBC MICRO £5.95

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

Please send me the following books:

- BBC Compendium
- Let Your BBC Micro Teach You To Program
- Putting Your BBC To Work
- 36 Challenging Games.

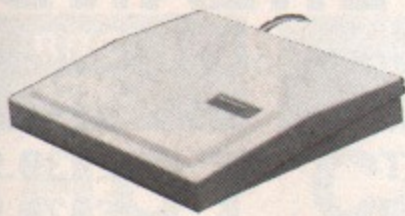
I enclose £..... Name

Address

**INTERFACE
PUBLICATIONS**

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

A SUPERB HARD COVER for your BBC MICRO



£10.95
(VAT included)
+ £1.55
Post & Packing
per cover

- ★ Engineered in top quality high impact rigid ABS. - very tough.
- ★ Super textured finish in cream to tone with your BBC Micro.
- ★ Looks good in the home.
- ★ Cushioned on foam pads.
- ★ Gives optimum protection
- ★ Ideal for schools.

**GRANGE CLOSE
SANDBACH
CHES.
CW11 9ET.**

Tekform

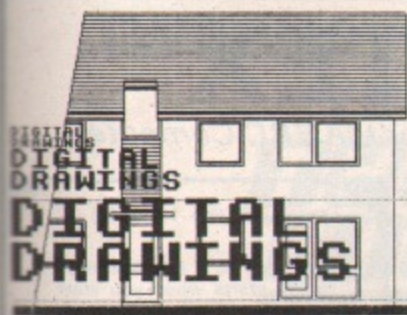
ATTENTION

~ all BBC owners ~

We want YOU on our mailing list, so for just £3.95 each (regular retail £7.95) we will send you either our new M/C arcade game "MUTANT DEFENDER" or our best-selling adventure "PIRATE ADVENTURE". (£6.95 for both!).

• WE WILL SELL YOUR PROGRAM IN NZ •

FG Software
PO Box 6662, Wellesley St, Auckland
NEW ZEALAND



DIGITAL DRAWINGS is C.A.D. using the BBC microcomputer and an Epson/Star/NEC printer * powerful but easy single-key mnemonic commands * drawing storage on disc or cassette * accurate scale drawings to almost any scale * arcs, circles, dimensioning, grids, hatching, ellipses, polygons, rectangles, curve splining, macros, symbols, text, shading, measurement, repetition, etc. * 68-page user guide * available on cassette: £65; disc: £75; or EPROM: £95.



3-D VIEW allows wire-frame perspectives to be generated, viewed from any angle or distance, saved on disc or cassette, and printed using an Epson/Star/NEC printer * view displayed while entering data * unlimited viewpoints * cassette: £30; disc: £35.

S.A.E. for more details or cheque with order * add £2.00 p&p (UK) * state printer make and model and filing system (cassette or 40-track or 80-track disc) with orders to:
IBBOTSONS DESIGN SOFTWARE
"The Byre" Ecclesbourne Lane,
Ildridgehay, Derbyshire DE4 4JB.

BBC MICRO CONSOLES

Not just a monitor/tv stand but an expansion console which gives your micro the professional look. Protects and encloses your micro with room for disc drives and 2nd. processor or teletext adapter etc., all untidy connecting wires safely out of sight within the console. Made of light yet strong aluminium with a textured finish in matching BBC colour. Coming soon a bolt on extra module to the console for further expansion options. YES this console will grow with your needs. Basic BBC console as shown **£39.99** + £4 carriage MAIL ORDER ONLY. Viewing by appointment only. Please add 15% VAT.

*** The console will house the Torch Disc Pack**



For further information or send cheque to:

Silent COMPUTERS

Matching Printer Stand, can double for VDU Stand over the micro - only £14.99 + £2 carriage
27 WYCOMBE ROAD, LONDON N17 9XN.
TEL: 01-801 3014 (24 Hr Ansaphone)

CHEMIPLANT



H & H SOFTWARE H
PRESENTS 3 NEW TAPES
for the
BBC 32K COMPUTER

to add to their existing range of games and educational software.

LOONEY LIFT

A new action packed arcade game with hi-res graphics, full colour and sound. Keep your guests jumping, operate the lift and watch out for the luggage. The alternative is the sack!

£7.50

CHEMIPLANT

Another first? A chemical plant simulation. Avoid explosions, spills and other disasters on your way to your first million. Plant manual included. Hi-res graphics.

£7.50

STORY

Electronic storytelling! First make up some scenes using pictures from the computer bank or use your own drawing skills. Then write your story. Up to 7 screens can be displayed, saved and printed.

£6.50

To get more information about our new and existing software, ask for a catalogue. Please send a s.a.e.

*** Disc versions available: please add £1.50 ***

Please send orders and cheques/PO to:

**H & H Software, Dept M, 53 Holloway,
Runcorn, Cheshire WA7 4TJ. Tel: 09285
65566**

A QUALITY LIGHT PEN for the BBC Micro

- ★ Absolutely insensitive to ambient lighting.
- ★ Responds to different colours and screen intensities without any adjustment of TV or monitor.
- ★ Red LED readout showing that data is available.

- ★ Switch for program control (allows pen to approach the screen without erroneous data capture)



- ★ All features are program accessible

Free Software includes

- ★ Handbook
- ★ Good Documentation
- ★ Tape storage of your work
- ★ User routines provided on tape and printout
- ★ 'Freehand' drawing program
- ★ 'Library menu' drawing program (define your own library of shapes)
- ★ Example programs illustrating uses of the pen and its features

£25

inclusive

Also available for VIC-20 and DRAGON microcomputers please state your computer type when ordering.

Send cheque or P.O. for £25 to:

Dept. MU1, Datapen Microtechnology Ltd., Kingsclere Road, Overton, Hants.

Please enclose SAE if requesting literature

Now also available from good dealers.

Datapen Microtechnology Limited

PRINTERLAND

Full 1 Year Warranty on all products

EPSON RX80 T	£219.95
EPSON RX80F/T	£239.95
EPSON FX80 F/T	£329.95
EPSON FX100 F/T	£434.00

Immediate (24 hour) delivery £7.00



WORDWISE Word Processor ROM **£32.00**

USHIDA Daisywheel **£315.00**

(20 cps/10, 12, 15 cpi)

PHILIPS 12" green screen monitor **£69.95**

FIDELITY 14" colour monitor **£189.00**

The Utility Disc **£11.25**

(makes exact copies of ALL protected discs)

Single-sided, single-density discs

(box of 10) **£10.99**

BBC/Printer Cable £10.99. FREE Excellent Machine Code Screen Dump (Cassette).

Please add 15% VAT to all prices.

All goods ordered before 3pm – despatched same day.

PRINTERLAND

29, Moorcroft Park, New Mill, Huddersfield HD7 7NH.

Tel: (0484) 687928

Government Dept/Educational/Quantity Orders please ring.



Barclaycard/Access



HORNBY SOFTWARE



**Britain's top
Spectrum Pro-Golf Series now
available for the first time on
BBC Model B 1.2 O.S.**

The real thing, exact simulation of Britain's top golf courses.

1. All golf rules apply.
2. Designed for one or two players.
3. Played off any handicap.
4. On each hole, distance, par, green enlargement.
5. Control shot – choice of all clubs, strength, direction.
6. Graphics excellent.
7. Extremely realistic.

TROON £7.75 NEWBIRKDALE £7.75

WENTWORTH EAST & WEST COURSE £11.00

All prices include VAT & P&P

Available from:

HORNBY SOFTWARE

21 Pinfold Hill, Leeds LS15 0PW.

Telephone: 0937 65847

CONTEX

Professional Software for the BBC Computer

Lesson 75, line 1 23

Copy text as it is presented
Timing starts when you start
and stops when req'd no. of
characters typed.

I am delighted to tell you that I have

I am delighted to tell you that I have

Your time is 20 words per minute

Press the SPACE BAR to continue

Command (? for help)

(8996) a b c

	Jan	Feb	Mar
1 Car tax	75.00	0.00	0.00
2 Insure	0.00	150.00	0.00
3 Loan	150.00	150.00	150.00
4 Deprec.	100.00	100.00	100.00
5 Repairs	0.00	25.00	0.00
6 Maint.	0.00	0.00	56.00
7 Petrol	36.00	25.00	52.00
8 Oil	0.00	5.00	0.00
9 Other	12.00	3.00	3.00
10			
11 Total	373.00	458.00	361.00
12			
13 Mileage	600.00	400.00	850.00
14 MPG	30.33	29.12	29.75
15 Cost/mi	0.62	1.14	0.42

TYPING TUTOR 32K

Specifically designed for the BBC micro the 90 smoothly graded lessons and the free form option teach and encourage fast touch typing. Intelligently checks for errors, monitors progress, times (WPM) and makes recommendations. Audio key feedback, metronomic pacing, clock and revised performance options. Auto keyboard/finger display for every lesson. Add own lessons if required. 12 page instruction booklet.

Cassette £9.99 inc.

Disc £11.99 inc.

SPREADSHEET 32K

A complete and versatile 'calc' program and tutorial. Models over 1,000 cells using up to 26 columns and 99 rows. Equations, constants, data or text in any cell. Emphasis on ease of use. 10 chr columns; 9 digit accuracy; print; row & col insert or delete; functions; colour; variables; save & restore; copy cell; auto replicate col & row; auto formulae adjust; scroll; search; help; evaluate; limits. 20 page instruction booklet.

Cassette £9.99 inc.

Disc £11.99 inc.

Fast delivery. Cassette based for models A or B with 32K, all operating systems, may be used with discs. Discs supplied are 5¼" please specify if 40 or 80 track required.

CONTEX COMPUTING (B2)

15 Woodlands Close, Cople, Bedford MK44 3UE.

NEW

PRIVATE TUTOR

BBC
32K

29, HOLLOWAY LANE,
CHESHAM BOIS,
BUCKS. 02403 21702

HOT CAKES

Cassette £7.95 (inc.)
Disk £8.95 (inc.)

An enthralling business game for
1-6 players teaching how to read
company accounts.

★ WORDWISE
£39.95 (inc.) ★

EDUCATIONAL & TRADE
ENQUIRIES WELCOME

DISC DRIVE OWNERS!

Now is the time to use your expensive disc drives as something other than a very fast program loader. DISC-DATABASE is a disc based filing system suitable for everyone. By using true RANDOM ACCESS FILING you are no longer confined to programs/data being a mere 32K.

Facilities include:-

* The creation of your own tailor made database. * Define your own screen layout. * Search by any field. * Search by full or part field references. * Find, Display, Amend or Delete any record. * Define your own print out summary.

The detailed manual supplied also shows how you can write and build into the main program your own additional routines which will not only enhance DISC-DATABASE but also help you learn how to get more from your disc drives.

Supplied on 40 track disc, complete with a comprehensive manual. Suitable for BBC Model B (Basic 2) with single or double disc drive. £11.50 including VAT. Cheque or P.O. to:-

S & B SOFTWARE

54 Wychwood Road, Wolds View, Bingham, Nottingham. NG13 8SB.

TOP QUALITY PRINTERS! ROCK BOTTOM PRICES!

NEW
LOW PRICES

EPSON RX80	£219 + VAT	SHINWA CP80	£189 + VAT
EPSON RX80F/T	£248 + VAT	JUKI 6100 Daisy-wheel	£328 + VAT
EPSON FX80	£328 + VAT	STAR DP515	£198 + VAT
EPSON MX100	£378 + VAT	STAR DELTA 10	£298 + VAT
EPSON FX100	£438 + VAT		



FIDELITY 14" COLOUR MONITOR
£189 plus VAT

We also have large stocks of sundries, etc.

For **FREE BROCHURE** and **DISCOUNT ORDER FORM** write now to:

Datatech Ltd (TMU)

8 Bellingham Close, Bury, Lancs. BL8 2TU.

Tel: 061-764 5579

ALL IN STOCK

S.P. ELECTRONICS

BBC SPECIALISTS

Acorn Electron (phone for availability)	£199
BBC Model B 1.2 O.S	£399
CP80 Printer (inc. cable)	£299
Disc Operating System	£85
Disc Drives	from £199
Disc Operating System D/Density	£91.00
G3WHO RTTY PROGRAM	£7.50
Circuit board for RTTY decoder (inc. instructions)	£6.30
Star Delta 10X Printer (inc. cable)	£299.00
Joysticks (pair) self centering + analogue	from £16.00
Printer Cable (Centronics)	£12.90
Speech Synthesis	£55.00
Disc Doctor	£33.00
WORDWISE Word Processor	£39.00

Wide selection of software, books, leads, plugs, etc.

All prices apply while stocks last.

SAE for full list. All available Mail Order

48 Linby Road, Hucknall, Notts. NG15 7TS.

Tel: 0602 640377



(all prices include VAT)

Carriage extra

TWO WAYS TO ENSURE YOU GET

THE MICRO USER

EVERY MONTH

1. Complete and mail subscription form on Page 137
2. Hand this form to your newsagent.

Please reserve me a copy of The Micro User magazine every month until further notice.

- I will collect
 I would like it delivered to my home.

Name _____

Address _____

**Note to newsagent: The Micro User should be obtainable from your local wholesaler, or contact the distributor - Wells, Gardner, Darton & Co Ltd
Tel: Faygate 444**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

★ **BBC** ★

★ **SOFTWARE** ★

★ **RICKSOFT** ★

★ * Arcade Games * Adventures * ★

★ * Educational * Utilities * ROMS * ★

★ * Languages * and more ★

★ **HIRE** ★ Most from £1

★ WITH OPTION TO ★ per fortnight

★ **BUY** ★ With up to

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

★ Membership £10 ★

★ For catalogue and membership form send name ★

★ and address to ★

★ Ricksoft, Dept. L, 78, Warren Drive, Hornchurch, ★

★ Essex RM12 4QX. ★

★ Tel: (04024) 47722 ★

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

northern computers

micro computer systems for all applications

we supply, support, and service:

- LISA
- IBM
- Apple II, III.
- Torch
- Acorn Electron
- Acorn Econet
- Fibre-Optic Networks
- Newbrain
- Sinclair
- B.B.C. Computers.

- TRAINING SOFTWARE
- SUPPORT - CAL primary and middle school, graphics design, programming, accounts training packages, professional accounts, e.g. - legal, estate agents etc.

Visitors are invited to evaluate and test LISA, and B.B.C. econet. please contact: GARETH LITTLER or MARK HOWARD

EDUCATION & TRAINING DIVISION.

Northern Computers, Churchfield Road, FRODSHAM, CHESHIRE WA6 6RD Tel: (0928) 35110

location:



ADMINISTRATIVE SOFTWARE SUPPORT - Timetabling and options, database records and filing packages, word processing, accounts.

ADVERTISERS INDEX

3D Computer	110	Lothlorien	147
A & F Software	80, 81	M.D.A.	157
A.M.S.	11	M.R.M.	58
Aardvark Software	106	M.W. Systems	95
Acornsoft	66	Mail Order Micros	138
Advanced Digital Systems	130	Merlin Computers	149
Advanced User Guide	56	Micro Resources	111
Alligata	71	Microage Electronics	17
Amersham	155	Microbyte	86
Antler	120	Micronet	24, 25
BBC Discount Club	44	Micropower	79, 160
Bridge Software	148	Microtraffic Systems	26
C.C.S.	52	Microvitec	63
C-Tech	21	Midwich	14
Cambridge Computer Cons.	109	Mosaic Publishing	118
Cambridge Computer Store	148	Musicsoft	132
Carson Developments	148	National Micro Centres	88, 89
Carsondale Enterprises	132	Northern Computers	156
Chasedata	126	OIC	86
City of Salford	150	Optima	12
Clares Micro Supplies	13	Opus	22, 77
Commotion	151	Orion Software	132
Computer City	159	P & H Electronics	92
Computer Concepts	2, 10	Pace	31, 103
Computerama	125	Pace Software Supplies	142
Contex	154	Peaksoft	152
CST PROCYON	102	Pee Bee	85
Cumana	23	Printerland	154
DACC	15	Psion	32
Dataplan	154	Qualsoft	157
Datatech	155	Quasar	151
Daware	134	Ricksoft	155
Dimax	152	Robot Computer Developments	149
Doctor Soft	156	S & B Software	155
Dynabyte Software	158	S.P. Electronics	155
Educare	158	Silent Computers	153
Electronequip	100, 101	Silverland	158
F.G. Software	153	Simon W Hessel Software	82
G.C.C. Cambridge	54	Simonsoft	102
G.S.L.	19	Sir Computers	112
Garland Computing	152	Softlife	134
Gemini	18	Softshop	150
Golem	151	Software for All	98
H & H Software	153	Software invasion	75
Heliwell	150	Software Supermarket	48
Hornby Software	154	SOLIDISK	60
Ian Copestake	138	Squirrel Software	158
Ibbotson's Design Software	153	System	3
Integrex	6	Technomatic	8, 9
Interface Publications	152	Tekform	153
Island Logic	20	Twillstar Computers	7
Kansas City	50	Universal Communications	87
Kosmos	120	Viglen	41, 115
L.V.L.	72, 73	Vision Software	110
Leigh Computers	148	Voltmace	130
Level 9	33	Walny Computer Education	151
Lifelong Learning	150	Watford	
Lincoln Microsystems	142	Electronics	36, 37, 38, 39, 40
London Software	102		

BBC 32K

all operating systems

747 FLIGHT SIMULATOR

"THE BEST SIMULATION AROUND, A MUST FOR ALL BUDDING PILOTS", PCN

from DOCTOR SOFT, 258 Coneygree Rd., Peterborough



Pilot written, instruments and 3D visual runway view (Heathrow, Gatwick). Banks and pitches with realistic motion. Now with full Instrument Landing System (ILS). Briefing program, charts, notes and flight plan. Fantastic!
ONLY £8.95 inc. VAT & P&P. Joystick control option in 4 program package.

* Available from JOHN MENZIES AND ALL LEADING DEALERS
* Direct mail order
* Micronet 800 (Prestel)

DISC VERSION NOW AVAILABLE (£11.95)

DEALERS CONTACT (0903) 206076
GENEROUS ROYALTIES PAID FOR GOOD MATERIAL

3 DOUBLE ACTS FOR CHRISTMAS

- Spook, Spook (MUNCHER: 20 mazes, 3 skills, Hall of Fame/GHOST MINE: dig for gold, watch for ghosts & snake) £6.95
- Space, Space (WOLFPACK III: amazing colour graphics, 3 ships, 4 galaxies, aliens galore!/MISSION ALPHA: 3D & music) £6.95
- Spy, Spy (KREMLIN: escape from 3D maze in Kremlin/ BONDSKI: lethal action on ski slopes!) £6.95

GAMES DISC PACKAGE

- Muncher, Ghost Mine, Mission Alpha, Kremlin, Bondski & Fireman (the building burns, the people jump, the helicopter bombs?!) £15.95
- COLOUR-SHAPE MATCH (2-4 yr old) £5.95 cass.
- 747 SIMULATOR £8.95
- DISC VERSION £11.95
- WORD PERFECT (Friendly & versatile full facility 40/80 column word processor. £8.95 + £2.95 Disc version)
- TALKING TABLES TEACHER (Speaks when speech ROM fitted, teaches multiplication with games & questions) £6.95(cassette)
- FAMILY DISC PACKAGE: Tables Teacher, Colour Shape Match, Harmony, Home Office & Word Perfect £15.95

ROYALTIES... DOC PAYS THE BEST FOR THE BEST!!



DOCTOR SOFT
ADVANCED SOFTWARE



All prices include VAT & P&P Cheque or PO to: "Doctor Soft", 258 Coneygree Road, Peterborough PE2 8LR

NAME _____
ADDRESS _____

MU2

YOUR MICRO COULD TEACH YOU A THING OR TWO ABOUT THE FRENCH... ...OR THE GERMANS...OR THE SPANISH

A home computer is an expensive toy; and, if playing games is all you do with it, a toy is all it is.

Now, using the New Personal Computer Superlearning System (PCSS) you can have fun with your micro and learn something at the same time.

PCSS language courses comprise 12 lessons on 3 audio cassettes used in conjunction with a fourth software cassette, to add a new dimension to learning.

Initially the software package enables you to see the words you're learning; then, as your vocabulary develops, it will test your skill in your new language.

Anyone can learn this way - no previous knowledge of the language is required. The unique PCSS method develops your overall learning and memory skills in a way that's both relaxing and enjoyable.

Each PCSS language pack - French, German or Spanish - contains a comprehensive booklet detailing

MDA

COMPUTERISED EDUCATION SYSTEMS

(PCSS software is compatible with the ZX81 (16K), ZX Spectrum, BBC Micro, Acorn Electron Micros.)

Each pack comes with a full money back guarantee if not completely satisfied.

the 12 audio lessons and the function of the interactive software. Additionally the booklet expands on the broader benefits of the PCSS method.

At only £29.95 per pack PCSS costs less than other home language courses yet it offers much more in terms of education and enjoyment.

Complete the coupon below and try PCSS for yourself - you'll be amazed what your micro can teach you.

Send your cheque or Postal Order for £29.95 made payable to:
**MDA Modon Associates Limited, 561 Upper Richmond Road West,
London SW14 7ED. (ZX81 users £26.95)**

or, alternatively phone **Teledata 01 200 0200** now, lines open 24 hours and quote your Visa, Diners Club, Access or American Express number.

Tick which Audio/software package you require. (Prices include VAT. Add £1.45 for postage and packing on each order.)

Please supply the following Audio/software Packages

FRENCH GERMAN SPANISH

Name: _____

Address: _____

Machine Type: _____ Memory Size: _____

BBC Model B
(any OS, Basic I/II)

QUAL-SOFT

present

£9.95

(inc. VAT and p.p.)

"LEAGUE DIVISION ONE"

THE THINKING FAN'S SOCCER GAME

Are you a soccer supporter? How much do you **REALLY** know about the game? Can you take a side, newly promoted to Division 1, and build it into a genuine contender for the 1st Division Championship? Can you select the right tactics and team to hold Liverpool at Anfield, and the right ones to improve your goal difference at home to Wolves? Can you "read" a match well enough to see your own team's weaknesses, and then have you the skill to exploit the transfer market to cure them? In short: Would you make a successful 1st Division team manager?

WELL HERE'S YOUR CHANCE TO PROVE IT!

- * You have 5 seasons, 42 League matches/season.
- * Opposition: 21 of the 22 current 1st Division sides.
- * Each team has its own playing style and strengths.
- * Each team has home and away match tactics.
- * Define your own tactics. Tactics really work because:-
- * There is a true match simulation, not a "dice-throwing" result.
- * Graphics representation: All you need to know about the match.
- * Realistic scoring, injuries, red and yellow cards.
- * Substitution and team adjustments for injuries.
- * Tactical substitution with repositioning of players.
- * Genuine transfer, real bargaining (who says computers' aren't intelligent).
- * A match by match upgrade of your league position and playing record.
- * 25 to 30 hours for a game unless relegated.
- * Simple, quick SAVE/LOAD game facility.

CAN YOU GET YOUR NAME ON THE SILVERWARE?

QUAL-SOFT

Dept. CES
18, Hazelmere Rd.,
Stevenage,
Herts.
Tel: (0438) 721936

Please send me copie(s) of NAME:

LEAGUE DIVISION ONE. ADDRESS:

I enclose cheque/postal order to the

value of £ or debit

my Access/American Express

Card No. SIGNATURE

EDUCATIONAL SOFTWARE

For children ages 4-11

EDUCARE'S 50

Fifty high-quality programs for primary education
Strongly recommended by educational authorities

on the
ZX81

with
SPECTRUM
SUPPLEMENT

£5.95 Paperback
122 pages

(All programs suit IK ZX81)

on the
BBC

MICRO

(Model A and Model B)

WITH COLOUR, SOUND AND
OTHER ENHANCEMENTS

PROGRAMS WRITTEN IN
STRUCTURED FORM

£7.95 Paperback
110 pages

NEW

These programs cover a wealth of basic concepts every child will meet in primary education. They are produced by professional educators and have been thoroughly tested in a primary school. Designed to go beyond drill & practice they promote learning through interaction and discovery. Programs range from counting and simple arithmetic to ones dealing with volume, balance and direction, mostly in form of games. Each program is short but powerful and comes with full documentation.

To:

EDUCARE
139a Sloane St.
London
SW1X 9AY

Please send.....copies Educare's 50 on ZX81/Spectrum.

.....copies Educare's 50 on BBC Micro.

I enclose cheque/postal order for £.....

Name.....

Address.....

Let your child benefit early - Send now

BBC

NEW

for BBC B
and ELECTRON

The latest release from SQUIRREL

TRAFALGAR

Command your own fleet! Battle plan unfolds to sea level view of individual engagements.

Cannonballs smash into hulls and tear holes in sails!

Magazines explode! Ships sink! Fire ships can be sent

downwind! Flags are struck and prizes taken! £8.00

The game that all the family can play!

SUPERGOLF

Amazingly realistic - the ball speeds into the air, slows, curves down and rolls. Bunkers, water, O.O.B., and a

variable gusting wind to cope with! Up to 4 players with

score card for each! £7.50

Favourite with the younger players!

BUNFUN

Icing and nuts have to be squirted on as the bun go past!

Good reactions, rhythm, and timing required! £6.50

ALL THESE GAMES FEATURE SUPERB MULTICOLOUR GRAPHICS

SQUIRREL SOFTWARE

Dept B,

4 BINDLOSS AVENUE, ECCLES, MANCHESTER M30

24 Hour answering service - 061-789 4120

Cheques, P.O.s



Trade enquiries welcome

Silverlind

SILVERLIND LTD. 156 Newton Road, Burton-on-Trent
Staffs. DE15 0TR. Tel (0283) 63987

TOWNTTEST BBC/B £6.50

A very useful aid for teaching Geography in primary schools, this program tests pupils' knowledge of the locations of major towns and cities in England, Scotland and Wales. Well presented, with a high-resolution map.

BIOLOGY BBC/B £12.50

A suite of programs using text, animated diagrams, examples, and questions to assist in the understanding of Biology to CSE, 'O' and 'A' Level standards. Most suited to individual use by students, these programs also contain material teachers can extract for classroom demonstration. Topics covered include the Eye, Ear, Heart, Blood and Circulation, Skeleton, Female reproduction, Genetics, Biochemistry and the Central Nervous System.

ENJOY MATHS 48K Spectrum £8.00

A suite of 4 highly motivating programs for the 8-14 age range: tables, simple equations, polygons and areas. The programs combine explanation with tests and make good use of colour and sound.

MASTER DIET PLANNER 48K Spectrum £11.95

The ultimate in diet programs, the MASTER DIET PLANNER contains details of calories, protein, vitamins and other nutrients for 681 foods! The MASTER DIET PLANNER will help you plan a well-balanced diet, including options to restrict fats, cholesterol and salt, or to increase fibre intake - at the same time offering maximum choice of foods. Instructions and Recipe Book included.

ALL PRICES INCLUDE POST & PACKING & VAT

We require good programs to increase our catalogue and pay high royalty rates for published material.

DYNABYTE SOFTWARE

EXPLOSIVE



BBC POOL (32K) £7.95

Classic representation of the real thing using high resolution super smooth colour graphics for accuracy and detail. A real pleasure to play.

BBC HORSERACE (32K) £6.95

An exciting colourful multi-player game complete in every detail with tumbling jockeys, realistic horses. Ty van, tote and leader boards, stewards enquiries, sharp bookies and much more. Don't lose your money at the track, try HORSERACE instead.

MULTI-AID (32K)

A powerful 3 program utility incorporating many useful features not available elsewhere.

Character - Allows you to define and edit MULTICOLOURED characters in blocks of up to 8 x 3 (max. 128) using up to 4 chosen colours. Characters previously loaded into memory can also be recalled and examined/edited in any mode. VDU23 statements are automatically generated and can be saved for later use. Simple to use and probably the best of its kind available.

Soundlab - Experiment with up to 7 envelope and 9 sound commands simultaneously. All parameters clearly displayed and easily altered EVEN when envelopes are in use allowing the effect of changes to be heard as you make them. Envelopes already defined by another program can also be read out of RAM and fine tuned to your own requirements.

Graph 7 - Any possible mode 7 display can be created and edited on the screen with minimal effort. Store up to 24 screens and recall at will for viewing or editing. Ideal for animated sequences, visual aids for lectures/presentations, slide preparations etc. Screens can also be saved and used in your own programs.

SUPERB VALUE FOR MONEY PACKAGE

Complete with full documentation ONLY £7.95

BRAIN TEASERS (32K)

Six thought provoking games of mental agility including Reversi, 3D noughts and crosses, mastermind, etc. Superb fun for all the family.

Only £5.95

All programs available NOW!
S.A.E. for catalogue

Orders to: Dept. MU

Dynabyte Software
31 Topcliffe Mews,
Wide Lane, Morley,
Leeds, LS27 8UL

Please add 50p p & p to all orders

Dealer and Distributor
Enquiries Welcome
Call (0532) 535401

COMPUTER CITY

THE COMPUTER CAPITAL OF THE NORTH

78 VICTORIA ROAD, WIDNES, CHESHIRE. 051-420 3333

MISCELLANEOUS	Dust Covers from £4.95	SINGLE DRIVES	DOUBLE DRIVES	ROM SOFTWARE	PRINTERS
Amicom DFS £95.00	Disk Box (40) £19.40	Single Sided 40	Single Sided 40	Wordwise £44.85	Seikosha GP100 £199.95
Amicom DFS £89.00	Disk Box (80) £27.90	Track (100k) £212.75	Track (200k) £388.70	Beebcalc £39.00	Seikosha 250X £249.95
L-DOS £90.85	ProLink Interface	Double Sided 40	Double Sided 40	DiscDoctor £33.85	Star DP510 £280.00
Speech Synthesis £55.00	(Joystick) £14.95	Track (200k) £270.25	Track (400k) £516.35	Gremlin £33.85	Shinwa CP80 £270.00*
BBC Joystick £16.95	MONITORS	Double Sided 40/80	Double Sided 40/80	View £59.00	Epson RX80 £310.00
Quickshot £19.95	Cabel 14" £229.00	Track (400k) £350.75	Track (800k) £665.85	Aid £28.00	Epson RX80F/T £340.00
Utility Recorder £29.95	Microvitec 14" M1431 £245.00	Double Sided 80 Track	Double Sided 80 Track	Pace DFS £34.45	Epson FX80 £430.00
DR201 Recorder £44.85	Microvitec 14" M1451 £373.00	Only (400k) £327.75	Only (800k) £618.70	Gemini Database £39.95	Juki 6100 £435.00
LightPen £27.00	Microvitec 14" M1441 £506.00	Single Sided 40/80	Single Sided 40/80	BBC HARDWARE	Smith Corona £395.00
ATPL ROM Board £44.85	Sanyo green £110.00	Track (200k) £270.25	Track (400k) £516.35	Electron £199.00	* Star Buy
Parallel Cable £11.00	BMC green £125.00	LVL Single (100k) £265.00	LVL Double (200k) £389.00	BBC Model B £399.00	P&P on Hardware
Serial Cable £11.00				BBC Model B/DFS £469.00	£5.00
Listing Paper (2000) £13.00				Teletext receiver £225.00	

NEW	Felix in the Factory £7.99
NEW	Felix and the Fruit
Worster	..... £7.99
Woonraider(B)	..... £7.99
Swoop(B)	..... £7.99
Galactic Commander	
(B)	..... £7.99
Time Trek(B)	..... £7.99
Laser Command(B)	..... £7.99
Constellation(B)	..... £6.85
Killer Gorilla(B)	..... £7.99
Croaker(B)	..... £7.99
Chess(B)	..... £7.99
Adventure	..... £7.99
Painter(B)	..... £6.85
Cowboy Shootout(B)	..... £6.85
Moon Base Alpha	..... £7.99
Danger LXB	..... £7.99
Draw	..... £10.30
Where	..... £6.85
Chemistry	..... £6.85
World Geography	..... £6.85
Junior Maths Pack	..... £6.85
NEW Hell Driver	..... £7.99
Martian Attack	..... £7.99

QUICKSILVA	Music Processor £14.95
Beeb Art	..... £14.95
Protector	..... £7.95
Wizard	..... £6.95
Mined Out	..... £6.95
The Generators	..... £6.95

ACORNSOFT	Hopper £9.95
Philosophers Quest	..... £9.95
Sphinx Adventure	..... £9.95
Castle of Riddles	..... £9.95
Monsters	..... £9.95
Snapper	..... £9.95
Planetoid	..... £9.95
Rocket Raid*	..... £9.95
Meteors	..... £9.95
Arcadians	..... £9.95
Super Invaders	..... £9.95
Missile Base	..... £9.95
Starship Command	..... £9.95
Countdown/Doom	..... £9.95
Snooker	..... £9.95
Number Balance	..... £9.95
World Sequencing	..... £9.95
Word Hunt	..... £9.95
Missing Signs	..... £9.95
Jars	..... £9.95
Sentence Sequencing	..... £9.95
Lisp Cassette*	..... £16.85
Forth Cassette	..... £16.85

BBC SOFTWARE	Home Finance £10.00
Painting	..... £10.00
Drawing	..... £10.00
Games of Strategy	..... £10.00
Fun Games	..... £10.00
NEW	White Knight £11.50
Dr. Who Adventure	..... £10.00
Canyon	..... £10.00
Toolbox	..... £21.00

- SPECIAL OFFER -
 £1.00 off 2 Cassettes
 £2.00 off 3 cassettes
 etc.

GEMINI SOFTWARE	Stock Control £19.95
Invoices & Statements	..... £19.95
Spread Sheet	..... £19.95
Home Accounts	..... £19.95
Easiledger	..... £19.95
Graphplot	..... £19.95
Mail List	..... £19.95
Database	..... £19.95
Missile Control	..... £9.95
Sleigh Bells	..... £9.95

SUPERIOR SOFTWARE	Frogger £7.95
Road Runner	..... £7.95
Pontoon	..... £6.95
Cribbage	..... £6.95
NEW - NEW	Hunchback £7.95
Colditz Adventure	..... £7.95
Qbert	..... £7.95
Crazy Painter	..... £7.95
2002	..... £7.95
Fairground	..... £7.95
Star Trek Adventure	..... £7.95
Lost City	..... £7.95
Gideon's Gamble	..... £7.95

Simon Hessel	Great Britain £5.95
Inheritance	..... £6.95
The World Travel Game	..... £6.95

Star Trek/Candy	Floss £6.50
Hangman	..... £4.50
Super Hangman	..... £4.50
Atlantis	..... £7.50
Flags	..... £4.50
Leap Frog	..... £7.50
5-a-Side Soccer	..... £7.50
Pontoon and Patience	..... £7.50

KOSMOS	The French Mistress
Level A	..... £9.95
The French Mistress	
Level B	..... £9.95
German Master	
Level A	..... £9.95
German Master	
Level B	..... £9.95

SOFTWARE CITY
 Call in and see our new shop within a shop (free parking/M62 Exit 7)
 Please ring or write for a full catalogue and special discount offers.

DOCTOR SOFT	747 Flight Simulator £8.95
Wolf Pack III	..... £7.95
Kremlin	..... £6.95
Harmony	..... £7.95
Tables Teacher	..... £9.95

A & L SOFTWARE	180 £6.90
Bouncer	..... £8.00
Shrinking Professor	..... £8.00
Horror Castle	..... £8.00
Cyclons	..... £8.00
Howzat	..... £8.00
Chuckie Egg	..... £8.00

VIRGIN	Space Adventure £7.95
Trench	..... £7.95
'Owzat	..... £7.95
Cheftain	..... £7.95
Noc A Bloc	..... £7.95
Cruncher	..... £7.95
Microbe	..... £7.95
Bug Bomb	..... £7.95
Plank Walk	..... £7.95

VISION SOFTWARE	Disc Executor £11.00
------------------------	----------------------------

MELBOURNE HOUSE	The Hobbit £14.95
------------------------	-------------------------

SHIVA SOFTWARE	Lauching £14.95
Additional Fun	..... £14.95
Sets & Operators	..... £14.95

BUGBYTES SOFTWARE	Space Invaders £7.50
Galaxy Wars	..... £7.50
City Defence	..... £7.50
Synthesizer	..... £9.50
Sea Lord	..... £7.50
Oblivion	..... £7.50
Graphics Package	..... £9.50
Old Father Time	..... £7.50

H&H SOFTWARE	Alphabeta £14.50
Billiards	..... £8.50
Shape & Race	..... £8.50
Signals & Magic	..... £5.50
Early One	..... £5.50
Early Two	..... £6.50
Early Three	..... £6.50
Extra One	..... £4.50
Extra Two	..... £4.50

DIGITAL FANTASIA	ADVENTURE GAMES FOR THE BBC
The Golden Baton (A/B)	
The Time Machine (A/B)	
Arrow of Death (Pt1) (A/B)	
Arrow of Death (Pt2) (A/B)	
Escape from Pulsar 7 (B)	
Circus (B)	
Feasibility Experiment (B)	
The Wizard of Akyrz (B)	
Perseus & Andromeda (B)	
Ten Little Indians (B)	
ALL ADVENTURES ARE £9.95	

LEVEL 9 COMPUTING	RQForth £15.00
Galaxy Wars	..... £10.00
RQForth ToolKit	..... £10.00
ULTIMATE ADVENTURES	
Snowball	..... £10.00
Adventure Quest	..... £10.00
Dungeon Adventure	..... £10.00
Colossal Adventure	..... £10.00
Lords of Time	..... £10.00

Send S.A.E. for further details and quote for any product

BEST PRICE IN BRITAIN

TURN YOUR BBC INTO A BUSINESS MACHINE WITH A TORCH DISC PAC
 £820 incl. VAT & FREE delivery

NOW WITH FREE SOFTWARE

PERFECT CALC
 PERFECT WRITER
 PERFECT FILER
 PERFECT SPELLER
 TORCHNET
 COMANEX SOFTWARE

Valued at over **£1,000**

LOWEST DELIVERY RATES IN BRITAIN

COMPUTER CITY SERVICE CENTRE
 Authorised service centre for Acorn, Apple & Dragon.
 Repair, maintenance and extended warranty available for many other computers and peripherals.

BOOKS FOR THE BBC MICROCOMPUTER	Assembly Language Programming for BBC £8.95
BBC Expert Guide	..... £6.95
Graphics & Sound	..... £6.95
Advance Programming Tech	..... £7.95
Creating Adventure Progs BBC	..... £6.95
Easy Programming The BBC	..... £5.95
Using Floppy Discs with BBC	..... £9.95

CREDIT FACILITIES
 Ask about instant credit up to £1,000.

MAIL ORDER

Please send me

-
-
-
-
-

Postage and packing on software 50p. Phone for hardware delivery rates.

I enclose cheque/P.O. for
 OR please debit my Access/Barclaycard/Visa*
 * delete as applicable

Card No Expiry date

Name

Address

Code

Tel No.

Dealers Discount Available
 ACCESS, BARCLAYCARD VISA ORDERS WELCOME ON
 24HR 051-420 3333
 COMPUTER CITY Dept F. FREEPOST (No Stamp Required) 78 Victoria Road, Widnes, Cheshire WA8 7RA.

LARGEST SELECTION OF SOFTWARE IN GREAT BRITAIN
COURTESY OF TIGER DISTRIBUTION.
OVER 700 LINES OF SOFTWARE FOR ALL LEADING MICROS

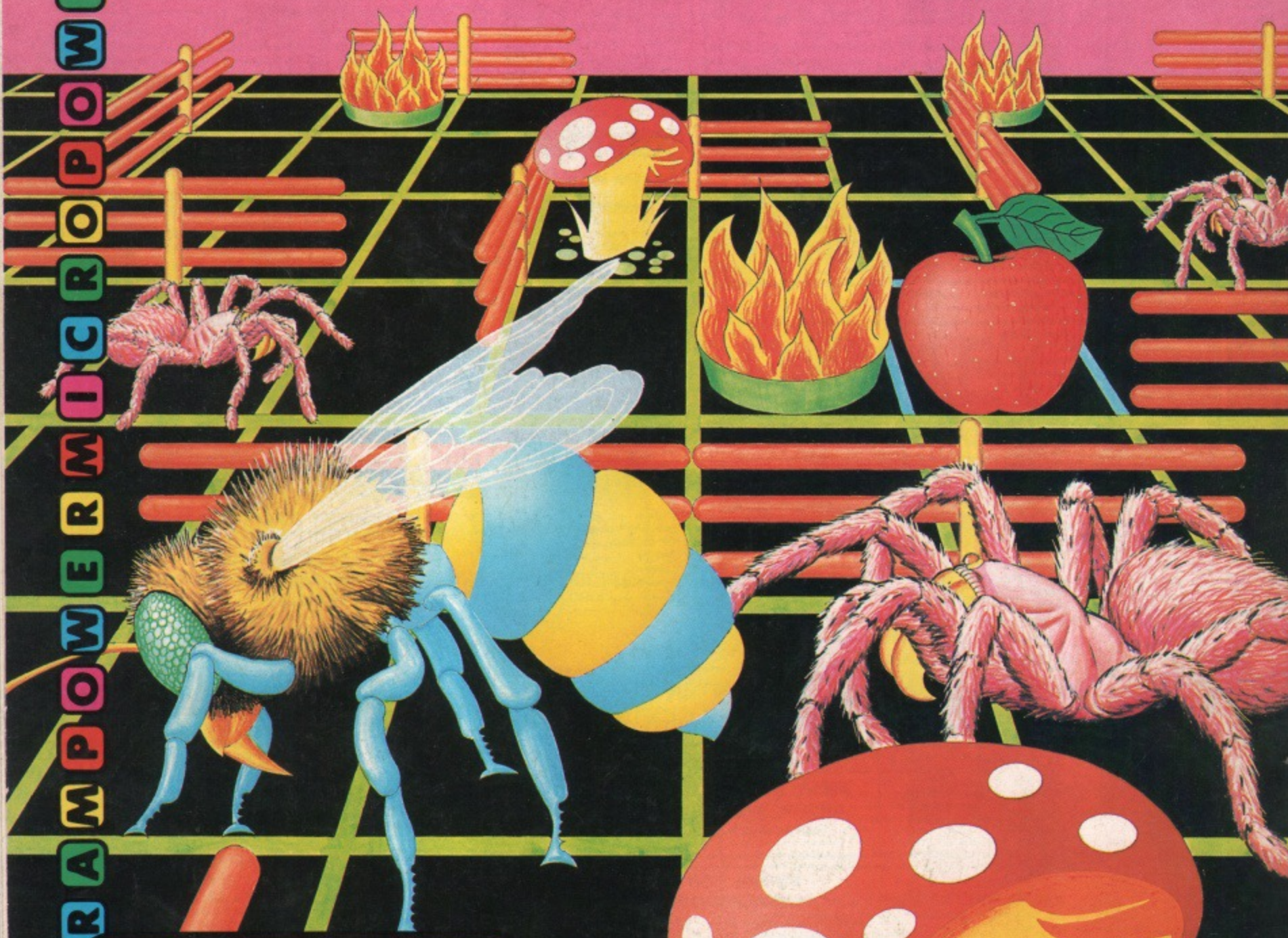
PROGRAM POWER MICRO POWER

ANOTHER FANTASTIC NEW B.B.C. MICRO PROGRAM FROM BRITAIN'S LEADING SOFTWARE HOUSE!

BUMBLE BEE

ONLY £7.95

Send the busy bee scurrying around the sprawling corridors to collect the precious pollen. Spin the turnstiles to escape the scavenging spiders in hot pursuit and use your skill and dexterity to coax them into the raging fireballs. Fast action, colourful graphics and top quality sound combine to make another winner from MICRO POWER.



The following top titles are available for both the BBC Micro and Electron:- Killer Gorilla £7.95/ Moonraider £7.95/Bandits at 3 o'Clock £6.95/ Croaker £7.95/Felix in the Factory £7.95/ Felix and the Fruit Monsters £7.95/Chess £7.95/ Escape from Moonbase Alpha £7.95/Draw £9.95/ Swoop £7.95/Intergalactic Trader £8.95/ Positron £6.95/Cybertron Mission £7.95.

All prices inclusive of V.A.T.

Mail Order: Please add 55p per order P. & P.

WE GUARANTEE THAT ALL OUR ADVERTISED PROGRAMS HAVE BEEN COMPLETED AND ARE READILY AVAILABLE.

Showroom: Northwood House North Street LEEDS LS7 2AA Tel: (0532) 458800

Mail Order: 8/8a Regent Street LEEDS LS7 4PE Tel: (0532) 683186 Or: 696343

WRITTEN ANY PROGRAMS? WE PAY 20% ROYALTIES!

SPECIAL OFFER Deduct £1 per cassette when ordering two or more.



WE STOCK THE BBC MICRO, ELECTRON, MEMOTECH MTX 500, COMMODORE 64, ORIC-1 AND SPECTRUM.

B.B.C. MICRO AND ELECTRON PROGRAMS CAN BE OBTAINED FROM SELECTED BRANCHES OF W.H. SMITH, JOHN MENZIES, BOOTS, HARRODS, ALL GOOD DEALERS, OR DIRECT FROM MICRO POWER.

MICRO POWER