A Database Publication

THE MICRO USER

Volume 3
Number 11
January 1986
£1.25

2 new series to help beginners: Basic & Machine Code

Top-selling guide to the BBC Micro!

YOUR pull-out supplement inside

SERIOUS SOFTWARE

FOR THE BBC MICRO

TOOLKIT PLUS

Rom
£39.00

Basic programmer's aid in 16K Rom

Toolkit, chosen by thousands of BBC users, has now been re-written.

- Full screen Basic editor (Wordwise-like in use). Fully integrated and works in any mode
- Syntax checker to spot mistakes as you program.
- Host of new commands & features
- Upgrade available. Phone for details.

PROGRAM BUILDER

Disc
£21.00
Tape
£16.00

60 handy Basic routines ready to slot into your own programs

Don't bother re-writing routines that have already been professionally coded.

Fully documented routines include: input validation, data entry, circles, ellipses, graphics, passwords, string handling, date validation, sorting, screen dump etc etc

ROMIT

Rom
£34.00

RAM filing system and silicon disc facility will put your own Basic (or Wordwise) programs onto Eprom.

- Simple to use, supplied on 16K Rom
- We can even blow the Eproms for you
- Allows you to use sideways Ram as a printer buffer
- Over 20 new commands

STUDIO EIGHT

Disc
£22.00
Tape
£17.00

The sound studio. Contains over 20K of machine code which converts your BBC micro into a 4 voice synthesiser with an 8 track digital recorder with rhythm and drum machine.

A truly exciting real-time studio system.

Other Programs From BEEBUG SOFT

Sleuth
Masterfile
Exmon II
Help
Discmaster
Dumpmaster
Murom
Quickcalc
Hershey Characters
Paintmaster
Teletext

WORDEASE

Disc
£21.00
Rom
£29.00

The Wordwise Plus utility disc

Adds new features such as Mail merging, Label printing, Copy (or move) seg. to seg., Auto-version no. save, Auto-printer codes, Programming Utilities, Auto-section renumber . . . and much more, to your Wordwise Plus.

- Menu driven & easy to use
- As approved by Computer Concepts

ICON MASTER

Rom
£34.00

Icon Control System

This pack automates the creation of an icon-driven user interface.

Supplied on 16K Rom it allows you to design a screen containing icons and then use it in your own programs, in place of a normal menu.

Compatible with AMX mouse & AMX icons.

ORDERING INFORMATION

All products are available from your local dealer or directly from Beebugsoft.

Prices include VAT.
Please add 50p post & packing.

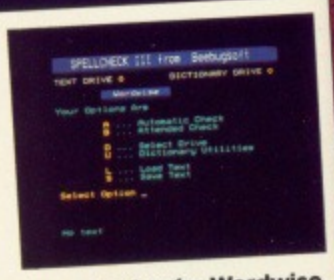
Mail Order: Beebugsoft, PO Box 109, High Wycombe, Bucks, HP10 8NP

Access and Barclaycard
24 hour hotline
PENN (049481) 6666

Further Information
Telephone St.Albans (0727) 40303

SPELLCHECK III

Rom
£36.00



Rom based spelling checker for Wordwise, Wordwise Plus & View

Now in 16K with 2000 words in Rom

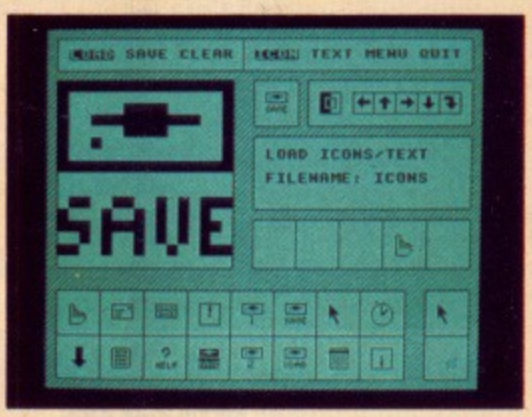
Even faster. On test timings . . .
Watford 1.3 DFS 1620 wpm
Acorn 1.2 DNFS & tube 2000 wpm

Comes with 6000 word dictionary disc.
Upgrades from Spellcheck.
Ask for details.

ICON MASTER — Icon Control System

GIVE YOUR PROGRAMS THAT PROFESSIONAL TOUCH

This pack automates the creation of an icon-driven user interface. It is supplied on a 16K Rom and allows you to design a screen containing icons and then use it in your own programs, in place of a normal menu.



It is easy to use and may optionally be controlled with the AMX mouse. Icons (sample sets provided) are designed on a special Icon screen editor and are compatible with AMX icons.

Having designed the icons, the next step is to select the Menu editor and design your final screen. You may position your icons and text wherever you choose on the screen. Icon Master then generates the code to append to your Basic program which will reproduce your icon screen and handle user input.

Your own icon-driven programs may be used with or without the Icon Master Rom in your machine.

ROMIT — Put your own Basic programs into Rom

CREATE YOUR OWN SILICON DISC

RomIt is a 16K Rom which adds a new feature to your BBC Micro — A Ram Filing System. This provides over 20 new commands which enable you to:

1. Create a silicon disc with its own filing system commands. Type ★RAM, then you can catalogue the "disc", save and load files to it, storing as many files as memory will allow. You will need sideways Ram to use this facility.

2. Put your own Basic or assembler programs (or any file) into Ram and then make them into Eproms. Whether it's your favourite game, your function key definitions or any program that you use frequently, you can now put it into Eprom so that it's always instantly available.

Your Eproms will work with or without the RomIt chip in your machine, and so you may pass on copies of your programs to other people.

Getting your own Basic program into Rom couldn't be simpler. Just load your program into memory and type: **★RAM ★TRANSFER "prog" ★DOWNLOAD** and either connect it to a blower, or send the disc (or tape) to us, together with your RomIt registration number, and we will Rom it for you. (There is a small charge for this service).

3. Use your sideways Ram as a printer buffer so that you can continue to use your computer for other work at the same time as printing long documents.

Over 20 new ★commands are provided by RomIt

To get the most from RomIt you will need sideways Ram fitted to your computer, eg just a single Ram chip plugged into your ATPL (or other) Rom board.

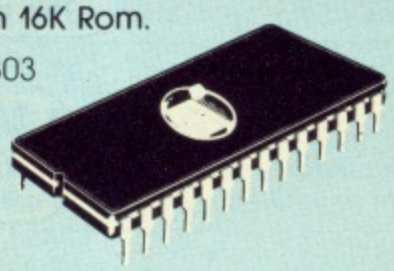
ICONMASTER £34.00 ROMIT £34.00 inc.VAT

Available from your local dealer. **Supplied on 16K Rom.**

For further information: Tel St.Albans (0727) 40303

24 hour Access & Barclaycard hotline
Tel Penn (049481) 6666

Mail order to
Beebugsoft, P.O.Box 109, St.Johns Road, High Wycombe, Bucks, HP10 8NP



BEEBUG SOFT

Vol. 3 No. 11 January 1986

Managing Editor
Derek Meakin
Features Editor
Mike Bibby
Production Editor
Peter Glover
Art Editor
Heather Sheldrick
Associate Editor
Alan McLachlan
News Editor
Mike Cowley
Technical Editor
Mike Cook
Advertisement Manager
John Riding
Advertising Sales
Mike Hayes
Margaret Clarke
Editor in Chief, Database Publications
Peter Brameld

Tel: 061-456 8835 (Editorial)
061-456 8383 (Administration)
061-456 8500 (Advertising)
061-480 0171 (Subscriptions)

Telecom Gold: 72:MAG001.
Telex: 265871 MONREF G.
Quoting Ref. MAG001.
Prestel Mailbox: 614568383.

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

Subscription rates for 12 issues, post free:

£15 – UK & Eire (Sterling only)
£40 – Europe
£52 – Rest of world (airmail)

ABC **64,956** January-June 1985

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.

© 1986 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, listings or advertisements.

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.

News trade distribution:
Europress Sales and Distribution Limited, 11 Brighton Road, Crawley, West Sussex RH10 6AF. Circulation 0293 27053.

NEWS 23
Read all about it. All the latest events in the ever changing world of your BBC Micro.

MAKING MUSIC 48
Making micro-music appeals to you? Creating spectacular sound on the BBC Micro is simple.

MUSIC EDITOR 51
Translate musical notation or write your own composition with this superb music editor.

HARDWARE SCENE 57
Need a silicon disc, memory cache or printer buffer? The PMS RAM module does the lot with style.

MICROLINK 66
A monthly update on the ever increasing potential of our on-line database for micros.

MEGAROIDS 68
Dodge the space debris and escape the Cylons in this super fast action arcade spectacular.

BEGIN HERE 73
The start of a new series for the first time programmer – PRINT and punctuation explained.

SOFTWARE SCENE 79
Our fearless reviewers present their detailed evaluation of some of the recent releases.

FIND AND REPLACE 88
Make programming easier with this utility to find and replace any text in a Basic listing.

DISCOPY 91
Tired of copying disc files individually? This utility reads and transfers them all in one go.

ELITE GUIDE 95
Among the many still struggling with Elite? This guide will help you make the grade.

WORDSQUARE 105
You've had a utility to create puzzles. Now you can use this program while you're solving them.

106 CLAUSTROPHOBIA
Trapped in a seemingly endless maze, can you recover your possessions and escape alive?

110 READER SURVEY
Here's your chance to tell us about yourself and win the latest ROM/RAM card from Watford.

114 FIVES
Test your skill at noughts and crosses in a 'five in a row' version of the old favourite.

117 OSWORD 8271
The first of three articles on the 8271 floppy disc controller: we show how your DFS works.

124 TELETEXT IN THEORY
We investigate the development of Teletext, one of micro-computing's major growth areas.

126 ...AND IN PRACTICE
Want to access teletext data? This adapter from Volex might be what you're looking for.

132 ROM ROUNDUP
Computer Concepts' Accelerator and Beebman from Slogger are put through their paces.

138 MACHINE CODE
Don't tell the experts – but machine code's quite simple when it's explained as clearly as this.

149 ADVENTURES
Our frank columnist looks at Acheton and Red Moon and comes up with yet another puzzle.

154 BODY BUILDING
Into m-m-music on your computer? With this utility your micro will utter more than stutters!

199 MICROMAIL
The part of the magazine you write yourself – your news, views, brain waves and moans.

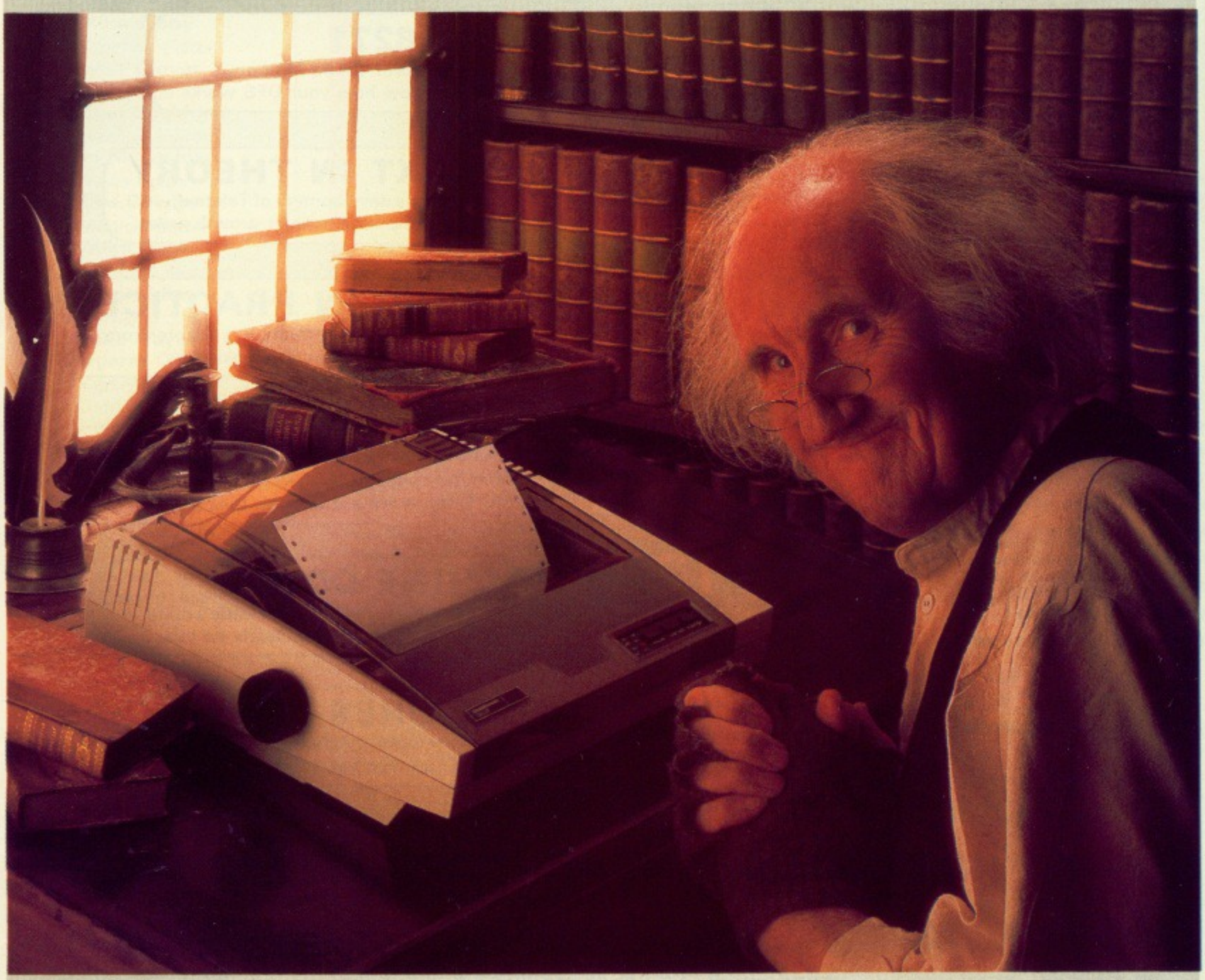
215 ORDER FORM
From back issues to binders, cassettes to cases, discs to dust covers – they're all here.

PROBLEM

This month one of the longest-running features of *The Micro User*, Mike Cook's Problem Page, takes on a new look. Our technical editor is receiving so many problems in search of solutions that we're giving him much more space to answer readers' queries. You'll find his words of wisdom throughout this issue.

SOLVED

Thrifty micro owners choose the new MT80+



Keen on saving money? But not prepared to sacrifice quality and performance? Then the new MT80+ serial matrix printer has plenty to offer at a price that will have you rubbing your hands with glee.

The MT80+ prints at 100 cps and is compatible with just about any popular office or home micro. For true print flexibility, there's compressed and expanded print, subscripts and superscripts, bold print, italics and, of course, graphics.

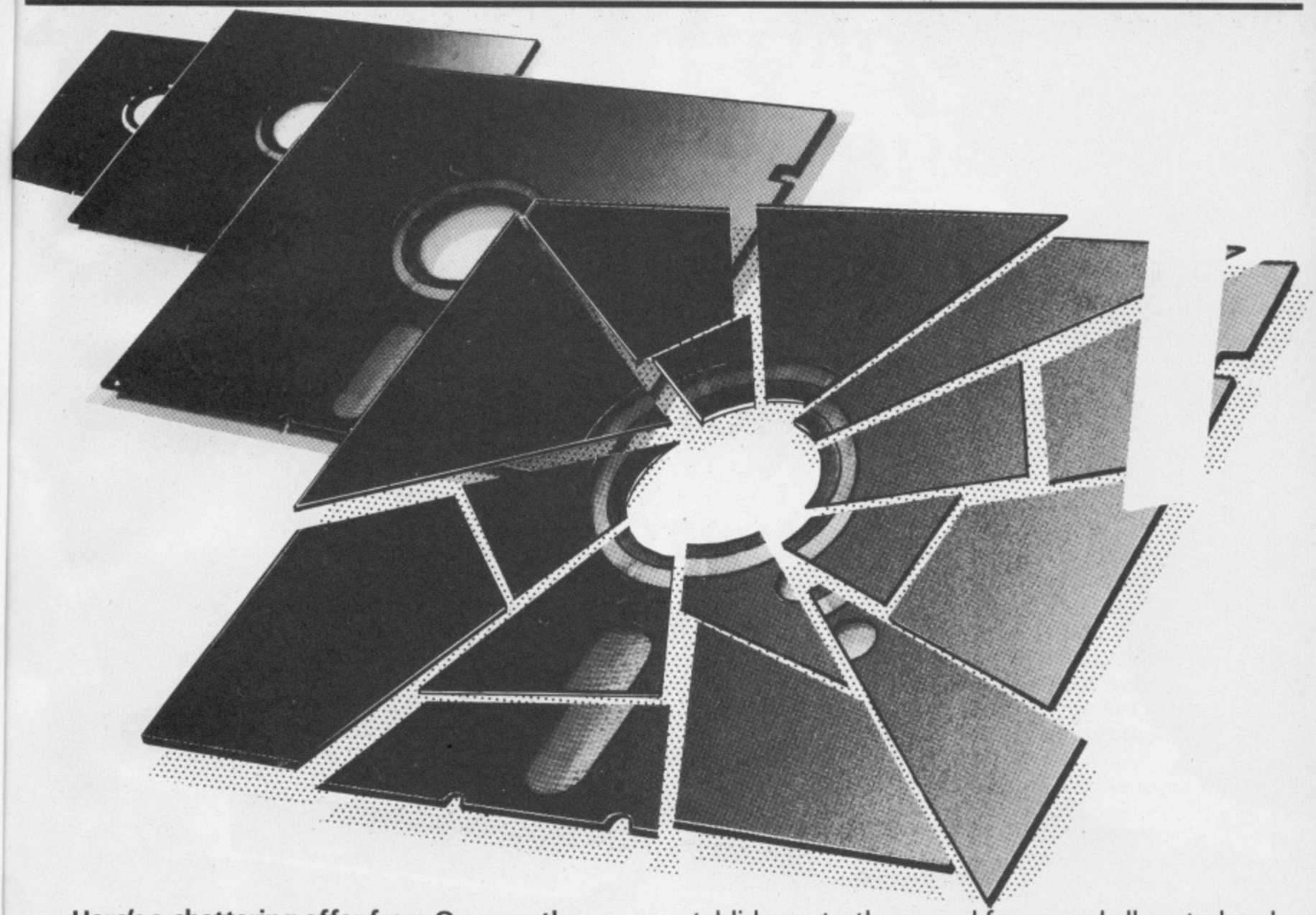
You'll have to see the print quality to believe it, thanks to the outstanding film ribbon cassette. Continuous fanfold stationery or friction fed single sheets pose no problem. And if you're in a hurry the quick tear facility is a real bonus.

The new MT80+ from Mannesmann Tally. Europe's leading matrix printer manufacturer. You'll be laughing all the way to the bank. Contact us now for our literature pack.

MANNESMANN TALLY

MANNESMANN TALLY LIMITED, MOLLY MILLARS LANE, WOKINGHAM, BERKSHIRE, RG11 2QT. TELEPHONE (0734) 788711

SIMPLY THE BEST QUALITY AT SIMPLY HALF THE PRICE



Here's a shattering offer from Opus on the world's most reliable diskettes. Fantastic high quality Dysan floppy disks at less than half-price.

Produced by Dysan for a major American company, these precision 5¼" diskettes are guaranteed 100% error free and are being offered by Opus at prices you won't find anywhere else on the market.

Where else will you find Dysan quality at prices like these?

- **Double-sided 48 TPI double-density disks only £14.95 (pack of 10)**
- **Double sided 96 TPI quad-density disks only £17.95 (pack of 10)**
  And our prices are inclusive of VAT and delivery.

If you want simply the best for less call Opus on 0737-65080. Substantial dealer discounts available.

We also have massive reductions for universities, colleges and schools, hospitals and research establishments, the armed forces and all central and local government departments. Wholesale price list available for bulk purchases.

Please rush me the following (ALL PRICES INCLUDE VAT & CARRIAGE) BMU

Quantity (Packs of 10)

____ pack(s) double-density disks at £14.95 each

____ pack(s) quad-density disks at £17.95 each

I enclose a cheque for £ _____ or please debit my credit card account with the amount of £ _____

My Access ☐ Barclaycard ☐ no.is _____
(please tick)

Name _____

Address _____

_____

_____ Telephone _____

To: Opus Supplies Ltd.,
55 Ormisde Way, Holmethorpe Industrial Estate,
Redhill, Surrey RH1 2LW.

Opus.

Dysan is a registered trademark of Dysan, a division of Xidex Corporation

SOLIDISK AND M

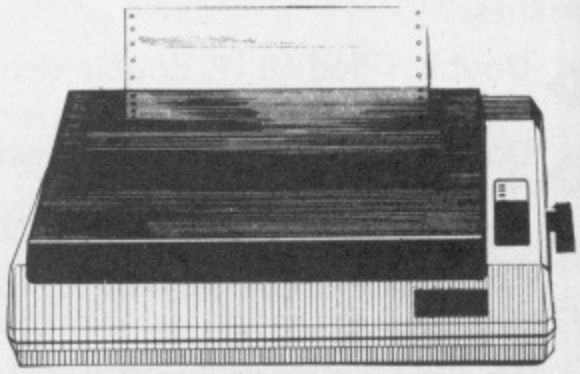
We pick up the best names in Wordprocessing software, in disc drives, in printers and offer them to you at — well, we wouldn't say it ourselves but our competitors might — a silly price.

The Wordprocessor is none other than the number one best seller for the BBC: WORD-WISE PLUS from Computer Concepts.
Respected opinions regard WORD-WISE PLUS as very user friendly, flexible, straightforward or simply excellent (1).

The Disk Drive is Mitsubishi's one Megabyte (unformatted) and can store up to 640 kilobytes of text on a double density single diskette.
The disk interface electronics are our 1770 based double density filing system totally compatible with the Acorn 1770 DFS and the newer ADFS.
In fact, it even works with the Acorn chips. It has so many features that even experts might suspect that it's too good to be true (2).

The printer is the Solidisk PR165, has a speed of 160 cps in normal mode, is very fast in NLQ (near letter quality) mode and is Dot Matrix, bit graphic capable and Epson compatible (3).
For the icing on the cake, you also get a free Spelling Checker, Electronic Spreadsheet, Database and lots of games.

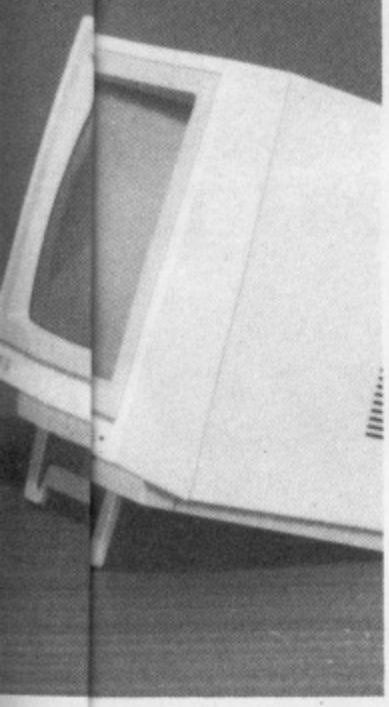
With around a quarter of the disc storage, a much slower printer, no colour and a membrane keyboard, with generally more expensive software, the AMSTRAD PCW8256 (at £399.00 + VAT) looks unconvincing.
By the way, the BBC already has more memory space than the AMSTRAD

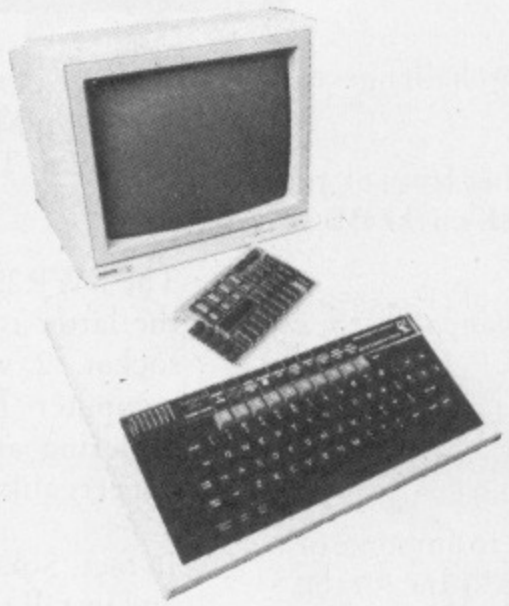


(1) See reviews in E & CM, CEEFAX, Acorn User.
(2) See reviews in Acorn User, BBC Micro User and A&B Computing.
(3) Solidisk own direct imports from Japan, subject to change without notice for improvements.

ME — AN ALL IN ONE

Wordprocessing system for the BBC to make the AMSTRAD PCW8256 look greener than just green . . .





PCW8256, but if you still need more, turn over the page and look at the new Solidisk baby: up to 500K of ROMs and a cool 4 Megabytes of RAMs, enough to knock down any challenger.

The Solidisk
package contains:
One 160 CPS PRINTER,
One 1 MEGABYTE DISC DRIVE,
One DOUBLE DENSITY DFS,
WORDWISE PLUS ROM,
KEYSTRIP, 4 MANUALS
5 SOFTWARE DISKETTES
1 BLANK DISKETTE.
100 SHEETS OF FANFOLD PAPER.

AVAILABLE FROM SOLIDISK BY DIRECT TELEPHONE OR MAIL ORDER AND FROM SELECTED BBC SPECIALISTS FOR JUST £299.00 + VAT

PLUS CARRIAGE

Wouldn't you like to order one now?
Just ring this number:
SOUTHEND (0702) 354 674
(Access/Visa)

Wordchic

SOLIDISK Office System

SOLIDISK TECHNOLOGY LTD
17 Sweyne Avenue
Southend Essex

To: Solidisk Technology Ltd, 17 Sweyne Avenue, Southend, Essex.
Please rush me the following:
Solidisk Office System at £355 incl. VAT + courrier carr.

I enclose a cheque/postal orders for £..... or please debit my credit card account:

Mr Access ☐ Barclaycard ☐ no. is ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

NAME .....

ADDRESS .....

.....

..... TEL NO: .....

Prices and specificatoins may change without notice. Delivery subject to availability. Please ring for details.

MU186

The new SOLIDISK BABY up to 500K of ROMS and 4 Megabytes of RAMS

The Baby From Solidisk is setting new challenges to software writers.

It takes up to 256K of ROMs, anything from 8k to 64K chips and can control another 256K on the BBC board.

It has 256K of RAM built-in, expandable to a whacking 4 Megabytes.

It runs at full 2Mhz, at the same speed (and timing) as the BBC board RAM.

It already comes with lots of software to put some of its potential to good use, but it is still waiting for the new generation of fully integrated software to come. Like the INTER suite from Computer Concepts.

To start with: the famous Wordwise Plus ROM from Computer Concepts and Solidisk 32K superb Toolkit ROM are included in the deal.

The additional 256k RAM are divided into 8 banks of 32k bytes. They can be independently used as Shadow or Sideways RAM or BOTH. i.e. the top of each bank can be used as Shadow while the bottom is Sideways RAM.

The Size of the paged memory is programmable, up to 31K for Sideways RAM/ROM and up to 30K for Shadows. That's 61K bytes out of 64K memory space.

The SWR256 board plugs into the 6502 socket and the latter is placed back into the on board 40 pin socket. 2 wires are hooked to IC legs on the computer board. The installation requires no soldering and can be carried out by novices or experts alike.

In fact, Solidisk engineers can open your computer and install the board in around 100 seconds.

Prices:
The SWR256, 2 ROMs and manuals costs £175.00 inclusive of VAT.

Upgrades: (incl. VAT)
From SWR32 to SWR256 ..... £129.00
From SWR64 to SWR256 ..... £89.00
From SWR128 to SWR256 ..... £75.00
These prices include the two ROMs.

INTEGRATED SOFTWARE?

That will do nicely

Solidisk introduces the SWR256

SPECIAL FEATURES:

The SWR256 system has a Programmable Memory Management Unit on board, totally compatible with all well known software.

It consists of a ROM register (&FE30), a Shadow register (&FE34), an Access register (&FE32), and a Size register (&FE36).

The ROM register duplicates the one built into the BBC board. It selects one of the 16 possible ROMs.

The Shadow register is new and similar to the BBC PLUS implementation. It selects one of the 128 possible Shadows or moves a Sideways RAM into the Shadow area.

The Size register is new and not implemented anywhere else. It specifies how big you want your Shadows and your ROMs.

The normal setting is 16K for Sideways ROM/RAM and 20K for Shadows.

If bit 0 is set, your Sideways ROM or RAM is 31K (useful for Hi-language, from &8000 to &FC00).

If bit 1 is set, your Shadow is 30k (useful for language, from &800 to &8000).

Bits 2 and 3 are reserved for possible Shadow modes 3 and 7.

The built-in software in the Solidisk Super Toolkit (a 32K ROM) runs with all well known ROMs and will handle all MOS calls.

By programming the Size register, it is possible for a ROM to have 61K of continuous memory, more than you can get with the 6502 Second Processor and you will still retain the paging facility.

By programming the Shadow register, one ROM can move another ROM into the Shadow area and call routines directly there.

There is also a 16 pin expansion socket on the board for direct access to the RAM array.

In a word, the Solidisk SWR256 is the perfect partner for any serious integrated software.

The new SWR256 is available by direct telephone or mail order from Solidisk and selected BBC Specialists.

SOLIDISK Office System

To: Solidisk Technology Ltd 17 Sweyne Avenue Southend Essex SS2
Please rush me the following:

..... SWR256K Ram at £175 incl. VAT and carr.

I enclose a cheque/postal orders for £ ..... or please debit my credit card account:

My Access ☐ Barclaycard ☐ no. is ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

NAME .....

ADDRESS .....

.....

..... TEL NO: .....

Prices and specifications may change without notice. Delivery subject to availability. Please ring for details.

MU186

WIN THE MAZE GAME . . .

Investing in extra equipment for your BBC Micro really needs thinking about; bear in mind, for instance, that for the last five years, all efforts have been put into more memory and faster disks.

The problem is that you may end up with a hotch potch of add-ons from different suppliers, and some may be reluctant to give advice on the whole ensemble.

We should know — here at Solidisk, we see it every day.

So how can you, too, keep pace with the latest technology?

The easy answer is buy important pieces of hardware from Solidisk.

Solidisk design rules adhere strictly to 2 principles:

a) 'Minimum Disruption' to the standard machine.
b) 'Do it in software' if at all possible.

We have Double Density Disc Interface, Winchester, Advanced DFS, Sideways RAM, Shadow/MOS RAM and MODEM and more than 50,000 happy users.

They are happy because their computers have more facilities, run faster, look tidy and usually cost them less money.

For many, it's the support that they receive that they are most happy about.

With over 90 Local Experts covering England, Scotland and Wales, with presence in Holland, France and Australia, Solidisk can offer many users free fitting and advice.

We also make available an ever increasing catalogue of free software to all Solidisk users, except media and carriage.

Solidisk Software Support Service can give you the sort of service only matched by the largest companies.

It's up to you to decide. Although they are happy now, many have made the journey twice and they are not ready to do it again.

SOLIDISK LOCAL EXPERTS

Solidisk has a nationwide network of more than 90 local experts and a growing number of experts overseas.

They do not sell our equipment, but they can generally fit it for you absolutely free of charge. If you would like to take advantage of this unparalleled service, ring us once you have our equipment for the name and telephone number of your nearest one. All areas are currently covered, but we still intend to expand the network; if you are interested, please call us for details.

PRICE LIST: (all prices include VAT unless otherwise indicated. We export world wide — contact us for details on prices and delivery).

	Prices	P&
BBC SIDEWAYS RAM:		
SWR32	£53.00	£2
SWR64	£80.00	£2
SWR128	£125.00	£2
SWR256	£175.00	£2
Software pack 2	£10.00	£2
NB: all versions of the Sideways Ram come supplied with Software Pack 1 free of charge. Please specify 40 or 80 tracks when ordering.		
Pack 1 is available without the Sideways Ram at a cost of £10 + £2 P + P.		
1770 DISC INTERFACE:		
1770 Double Density with DFS 2.0 ROM	£45.00	£1
1770 Double Density with ADFS	£55.00	£1
1770 + 8271 DFDC with ADFS	£60.00	£1
DISC OFFERS:		
640k with ADFS Disc Offer (£10.00 Datapost)	£200.00	£3
1.3MB with ADFS, CPU and keyboard case (£10.00 Datapost)	£340.00	£5
WINCHESTER DISC DRIVES:		
XD-10 without PSU 10MB (Minimum config)	£399.00	+ VA
XD-10 10MB (with additional PSU)	£460.00	+ VA
The following prices include keyboard and CPU case:		
XD-20/40 20 MB	£699.00	+ VA
XD-20/40 TWIN (40 MB)	£1100.00	+ VA
XD-30/60 30 MB	£900.00	+ VA
XD-30/60 TWIN (60MB)	£1300.00	+ VA
All Winchester systems are despatched by Datapost within the UK, included in the prices above. (Please remember that if you also need to use floppy disks in conjunction with these, it is advisable to also purchase our 1770 DFS interface or 1770 + 8271 DFDC interface — see previous pages.)		
EPROMS:		
2764 × 5	£24.00	£1
27128 × 3	£25.00	£1
27256 (to be used on UVIPROM32)	£10.00	£1
UVIPROM Eprom programmer, suitable for 2764, 27128	£19.00	£2
UVIPROM32 Eprom programmer, special for AMD27256	£20.00	£2
UVIPAC Eprom Eraser	£21.00	£2
DISKETTES:		
Datalife MD525 SS/DD	£17.00	£1
Datalife MD557 2S/4D	£28.00	£1
MISC.		
CPU and KEYBOARD case	£30.00	£4
Solidisk TOOLKIT a must for ADFS	£10.00	£1
DFS + ADFS if purchased separately	£20.00	£1
EFS for the Electron	£59.00	£1
Special 3.5" Electron disc offer	£197.00	£3
Please circle: BBC Model B/B PLUS/40 tracks/80 tracks.		

Name: _____

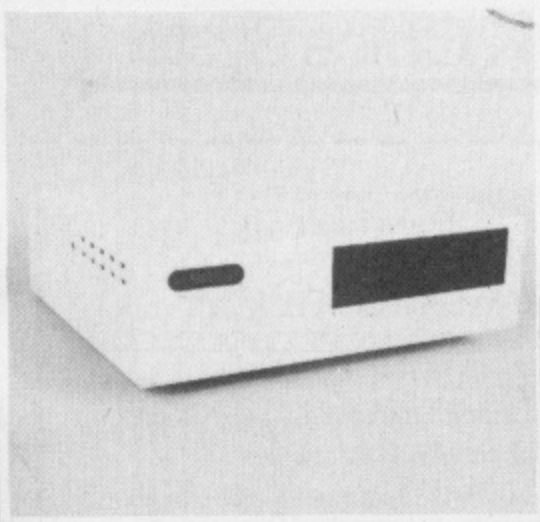
Address: _____

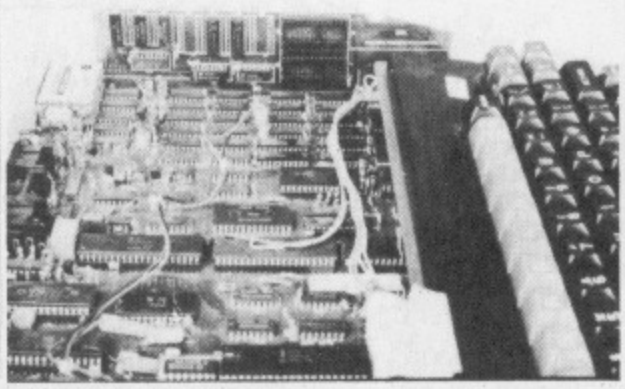
_____

BARCLAY/ACCESS :

We reserve the right to change prices and specifications without notice and delivery is subject to availability. Please call our office for confirmation. Callers are welcome Monday to Friday 9.30 to 5.30. Please note that we are closed on Saturdays. Callers requiring fittings or installation checks: it is now essential to ring for an appointment.

SOLIDISK TECHNOLOGY LTD 17 SWEYNE AVENUE SOUTHEND ESSEX SS2 6JQ
TEL: (0702) 354674 (16 LINES)





SOLIDISK TECHNOLOGY

Tel. SOUTHEND (0702) 354674

(16 lines)

OPUS WILL MAKE YOU A BETTER ORGANISER FOR ONLY £60

If your micro system is starting to get out of hand a smart organiser could be the solution to your problems.

At just £59.95 the Organiser desk from Opus Supplies will help to organise your system beautifully. It's purpose built to provide plenty of storage space and because it's produced alongside our range of executive computer desking it offers a level of quality you'll appreciate.

Shelving accommodates your monitor, printer computer, disc drive or cassette recorder and software, and the teak-finished unit is fitted with castors to make it fully mobile. The Organiser's assembled dimensions are: H. 31", W. 40¼" and D. 26".

And our price includes VAT and FREE DELIVERY.

The Organiser desk is suitable for use with all leading home micros including the BBC, Amstrad, Commodore and Sinclair computers.

Getting organised couldn't be easier. Phone us on 0737 65080 or simply post the coupon below.

To: Opus Supplies Ltd,
55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.

Please rush me the following:
(PRICES INCLUDE VAT AND CARRIAGE)

_____ Organiser Desk(s) at £59.95 each (inc. VAT)

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

_____

Name _____

Address _____

_____

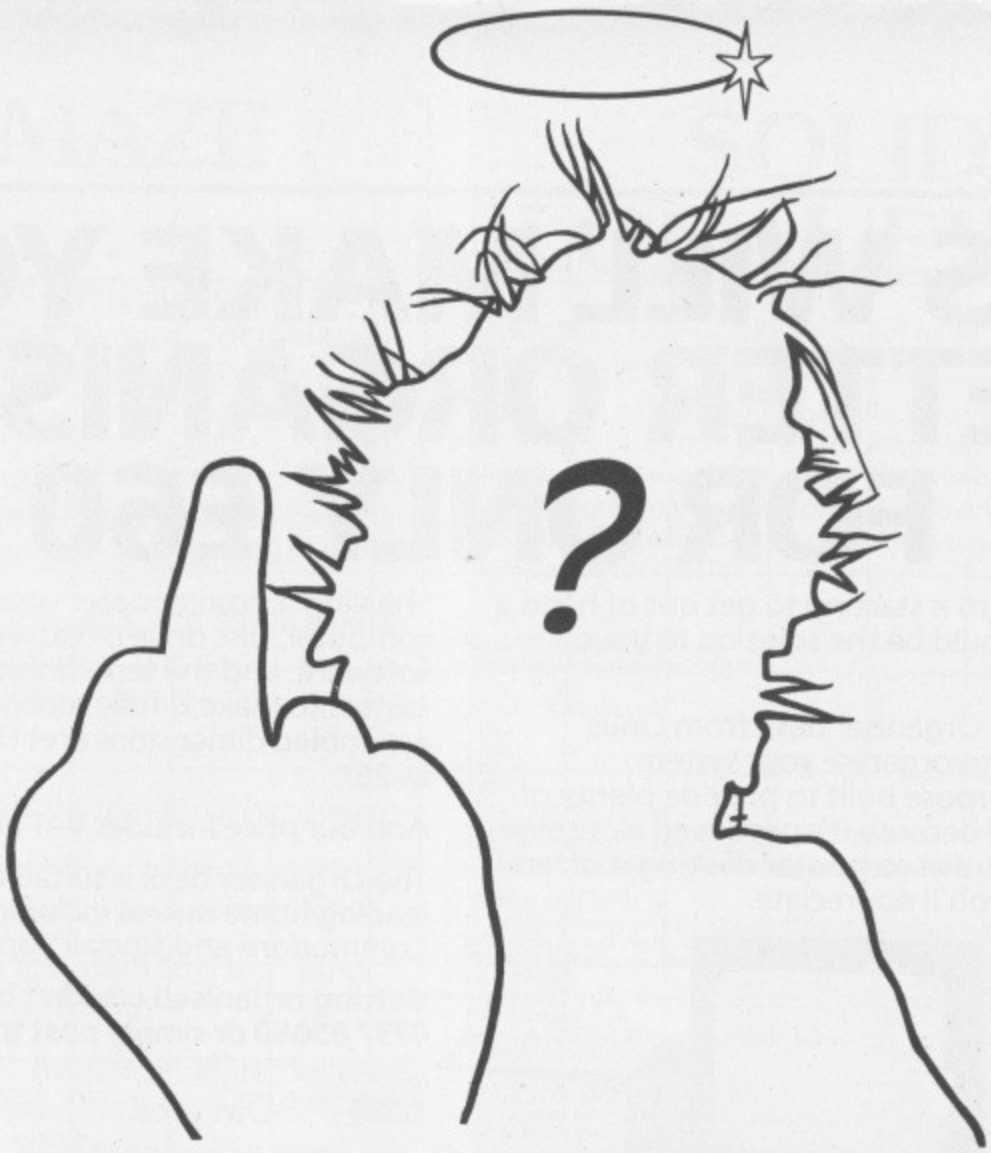
_____

Telephone

_____

_____ MU1

Opus.
Opus Supplies Ltd.



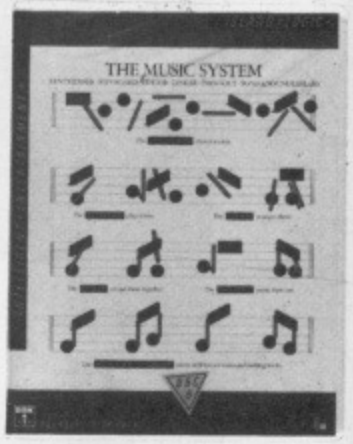
You don't have to be an angel or a punk to enjoy The Music System this Christmas

The Music System is the most advanced micro based music program for the BBC microcomputer.

It features unparalleled facilities for creating, editing, playing and printing tunes whilst still being simplicity itself to use.

The Song and Sound Library gives you a good start and the acclaimed Instruction Manual leaves little to the imagination.

So there's no need to wait until your hair turns green and spiky ..... use ALL your fingers and brain. Buy one today.



DISC PACK: EDITOR · SYNTHESISER · KEYBOARD · LINKER · PRINTOUT · SONG AND SOUND LIBRARY · £29.95 INC VAT. CASSETTE 1: KEYBOARD · SYNTHESISER · SOUND LIBRARY · £14.95 INC VAT. CASSETTE 2: EDITOR · PRINTOUT · SONG AND SOUND LIBRARY · £14.95 INC VAT. PLEASE ADD £1.25 P&P PER ORDER.

ADDITIONAL SONG LIBRARY DISC: 2 TOCCATA AND CAROLS · 3 400 YEARS OF MUSIC · 4 MAINLY BACH · 5 IAN WAUGH ORIGINALS · 6 OLD FAVOURITES · £4 EACH INC VAT · POSTAGE FREE

NEW UTILITIES DISC: KEYBOARD → MUSIC FILE CONVERTER · PLAY FROM BASIC UTILITY · TMS MUSIC FILE CONVERTER · MUSIC EDITOR FILE CONVERTER · £6 INC VAT · POSTAGE FREE.

ORDERS TO: SYSTEM, DEPT. B 12 COLLEGIATE CRESCENT, SHEFFIELD S10 2BA. (0742) 682321

DEALER ENQUIRIES WELCOME.

ISLAND · LOGIC

SYSTEM SOFTWARE

TOOLKIT PLUS

BASIC PROGRAMMING AID IN 16K ROM

A VERY SPECIAL PROGRAM

- Now in 16K
- Full screen Basic editor — Wordwise-like operation
- A host of new commands
- Unique syntax checker
- "★command" or menu driven
- Toolkit upgrades available

In the two years since its launch Beebugsoft's Toolkit has been chosen by many thousands of BBC users and established a reputation second to none. The launch of our new second-generation Toolkit is therefore something rather special.

Toolkit Plus is a 16K Rom which has been written from scratch making use of the latest programming techniques. It offers over 40 commands (grouped for ease of use) and some new and very exciting features, all of which may be called directly or from a menu.

TWO SPECIAL FEATURES

1 **Syntax Checker.** The first of its kind on the BBC. As you key in your program, Toolkit will draw your attention to syntax errors that may otherwise come to light only after many program runs. You may also pass complete programs through the checker.

2 **Basic Editor.** A fully integrated full screen editor, comparable with Acorn's stand-alone Basic Editor, using "single key" commands for Move, Delete, Search etc all from within the on-screen editor.

OTHER COMMANDS

Autosave	Save programs at the press of a key	**Check**	Compare memory with disc/tape
Psave	Partsave any program section	**Function**	Function key editor
Xref	Powerful cross referencer to display values of variables, arrays, fns, procs, etc and their line numbers	**Envelope**	Envelope display
		Clear	Clear all variables
		Free	Memory status info.
		Duplicate	Copy program lines
		Erase	Delete program lines
Format	Flexible disc formatter	**Move**	Move program lines
Slomo	Program speed controller	**Look**	List file directly from disc/tape
Roms	Display & enable/disable Roms	**Renumber**	Flexible renumber
Crunch	Amazing Basic program packer. Beats the rest. (Removed 4,500 bytes from original Masterfile II)	**Memory**	Hex and Ascii memory display
		Merge	Combine 2 programs
		Relocate	Move program in memory
Search	Flexible search & replace with 4 wildcards & special options (eg ignore spaces, Rems, case etc). Integrated with editor	**Recover**	Recover "Bad Program"
		Report	Extended error reporting
		Screen	Screen save
		Verify	Disc verify
Trace	Output to window with single step options	**Tools**	Command summary
		Menu	Toolkit menu
Error	Auto error detection		

UPGRADE
Existing Toolkit owners may return their Rom and manual (mail order only) for a discount of **£13.50**

PRICE £39.00 inc.VAT. Available from your local dealer.
For further information: Tel St.Albans (0727) 40303
24 hour Access & Barclaycard hotline
Tel Penn (049481) 6666
Mail order to
Beebugsoft, P.O.Box 109, St.Johns Road, High Wycombe, Bucks. HP10 8NP

BEEBUG SOFT

INTEGRATION—THE FACTS

INTER-SHEET and INTER-CHART are the first of a new generation of integrated packages for the BBC Micro. They are more powerful and much easier to use than any other similar application program.

The ROM-LINK concept is unique to this range of programs; it ensures that all ROM-LINK programs are totally compatible and truly integrated.

The word 'integrated' has been much abused recently. In our eyes 'integrated' should mean that all programs in the range should share a common data format, that it should be possible to transfer data directly from one program to another (not just by saving and loading) and it should be possible to have multiple programs resident in the machine at once. The integrated programs in the ROM-LINK series are the only ones that can do this.

The ROM-LINK system allows up to 16 packages to be resident in memory at the same time. It makes no distinction between any of the packages, so that you could have up to 16 separate spreadsheets stored in memory or (more usefully) a few spreadsheets, a few graphs and a couple of documents being word processed. It is a simple matter to transfer data from any package into the one in current use, and because the packages are resident in memory, the data transfer is very fast. It is also possible to use data from other packages without actually transferring, thereby saving memory.

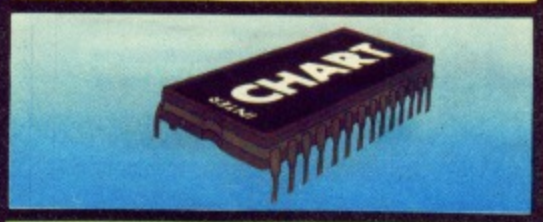
Put simply, this means that INTER-SHEET can use multiple spreadsheets and use data from one sheet in another sheet, and INTER-CHART can plot graphs using data taken directly from a spreadsheet. When INTER-WORD and INTER-BASE are available then these will be able to use data from the other packages in the same way.

FACTS INTER-CHART

The chart and graph plotting program

This general purpose graph and chart plotting program allows the user to display data in the most easily understood manner—graphically.

Two quite distinct sorts of graphs are catered for. 'Labelled' graphs that always have fixed increments on the X axis like yearly sales figures, and 'scaled' or scatter graphs. These allow both the X and Y values to be specified.



Data can be entered into the system from three distinct sources: Typing at the keyboard is the simplest method, but data can be read from ASCII files produced by WORDWISE, VIEW or a programming language such as BASIC. Because INTER-CHART is ROM-LINK compatible it can also import its data directly from other ROM-LINK packages such as INTER-SHEET.

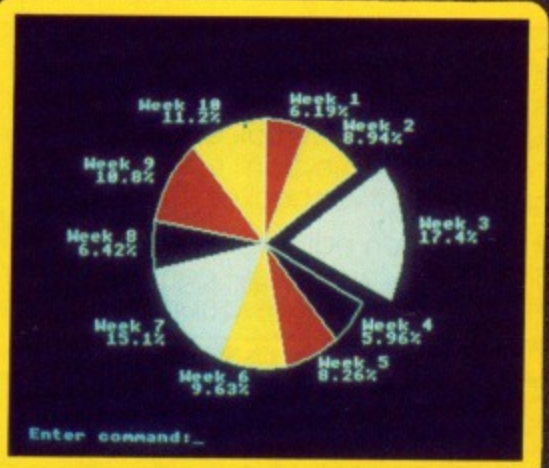
Once the data has been entered a straightforward editor allows any previous data to be altered or new values to be inserted at any position.

TEXT WITH GRAPHS: Labels are normally printed along the X-axis for lines and bars. Pie charts have their labels and values printed around the chart. These may be optionally switched off. With a pie chart the values may be replaced with a percentage figure. All graph displays can have additional labels or messages printed at any position on the screen using a powerful label editor. This allows headings to be easily added to graphs. These labels are stored with each graph when saved.

COMPATIBLE WITH: All shadow RAM boards and the 6502 2nd processor. However the ROM-LINK facilities are not available when using a 2nd proc., these include multiple INTER-CHARTS and direct data transfer from other ROM-LINK programs.

PRICE: £36.80 incl.

INTER-CHART allows up to 16 graphs to be held in memory at the same time as one 'package'. Each graph is named and, once entered, any named graph can be selected from a simple menu display.



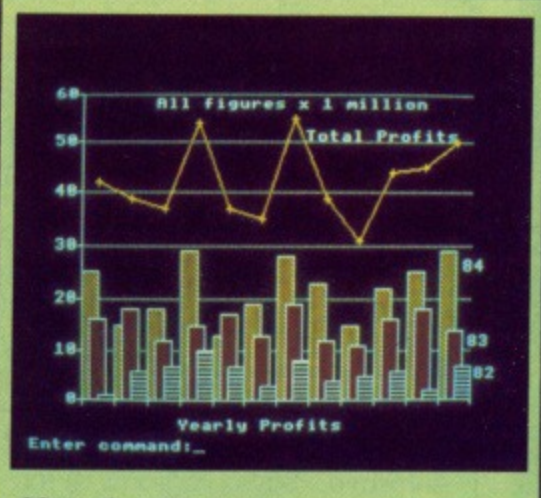
SCREEN DISPLAY: The graphs can be displayed in any of the BBC's graphics modes. The colours of the bars, lines or segments can be altered in a simple table of colours. This also allows special striped colour combinations and for bar charts a variety of cross hatching styles is available. It is also possible to use a VDU19 statement to alter the colour palette.

DISPLAY OPTIONS: Where appropriate (not pies, etc) either axis can be displayed as a log or linear scale, and there is an option to display dotted graduation lines on either axis. Pie segments and bars can be highlighted (segment 'pulled out').

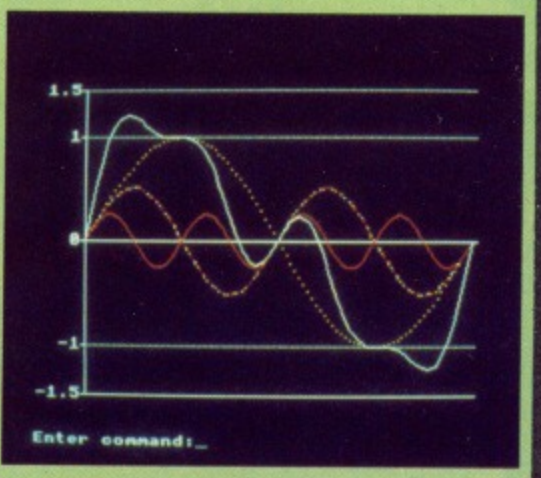
PRINTERS: INTER-CHART has a built in screen dump routine for all EPSON matrix printers and compatibles. It is possible to use other screen dump routines from within (or external to) INTER-CHART for other printers or plotters.

FILING OPERATIONS: Any named graph can be saved or loaded individually to disc or cassette, or all graphs can be saved together in one file.

GRAPH TYPES: INTER-CHART supports the three main graph types, lines, bar charts and pie charts. Scatter graphs are also catered for and can be displayed as points or lines.



SCALING: INTER-CHART automatically scales the graph display to cover the full range of values entered. INTER-CHART can cope with numbers in the range 2E-39 to 2E+38. It is possible however to force the scale independently on the X and Y axis to show any specified range, including the option for log scales on either or both axes.



FUTURE RELEASES

Both INTER-SHEET and INTER-CHART are available now. INTER-BASE and INTER-WORD are under development at the moment, and are likely to be released in early 1986. Both are fully ROM-LINK compatible so that they will be totally integrated with the others in the range.

INTER-WORD is an 80 and 105 column word processor (not 40 columns). This will be a 'WYSIWYG' word processor showing the page on screen exactly as it would appear on the page, including page breaks, headings/footings and centered lines, justification, margins, etc. It will also handle 'continuous' documents on disc up to the capacity of your filing system.

Like all of our products this will be smooth and very fast in operation, and of course very easy to use. Editing operations will be similar to WORDWISE but this is not totally WORDWISE compatible. There will be an exchange arrangement available to WORDWISE owners—more details available nearer the release date.

AVAILABILITY: Winter 85/86
PRICE: Approx. £49.00 + VAT

INTER-BASE will simply be the most powerful database available. This will operate with all disc filing systems and have a very large data handling capacity. It will contain a powerful BASIC-like programming language with full string and mathematical operations.

This will work at 2 levels, a simple user interface will allow card-index like operations but, via the programming language, the system can be easily tailored to the individual needs. Up to 250 fields per record, each field up to 32K long. This would enable the user to store complete documents in the database. Variable length fields and records.

AVAILABILITY: Early 1986
PRICE: Approx. £59.00 + VAT

INTER-SHEET

FACTS

The electronic spreadsheet program

FILING OPERATIONS: Load and Save entire sheet. Save specified part of sheet. Load part of sheet to any sheet position. Spool sheet to file. Save all ROM-LINK packages. Load all ROM-LINK packages.

IMPORT/EXPORT: Export any part of sheet for use in word processors. Import sheets created on word processors. Import data directly from other ROM-LINK packages.

PRINTING: Print all or specified part of worksheet. Print with or without sheet borders. Print with or without held lines (windowing). Sheets titles can be printed and control codes can be sent to the printer. Print all formulae. The pound sign code can be altered to a sequence of codes for different printers.

AUTO-STEP: Whenever an entry has been made the cursor can automatically move one box up, down, right or left.

CELL DISPLAY: Any box (cell) can be displayed left or right justified. Labels can also be centered. Numbers may be displayed in three formats, exponent, fixed or general format. The number of digits is controllable from 0 to 10.

LOCKING: Any box, row or column or all boxes can be locked to prevent accidental alteration.

LABELS: Formulae can refer to other boxes in the normal way (e.g. A1 or G5) but can also refer to boxes in a much more meaningful way via labels (e.g. JAN SALES), the box referred to is at the intersection of the column and row of the specified labels. Labels are not restricted to being placed on the borders of the sheet only.

REPLICATION: Any box or area can be copied to any other box or area on the sheet, giving total flexibility. The replication is very fast—see comparisons. Single key operations for inserting or deleting a row or column. Formulae can automatically be altered, if desired, relative to their new position.

OPTIONS: A variety of spreadsheet defaults can be altered, such as the default box justification, number format, sheet area. Screen colours are easily alterable.

WINDOWING: A unique system that allows any row or column (or multiple rows and columns) of the sheet to appear at a fixed position on screen, still allowing the sheet to scroll underneath. Far easier to use and more flexible than other windowing systems.

INTER-SHEET and the rest of the ROM-LINK series belong to the 2nd generation of application programs for the BBC Micro. They are larger, more powerful and easier to use than any previous products of this sort.

ROM-LINK

INTER-SHEET offers many quite unique features.

1. The fastest spreadsheet—see comparison box
2. The largest capacity—see comparison box
3. 40, 80 and special 105 column screen mode
4. Multiple spreadsheets in memory at once
5. Data transfer between sheets in memory
6. Data transfer to and from word processors such as WORDWISE and VIEW
7. Menu operation and fully prompting commands
8. Complete documentation. 2 manuals, an introduction and a reference, are supplied along with a quick reference card.
9. Will integrate directly with INTER-CHART and other ROM-LINK compatible products.

Some further facts about INTER-SHEET:

CURSOR MOVEMENT: WORDWISE-like cursor movement allowing the user to move left or right one box, one screenful or to the extremes of the used sheet area. A further command allows immediate movement to any specified box.

SCREEN DISPLAY: Single key switch for 40, 80 and a special 105 column screen mode. This allows much more of the spreadsheet to be visible on screen at once. The 105 column mode requires no special monitors—if you can read the 80 column mode then the 105 will work perfectly well.

SHEET SIZE: 64 columns by 255 rows. Each box can hold up to 80 characters. Column widths are variable up to 31 characters wide. There is no gap between boxes so labels can continue across boxes.

MATHS: A full range of maths functions is included. There are also additional special spreadsheet functions such as AVERAGE, COUNT, IF . . ., LOOKUP, MAX, MIN, SUM, BOX and SQRS (sum of the squares). Numbers can range from 2E-39 to 2E+38 and can be printed to 10 significant figures.

The first published review of INTER-SHEET says:

"... It offers higher capacities than any previous Beeb spreadsheet, but it runs significantly faster than Lotus 1-2-3 and Symphony on the IBM-PC,"

"INTER-SHEET is quicker, has more features and is cheaper than either of its competitors. If the remainder of the "Inter-" series are as good as this Acornsoft and the rest better look to their laurels. Software of such quality can only make the Beeb even more attractive as a business machine."

Gordon Taylor—A&B Computing Sept. 85

PRESS

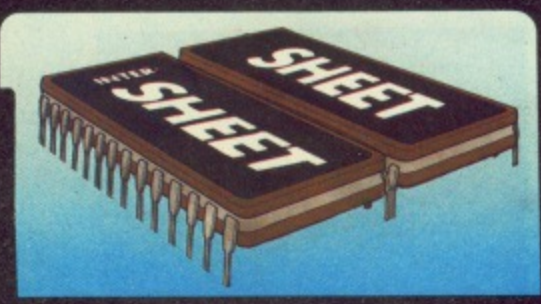
ROM BASED SOFTWARE FOR THE BBC MICRO

Spreadsheet comparisons

Times in seconds	VIEW-SHEET	ULTRA-CALC 2	INTER-SHEET
Replicate SIN(PI) into boxes A1 to Z50	66	65	7
Recalculate the above	28	33	5
Number of bytes free with above sheet	4664	1415	8400
Price (Exclusive of VAT)	£52.00	£69.13	£49.00

COMPATIBLE WITH: Shadow RAM boards such as the Aries B20 and Watford electronics 32K RAM board. Because the ROM-LINK system needs to switch ROMs INTER-SHEET is not compatible with the 2nd processor, although a HI version of INTER-SHEET will be available for the 6502 2nd processor (No ROM-LINK facilities and no 105 screen mode). INTER-SHEET is supplied in 2 ROMs, but if you only have 1 socket then only the ROM-LINK facilities are lost (multiple spreadsheets etc).

PRICE: £56.35 incl.



Computer Concepts

Gaddesden Place, Hemel Hempstead, Herts HP2 6EX (0442) 63933

For the BBC MICRO
Available from all good software dealers or directly from ourselves

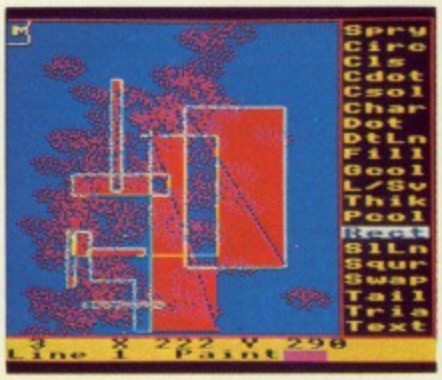
Access VISA

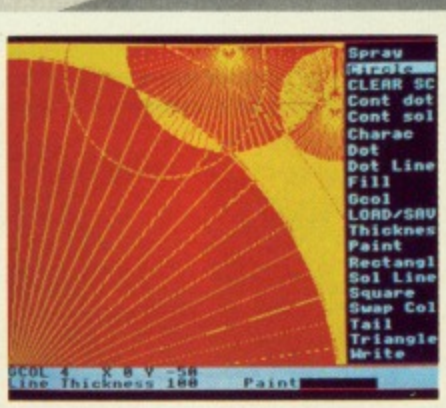
TOUCH PAD SCREEN ARTIST

SCREEN ARTIST

Cumana's new, improved Touch Pad with Screen Artist forms the perfect combination of state of the art technology and human creativity – an easy-to-use graphics plotting aid with a brand new and powerful software library with new titles being added on a regular basis.

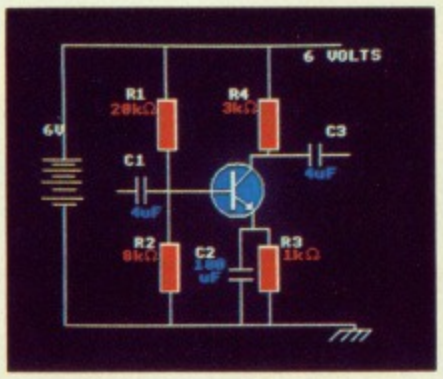
Screen Artist software has a host of ingenious features for producing creative designs and graphics, illustrations, plans and diagrams, for an infinite variety of applications from interior designs, designing electrical circuits and creative pictures. With Screen Artist, the bounds of artistic skill and invention are virtually limitless.





SCREEN ARTIST (DRAWING COMMANDS)

- Airbrush, Swap Colours, Paint Change
- Circle, Triangle, Rectangle, Square, Dot
- Dotted Line, Solid Line
- Continuous Dotted and Solid Line
- GCOL Functions – for remarkable patterned effects
- Character generator – redefine existing characters with rotate, invert, inverse and multi-functions or create entirely new ones and recall them for inclusion in your developing masterpiece!
- Save and load routines for character generator and drawing routines.
- Variable text size with rotate function and shadow effect.
- Print routine – dump positive/negative images onto any Epson-compatible printer.



CUMANA TOUCH PAD ONLY £49.95 inc VAT.

CUMANA®
The best name in memory

Pines Trading Estate, Broad Street, Guildford, GU3 3BH. Telephone: Guildford (0483) 503121.

TOUCH PAD SCHOOL SERIES

SCHOOL SERIES

Cumana's School Series software programs for the Touch Pad have been specifically developed as a graphic learning aid for both teachers and pupils and are easy to use and an interesting way to learn.

Five programmes are currently available, with additional subjects under development.

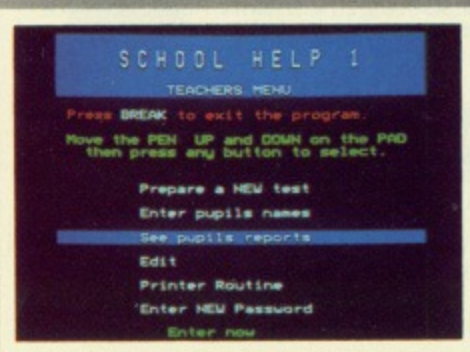
* School Series 1 – England and Wales
* School Series 2 – Scotland
* School Series 3 – Europe
* School Series 4 – Heart & Lungs
* School Series 5 – The Human Eye

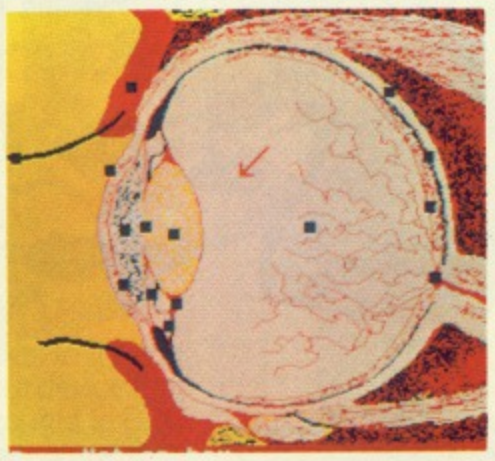
FOR TEACHERS

Each test comprises of a screen picture supplied with a set of questions. Easy editing facilities allow the question and location tags to be altered or rewritten completely, giving five sets of your own choice. A teacher's password (user selectable) is supplied to prevent student access to the editing section.
A detailed record of each pupil's achievements and results is kept, and may be printed using the printer routine.
The difficulty of the questions can be varied to suit the pupils' abilities.
Up to 200 pupil results can be stored and recalled on one test disk.

FOR PUPILS

Pupils are able to pass if an answer is not known, or they may go through a test as many times as they wish. Their scores are recorded and given as a percentage mark at the end of every test.





SCHOOL SERIES MENU

- Prepare a New Test
- Enter Pupils Names
- See Pupils Reports
- Edit
- Printer Routine
- Enter New Password

ORDER FORM (TOUCH PAD) MICRO USER JANUARY
QUANTITY ———•

Please send me _____ Touch Pad(s) with Screen Artist at £49.95
_____ School Series 1 at £4.95
_____ School Series 2 at £10.95
_____ School Series 3 at £10.95
_____ School Series 4 at £10.95
_____ School Series 5 at £10.95

I enclose cheque/P.O. for _____ or debit my Access/Visa Card no _____

NAME: _____
ADDRESS: _____
_____
TEL NO: _____

Cumana Limited,
Pines Trading Estate, Broad Street,
GUILDFORD, Surrey, GU3 3BH.

School Series + Screen Artist were developed by Microdraw Ltd.

Now you can stretch your imagination, without stretching your budget.

AMX PAGEMAKER
£49.95 INC VAT, 2 ROMS + DISC

From Advanced Memory Systems comes an irresistable selection of Icon driven software that AMX Mouse, ROM and AMX Super ROM owners can really get their teeth into!

Seven incredible programs, so comprehensive, they will more than satisfy even the most demanding BBC Micro user and when coupled with the AMX Mouse will broaden the horizons of the BBC Micro to new, undreamed of standards of sophistication.

AMX PAGEMAKER.

A fantastic high resolution A4 Typesetting and Artwork system.

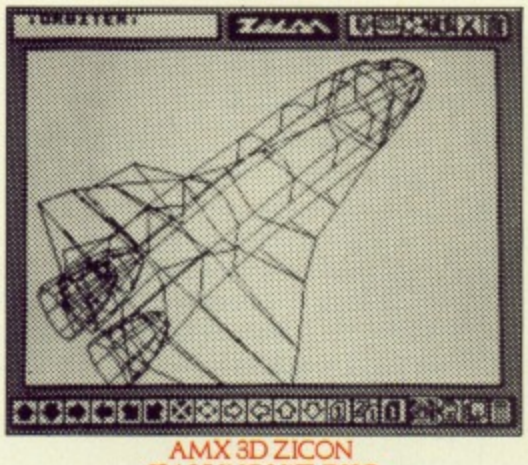
Comprising 2 ROMS (8K and 16K) 'Pagemaker' features a fast scrolling A4 page.

There is a wide selection of typefaces and user definable fonts.

You can load in Wordwise and View files or type directly onto screen.

An incredible 'Cut and Paste' facility includes copying, rotating, stretching and zooming.

For the professional touch there is N L Q high quality dump, and you can dump any part of, or full A4 page.



AMX 3D ZICON
£24.95 INC VAT, DISC

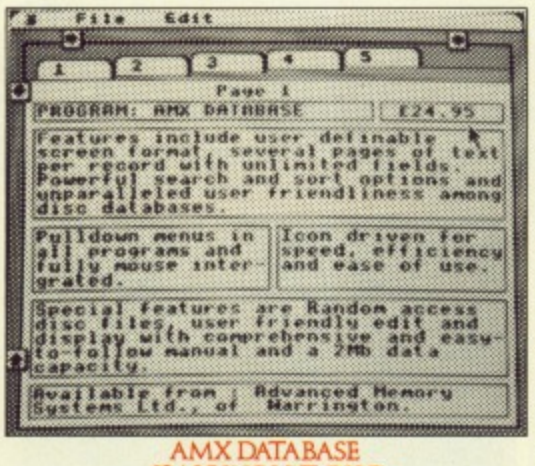
AMX 3D ZICON.

Now, with a 3D ZICON you can transform three dimensional vector data and translate them into on-screen graphics.

You can Print or Plot graphics to suitable peripherals and produce output suitable for other AMX programs such as ART – UTILITIES and Paintpot.

There is even the facility to sketch in two dimensions and convert to three dimensions and auto swaps generator.

Some interesting example objects on file include – helicopter – jet plane and dodecahedrom.



AMX DATABASE
£24.95 INC VAT, DISC

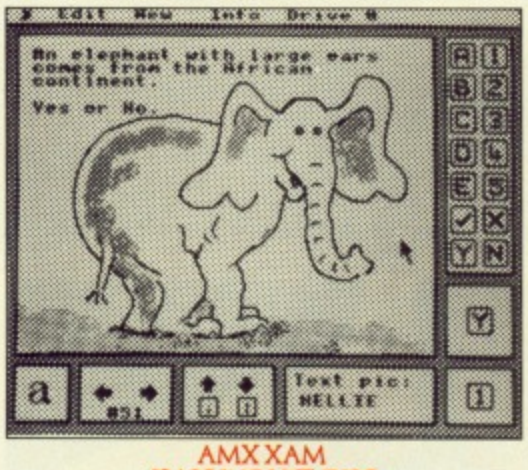
AMX DATABASE.

Database is a brand new super filing program featuring 1000 records and unlimited fields per record.

It has a powerful search and sort facility and user friendly edit and display.

In fact it is probably the most advanced user friendly database available today.

Special features include: User definable screen format for record display – random access files – super fast sort – flexible printer dump and screen display.



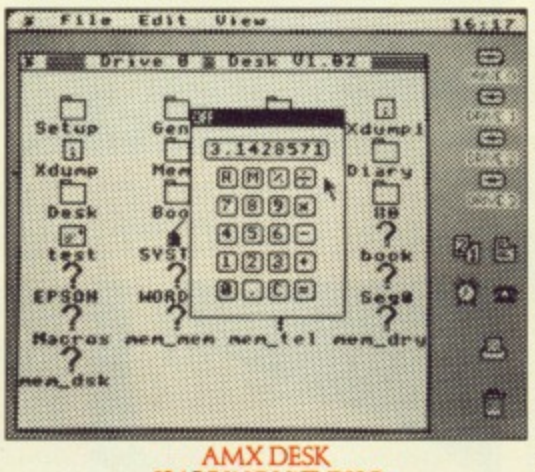
AMX XAM
£24.95 INC VAT, DISC

AMX XAM.

A brand new and exciting educational program with maximum flexibility, allowing a multitude of options and variations.

With XAM you can create a multiple choice exam which would not be alterable by the examinee.

And you can incorporate within the questions, your own pictures, created on AMX ART, building the finished picture into the quiz and providing an extra and fascinating aspect to the examination.



AMX DESK
£24.95 INC VAT, DISC

AMX DESK.

The complete home or office acquisition.

You will wonder how you ever managed without AMX Desk.

Just point your Mouse and select the following additional aids:

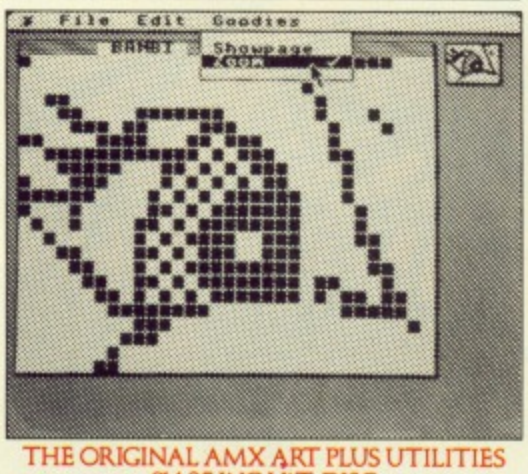
MEMO-PAD for up to three pages of text

TELEPHONE/ADDRESS BOOK with 200 or 400 scrolling entries

DIARY with three months calender

ALARM to remind you about appointments

CALCULATOR – Yes! A full function calculator that cannot be lost or suffer flat batteries, and any window can be dumped to your printer at the touch of a button.



THE ORIGINAL AMX ART PLUS UTILITIES
£14.95 INC VAT, DISC

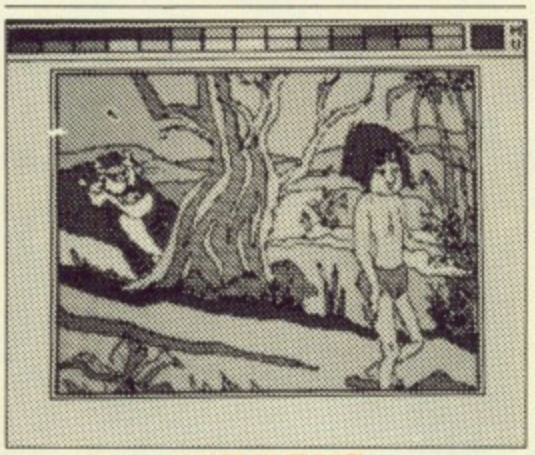
THE ORIGINAL AMX ART PLUS UTILITIES.

Now available as a single package – two of AMX's most popular programs.

AMX ART is a superb mode 4 graphics program, making full use of windows, icons, menus and pointers, it allows you to create your own pictures and the host of graphic features in AMX UTILITIES including a fantastic zoom facility for accurate amendments to your ART pictures – one dot becomes a character.

You can also move, copy, rotate, reflect, enhance circles, draw ellipses and arcs, even print icons.

Border can be added and pictures stripped and centred for saving and printing. All pictures can be loaded into AMX PAGEMAKER, AMX 3D ZICON, AMX XAM, AMX PAINT POT, and AMX SUPER ART.



AMX PAINT POT
£14.95 INC VAT, DISC

AMX PAINT POT.

The pictures you have created with AMX ART and enhanced with AMX Utilities can now be coloured in, using PAINT POT.

They will burst into life with rich, vibrant colours, and with a palette of 256 different shades you should not be short of inspiration.

You can even store up to 20 Illustrations in Picture Show mode, then display them in sequence.

To start you off we have included eight exciting pictures in the program.

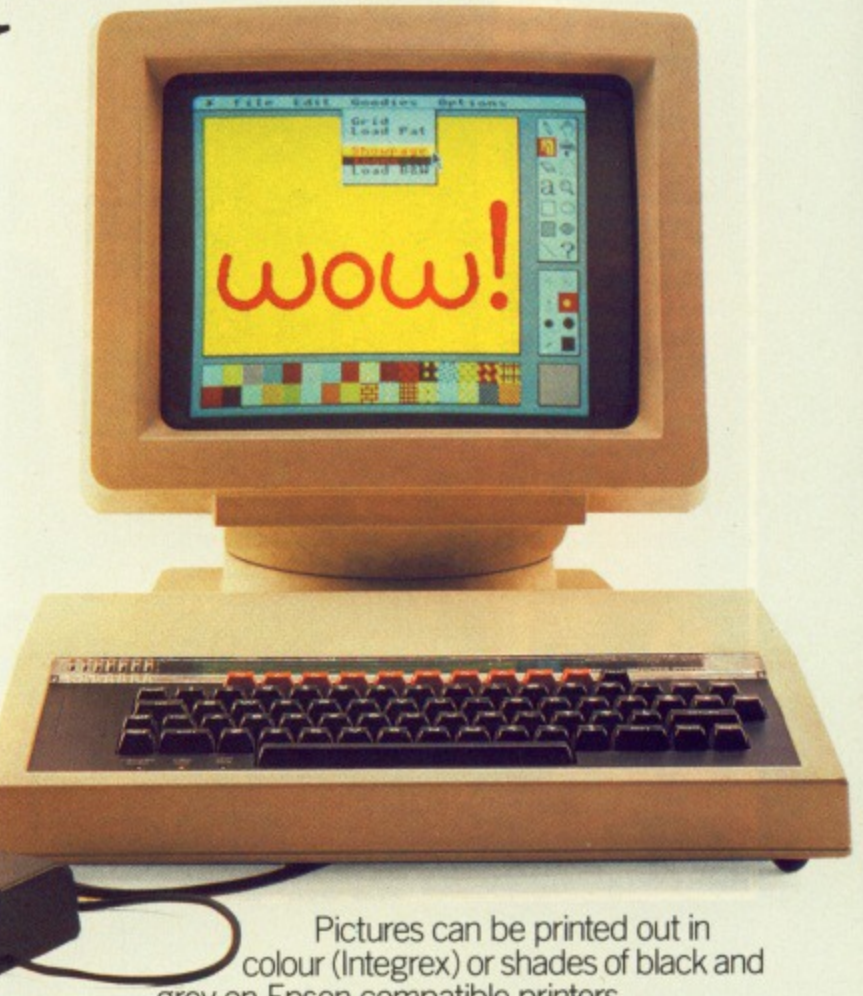
AMX SOFTWARE

IMAGINATION AT YOUR FINGERTIPS.

ALL THESE EXCITING AMX ROM AND AMX SUPER ROM COMPATIBLE SOFTWARE PACKAGES ARE AVAILABLE FROM GOOD COMPUTER DEALERS OR BY SENDING CHEQUE TO PO TO FREEPOST ADVANCED MEMORY SYSTEMS LTD, GREEN LANE, APPLETON, WARRINGTON WA4 5NG.

FOR INSTANT ACCESS OR VISA ORDERS TELEPHONE (0925) 602959/602690.

We thought it was about time we put you in the picture.



When we introduced our AMX Mouse to BBC Micro users, the response was phenomenal.

And no wonder!

It was regarded as 'pushing the BBC to its limits' and hailed by the press as 'probably the best input device that has appeared recently'. The AMX Mouse brought to BBC Micro users the same sophisticated, positive control that had, until then, been the province of the more expensive computers, like the Macintosh.

Now we announce a new enhanced software package which, can be used with a traditional keyboard or joystick but truly comes into its own when used with the AMX Mouse.

AMX Super ROM and Super Art adds colour to the features of the original AMX ROM, on a new 16K ROM.

It dramatically extends the original AMX ROM facilities to include Pull Down Menus, over lapping colour windows, colour patterns and an extended Icon set in all graphic modes.

Specially written to be usable with the vast majority of BBC Systems including 2nd processors, the Aries RAM Board, the BBC + Shadow mode, tape, DFS and ADFS.

The kernel of the Super Art program is included in the 16K ROM, providing tape and disc users with a Mode 1 colour drawing program.

But Super Art really comes into its own when used on a disc based system; a host of additional facilities can be selected direct from the screen.

Colour pictures can be created in dot resolution up to A4 size by scrolling the screen window, over the picture.

Other facilities include colour pattern editing – use of icons, additional text styles, various copy facilities and a superb colour Zoom.

Pictures can be printed out in colour (Integrex) or shades of black and grey on Epson compatible printers.

The results can be astonishing! – you can even store your finished 'masterpieces'.

The AMX Icon Designer facility gives you further freedom to design and store your own custom icons for use in your own programs.

This fabulous new package costs only £89.95 – a price as remarkable as the package itself – and includes a fully illustrated operating manual.

If, however, you are afraid of mice, you can purchase just the software package plus the 16K Super ROM for just £49.95.

You will still achieve some pretty remarkable results using your keyboard or joystick – not nearly as good as with the Mouse of course – but you can always add one later on for just £40.

Then you'll really be 'in the picture'.

AMX MOUSE

IMAGINATION AT YOUR FINGERTIPS.

BOTH THESE EXCITING PACKAGES ALONG WITH OUR SUPERB RANGE OF AMX ROM AND SUPER ROM COMPATIBLE SOFTWARE ARE AVAILABLE FROM ALL GOOD COMPUTER DEALERS OR BY SENDING CHEQUE OR P.O. TO FREEPOST ADVANCED MEMORY SYSTEMS LTD., GREEN LANE, APPLETON, WARRINGTON, WA4 5NG.
FOR INSTANT ACCESS OR VISA ORDERS, RING (0925) 602959/602690.

"THE HOST IN THE MACHINE"

M.U.D

MULTI USER DUNGEON

M.U.D is here!

If you have a computer, a modem and a telephone, you can play the world's largest multi-user game.

Phone the M.U.D-line now and we'll send you further details.
But hurry - the quicker you call us, the quicker you join us.

01-608 1173

M.U.D is a trade mark of British Telecommunications plc/M.U.S.E Ltd.

THE MICRO USER

January 1986

NEWS

MINI OFFICE II IS A WINNER!

MINI Office, the revolutionary software package which transformed the face of low-cost business computing in the UK, has finally met its match – an enhanced version of itself. In all it has taken a total of 26 man years of programming to come up with its successor, Mini Office II.

Some of Britain's leading programmers and software designers were called in not only to improve the four existing modules – word processor, database, spreadsheet and graphics – but to add another two, label printing and communications.

And already Mini Office II is being hailed as a potential blockbuster in the same mould as the original version, the only non-game to reach number one in the BBC Top Ten chart.

Given a sneak preview, one leading reviewer told *The Micro User:*

"State of the art has become a much devalued phrase these days – but this really is it. But what is most surprising is that once again they've brought it out at a price everyone can afford".

It was from Peter Davidson, head of Database Software, that the instruction went out to the programmers to go one better than Mini Office.

"The problem we faced was that here was a product that had everything", he says. "It was a bestseller, it had been critically acclaimed and it was the easiest to use business package ever.

"Also it had reached the finals of not one but two categories of the British Microcomputing Awards and it had broken the price barrier for business software.

"In other words, the task for the programmers was enormous. But they've done it".

£1 million show bonanza

A POLL of exhibitors conducted at the close of the November Electron & BBC Micro User Show revealed that revenue from the event is expected to top £1 million.

Some 90 per cent of the companies contacted agreed to disclose their figures with the strict proviso they were for statistical purposes only.

"We have never experienced the like of it before", one leading exhibitor told *Micro User*. "It was a pure business bonanza".

Company after company reported record takings as once again more than 20,000 visitors went through the turnstiles during the four day event.

On several occasions during the Saturday and Sunday openings admission had to be temporarily suspended as the "house full" sign went up at the New Horticultural Hall, London.

But even on the relatively quieter opening day – the Thursday – stallholders were swamped with customers.

One company – Advanced Memory Systems of Warrington – took more money during the first day alone than for the whole of any previous show they had attended.

"It was just incredible", said Nick Pearson of AMS, "and it carried on that way for the rest of the show".

The show's organisers, Database Publications, believe much of the reason for the record sales stems from the vast number of special offers available.

"People are definitely getting more and more price conscious these days, so they were particularly keen to snap up all the bargains", said Derek Meakin, head of Database.

And there were bargains galore. In all more than 300 special offers were available during the show.

These combined with 70 new products – the original pre-show forecast had been 50 – turned the event into a mass pre-Christmas shopping spree for visitors.

Whereas Beebugsoft had made a prior announcement of eight new products for the show – a record – this was topped by Advanced Computer Products with nine.

However at least one company was just happy to be seen at the show. Symbiotic, whose stand took the form of an "electronic classroom", simply wanted to demonstrate why it leads the fibre optic networking market.

"Naturally, because our systems aren't the sort of things sold over counters, we didn't expect visitors to start rushing up to buy", said Charles Kennard of Symbiotic, "but we have had some first class leads and it is important for us to be seen at a prestige venue like this".

For one leading exhibitor the show marked a special occasion. It was the 13th birthday of Watford Electronics.

"The show was better than ever", Nazir Jessa of Watford told *The Micro User*. "It proved once again that the BBC Micro is still the most important machine around.

"We couldn't have chosen a better way to celebrate our birthday".

LX80 winners

WINNERS of LX80 printers in *The Micro User's* August competition were: M.R. Fitchett of Harris Road, Lincoln, I. Willems of 6603 DA Wychem, The Netherlands, Pamela Cooper of Clarence Road, Teddington, Middlesex, Mr E.J. Allen of Wycliffe Road, Norwich, Norfolk and John R. Clements of Stowhill, Childrey, Nr. Wantage, Oxon.

SATELLITE LINK GOES WORLDWIDE

A SYSTEM which allows the BBC Micro to tune into signals from outer space – first revealed in the September issue of *The Micro User* – is about to be marketed worldwide.

It is the brainchild of 38-year-old Steve Webb, whose track record in the electronics industry includes 10 years working on space and satellite defence projects.

Known as Astrid – Automatic Satellite Telemetry Receiver and Information Decoder – it enables micro users to receive messages from two educational satellites circling the Earth.

Launched respectively in 1981 and 1984, Oscar 9 and Oscar 11 are part of a University of Surrey experiment.

However until Astrid came along communication with the two Oscars was limited to those with highly complex computer and satellite tracking knowledge.

Now Steve Webb has solved all that with his fully automatic system.

At £149 it includes receiver-decoder, antenna, power supply and leads plus test tape with display facility.

The antenna can be attached to a television aerial or even the garden fence – so long as there is nothing between it and the sky.

"Astrid will help people communicate easily with the satellites and so make subjects like maths and geometry much more fun", said Steve Webb.

The system is to be marketed by M.M. Microwave of Kirkby-moorside, North Yorkshire, who put up most of the development money.

No one will be more pleased if Astrid is successful than Steve Webb's three children, Alex, 14, Melanie, 13, and Jenny, 8. For it was they who urged him on after he developed a basic receiver when they got bored with playing computer games.

"They were so thrilled to receive data, news bulletins and messages from space that I realised I was on to something with wide appeal", Steve Webb recalled.

Steve Webb and his daughter Jenny, who helped inspire the development of the Astrid satellite link.

Watford signs on with Acorn

WATFORD Electronics – the company whose name has been synonymous with the BBC Micro market from day one – has finally become an official Acorn distributor.

Now one of the largest suppliers of electrical components in the UK with a multi million pound turnover, Watford has owed much of its recent success to its close links with the BBC Micro.

Nazir Jessa, Watford's boss, has always been sufficiently astute to exploit the market potential of the machine. This goes back to the time his company was able to provide A to B upgrade kits when even Acorn couldn't.

Even of late, when Acorn has suffered from severe financial problems, Watford has continued to flourish.

"Our faith in the BBC Micro from the beginning has paid handsome dividends for us", Nazir Jessa told *The Micro User*.

Turbulent

What will becoming an official Acorn distributor mean to Watford after what has been occasionally a turbulent relationship between the two companies?

"This new spirit of cooperation between us will ensure the development of even more expansion products for the machines", says Nazir Jessa.

"And perhaps I'll have my two tone Rolls-Royce resprayed Acorn green to show what good friends we now are".

THE ACCENT ON EDUCATION

Spring release by BBC

FIVE Econet-compatible educational software packages for the BBC Micro and two books to help programmers will be released in the spring by BBC Publications.

Details are contained in the latest BBC Software and Computer Books catalogue, which also lists the nearly 70 programs, 20 books and other computer-related publications previously issued by the BBC.

A Vous La France is a pack designed as a home study aid for anyone learning French and has been developed in connection with the BBC Television Continuing Education series of the same name.

It will contain more than 40 programs and the computer is used to give a variety of stimuli for language production and to present new angles on problem areas.

It consists of two cassettes, transferrable to disc, and will cost about £15.50.

Colouring Book is aimed at the 4 to 10 age group and consists of flexible design and colouring programs to introduce shapes, rotation and other geometrical concepts.

It will have the facility to save pictures and print them out on an Epson printer. The cassette, transferrable to disc, will cost about £9.95.

Deutsch Direkt is a disc-based German vocabulary pack. Six separate word activity programs will be centred on a 1,000-word English/German dictionary. Accompanying audio tapes will assist with pronunciation. The pack is designed for use with the BBC Television Continuing Education language course of the same name.

The disc and audio cassettes will cost about £19.95.

Science Topics: The Periodic Table is a secondary level utility program which allows classification of information according to the user's own criteria.

The suite is supplied with its own database of chemical elements and will cost about £23.

Science Topics: Food and Population is a secondary level role-playing simulation which examines the problems of feeding a population given limited sources of nutrition. It will cost about £23.

Mastering Assembly Code is the latest book in the BBC Master Guide series aimed at the dedicated BBC Micro user.

It will look in detail at assembly language and give an in-depth analysis of BBC Basic. Price, about £7.95.

How To Sell and Publish Your Computer Software is a book designed to take the mystery out of the mechanics of publishing, marketing and selling software as well as giving tips on contract details and royalty payments. Its price will be about £6.95.

A CHALLENGE to Amstrad's bestselling PCW8256 business machine has been mounted on behalf of the BBC Micro camp.

It comes from Solidisk Engineering in the shape of the Solidisk Office System, launched at the November Electron & BBC Micro User Show.

Priced at £299, it includes a 160cps printer with NLQ, 640k disc drive and double density disc filing system. In the package are word processing, database and spreadsheet programs.

"This will at last give Amstrad a run for its money in this sector of the market", said a Solidisk spokesman.

SHELTERED WORKSHOP SOS

HELP from *Micro User* readers to save a commercial software operation that is providing work for four physically handicapped programmers is being sought by psychologist Neville Marston.

Nordis Software is attached to a sheltered workshop run by Northamptonshire County Council and employs four spina bifida sufferers who, says Marston, "are very bright people and most unlikely to find any other form of employment that realises their potential".

They produce programs to teach the mentally handicapped and their software has been well received since the company was set up a year ago.

Revenues have covered most of the wages costs and Nordis hopes to have an extended product line available this year.

But because of the lack of an advertising budget Nordis has a major problem publicising its products and this has led to falling sales and the threat of closure.

Explains Marston: "We are in the unhappy position that the national central sales organisation of the sheltered industries has expressed doubts about the whole idea of a sheltered workshop running a software house and are using our currently falling sales as proof of this.

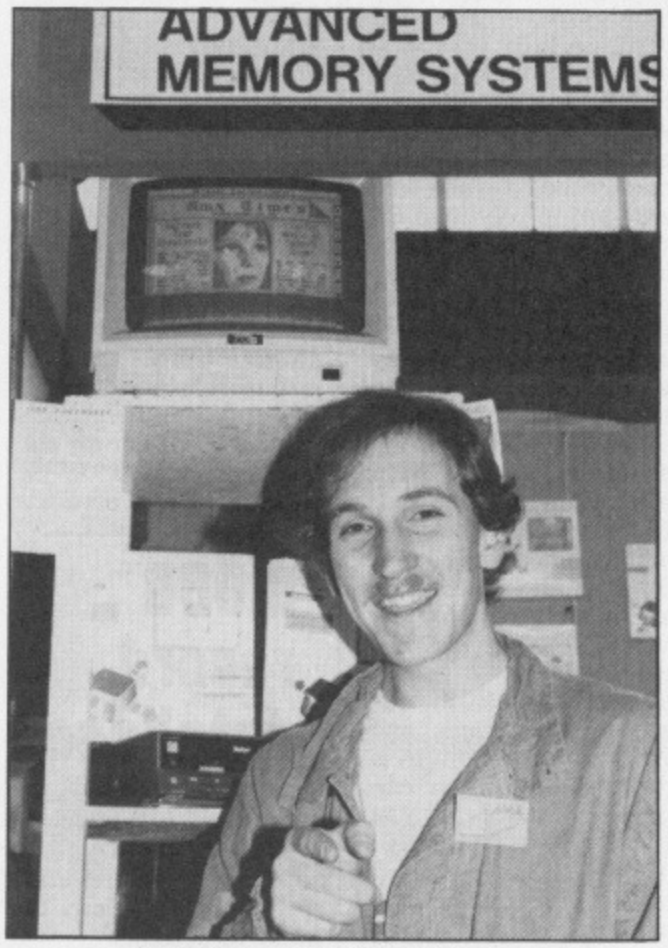
Experimented

"Sheltered industries usually do minor engineering work or packing and we are the first to try anything this experimental.

"I believe we have a very real chance of being a commercial success if we can overcome our present difficulties, as we have had a great deal of praise for our programs from all over the UK and abroad.

"But we are unable to follow up these openings until we have access to some funds – even the letterhead we use has to be scrounged as we have no budget for stationery!

"If any readers of *The Micro User* can come up with suggestions or practical help I'd like them to phone us at Nordis Software on 0604 54358/9".



Alex Blok . . . Pagemaker's co-author

Pagemaker hit of show

A STRAW poll of computer journalists saw the AMX Pagemaker voted the undisputed hit of the November Electron & BBC Micro User Show.

The new software package from Advanced Memory Systems of Warrington – the company that gave BBC Micro users the acclaimed AMX Mouse – was on display to the general public for the first time.

And such was the demand it created that on several occasions the company ran out of stock and had to send for fresh supplies.

"We knew we were on to a winner with Pagemaker – after all it is the most sophisticated piece of software ever written for the BBC", said Nick Pearson of AMS.

"But even we were surprised at just how enormous the demand would be".

The Pagemaker combines a low cost typesetter, graphics and word processor on two ROMs and two discs.

It lends itself to letters, notices, posters, menus – in fact anything that needs to be created on A4 size paper. Particular interest has already been shown by schools and colleges.

Satisfaction

The large crowds that gathered to watch Pagemaker on display on the AMS stand were of particular satisfaction to the demonstrator.

He turned out to be non other than the co-author of the software, 22-year-old Alex Blok, from Newbury.

With Neil Lee, a 20-year-old Warwick University student, he took 11 months to write Pagemaker.

"It was the first big project for both of us", Alex told *The Micro User*. "We wanted to bring out software that was really useful – and we believe this is".

CARTRIDGE ROM – RAM

A SIDEWAYS ROM/RAM cartridge system in kit form has been released by Voltmace for the BBC Micro.

The initial system – based on five by three-and-a-half inch cartridges – consists of a steel box with two cartridge slots.

Under each is a single-sided edge connector so no connection is made if a cartridge is inserted backwards. The connectors' buffers are also disabled if the cartridge is removed, enabling software to be plugged in and out safely while the computer is in operation.

The buffer box with 34 way plug is connected to the computer with a ribbon cable which ends in two dip plugs, 28 pin socket and flying lead.

ROM cartridges for the system are sold as two case halves with screws, a printed circuit board fitted with a 28 pin IC socket and decoupling capacitor. The RAM cartridges are made up in a similar way, but with a different PCB.

Feature of the system is its RAM cartridge with battery back-up which enables RAMs to be taken from the computer and stored intact.

The initial Voltmace kit – buffer box, cables and ROM cartridge – costs £29.95, RAM cartridge with battery back-up £19.95, RAM cartridge £9.95 and additional ROM cartridges, £3.50.

Moving into Mexico

ACORN has enlisted the aid of a major Mexican electronics company in yet one more attempt to establish a beachhead for the BBC Micro in America.

In a deal worth £1,250,000, Datum of Mexico City has acquired the rights to manufacture the BBC Micro for both the North and South American markets.

The Mexican company is already working on a Spanish version of the BBC Micro as a result of an earlier arrangement between the companies.

As part of the deal, Datum subsidiary British American Scientific Instruments Corporation of San Antonio, Texas – or BASIC for short – will now become the sole supplier to US dealers. It will also acquire the entire existing US stock of BBC Micros.

Since Acorn "withdrew" from the American market after substantial losses last year, the company has maintained only a skeleton staff to fly the flag.

Acorn managing director Brian Long has hailed the arrangement with Datum as not only unlocking the door to the North American market, but this time Central and South America as well.

"The deal will open up the possibility of whole new markets in Central and South America, an area already well known to Datum", he says.

O LEVEL REVISION

LEADING publishers of printed revision aids for secondary school students Charles Letts has launched Keyfacts Revision software for the BBC Micro.

The eight programs are designed for use throughout the O-Level GCE, CSE and GCSE courses.

Subjects covered are biology, chemistry, computer studies, English literature, geography, mathematics and physics.

'Ware the Logo trap

HARD pressed education advisers are falling into the trap of choosing BBC products purely on face value.

And it is causing problems for the schools saddled with unsuitable programs, claims Logo Software, producer of the BBC programming language LSL Logo.

"Many LEA advisers rushed to choose a BBC Logo without testing it first in the classroom", said Chris Squire, LSL's marketing director.

"They took it for granted that Logo would work both Turtle Graphics and Concept Keyboard packages – two of the most popular ones in use in schools.

Only LSL Logo can do this according to Squire. "All the other BBC Logos use the parallel port for both devices, making it impossible to use the packages together.

"Our version uses the machine's serial RS423 port instead to run a turtle and the user port is left free for the Concept Keyboard", he said.

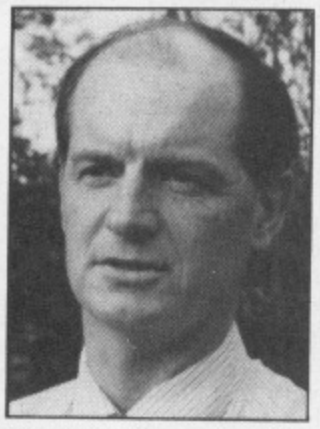
LINK WITH WORLD OF ELECTRONICS

HAVING personally experienced the problems of getting to grips with micros when he was a schoolteacher, Alan Young has for a long time sympathised with people in a similar position.

Now he is able to offer more than a comforting pat on the shoulder – he has devised a new approach to computer and information technology awareness for children in the nine to 13 age group and their teachers.

Called Chipclub, it consists of a range of educational programs designed to encourage a variety of practical activities which will be released in six parts over the course of a year.

An electronics kit supplied with the first package can be used throughout the year. A 15 pin D plug connects to the analogue port of the BBC Micro and provides access to three channels.



Alan Young . . . "a nice change from all those repetitive arithmetic programs"

The first Chipclub experiments enable children to test the equipment, make a simple joystick, measure light intensity and set up an alarm system.

Later experiments will include measuring the speed of an object between two points, temperature measuring including calibration of a thermistor, making a barcode reader with child-sized barcodes, an anemometer and counting situations.

Experiments

The current issue of Chipclub includes a graphics package, two databases and the necessary software for electronics experiments.

Future programs include teletext, computer dating and matching, and magazine construction. All the software is disc-based.

Young, who is charging £42 for a year's subscription to Chipclub, started the computer department at what is now Worthing High School four years ago.

As a result of this work he was invited to join a team developing computer awareness projects for SMIC, the southern branch of the Microelectronics in Education Project.

MEP bought two of his programs for inclusion in their software package for schools.

He told *The Micro User:* "Since that time I have given several talks and demonstrated my programs to teachers, most of whom have been thrown in at the deep end with regard to computer awareness and information technology, and who are looking very hard for software to develop skills in these areas.

"The MFI kit developed by MEP is very expensive and probably too difficult for children below about 11 years old.

"It was while thinking about this situation that I hit upon the idea of Chipclub, something low in price and a nice change from all those repetitive arithmetic programs.

"Information will flow two ways – via a magazine that will include articles and letters, and via the disc which is returned after each edition to show what the children have produced".

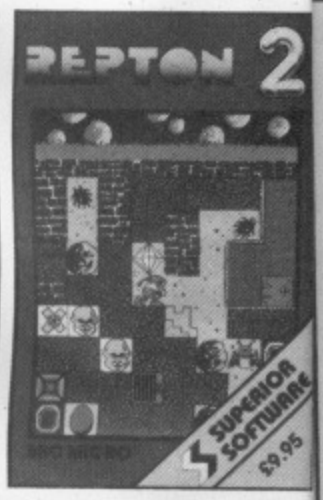
Young has now left teaching to set up his own business, Alpha Computer School, and runs courses in computer awareness for adults and YTS trainees, as well as courses in programming and Wordwise on the BBC Micro.

Bob Hillyer (left) and Mike Male, co-authors of steam railway simulation Southern Belle from Hewson Consultants, take to the footplate of tank locomotive 1466 to announce that the program is now available for the BBC Micro at £7.95.

CP/M PROCESSOR

A SECOND processor compatible with all CP/M formats has been launched for the BBC Micro. The Multiform, produced by Technomatic, also contains a utility disc which contains popular CP/M terminal emulations and formats and procedures for configuring more.

Multiform can transfer View or Wordwise text to CP/M format and CP/M format to BBC. It can also run two different CP/M formats at the same time, transferring data between them. Price £299.



Bet your shirt on Repton 2

BIGGER, more powerful, with more puzzles and better graphics and sound than the original version, Repton 2 has been released by Superior Software for the BBC Micro.

The first 100 people to crack the game will receive a T-shirt and a draw will be held early this year with the first name out of the hat getting a cheque for £200.

Repton 2 includes software speech in the loader and costs £9.95 on cassette, £11.95 on disc.

8,000 record database

A DATA management system which can handle up to five files simultaneously has been released for the BBC Micro by Minerva Systems.

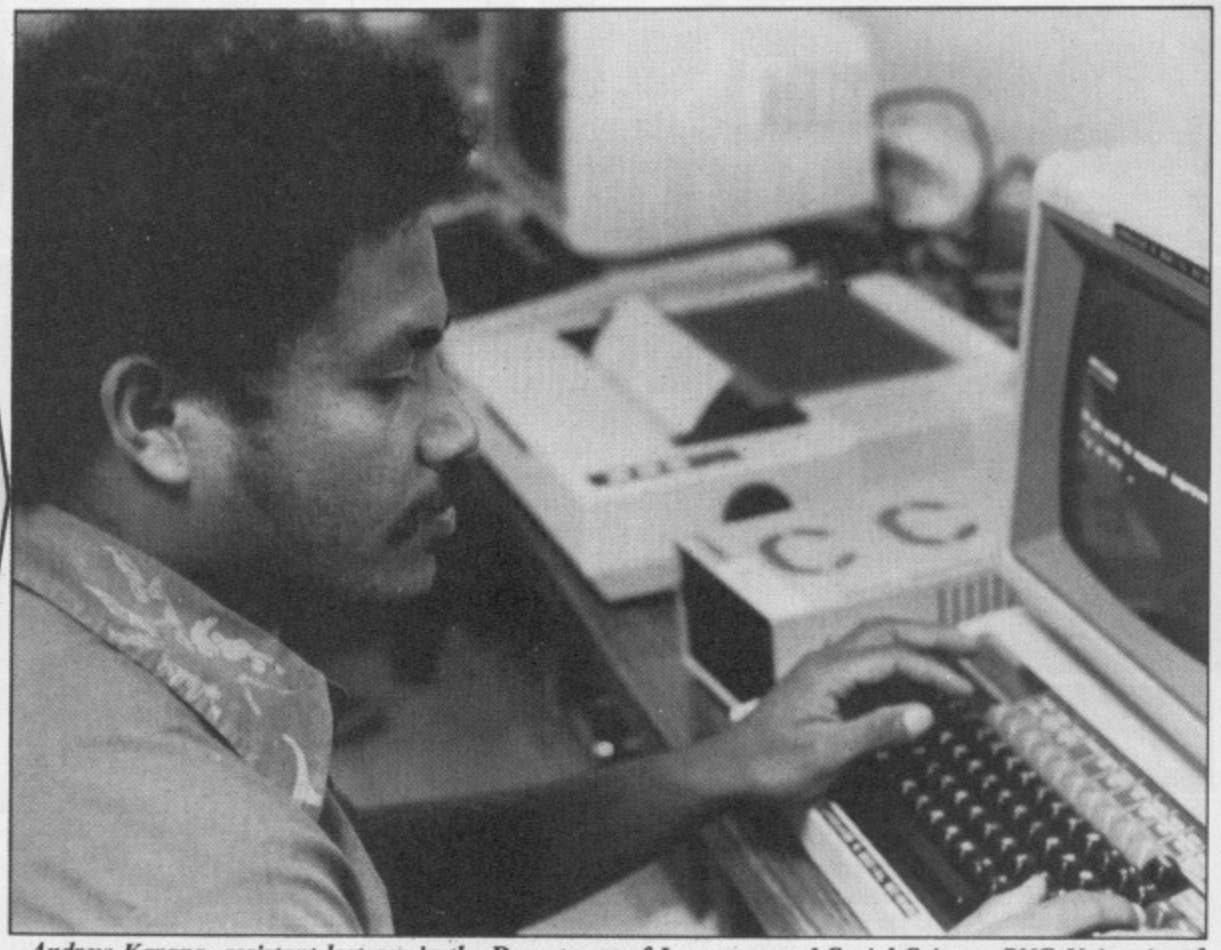
System Delta is a 16k utilities ROM which apart from its file handling capabilities has 30 major and 30 lesser commands and access to low level subroutines.

Applications can be tailored to meet individual needs, but for those unable to create their own programs the company is planning to release a range of applications.

The first, Card Index Application, is said to be simple enough to be a first database and powerful enough to handle up to 8,000 records.

CIA with System Delta Utilities ROM bundled costs £54.95.

The sun never sets on the BBC Micro



Andrew Kavana, assistant lecturer in the Department of Language and Social Science, PNG University of Technology, marking a report using a dedicated report-marking program designed for the BBC Micro

THE BBC Micro can be found waving the flag for British technology in some increasingly exotic locations these days.

Not so long ago the inhabitants of Papua, New Guinea, were best known for their local pastime of hunting each other's heads.

But now it seems they have turned their backs on this bloodthirsty activity in favour of the wonders of the BBC Micro.

Such is the islanders' fascination with the machine that it featured recently on the official poster celebrating 10 years of independence.

"It is used all over the country, in schools and universities", Colin Barron, a senior lecturer at the PNG University of Technology, told *The Micro User*.

"Here at PNG we have been using BBC Micros for some time for word processing, and more recently for marking students' reports by means of a program written by Professor Stewart Marshall, head of department".

Future plans involving BBC Micros at PNG University include an econet system of 16 micros to teach writing skills to students, a wide-area network linking the university departments and an electronic noticeboard in the university library.

"Ours is not a big market for BBC Micros", says Colin Barron, "but their value in the country is very high".

Meanwhile over on a tiny speck on the map of the Indian Ocean, the BBC Micro is also making its mark.

Mahé, an island in the Seychelles, measures only 1.9km by 1km and is populated by only 40 people, yet it boasts its own computer.

As giant tortoises wander along the sun-drenched beaches some 1,000 miles off the East African coastline, Glynn Burridge takes inventory of the dried coconut, which is the main crop on the island, on his BBC Micro.

Connected to a Cumana disc drive and an Epson FX80 printer, it has survived for two years in a climate that is considered a nightmare for machinery – salt winds and 80 per cent humidity.

"Only the best will stand up to this", says Glynn Burridge. "If the BBC Micro has ever had to prove itself it must be here, starting up without complaint even when its cabinet is moist from the monsoon rains".

Whoopsy rides out the rumpus

A NEW game for the BBC Micro has got the thumbs down from the major distributors on the grounds that it is too rude.

Yet Whoopsy, from Shards Software, is on the verge of becoming a bestseller anyway based on mail order sales only.

Now Steve Maltz, of Shards, is claiming that this is simply a case of the distributors lacking a sense of humour.

"We have been amazed by their reaction", he told *The Micro User*. "After all, the program was written by a 54-year-old grandfather and retired businessman.

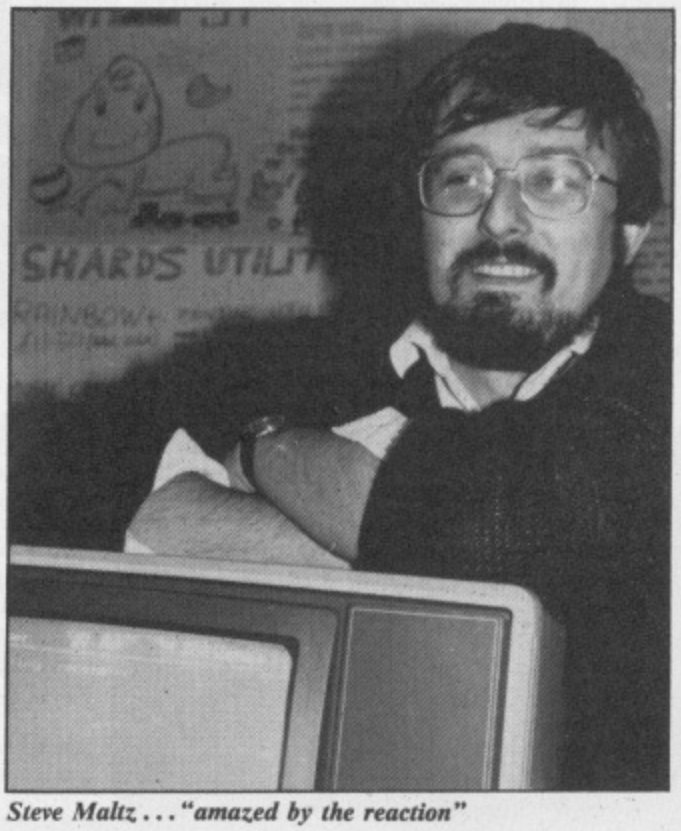
"Naturally it won't be to everybody's taste, but to virtually place an embargo on it is all a bit silly".

The problem stems from the fact that Whoopsy – as the name implies – involves a baby (the player) attempting to frustrate its mother's attempts at early potty training.

However it is apparently not the graphics which have caused offence but rather the accompanying sound effects. "To have what are obviously lavatory noises in it we feel goes rather over the top", said one distributor.

Meanwhile Whoopsy was reported to have sold in large numbers at the Electron & BBC Micro User Show.

"Judging by its success to date, it would seem to me that the distributors themselves have made a bit of a Whoopsy by not handling the game", said Steve Maltz.



Steve Maltz ... "amazed by the reaction"

CLARES Nº1 IN UTILITY SOFTWARE!

Enhanced BETA-BASE £25

40 80 3"

WHAT IS DATABASE?
It is a FILE containing RECORDS , each record consists of a number of FIELDS containing the information - an analogy can be drawn with a card index in which a box of cards is the file, each card is a record and each line on the card is a field.

SPECIFICATION

1) Random Access	- disc based, single or dual drives
2) File Size	- max 65,000 records
3) Record Size	- up to 2048 characters and 200 fields
4) Field Size	- up to 254 characters
5) Holds	- approx 1200 ADDRESS records per 100k
6) Search	- 5 search fields using powerful options
7) Sort	- 500 records on 3 fields in 60 seconds.

SYSTEM FEATURES
*CALCULATE - using any valid expression
*PRINTOUT - Powerful options
*REDEFINE - Titles, fields etc.
*TRANSFER - From one file to another
*GLOBAL ENTRY - of repetitive data
*SEARCH LISTS - Allow creation of sub Databases within main Database
*SPOOLER - enables you to create spooled files that are compatible with Wordwise, View etc.
*INPUT - is a routine included on the disc which will allow you to write your own utilities for accessing your data. Many of the programs on the utilities disc were written using this procedure
*TUBE - compatible with the 6502 second processor
*Comprehensive manual and tutorial.

"We use Beta-Base ourselves"
Mike Bibby Editor of MICRO USER
"Beta-base is a joy to use" BEEBUG March 85
"Excellent value for money"
A & B Computing OCT 84
"Rated best value for money"
ACORN USER Dec 84
Ask for our data sheet if you need to know more.

REPLICA III £15.00

40 80 3"

The all new improved REPLICA III is now available and it's better than ever. Just look at the features below and place your order now by ACCESS or cheque.

*DISC BASED - No ROM sockets required
*ONE TIME PURCHASE ONLY
*AS MANY DISCS AS YOU LIKE
*COMPATIBLE WITH MOST DFS & DDFS
*B+ COMPATIBLE
*SIDEWAYS RAM COMPATIBLE - uses sideways RAM, including that in the B+, if it is there and so enables the transfer of many more programs.

As a thank you to our 30,000 REPLICA II users you may return your REPLICA II for upgrade to REPLICA III for just £12.

BETA-BASE UTILITIES £12.00

40 80 3"

Extend the power of Beta-Base with the extra facilities provided on this disc.

*MAIL MERGE
*LABEL PRINTER
*DISC SORT
*EXTENDED SEARCH
*FREE FORMAT TRANSFER
*FAST PACK
*STATUS

The MAIL MERGE alone is worth £12 so you get a real bargain with this disc. The features are so numerous that we cannot mention them all here.

Ask for our UTILITIES DATA SHEET if you want more information.

New! BETA-ACCOUNTS INVOICE & DELIVERY NOTE MODULE £25.00

40 80 3"

*INTEGRATED ACCOUNTS and DATABASE
*MULTIPLE VAT rates
*SCREEN EDITING with insert and overwrite
*AUTOMATIC DELIVERY NOTES
*INVOICE COMMENTS
*ACCOUNT HOLDERS details inserted automatically
*MAILING LIST generated automatically
*LEDGER SHEET printed automatically
*VAT sales returns prepared
*TRANSACTION FILE generated
*Beta-Base compatible

This is the first module in an integrated accounting suite of programs written to be used and not simply to please an accountant. This module contains an INVOICE and DELIVERY NOTE program with 80 column input and screen editing, you see what will be printed before committing yourself. Customer details can be automatically placed in a Beta-Base compatible file for use as a mailing list.

VAT details are generated at the end of the VAT period and the YEAR TO DATE figures can be viewed at any time. Provision is made for multiple VAT rates including standard, zero, export and exempt.

A transaction file is generated for account customers for use with the STATEMENT and ACCOUNTS RECEIVABLE module.

Future modules will be STATEMENT and ACCOUNTS RECEIVABLE, STOCK CONTROL, ACCOUNTS PAYABLE and NOMINAL LEDGER. All relative files are compatible with CLARES Beta-Base which can be used to manipulate the files as required. The Beta-Base Utilities Disc provides Mail-Merge facilities using the customer list.

This program was written for our own use and is used to prepare hundreds of invoices per week. We have made life as easy as possible for ourselves, so why not take advantage of our efforts.

Requires double sided single drive for minimum configuration - no stock control or customer database. Double sided twin drives will enable a full integrated system to be used.

40 80 3" _____ DISC
40 _____ 40 TRACK
80 _____ 80 TRACK
3 _____ 3" DISC - ADD £3
_____ EPROM

Send for detailed newsletter
All prices inclusive of VAT & Carriage -
NO EXTRAS! Please state 40 or 80 track disc and state D.F.S. you use

Clares MICRO SUPPLIES
98 Middlewich Rd.,
Northwich, Cheshire CW9 7DA.
Tel: 0606 48511
Open 9—5pm Monday—Friday
LUNCH 12.30—1.30

Radio software on way

A FATHER and son from Gosforth, Newcastle, are planning to write a range of software for the BBC Micro to run radio equipment.

John and Stephen Melvin have already written software which allows the computer to drive a Yeasu 757GX radio transceiver.

The software is said to check 300 station frequencies in a matter of seconds. On disc it costs £9.50, on ROM £12.

The pair – call signs G3LIV and G8UEE – have also developed a data input interface which they say will be cheaper and more reliable than others on the market.

Programs are being developed for the Trio range of radio equipment, including the FT9600, FRG 8800 and FT980.

Floppy upgrade

THE Floppy-Wise ROM for the BBC Micro from Software Services has been extensively upgraded.

Floppy-Wise Plus is now on a 16k eprom. It contains 40 commands including a full disc sector and ID editor, and a set of memory monitors for machine, second processor and sideways ROM/RAM editing.

Logo in the news

A FREE newspaper-style publication on the programming language for the BBC Micro – Logo – has hit the classrooms.

Publisher Logotron says it is intended to keep schools informed about the latest news, views and developments surrounding the role of Logo in education.

The publication, *Logo, had its first print run at 35,000 copies.

It is to be followed by 16-page editions each term. All will be circulated to local education authorities.

BBC Micro gives dumb woman a 'voice' again

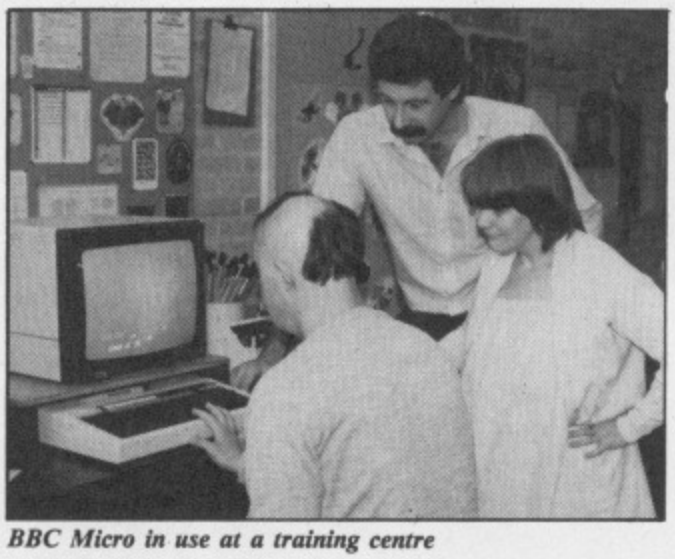
STRUCK dumb with shock at the death of a close friend in 1975, a Yorkshire woman has recently broken her 10 year silence – thanks to a BBC Micro.

The dramatic cure was achieved at one of the dozen training centres run by North Yorkshire County Council where BBC Micros are helping mentally handicapped people learn to express themselves better.

The woman's breakthrough came only two days after she was given the use of a BBC Micro linked to a microphone.

A special program designed to improve speech enabled the sounds she could make to be converted into symbols on a specially adapted colour monitor.

It is the most startling result so far from a project that is enhancing the lives of 400 people in the county who have problems communicating.



BBC Micro in use at a training centre

In some centres the trainees have been queueing up to use the computers and the main problem has been to control its use, spokesman Ralph Robinson told *The Micro User*.

"Already the new teaching aid has brought breakthroughs for the mentally handicapped people attending the centres", he said.

"Many using the computer are for the first time able to design and create attractive coloured patterns which they could not have done using conventional art materials.

"And at Hebden Rise Adult Training Centre in York a group of handicapped users have even been able to copy and type in a complete program from a magazine".

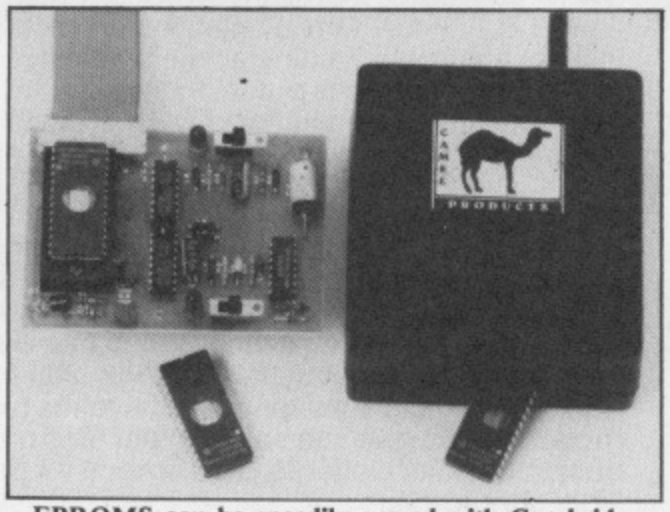
The project has been so successful that two centres have raised funds for a second computer.

The College of Ripon and York St. John computer department has offered to design special programs not available on the open market.

And BBC Micro enthusiasts and educators in special schools already using computers have offered advice and support for their local training centres.

"The handicapped user can see an immediate response from the micro and in the case of the dumb woman the result was fairly dramatic", said computer development officer Brian Quinn.

"We are hoping to develop further following her success".



EPROMS can be speedily erased with Cambridge Electronics' Dhobi Eprom Eraser.

Up to three eproms or one CPU with on-board eprom can be erased in from five to 20 minutes.

Dhobi 1 costs £18.95 and the Dhobi 2, which has a 15 minute inbuilt automatic timer is £22.95.

A NEW NAME IN BUSINESS TUTORS

A NEW company has been launched to exploit what it says is a gap in the higher and further education software field.

Called Tutor Software, its first offerings are Management I and II which will be joined by further titles to make up a Microtutor series exclusively for the BBC Micro with disc filing system.

The company was formed by Belfast couple Brian and Barbara Sloan and Brian's brother Robert.

They decided to pool their talents in Tutor – Brian is a chartered quantity surveyor with several years experience of computers, Barbara is a teacher and Robert works with micros at an engineering firm.

For the more specialised titles in the Microtutor series the company will bring in experts from the particular fields concerned.

These titles – some of which are already under development – include Building Contracts, Building Economics, Construction Management, Estate Management and Economics.

Each package in the series consists of six self-learning tutorials.

Price of each title is £19.95.

BBC HARRIER TAKES OFF

THE Harrier jump jet's unique vector thrust techniques are featured on Strike Force Harrier, a flight and battle simulator for the BBC Micro.

From Mirrorsoft, the program allows the player to select practice or combat level and both pilot commander or ace skills.

Players plan a strike attack, move ground forces as required for refuelling and rearming, outmanoeuvre the enemy's MiGs and defend the Harrier from ground and air attack.

The plane's defences are formidable, including advanced tracking systems, cannon, bombs and sidewinders.

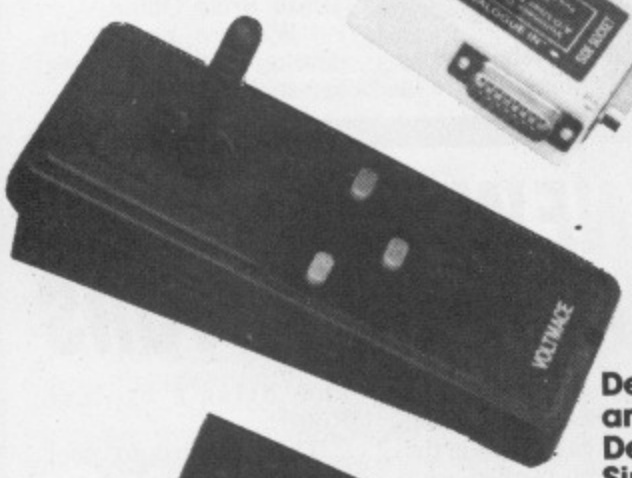
Price £9.95 on tape, £12.95 on disc.

JOYSTICKS—
THE COMPLETE SOLUTIO

Delta 3B Twin

Delta 14B

Delta 14B/1



Delta 3S and Delta 3B Single

Datapad 16B

DELTA 3B TWIN—BBC B or ELECTRON PLUS 1 **£19.95**
A direct but improved alternative for the original ACORN joysticks, with 2 joysticks wired to one plug. As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.

DELTA 3B SINGLE—BBC B or ELECTRON PLUS 1 **£12.00**
A single joystick that in some ways can act as two. The custom made special "low noise" potentiometers are wired so that it will work as a left hand or right hand joystick. It can even run some programs written for two joysticks and has the fire buttons of both.

DELTA 14B—BBC B **£14.95**
Our original ACORN/BBC handset. The same super light joystick, but the long life buttons, which have been video game tested for many years, increased to 14 in number. A DELTA 14B/1 is needed to run the keypad but a 14B on its own will work as a joystick and fire buttons, so you can always add the 14B/1 to it later.

DELTA 14B/1 for use with 1 or 2 DELTA 14Bs **£14.85**
DELTA DRIVER CASSETTE **£5.95**
The A/D/USER PORT interface box. This gives simultaneous access to both the analogue port, for the joystick part and the user port, for the keypad. Two handsets can be plugged into the box giving a total of 24 user definable keys.
Full instructions are provided to include the keypad in your own programs even in BASIC or for the non-programmer a DELTA DRIVER cassette is available with keyboard to joystick/keypad conversions and keypad set up programs.

DELTA 3S—ELECTRON with switch joystick interface £12.00
For an ELECTRON with a switched joystick interface (Not a PLUS 1) this gives you the same delightful light, fast action of the DELTA joysticks but fitted with a 9 way D plug as per Atari, Commodore, etc. and will run on First Byte interface or similar.

DELTA ASC not illustrated **£9.95**
This little box plugs in series with your analogue joystick to alter its characteristics simply by using a switch. In one set up the joystick will act like a switched joystick, i.e. a slight movement will act as if the joystick has been pushed hard over. In the other mode the joystick only covers the centre half of the A/D converter so that it takes twice as much movement to give the same effect. This makes it much easier to make delicate adjustments to programs like flight simulators.

DATAPAD 16B **£39.95**
A commercial spec. 16 way keypad. Full travel mechanical keys with double shot moulded keycaps mounted in a low profile metal case. The keys are marked with calculator legend, but the software included allows the pad to be defined as any keys, including function keys or single byte VDU commands such as PRINTER ON/OFF. No tampering with the computer as it fits onto the user port.

Access

Available from your dealer or direct from us

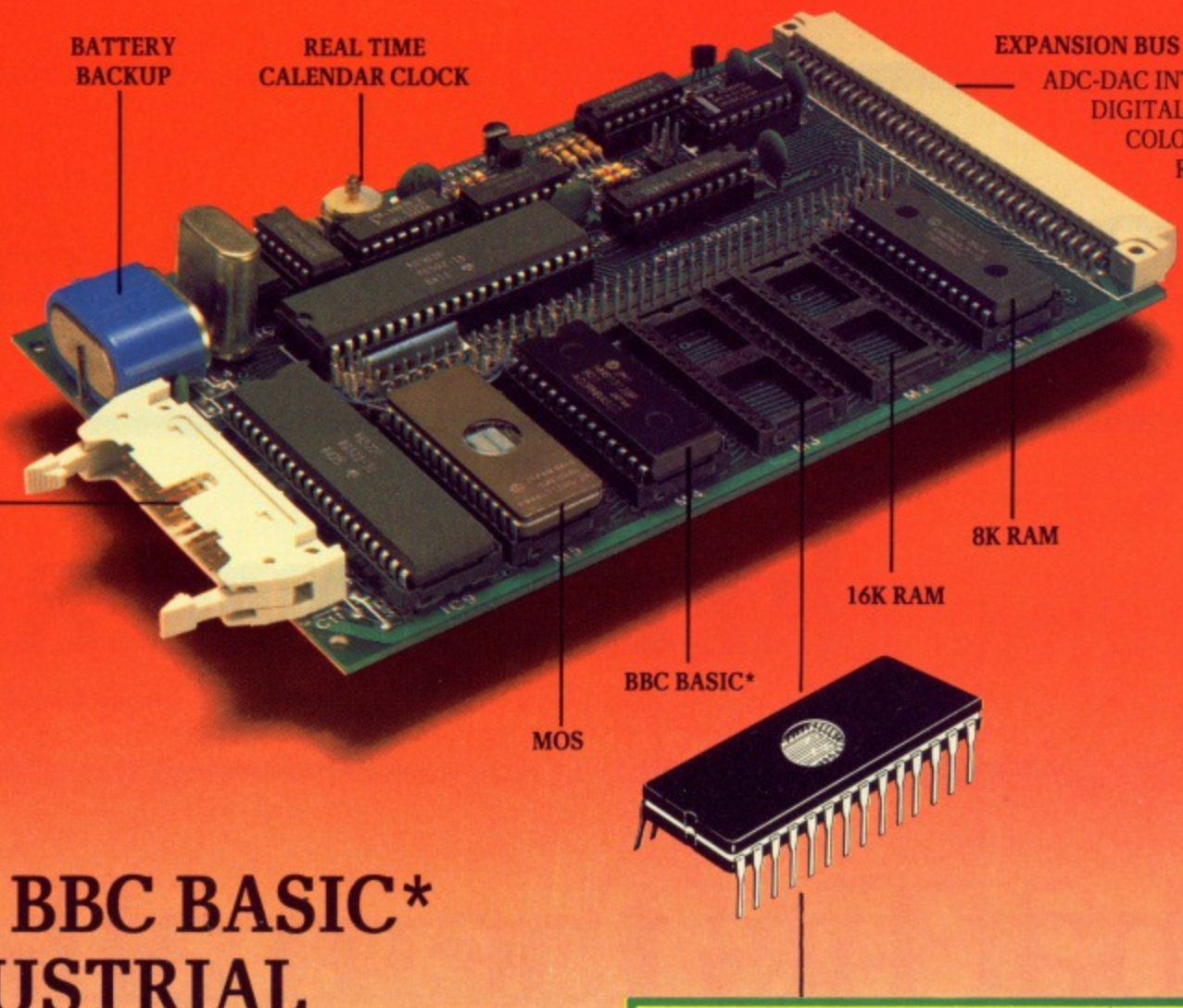
VISA

Voltmace Limited

Park Drive
Baldock
Herts
SG7 6EW
Telephone (0462) 8944

THE WAY TO CONTROL...

. . .switching, relays, heat, temperature, flow, alarm systems, lift control systems, management systems, refrigeration plants, kilns, furnaces, boilers, spray driers, production lines, bakery control systems, energy management, process control, banking systems, plant & machinery, analysis, data acquisition . . .



THE BBC BASIC* INDUSTRIAL CONTROLLER

- Robust INDUSTRIAL NETWORK.
- Single Eurocard–can stand alone and run BBC BASIC programs.
- Program control applications in BBC BASIC, MULTIBASIC, FORTH, PASCAL or any other language ROM.
- Adds I/O expansion to your BBC via the 6502 Bus connector.
- Tube Interface for fast development.
- Runs BASIC programs in ROM or from battery backed up RAM.
- Battery backed up Real Time calendar clock.
- A full range of Eurocards for use in target applications.
- Ideal for industry, education, research and commerce.
- Fully BUS compatible.

CMS Cambridge Microprocessor Systems Limited

44a Hobson Street, Cambridge CB1 1NL. ☎ 0223-324141

MULTI BASIC

- The real time multi-tasking ROM
- ENABLE EVERY.
- ENABLE WHENEVER.
- Full MULTI-TASKING with up to 8 background tasks running concurrent with the main program.
- BBC BASIC CONTROL FEATURES powerfully enhanced.
- The ability to run REAL TIME PROGRAMS.
- Control of PHYSICAL INPUT/OUTPUT.
- Five real-time COUNTER/TIMERS.
- Eight real-time TASK INTERVAL TIMERS.
- 19 Industrial Network Commands.
- Also available for the BBC Micro.

* Licenced by Acorn Computers Limited.

Here's p

IBM, Epson QX-5,

Acorn Electron, ACT Bi

Ericsson...and hi

that fits them all-then

At last, your computer can have an Epson printer.

Even if it's only supposed to be compatible with 'own brand' printers (like Atari).

Our latest printer, the GX-80, has a revolutionary new interface called PIC (it means Printer Interface Cartridge and that's it on the right). The cartridge slips into the back of the GX-80 and enables the GX to understand commands from the host computer.

So if you've ever wanted to have an Epson printer for your micro but thought you couldn't, here it is.

But first, read about the GX-80's other cracking advantages . . .

What happens when I change computers?

Gone are the days when you had to scrap a perfectl good printer just because it 'didn't go with' your new computer.

Once bought, your GX-80 stays put. (Epsons tend to stick around for ages anyway; now we've taken tradition a little further.)

When the time comes to upgrade your computer, you simply go back to your Epson deale and buy the corresponding new PIC.

It's a far sight cheaper than being forced t sell/scrap out your printer only to buy another one And in effect it makes the GX-80 your printer for life.

ou car won't hange bit m

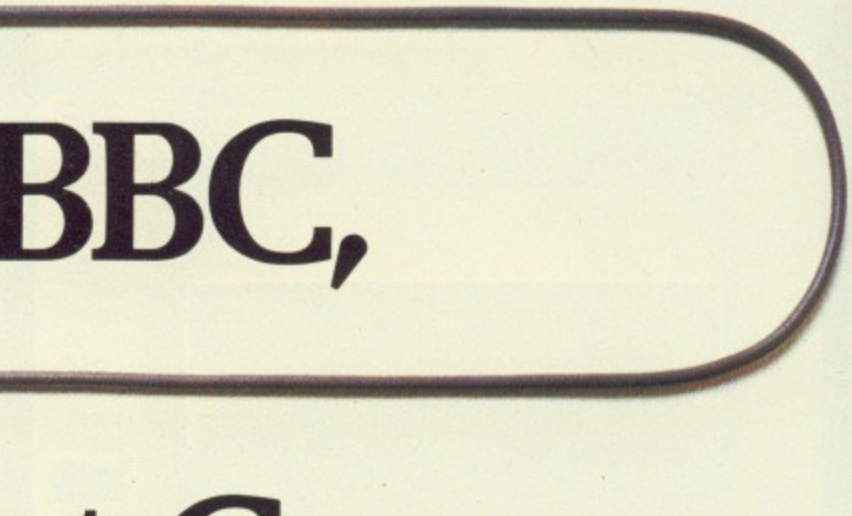
e's plug for any Atari,

X-6, Apple IIc, BBC,

CTSirius/Apricot, Compaq,

d his is the printer

henew Epson GX-80.



A printer for life? What's the catch?

Sheer, unremitting boredom.

The GX-80 takes all the fun out of printer ownership. You can't shout, "Lousy printer! It's fouled up again!" because it won't. It's just as reliable as every other Epson.

Nor can you gleefully chuck it merely because you've changed computers — PIC's seen to that.

But all is not lost. You could change your computer a bit more often. Just for fun.

EPSON

Epson (UK) Ltd., Dorland House, 388 High Road,
Wembley, Middlesex HA9 6UH. Telephone 01-902 8892.

I'm looking for a permanent relationship too. Tell me the rest about the GX-80 with PIC.

Name _____

*Position/Company _____

Address _____

_____ Tel No. _____

*Please leave blank if inapplicable.

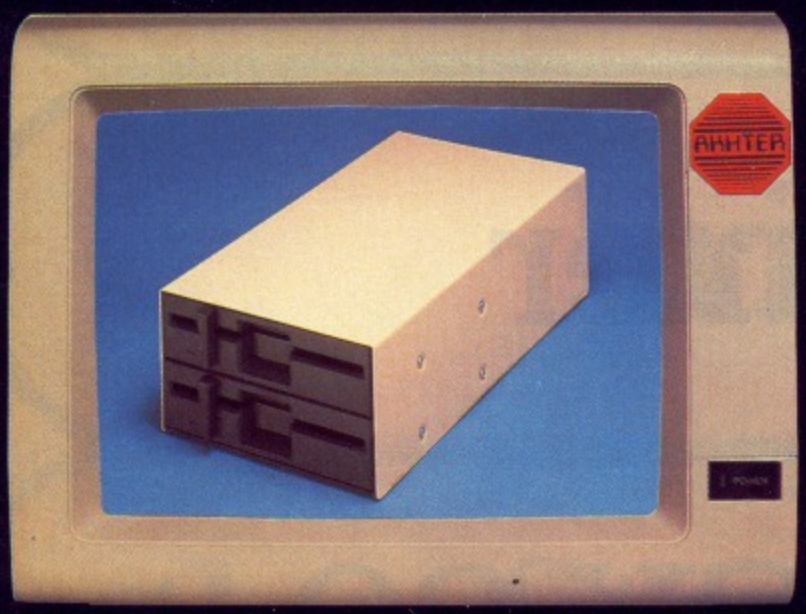
KMU 2

COMPUTER GROUP DISK DRIVES

affordable computer solutions

Dual 5¼" drives, with integral power supply. Horizontally cased in a metal stand. The ideal partner for your BBC & monitor. (Code suffix 'D' see opposite page).

Single 5¼" drive, with integral power supply, in a metal case. (Code suffix 'B' see opposite page).



Dual 5¼" drives with integral power supply in a metal case. (Code suffix 'E' see opposite page).

Either a single or dual 3½" drive, without power supply, in a metal case. Single version is fully equipped with cables for later expansion to dual drives. (Code suffix 'F' see opposite page).

Single 5¼" drive, without power supply, in a plastic case. (Code suffix 'A' see opposite page). Dual 5¼" drives, without power supply, in a plastic case. (Code suffix 'C' see opposite page).

Either a single or dual 3½" drive, with integral power supply, in a metal case. Single version is fully equipped with cables for later expansion to dual drives. (Code sufix 'G' see opposite page).

AKHTER INSTRUMENTS LTD T/A

COMPUTER GROUP

AKHTER HOUSE, PERRY ROAD, STAPLE TYE,
HARLOW, ESSEX, CM18 7PN UK
Tel: HARLOW (0279) 443521. Telex: 818894 AKHTER G

For affordable computer solutions

COMPUTER SOLUTIONS from COMPUTER GROUP

For the complete range of: **ACORN** Computer Systems & Peripherals

For the complete range of: **DISK DRIVES**

For the complete range of: **TORCH** Computer Systems & Peripherals

DISK DRIVES

100% BBC Compatible High Quality, Disk Drives

All these drives are supplied ready cased and equipped with all necessary cables, formatting disc and User Guide.

5¼" DUAL DRIVES, HORIZONTALLY MOUNTED
(Monitor Stand Metal Case, with PSU)

MD802D
Double-sided 800K (2 x 400K) 40/80 track switchable, 2 Year Warranty
£260 + VAT £299

5¼" DUAL DRIVES, VERTICALLY STACKED
(Housed in Metal Case, with PSU)

MD802E
Double-sided 800K (2 x 400K) 40/80 track switchable, 2 Year Warranty
£234 + VAT £269

5¼" DUAL DRIVES, VERTICALLY STACKED
(Housed in Plastic Case)

MD802C
Double-sided 800K (2 x 400K) 40/80 track switchable, 2 Year Warranty
£186 + VAT £214

5¼" SINGLE DRIVE
(Housed in Metal Case, with PSU)

MD400B
Double-sided 400K 40/80 track switchable, 2 Year Warranty
£120 + VAT £138

5¼" SINGLE DRIVE
(Housed in Plastic Case)

MD400A
Double-sided 400K 40/80 track switchable, 2 Year Warranty
£99 + VAT £114

5¼" NEW LOW COST DRIVE WITH 1 YEAR WARRANTY
(Housed in Metal Case)

SD400A
Double-sided 400K 40/80 track switchable without PSU
£86 + VAT £99

SD400B
Double-sided 400K 40/80 track switchable with PSU
£104 + VAT £119

SD802E
Double-sided 800K (2x400K) 40/80 track switchable Vertically stacked dual drives
£191 + VAT £219

3½ VERTICALLY STACKED DRIVES AT LOW, LOW COST WITH 1 YEAR WARRANTY

MD400F
Double-sided 400K (single density) 800K (double-density), 80 track switchable. Single drive, with provision for second drive to be added to the same case.
£99 + VAT £114

MD400G
As 400F with power supply
£121 + VAT £139 inc.

MD 802F
Double-drive 800K (single density) 1600K (double density) 80 track
Dual drives ready fitted in the vertically stacked casing
£173 + VAT £199

MD802G
As 802F with power supply
£199 + VAT £299 inc.

ACORN PRODUCTS

	AKHTER Ex. VAT £	PRICES Inc. VAT £
BBC MODEL B Plus with DFS	384	442
BBC MODEL B Plus with Econet	373	429
BBC MODEL B Plus with DFS and Econet	428	492
BBC MODEL B Plus, 128K version	418	481
6502 Second Processor	173	199
Z80 Second Processor	346	399
Winchester Disk Drive — 10 Mbytes	1304	1499
Winchester Disk Drive — 30 Mbytes	1999	2299
BBC Prestel Receiver	121	139
BBC Teletext Receiver	196	225
MODEL A to B Upgrade (incl. fitting)	90	103
Econet Interface (incl. fitting)	60	69
Disk Interface (incl. fitting)	103	118
New 1770 DFS kit	43	50
64K RAM Upgrade for Bplus	34	39
ADFS ROM	26	30
IEEE Interface	284	327
Music 500	170	196
Speech Upgrade	48	55
EPROMER for the BBC (with software available on Cassette, Disk or ROM — please specify)	99	114
Acorn Bitstick	328	377
Acorn Bitstick, Multi-plotter Driver	69	79
AMX Mouse	75	87
Traker Ball	52	60
Grafpad	120	138
Games Paddles	13	15
BBC Software		
ISO-Pascal	50	58
Wordwise	35	41
Wordwise Plus	49	56
View	52	60
Viewsheet	52	60
Viewstore	52	60
Logotron	49	56

ECONET ACCESSORIES

File server level two	209	240
Econet Starter Kit	85	98
Printer server ROM	42	49
10 Station lead set	26	30
Econet interface kit (incl. fitting)	60	69

TORCH COMPUTERS

Torch Z80 Disk Pack	564	649
Torch Z80 Drive Only	266	306
Torch ZEP 100 Second Processor	299	344

3M PRODUCTS

3M 5¼" DISKETTES		
Single-sided, double-density, 40 track	16	18
Double-sided, double-density, 40 track	23	26
Double-sided, double-density, 80 track	27	30
Head Cleaning Kit	12	14
3M 3½" DISKETTES		
Single-sided, double density, 40 track	28	33
Double-sided, double-density, 40 track	39	45
DISKETTE STORAGE BOXES		
3M FLIP N File (15 diskettes)	6	7
3M Locking diskette file (capacity 50)	18	21
Lockable storage file (capacity 100)	20	23

SPECIAL ADVICE GIVEN ON ALL ASPECTS OF EDUCATIONAL SOFTWARE & HARDWARE PRODUCTS

EDUCATIONAL COMPUTER SOLUTIONS from COMPUTER GROUP

SPECIAL EDUCATIONAL DISCOUNTS & BULK ENQUIRIES WELCOME.

Watford Electronics

Dept. BBC, Jessa House, 250 Lower High Street, Watford, England
Tel: Watford (0923) 37774/40588 Telex: 8956095 WATFRD
Credit Card Orders (ACCESS & VISA) Tel: (0923) 33383 or 50234 (24 Hours)

Watford Electronics' overseas Distributors:
Absolute Electronics, 483 Centre Road, Bentleigh, Victoria, Australia 3204. Tel: (03) 557 3971
First Ludonics International, 2400 AJ Alphen aan den Ri jn, Nedherlands. Tel: 01720 72580.

BBC B Plus (64k)	**£375**
BBC B PLUS with 128K	**£415**
BBC B PLUS with Econet	**£389**
Extra 64k Upgrade Kit	**£32**
1770 Upgrade Kit	**£42**

ECONET ACCESSORIES

ECONET UPGRADE KIT	**£52**
Econet STARTER KIT	**£85**
Clock Boxes	**£39**
Terminator	**£30**
File Server Level I	**£75**
File Server Level II	**£205**
Printer Server ROM	**£40**
10 Station Lead	**£24**
Advance Econet User Guide	**£8.50**

6502 Acorn 2nd Processor package	**£175**
Z80 Acorn 2nd Processor package	**£339**
TORCH Z80 Card + Perfect Software	**£249**
TORCH Z80 Card+Soft. + Disc Pack	**£499**
Acorn Bitstick	**£325**
Acorn IEEE Interface Complete	**£280**
Acorn Teletext + Interface	**£195**

(Securicor carriage on Micros £7)

Dust Cover for BBC Micro

£3.50

VARIOUS PRINTERS

- EPSON RX100 **£342**
- EPSON FX80 Printer **£265**
- EPSON FX100 Printer **£429**
- EPSON JX-80 Full Colour Dot Matrix Printer. Prints in 7 Colours. Upto 160 cps **£499**
- EPSON Hi-80 Printer Plotter **£345**
- EPSON Paper Roll Holder **£17**
- FX80 tractor attachment **£37**
- SEIKOSHA GP50A & GP50S **£69**
- Centronics Printer Cable to interface all the above Printers to BBC **£6**

(Securicor carriage charge on printers £7)

EPSON LX-80 PRINTER

EPSON's new Low cost High performance printer. Print speed 100 cps, NLQ mode 22 cps. 9 needle print head. Full FX-80 capability is supported with downloadable fonts. Friction feed is supplied as standard, with tractor feed and an attractive auto sheet feeder as optional extra. NLQ Mode and current typeface selectable from front panel.

Price: **£220** (carr £6)
Tractor Feed Attachment **£20**
Single Sheet Feeder **£49**
Spare Ribbons **£4**

RX & FX PRINTER INTERFACES

Epson interfaces fit inside the printer to allow connection using techniques other than Centronics.

RS232	**£25**	RS232 + 2K Buffer	**£55**
IEEE 488	**£62**		

ALL PRICES EXCLUDE VAT

CENTRONICS GLP (NLQ) Printer

A major price break-through in NLQ Printers from Watford

At last, a full feature Epson compatible NLQ printer at a price that everyone can afford. Due to Watford's bulk purchasing power and low margins we can now offer this incredible printer deal direct from the manufacturers to our customers.

The Centronics GLP features a near letter quality (NLQ) mode using a 23 by 18 dot matrix for each NLQ character (this is the same as is used by the very popular Kaga Taxan printers).

Single, double and quadruple density graphics modes as well as four character widths and super/sub script printing are also supported, along with many other facilities normally found on printers costing twice as much.

Although the GLP is a very compact printer, it can handle paper up to 10 inches wide. Friction feed is supplied as standard with a low cost tractor feed available as an optional extra.

The GLP is a bidirectional logic seeking printer with a 9 needle print head and features a long life ribbon cartridge. The GLP is supplied with a Centronics parallel interface and comes complete with a ready fitted alternate NLQ font ROM containing a different and more pleasing type face (other font ROMs available, including Gothic, Courier, Italic, Copper Plate, Script, Double, Bold etc.)

Send an SAE for further details of the GLP NLQ Designer and extra font ROMs.

Christmas Offer **£99** (carr £5)
Tractor Feed Attachment **£9**
Spare Ribbon Cartridge **£4**
NLQ DESIGNER ROM for Centronics Printer **£20**

BROTHER HR-15

Brother HR15 is a high-quality daisy-wheel ideal for a budget printer for serious use. Notable features of this printer include a 3k buffer, 18cps (max), bi-directional proportional spacing, Centronics interface standard, (RS232 optional), optional Sheet Feeder and Keyboard.

ONLY **£315** (carr. £7)

Single Sheet Feeder	**£185**
Electronic KEYBOARD	**£135**
TRACTOR FEED Attachment	**£84**
RIBBON CARTRIDGES: Fabric **£3.75;** Carbon **£3.75;** Multistrike **£6**	
DAISYWHEELS (various typefaces)	**£18**

We are now offering at no extra cost ON-SITE 12 months maintenance on all HR15 Printers purchased from us. W.E. GIVES YOU A GREAT DEAL

Listing Paper (Perforated)

1,000 Sheets 9½" Fanfold Paper	**£7**
2,000 Sheets 9½" Fanfold Paper	**£13**
1,000 Sheets 15" Fanfold Paper	**£9**
Teleprinter Roll (Econo paper)	**£4**

Carriage on 1,000 Sheets £1.50

KAGA KP810 NLQ PRINTER

This excellent printer is fully Epson FX-80 compatible and offers superb NLQ printing. Over the last year, we have sold more of these printers than any other make. Write in for further details of this printer.

Special Offer: ONLY **£229** (£7 carr.)

Kaga RS232 Interface	**£49**
Kaga RS232 Interface + 2K Buffer	**£69**
Kaga RS232 Interface + 16K Buffer	**£95**

KAGA KP910 Printer

Similar to the KP810 but with 17" carriage for wide print. Gives 156 columns of normal print or 256 columns in condensed mode. Ideal for printing out spreadsheets.

ONLY **£339** (£7 carr.)

PRINTER LEAD

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA etc. printers.

Standard length (4 feet long)	**£6**
Extra long (6 feet long)	**£8**

We can supply leads to any required length.

RS232 Cables available in any length and any combination. Please telephone for your requirement.

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
FX100	**£10.00**	**£5.25**
FX80/MX80	**£4.50**	**£4.95**
RX80	**£4.50**	**£4.50**
GP80	**£4.50**	–
GP100	**£4.95**	**£3.95**
GP250	**£5.95**	**£3.95**
KAGA KP810	**£5.95**	**£4.75**
CANON PW1080	**£5.95**	**£4.75**
MICROVITEC MONITORS	–	**£5.50**

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

SEIKOSHA SP-1000

This new attractively finished dot matrix printer features **Near Letter Quality** mode and is unsurpassed at the price. Provides high quality printout for word-processing, whilst retaining a fast mode (100 CPS) for draft copies. Other features include a variety of character sets, underlining, bold print and double strike, bi-directional logic seek, automatic paper loading, variable paper width etc. Has Friction and Tractor feed. SP1000 makes available the facilities of much more sophisticated printers at a very reasonable price.

Introductory price: **£185** (carr £6)

PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90×36mm (Single Row)	**£5.00**
1,000 90×36mm (Twin Row)	**£4.90**
1,000 90×49mm (Twin Row)	**£7.50**
1,000 102×36mm (Twin Row)	**£6.25**

Carriage on 1,000 Labels £1.00

We stock a range of monitors to suit all needs. Choice of a monitor is a matter of personal taste so we recommend that whenever possible, you ask for a demonstration at our shop. All Monitors are supplied complete with connecting lead.

MICROVITEC 14"

- 1431 – Medium resolution as used on the BBC television computer programme **£179**
- 1451 – High resolution, suitable for word processing in mode 0 ..... **£229**
- 1441 – High res, exceeds the capabilities of the BBC micro **£385**
- 1431AP RGB + PAL and AUDIO **£199**
- 1451AP RGB + PAL and AUDIO **£269**
- Dust Cover for Microvitecs **£5.50**

KAGA/TAXAN 12"

- KAGA KX1201G Hi-res Green Monitor **£90**
- KAGA KX1202G Ultra-Hi-Res Green Monitor **£105**
- KAGA KX1203A Ultra-Hi-Res Amber Monitor **£105**
- KAGA Vision 2, Hi-Res, RGB Colour Monitor **£225**
- KAGA Vision 3, Ultra Hi-Res, RGB Monitor **£310**

PHILIPS 12"

- BM7502 Hi-Res Green **£74**
- BM7522 Hi-Res Amber **£77**

FIDELITY COLOUR MONITOR

- Medium Resolution, attractively finished, 14" RGB and Composite VIDEO/AUDIO Input. Has a detachable anti-glare screen.

Introductory Offer: **£169**

ZENITH

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. The high resolution makes it good for games too – you can really see the detail that has been put into the graphics.

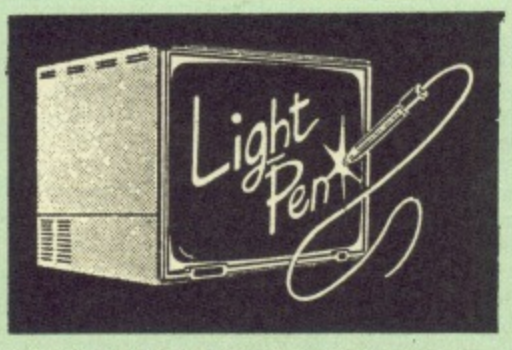
Zenith Green Hi-res **£70**
Zenith Amber Hi-res **£72**

LEADS

BNC Lead for Zenith or Philips **£3**
RGB lead for KAGA **£3**

N.B. Carriage on Monitors **£7** (securicor)

CREDIT CARD Orders (ACCESS or VISA) Simply phone (0923) 33383/50234 24 Hour Service



This Light Pen for the BBC micro is packaged in a neat pen shape with built in switch. Supplied complete with our sophisticated Pen-Pal software on cassette.

Only **£23**

(For software on disc please add £2)

4 COLOUR PLOTTER PRINTER

SAKATA SCP-800 printer/plotter facilitates plotting & printing in 4 colours on paper upto A4 size, using easily replaced pens. In text mode it prints upto 12 CPS. Max 160 Char. per line. In graphics mode it offers full plotting facilities incl. drawing, moving, scaling of text, rotation & drawing of axes. (Write for a sample printout).

Only £155

Set of 4 SPARE PENS only **£4.50**

SPECIAL OFFER

HITACHI EPROMs for Sideways ROMs

2764-250nS £2
27128-250nS £3

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6264LP (8K) £4
2 × 6264LP (16K) £7.50

PRINTER SHARERS

Connects
3 BBC Micros to 1 Printer **£65**
6 BBC Micros to 1 Printer **£129**

BBC MICRO WORD-PROCESSING PACKAGE

A complete word-processing package (which can be heavily modified to your requirements, maintaining the large discount). We supply everything you need to get a BBC micro running as a word-processor. Please call in for a demonstration.

EXAMPLE PACKAGE

BBC Model B Plus 64k, Watford Electronics' DFS upgrade, WORDWISE ROM, Twin 800k Mitsubishi drives in beige, Zenith 12" Hi-resolution monitor (Green or Amber), Brother HR15 daisywheel printer. Gemini software: BEEBCALC spreadsheet, analysis and DATABASE software on disc. 10 × 3M disc, 500 sheets fan-fold paper, 4 way mains trailing socket, manuals, all leads and BBC carrying case.

NEW LOW PRICE

Only £999

THE EPSON RX/FX/KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX/KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English how to use your printer (Kaga KP810, Canon PW1080A, or any other Epson FX-80 compatible printer) with the BBC micro, both from Basic and your Wordwise wordprocessor.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

This book is superb value at only **£5.95** (Book – No VAT)

Nightingale Modem

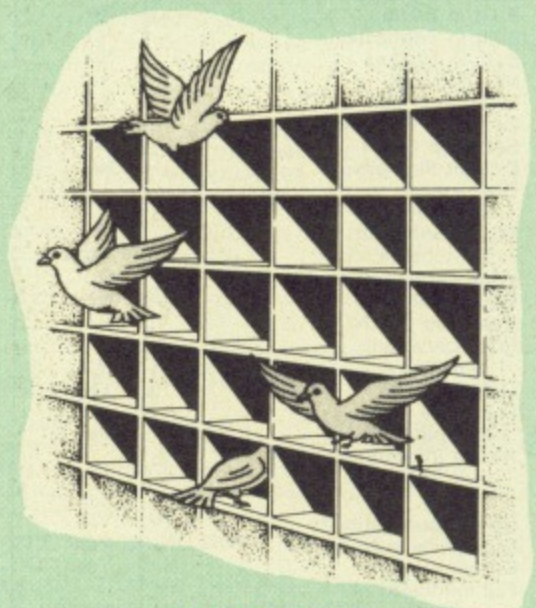
SPECIAL PRICE to our Customers

£119

(Price includes COMMSTAR ROM & comprehensive manuals)

Nightingale Modem without software	**Only £99**
COMMSTAR ROM package only (P&P on modem £2.00)	**£29**
Auto Dial/Auto Answer Board	**£48**
Auto Dial Utilities Disc	**£9.50**
OBBS Bulletin Software	**£20.00**

DATABASE MANAGEMENT SYSTEMS



DISCDATA

Discdata is an entirely disc based database handling system. It is extremely easy to use through its comprehensive menu system. The simplicity is such that we do not feel the need to provide explanation on use in the written guidance supplied with the program. The first-time database user will rapidly become familiar with this package designed throughout to be simple and obvious.

On disc at **Only £17**

(Please specify 40 or 80 track when ordering)
(Please write in for technical specifications)

FILE-PLUS

File-Plus is a powerful database for the BBC micro with many advanced features. Largely menu driven, File-Plus is provided on a 16k ROM with some extra utilities on disc. Features included are detailed below:

- Flexible full screen form layout.
- Built in File Query Language (FQL).
- Printer Output.
- Arithmetic operations in FQL.
- Looping in FQL.
- Number range of +– 9999999999.9999.
- File linking allows files over different drives.
- Multiple forms allow selection of displayed data.

Only £32

(Please specify 40T or 80T disc

DATAGEM

Gemini's 24K ROM based DATABASE Management System

Special Offer: **£67**

Continued

The ULTIMATE DFSs for the BBC MICRO

WATFORD TOPS THE DFS CHART

Watford's Ultimate DFS has scored highest points in ACORN USER's unbiased DFS's Review of July 1985.
In concluding, the reviewer writes "It must be said that Watford's DFS certainly offers a comprehensive range of facilities at a very attractive price". (Please write in for comprehensive details.)
To celebrate the occasion, we are offering Watford's complete Disc Interface Kit at only £56 and the Double Density Unit at £58.

Just compare the features:

Features	Acorn 1.20	Watford Single Density	Watford Double Density
Max nos. of files per disc side	31	62	62
Max disc capacity	800k	800k	1440k
Tube compatible	Yes	Yes	Yes
Built-in Editor	No	Yes	Yes
Built-in Formatter	No	Yes	Yes
Built-in Verifier	No	Yes	Yes
MRUN a file	No	Yes	Yes
MLOAD a file	No	Yes	Yes
Extended RENAME	No	Yes	Yes
Selective COPY	No	Yes	Yes
Default file name	No	Yes	Yes
Disc space distribution	No	Yes	Yes
40/80 Software Switchable	No	Yes	Yes
Wide catalogue	No	Yes	Yes
Close open files	No	Yes	Yes
Improved OPENOUT	No	Yes	Yes
Copy between densities	N/A	N/A	Yes
OSWORD &7F	Yes	Yes	Yes
Full entry point compatibility	Yes	Yes	Yes
Retain information over a break	1.20 partial	1.43 Yes	1.53 Yes
Games compatibility	Yes	Yes	Most
Econet file server	Yes	Yes	Yes
Econet station	Yes	Yes	Yes
Full wildcard facilities	No	Yes	Yes

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for two years, and has gained a large following amongst serious users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. (P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS).

PRICES

- *Complete Disc Interface Kit incl. DFS ROM & fitting instructions* **£56**
- *Acorn's DFS Kit complete* **£56**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**

(P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs)

- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS* **£16**
- *ADFS* **£25**
- *Watford's DFS is exclusively available from Watford Electronics. Every ROM carries a special label with our LOGO and serial number.*

WATFORD's DOUBLE DENSITY DFS INTERFACE

The DDFS from Watford Electronics represents a new standard in DFSs for the BBC micro. This is a double density version of our popular single density DFS, and combines all the features of this powerful DFS with the advantages of a system that gives 80% more storage per disc in double density mode. P.S. – Please note that not all DDFSs are capable of providing either the full 80% storage increase, or of allowing a file the full size of the disc – Ours allows both of these!

The typical piece of games software these days is provided upon a protected disc. In order to work on any double density system (including the others on the market) a protected piece of software needs to make calls through the OSWORD &7F routines. To ensure compatibility, the Watford DDFS features probably the most comprehensive and powerful 8271 emulation ever written for a double density system.

PRICES

- *Complete DDFS Kit incl. fitting instructions* **£58**
- *DDFS Manual* *(no VAT)* **£6.95**
- *We will exchange your existing Single Density DFS Kit for our DDFS Unit at* **£35**

The Watford Electronics DDFS for the BBC B Plus

Watford Electronics was the first company to produce a serious alternative Disc Filing System (DFS) for the standard BBC micro. Since then, we have been refining and advancing this sophisticated product right up to today.

Now WE'VE DONE IT AGAIN; Watford proudly presents the Double Density Disc filing system for the BBC B+, with all the advantages of the advanced Watford DDFS available on the new BBC B+ DDFS.

Acting as a powerful alternative DFS to Acorn's '1770 DFS' supplied with the BBC+, this superb addition to any BBC+ greatly enhances it's performance with a simple fitting operation. Just compare the features below with those offered by the Standard DFS:

- SINGLE or DOUBLE DENSITY operation. Double Density operation gives 80% more storage.
- Automatic detection of density for operations.
- 31 or 62 file catalogue with automatic catalogue size detection.
- Files can be up to FULL size of disc (360k) due to extension bit.
- Multiple file rename with FULL wildcards (even more powerful than those offered by the Standard DFS on it's *COPY operation!)
- *COPY with FULL wildcards; not the normal Acorn ones.
- Selective *COPY operation, with FULL wildcards.
- *COPY, *MOVE, *BACKUP, etc, over densities, 40/80.
- Status Display of open files (handle, full filename, pointer, extent and access type).
- Close all open files with a single * command.
- Built in single and double density verify routine.
- Built in single and double density sector editor.
- Read and WRITE in 40 track discs on 80 track drives.
- 40/80 switching drive independent.
- 40/80 switching automatically performed if needed.
- Built in formatter allows for mixing of density, catalogue size, 40/80 track and 40/80 switching.
- MLOAD and MRUN commands help run tape files from disc.
- Econet Level II file server capability Econet work station capability.
- Extremely powerful 8271 emulation for loading games, etc.
- Comprehensive OSWORD &7F emulation.
- Default filename system, useful for program development.
- Full width wide catalogue display in 80 column modes.
- Extended *LIB specifications.
- Optional preceding letter on * commands to avoid ROM clashes.
- List of sector gaps unused on disc.
- Full retention of open files over Break.
- Full retention of drive settings over Break.
- Full retention density settings over Break.
- Extended read filenames (via extended OSGBPB functions).
- Automatic sector skewing during formatting.
- Assumes last density for next disc access for speed.
- Read drive of last *RUN / *LOAD operation.
- Load ambiguous filename for convenience.
- Improved space allocation for OPENOUT.
- Invalid execution address (&FFFFFFFF) in *RUN causes *EXEC of file.
- Extended *HELP implementation shows syntax of individual commands.
- Extended error checking on operations.
- Catalogue shows number of files in catalogue.
- 40/80 stepping state displayed in catalogue.
- Catalogue shows catalogue size.
- Catalogue shows number of tracks.
- Default filename displayed in catalogue.

As you can see from the above information, Watford's DDFS for the BBC+ is far more sophisticated and well thought out than the standard. Take any disc produced by any Watford DFS from the standard BBC and catalogue straight off with no problems.

Unlike the Acorn 'ADFS', our DDFS+ system is just as easy to use as the standard DFSs, with no new complex concepts to have to learn. The features within our DFSs have been constantly enhanced over a period of three years during the time that they have been released; significant attention has been paid to feedback from our customers so that the features offered are carefully honed to the requirements of hobbyists and serious programmers alike.

The Watford DDFS+ is supplied with a comprehensive DDFS manual that explains the basics of disc drives, DFSs, etc. Priced at only £35 including the manual, the Watford DDFS+ is surely one of THE best buys you could make for your BBC B+!

Join the leaders in BBC peripherals; join Watford Electronics – committed to supporting the BBC micro.

BBC B+ DDFS **£25**
(Price includes comprehensive manual)

Quality Disc Drives from Watford Electronics

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates the single density capacity. The double density storage capacity is second one, (that within the brackets). All disc Drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track and which are 80 track. The 40 track ones are manufactured by EPSON, the world famous Japanese company, (non-tinted boxes). The 80 track drives are famous MITSUBISHI drives (tinted boxes).

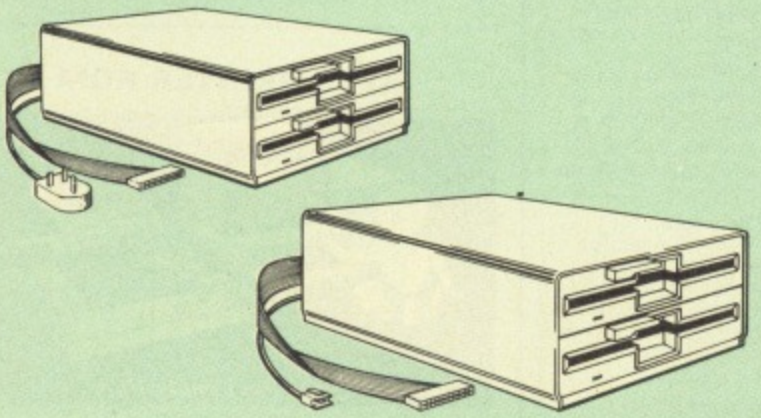
With two prices in a box (e.g. £295/£299), the first price is for the standard drive and the second for the same unit in switchable type. Users of either of the two Watford DFSs will not need switchable drives as their DFS will provide software switching for them. Users of Acorn's DFS will find that they need to pay the extra for switchable drives if they wish to use 40 track discs in an 80 track drive.

The drives we supply are fast (3ms track to track, 15ms settle), quiet and have a low power consumption (average well under 1 amp). Extensive experience of the usage of disc drives suggests that the MITSUBISHI and EPSON drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality Epson and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

Names you can trust, at prices you can afford!

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate: extensive tests within our workshops have confirmed this. All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. (Ideal for Schools & Colleges. All single disc drives with power supply, (i.e. CS100, CS200 & CS400S) are supplied in a twin case with twin data cable for later inclusion of a second drive). At Watford we anticipate your needs of tomorrow not just today!

All disc drives advertised here will operate in double density mode with the appropriate interface and software.



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
100K (180K)	CLS100 £76		CS100 £89	
200K (360K)	CLS 200 £76	CLD200 £140	CS 200 £89	CD200 £145
400K (720K)	CLS 400 £78 / CLS400S £79	CLD 400 £140	CS 400 £98 / CS 400S £99	CD400 £145
800K (1.44M)		CLD800 £158 / CLD 800S £159		CD 800 £175 / CD 800S £179
Securicor carriage on Disc Drives £5				

Prefix *C = Cased Drive*
L = Less PSU
S = Single
D = Double

Suffix *S = 40/80 Switchable*

e.g. *CLS400S = Cased drive, Less power supply unit, Single 400K, Switchable (40/80 track).*

MYSTERIES OF DISC DRIVES & DFS REVEALED

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

For instance, what is the difference between single and double density formats, how can you use a 40 track disc on an 80 track disc drive? What is the difference between a DFS and disc interface kit? Should you acquire a single Disc drive or twin? What does 48 TPI and 96 TPI discs mean? These are just a few of the questions you may have asked yourself and never found the answer or maybe you have yet to encounter these questions.

Now the mystery of buying a suitable interface and disc drive for your BBC micro is revealed in Watford's new book entitled 'MYSTERIES of DISC DRIVES & DFS REVEALED'. It describes in fine detail, yet remaining very readable to the beginner, how disc drives operate, the type of interfaces available, which type of discs to use on a disc drive and how data is stored on the discs.

£5.95 (Book No VAT)

3M – DISKETTES

Top quality 3M – SCOTCH Diskettes from Watford Electronics (Your 3M Appointed Distributors). All our discs carry a lifetime warranty. These discs are quiet in operation and insert positively with their reinforced hub rings. Boxes of 10 supplied complete with self stick disc labels and write protect tabs.

- *10 × 5¼" S/S D/D 40 Track Diskettes* **£12**
- *10 × 5¼" D/S D/D 40 Track Diskettes* **£17**
- *10 × 5¼" S/S D/D 80 Track Diskettes* **£22**
- *10 × 5¼" D/S D/D 80 Track Diskettes* **£23**

- *10 × 3" S/S D/D 40/80 track Discs* **£37**
- *10 × 3" D/D D/D 40/80 track Discs* **£45**

Buy 2 packs of any of the above Diskettes & qualify for a FREE Egon Ronay's "JUST A BITE" Guide.

TOP QUALITY 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

- *10 ×* **M4** *S-S D/D 40 Track Discs* **£11**
- *10 ×* **M5** *D/S D/D 40 Track Discs* **£14**
- *10 ×* **M7** *D/S D/D 80 Track Discs* **£19**

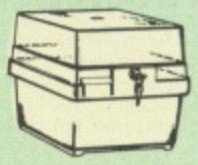
DISC ALBUMS

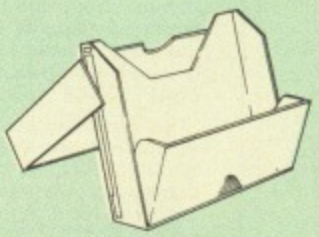
Attractively finished in beige leather-look vinyl, these conveniently store upto 20 Discs. Each Disc can easily be seen through the clear view pockets. **£4**

LOCKABLE DISC STORAGE UNITS

Strong plastic case that afford real protection to your discs. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

M35 - holds upto 40 discs **£10**
M85 – holds upto 95 discs **£12**





PLASTIC LIBRARY CASES

FOR 5¼" DISC STORAGE holds 10 Discs. **£1.80**

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. **£8**

DUST COVERS (For our Disc Drives)

Single (without PSU) **£3.20** Twin (without PSU) **£3.85**
Single (with PSU) **£3.25** Twin (with PSU) **£3.90**

Continued ⟶

Impress your friends and business colleagues with the quality of your letters and printed material with Watford's very simple to use EPSON NLQ! (Near Letter Quality) ROM. Suitable for FX80, RX80, RX80F/T, FX100.

Look at the features:
- Simply type *NLQ80/100 and a single VDU code to use NLQ print.
- NLQ is then available without any modifications from BASIC, WORDWISE, VIEW (with NLQ DRIVER) or virtually any other program or language.
- Single codes select PROPORTIONAL type (yes even on the RX80); ENLARGED type; UNDERLINED type. These features can be used seperately or in any combination.
- Full UK character set; Standard 'pica size'; Proportional spacing; Enlarged; Underlined; Normal type.

The NLQ ROM is supplied complete with comprehensive manual.

P.S. NLQ ROM is compatible with the Torch Z80 system and can be used from within the Perfect Writer software.

Only: £25

VIEW PRINTER DRIVER for NLQ ROM

This specially written printer driver has been designed to allow View access to the full features of our NLQ ROM.
A must for all VIEW and NLQ ROM users.

£7.00

THE NLQ DESIGNER

The Kaga Taxan KP810 and KP910 are two superb printers, as our many thousands of satisfied customers would surely attest to. One of it's particularly strong points is the NLQ option that it offers; perhaps one of the more weaker points is the effort required to design your own custom NLQ font.

Well the solution is here NOW in the shape of Watford's NLQ DESIGNER ROM! This powerful piece of software allows easy design and entry of a full NLQ font, with further fonts recallable from disc. Once a font has been programmed with the versatile NLQ DESIGNER, it can be saved to disc, downloaded to your Kaga (or Canon) printer, or even programmed into an EPROM (given the appropriate hardware) and then plugged directly into your printer so that it is available immediately when you turn it on. Downloadable Fonts require 6264 RAM chip fitted.

A 40/80 track format disc containing 3 example fonts is included in the package.

(P.S. This ROM is not suitable for Epson printers as they don't normally have NLQ ability. Keep reading our adverts though – work is in development!)

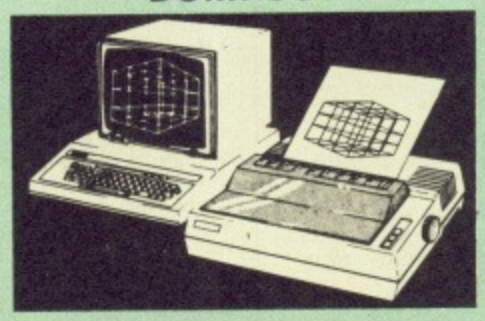
NLQ DESIGNER & FONT DISC **£25**

INDIVIDUAL Preprogrammed FONT ROMS **£15**

(Please write in for further details on both the NLQ DESIGNER and the individual font ROMs available.)

Now available . . .
Centronics GLP printer, additional font ROMs.
Price **£15**
(Please write in for full details).

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including all Mode 7 facilities etc. We have to admit that there is one facility that we cannot replicate – if anyone can supply flashing ink we would like to know!
The ROM also provides window setting utilities and two new OSWORD calls that allow mode 7 graphics pixels to be read and plotted using the standard graphic co-ordinate system. The latest version includes a graphic dump trigger for dumping screens from games whilst they are running.
Two commands are used to operate the dump routines:
*GIMAGE – This provides a full graphics dump of any graphics mode, plus modes 7 and '8'. There are many optional parameters but you need only specify the parameters you wish to change.

Features available include:

- Vertical and horizontal scaling through all the graphic modes and mode 7
- Rotation of the image produced through 90, 180 and 270 degrees
- Left hand indentation setting
- Screen dump window definition
- Colour grey scaling
- Two tone fast dump
- Special colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered dumps
- User port switched dumps

What does the independent press say!

Practical Electronics, May 1985
"The Dump Out 3 ROM from Watford Electronics represents one of the most sophisticated types of printer dump utilities available for the BBC Micro . . .".

"an extremely sophisticated and powerful dump utility".

"VERDICT – Dump Out 3 ROM has all the facilities which you are ever likely to need for producing printer dumps. The facilities available work extremely well and if printer dumps are something which you require, then this ROM can be recommended to help you to get the best out of your dot matrix printer".

The Micro User Feb. 1985.
"Well, here is that winner"!

"provide(s) some rather sophisticated screen dumps. Producing high resolution paper copies of graphic screens in any (graphics) mode will be the major reason for buying this ROM, and this is where Dump Out 3 performs PAR EXCELLENCE". (Our capitals for their italics.)

"The versatility of *GIMAGE (the graphics dump command) when using these parameters is amazing. Pictures of almost any size, shape, contrast or distortion may be produced without the need for a reducing photocopier or trick photography".

"Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC micro. It is easy to use yet highly versatile, and caters for all BBC screen modes in multitone high resolution printing. Whole, partial, rotated and scaled screens may be dumped to almost any BBC compatible dot matrix printer (see our list at the end of this advert). At £24 it must represent excellent value for money and surely cannot be beaten".

Designed for use with the following printers:
CP80, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, LPVII, NEC PC8023, DMP100/200/400, etc. etc.
Price including comprehensive manual

£25

VIEW

VIEW WORDPROCESSOR 2.1 ..... **£46**

VIEW 3.0 ROM

This latest version features automatic relocation with a 6502 second processor and takes full advantage of any shadow memory fitted. BBC B Plus compatible. Supplied complete with Printer Driver Generator tape.

Price: Only **£60**

HI-VIEW

A special version of VIEW designed for use with 6502 2nd Processor. Available on disc, it offers 47K of text memory.

£49

VIEWSHEET (Acornsoft) £49

VIEWSTORE £49

Watford's own Sophisticated VIEW PRINTER DRIVER for Epson FX80 & KAGA KP

Only £10

VIEW DRIVERS FOR JUKI & BROTHER PRINTERS

Only £10

VIEW/VIEW SHEET PRINTER DRIVER for SILVER REED

(Officially approved by Silver Reed)

Only: £10

BEEB PRINTER ROM

This utility ROM is designed to simplify using all the facilities of your printer. It has many facilities:

★ Selection of printer modes such as underline, font and size is by 'Single Key' operations.

★ From Wordwise, a single number following OC will select a mode rather than a long and incomprehensible string of control codes. This makes using your printer with Wordwise much more convenient.

★ When using Basic (or other languages) you can have control over the formatting of the output to the printer in the style of a wordprocessor. You can define page top, bottom and side margins etc. with intelligent page skip for binders an option. All supported printers will now respond to form-feed etc. commands.

★ User defined characters are printed as you see them on the screen so that non-standard characters are automatically printed out correctly.

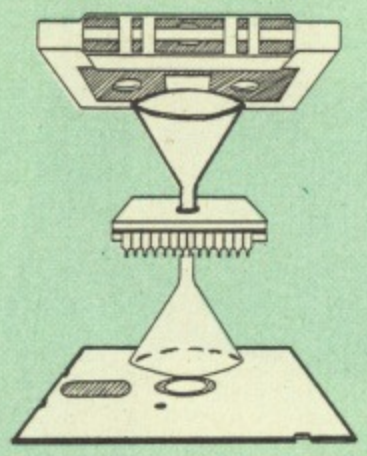
★ Commands select the options for the following printers:
GP100, STAR, NEC, MX/FX, KAGA, LP/VII/DMP100, DMP200.
Operates with either parallel or serial interfaces.

★ Supplied with a 50 page manual that is very comprehensive and easy to follow. Please specify printer type when ordering so that we can send the correct function key strip.

Price: £24

TRANSFEROM

(Tape to Disc Utility)



The only TAPE to DISC Utility ROM that works with our Double Density Disc Interface.

After months of top secret development, we are now able to supply details of this advanced and sophisticated utility ROM for the BBC micro. Just look at the features:

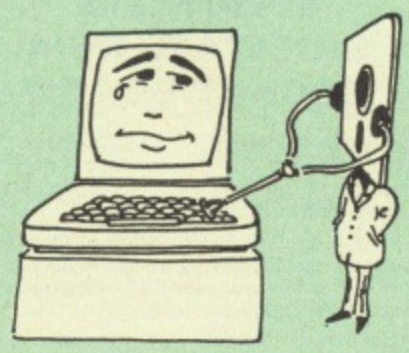
- Fully menu driven for ease of use
- Copes with locked programs
- A very comprehensive built in copying features
- Copies very long adventure games
- Supplied with comprehensive manual

TRANSFEROM is now available in BOTH single and double density versions. The single density version works with both the Acorn and Watford single density DFSs. The double density version works with the Watford DDFS system only.

TRANSFEROM takes your software on tape and saves them onto disc. TRANSFEROM does not stop when one disc is full; you just insert another disc in and carry on with that one! Surely this is the most valuable investment you could make if you have tape software that you wish to transfer to disc! Please specify version required – Single or Double Density.

£25.00

DIAGNOSTICS DISC



The BBC micro is a very complex machine and thus diagnosing a fault can be very difficult. Until now, the only way to discover the nature of a fault was either to find a competent friend with a large degree of patience or to find your nearest dealer and pay him to find out what is wrong.

At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:

RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

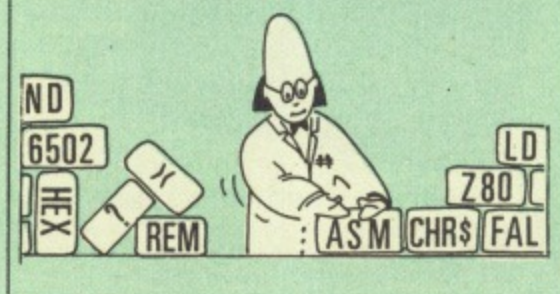
Continued

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

ROMAS

THE CROSS ASSEMBLER AND MACRO EDITOR FOR SERIOUS PROGRAMMERS!



ROMAS is a carefully designed, sophisticated yet simple to use, development system for serious assembly language programmers. Using the BBC as the development system, you can choose your target system from the following processors:

6502, 65C02, Z80, 8085, 8041, 6809 and Z8
P.S. This includes the Acorn 6502 & Z80.

ROMAS features a powerful expression analyser, making complex table easy to generate. To aid in documentation, fully formatted assembly listings may be produced, with full symbol table output at the end.

ROMAS is provided with a powerful cross referancer to produce a listing of all the labels in a given "source" program; this makes it easy to check to see if you are about to duplicate a label.

The Macro Editor

Features of this powerful editor provided with the ROMAS package include:

- Works in all 40 and 80 column screen modes
- Fast load and save speeds
- Continuous line and column number displays
- Search, replace and move; all available in macros
- Command repetition

The ROMAS package includes a comprehensive manual, providing detailed documentation and plenty of examples.

A give away at... **Only £45**

Please specify 40 or 80 track disc when ordering.

ADE

'Systems' complete program development package in a 16K ROM. We are now supplying the new 6502 2nd processor compatible version.

SPECIAL OFFER ONLY **£43**

ULTRACALC 2

The mark 2 version of the BBC Publications' extremely popular electronic spreadsheet ROM.

Only: **£66**

THE INVESTIGATOR

This sophisticated Utility program on disc, enables you to make security back-up copies of most of your valuable Disc Software. Makes full use of all 8271 (will not run with double density DFSs) facilities to discover the precise format of your protected disc so that an exact copy can be produced. Supplied with detailed instructions. Please specify 40 or 80 track disc when ordering.

Only **£20**

ROM-SPELL

"way ahead of any competition"

ROM-SPELL is probably THE most advanced and fastest spelling checker available for the BBC Micro. Printed below are some extracts from a recent independent review (A&B Computing Nov. '85), which we feel sure will convince you that this is THE only spelling checker worth considering.

"The editing system is very neat and simple, instead of replying to queries and beeps all of the time . . ."

"The other feature which places ROM-SPELL way in front of any competition is the ability to examine the user dictionary, so any spelling mistakes that have found themselves on the disc can be examined and taken out if necessary".

". . . that it is compatible with many of the popular word processors on the market is a good indication that ROM-SPELL is going to be a very popular product indeed".

". . . ROM-SPELL is by far the best spelling checker for the unexpanded BBC B (with or without word processor). It boasts features which are hard to find on conventional spellcheckers on CP/M and MSDOS, namely Spellstar and has a speed/performance ratio of roughly the same as its CP/M cousin. The difference is that the CP/M version would cost the best part of £500".

". . . and with such vital house keeping features as an ambiguous word checker, the ability to edit the user dictionary, a comprehensive manual that is both easy to read and actually ENJOYABLE to learn from, . . . I feel confident that ROM-SPELL will woo the word processing public with no problems at all".

Don't settle for less, Buy the best.

ROM-SPELL costs only **£25**

(Please state 40 or 80 track disc)

DISC EXECUTOR

Disc Executor is a sophisticated disc utility for the transfer of your programs from cassette to disc. It copes with 'locked' files and full length adventures (up to &6E blocks long) and programs that load below &E00. Disc Executor is simple to use and provides menus to prompt the user along the way. Disc Executor will cope with the vast majority of tapes. (Please note that Disc Executor is not compatible with double density disc interfaces – keep reading our adverts though!)

Price only **£10** (40 or 80 track)

BEEBMON

BEEBMON is the most powerful and versatile machine code monitor from Watford Electronics. BEEBMON offers some superb features specially designed to make the task of understanding and debugging machine code easier; indeed BEEBMON is probably the only product with sufficient power to aid in the debugging of such complex pieces of software as a DFS.
Offering a total emulation mode, BEEBMON can be used to single step through code anywhere in memory. All breakpoints are emulated and the workspace is totally relocatable, allowing for the simulation of all those "awkward" pieces of code.
(Write in for technical details.)

£24

DISASSEMBLER ROM

Discover the hidden secrets of BASIC and the OPERATING SYSTEM with this easy to use progammers tool.
Please write in for technical details.

ONLY **£16**

Continued ⟶

SIDEWAYS ZIF SOCKET

Now Watford Electronics brings you a ROM board for small budgets or for those of you who do not wish to open up your Micro frequently. It allows you to change ROMs quickly and efficiently with the minimum of effort – no screws to loosen or keyboard to remove. The unit consists mainly of a zero insertion force (ZIF) socket on a small circuit board which is located into the position of the 'ROM Cartridge' and is connected to one of the internal ROM sockets via a ribbon cable.

- Very simple to install. NO SOLDERING REQUIRED. The ZIF eliminates the possibility of damage to your ROM pins when inserting and extracting them.

- The low profile of the socket allows unrestricted access to the keyboard, unlike other cartridge systems. In addition, there are no costly extras, such as ROM cartridges for every new ROM.

- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- This versatile hardware solves the problem of running out of socket space, simply unplug the ROM and plug in a different one. It is a real must for Professionals and Hobbyists alike.

ONLY **£15**

16K Sideways RAM Modules

This is it! The revolutionary design RAM Module you've been waiting for. Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

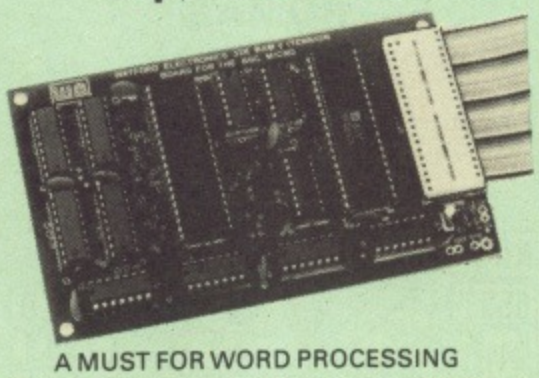
- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Works with any ROM.
- Ideal for professional software development.
- Supplied with utilities software disc.

Introductory offer: **£29**

Optional extras

READ and WRITE protect Switches **£2**
BATTERY BACKUP £3

32K SHADOW RAM– Printer Buffer Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in text in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This superb product is recommended by Computer Concepts for use with both Wordwise and Wordwise Plus. We wholeheartedly agree with this commendation.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Only 12K Buffer can be used in Wordwise or Wordwise+ because of the way these softwares are written. Print large text files while running long graphics programs and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Only 12K Buffer can be used in Wordwise or Wordwise + because of the way these softwares are written.

- Ensure COMPATIBILITY with a vast range of hardware (including Watford & ATPL ROM boards, double density boards, second processors), and software (including BASIC, TOOLKIT, VIEW, WORDWISE (1.20+), WORDWISE-PLUS). This is because our board, unlike those of our competitors, is connected to the computer by a ribbon cable.

- Achieve EASY OPERATION with ROM based software. A large range of commands is available for machine code and BASIC users, including some useful *HELP messages.

Only: £59

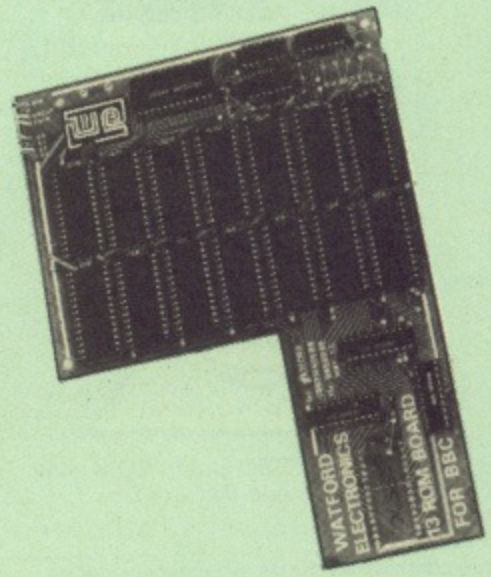
(Price includes a comprehensive manual and the ROM)

SPECIAL OFFER

Watford's 32k RAM CARD
plus Computer Concept's new
WORDWISE PLUS Wordprocessor
ROM Package.

At an incredibly low price of
Only **£69**

Mk-3 13 ROM SOCKET EXPANSION BOARD



- Increase BBCs capacity for ROMs from 4 to 16.
- Easy installation; simply plug in with only 5 wires to solder.
- Minimal space needed.
- Compatible with our DDFS, RAM Card, Torch card, 2nd Processors, etc.
- Advanced low power chips keeps power consumption to a minimum.
- Very versatile Socket 14 can take 2716, 2732, 2764, 27128, 6116 and 6264 chips.
- *LOADs or writes in the region &8000 to &BFFF are automatically directed at the RAM.
- Auto-write protect line makes RAM look like ROM.
- READ protect line which makes socket 14 "vanish" – useful to get out of software crashes.
- On-board battery back-up option with a high speed charging circuit.
- Supplied ready-built and tested, complete with fitting instructions.

Price: Still Only £30
Ni-cad 'PCB' Battery £3

SOLDERLESS SIDEWAYS ROM SOCKET BOARD

Following the success of our 13 ROM SOCKET BOARD, we are proud to announce a new addition to our range – the New Solderless Sideways ROM Socket Board.

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16. Also permissable, are various configurations of RAM (up to 16k) and different sized EPROMs (see below).

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 can take the following chips: 2716, 2732, 2764, 27128, 6116, 6264.
- Auto write protect for RAM chips.
- Read protect to make RAM "Vanish"; allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£35**

Watford ROM/RAM CARD

A must for all serious users

Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with ALL BBC micros (not BBC Plus).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Write protect for ALL RAM.
- Master write protect for all sockets.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Can run ANY BBC ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- Fast *BACKUP via sideways RAM.
- ROM to RAM load and save facilities.

The RFS (RAM FILING SYSTEM) can utilise up to the full 128k of RAM (with the RFS in CMOS RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM/RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM/RAM Board.

The ROM/RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, should the user wish to upgrade in the future. Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM .. **£45**
- ROM/RAM card with 64k dynamic RAM .. **£69**
- ROM/RAM card with a massive 128k dynamic RAM **£109**

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit **£9**
- Battery backup **£2**
- Read and Write protect switches **£2**

Complete ROM/RAM board (all options installed) **£125**

Le Modem

The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 UK and BELL (USA) are all supported.

The features that make Le MODEM such good' value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World/wide data transfer system.*
- *Auto Dials, Auto Answers, Auto Baud selects and is completely controlled by your Micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELESOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON/OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- *BT Approval applied for.*

Launch Price: Only **£89** (carr £3)

(Price includes Software ROM, Cables and Manual)

NEW

GRAPH PAD

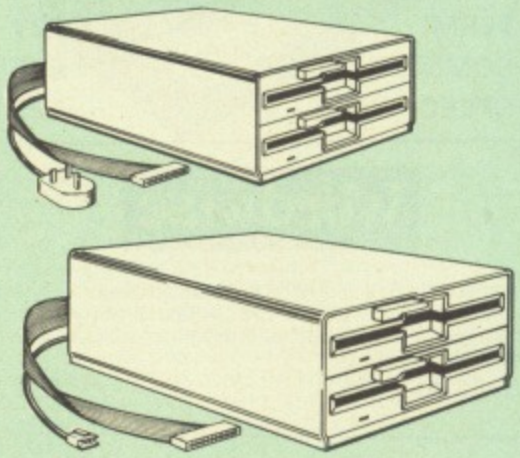
With this popular British Micro's Graph-pad, you can add new dimensions to your computer enjoyment. It helps you to create your own application programs by the simple use of the Graphpad. Ideal for Educational use. Supplied complete with Cables, Manual and a two program cassette.

SPECIAL OFFER **£49** (£3 carr)

CHRISTMAS GIFT VOUCHERS

Following numerous requests from you the customers, we have at last introduced our GIFT VOUCHER service. The Vouchers are available in £5; £10 & £15 denominations and are an ideal answer when faced with that problem of what to give for that special Birthday/Christmas gift. Simply send your credit card number or your cheque for the amount of Vouchers you require and we shall send you these attractive Vouchers. (There is a 50p handling charge on any amount.)

CHRISTMAS DISC DRIVE OFFER



Watford Electronics has always been renowned for bringing high quality products to the consumer at realistic prices.

For the Christmas period, Watford is offering an even better deal on their top quality slimline MITSUBISHI DISC DRIVES for the BBC micro.

Packaged in matching decor the BBC micro, these superb disc drives are an ideal complement to any DFS on the BBC. Backed by a twelve month warranty from Watford, UK's largest distributors of BBC micro peripherals. You can be sure of a great deal from Watford.

The following 40/80 track switchable Disc Drives are being offered at rock bottom prices. The price includes a Utilities Disc. (For technical specification, please see the opposite page.)

- CLS400S Single 40/80 track switchable Disc Drive, cased with cables **£79**
- CLD800S Twin 40/80 track switchable Disc Drives cased with cables **£159**
- CS400S Single 40/80 track switchable Disc Drive cased with cables & Power Supply **£99**
- CD800S Twin 40/80 track switchable Disc Drives cased with cables & Power Supply **£179**

BUY NOW & SAVE £ £ss . . .

Versatile **BEEB SPEECH SYNTHESISER** Unit

The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32

LOGOTRON LOGO

The popular Logotron Logo in ROM.
Recommended by most Education authorities.

Only: £55

Continued ——→

COMPUTER CONCEPT'S ROMS

ACCELERATOR	**£52**
CARETAKER Basic Utility	**£27**
Graphics ROM	**£26**
Disc Doctor ROM	**£26**
TERMI	**£27**
COMMUNICATOR	**£58**
SPEECH ROM	**£26**

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.

SPECIAL OFFER: **£32**

Wordwise plus

£45

FREE FREE FREE

This month we are giving away absolutely FREE, the superb Word-Aid ROM worth £16, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text/segment area.

Price; Only **£16**

HI-WORDWISE-PLUS

Supplied on disc. This version requires a WORDWISE-PLUS ROM to be present in the machine. It gives up to 44k of text space on the 6502 2nd processor.

£5

SHEET

The most powerful spreadsheet package available for the BBC Micro. Ultra-fast replication and calculation times help make this the easiest to use. It has received very favourable reviews. Unique 105 column screen mode. Supplied in 2 ROMs.

£45

INTER-CHART

This unique program is the only one of its sort on the market. Accepts data from a variety of sources and plots line graphs, bar charts or pie charts. Up to 16 separate charts may be stored in memory. Built in screen dump for EPSON compatible printers, but can use other printer dump routines.

ONLY: £30

These ROMs form part of the first and only truly integrated range of programs for the BBC. Up to 16 sets of data can be stored in memory at once and data can be transferred directly and simply between programs, e.g. from sheet to sheet, or sheet to chart, or word processor to sheet etc., etc.

INTER-WORD and INTER-BASE will follow shortly to complete this suite of programs.

P.S. The Watford 32k shadow RAM board is an ideal complement to these programs, allowing them to operate in the 80 column screen modes with NO reduction in memory.

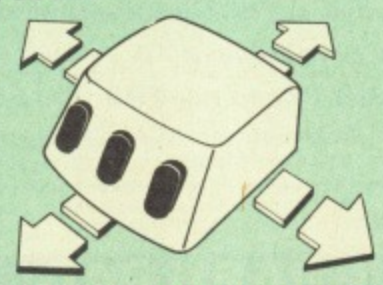
SPECIAL OFFER

Watford's 32k RAM CARD plus Computer Concept's new WORDWISE PLUS Wordprocessor ROM Package.

At an incredibly low price of Only **£69**

THE AMX MOUSE

The AMX Mouse needs no introduction. It is simply the best.



Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.

ONLY: £67.95

We are giving away the sophisticated **COLOUR ART** Software package **ABSOLUTELY FREE** with every purchase of the AMX Mouse from us.

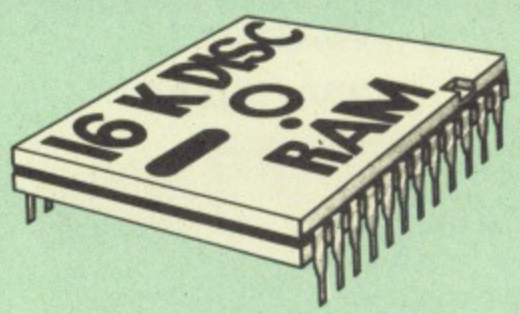
AMX DESK Package	**£19.00**
AMX UTILITY Package	**£11.50**
AMX SUPERART Package	**£43**
AMX PAGE-MAKER Pack	**£43**
AMX 3D ZICON Disc	**£21**
AMX Database Disc	**£21**
AMX XAM Educational	**£21**

COLOUR ART

This novel program allows you to add COLOUR to any drawing produced with your AMX Mouse package, and really brings those pictures alive. Not with just any colours, mind you, but a full range from up to 255 different shades! It's simplicity itself to use this "painting by numbers" painter to create simple, striking and powerful images to please the eye.

Price **£10**

(please specify 40 or 80 track disc when ordering)



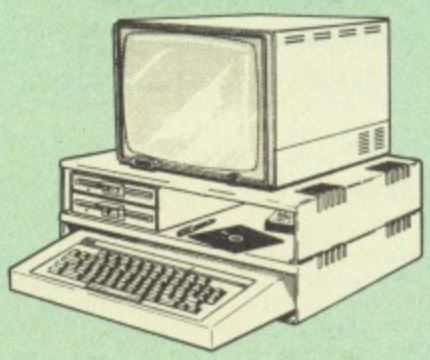
This is the RAM you've been waiting for!! This battery backed up, write protectable 16K sideways RAM board allows you to run from disk every sideways ROM available. Beware of other sideways RAM boards which are not backed up as certain ROMs will not run in these boards even though the RAM can be write protected. The Battery Backup facility allows retention of DATA after power off. On switch on the Micro will think the WATFORD DISC RAM is a ROM. Features available are:

- No soldering or modifications to BBC micro necessary.
- Plugs into normal ROM socket fitting neatly under the keyboard allowing room for other add-ons.
- Easy to use. Comes with disk based software to SAVE and LOAD ROMs. Allows you to make backup copies of your ROMs.
- Disk software can be copied onto other discs when disc is full.
- All existing ROMs can be stored on disk and used in DISC RAM.
- No messy plugging and unplugging of your ROMs. Simply Load the one you want into DISC RAM.
- Ideal for Professional users to develop ROMs. Backup facility allows testing of final versions without using EPROMs.
- The switch provided allows backup and write protection to be switched off externally.
- Can also be used as 16K printer buffer RAM in conjunction with our Buffer & Backup ROM.

New Low Price: £30

P.S. 16K DISC RAM Board is not designed to work in conjunction with a Sideways ROM Board.

PLINTHS FOR BBC MICRO AND PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£19** (carr. £2.00)
PRINTER PLINTH	**£10** (carr. £1.50)

BOOKS (No VAT on Books)

21 Games for the BBC Micro	£5.95
30 Hour BASIC (BBC Micro)	£6.95
35 Education Programs for BBC	£6.95
40 Educational Games for the BBC Micro	£5.95
6502 Assembly Language Program	£13.95
6502 Application	£11.95
6502 Assembly Language Subroutines	£19.95
6502 Machine code for Humans	£7.95
68000 Assembly Lang. Programming	£19
A young persons guide to BBC Basic	£4.50
Advanced Disc User Guide	£9.95
Advanced ROM User Guide	£14.95
Advanced Machine Code Technique for BBC	£7.95
Advanced Programming for the BBC Micro	£6.95
Advanced User Guide for BBC Micro	£11.95
Advanced Graphics with BBC	£9.95
Advanced 6502 Programming	£12.45
Assembly Language Programming on BBC Micro	£7.95
Advanced Programming Techniques for the BBC Micro	£7.95
Applied Assembly Lang. for BBC	£7.95
Assembler Routines for the 6502	**£XXX**
Assembly Language Programming FOR the BBC Micro	£8.95
Assembly Programming made Easy	£5.95
Basic ROM User Guide	£9.95
Basic User Guide for BBC Micro	£10.00
BBC BASIC for Beginners	£7.95
BBC BASIC	£5.95
BBC Forth	£7.50
BBC Hardware Projects	£8.95
BBC Machine Code Portfolio	£7.95
BBC Micro add on guide	£5.95
BBC Micro An Expert Guide	£6.95
BBC Micro Assembly Language	£7.95
BBC Micro Book BASIC Sound & Graphics	£7.95
BBC Micro Graphics and Sound	£6.95
BBC Micro ROM Book	£9.95
BBC Micro **ROM PAGING** System Explained	£2.00
BBC Micro Disc Companion	£7.95
BBC User Guide	£10.00
BBC Wargaming	£8.95
Basic Programming on BBC Micro	£5.95
BCPL User Guide	£15
Brain teasers for BBC micro	£5.95
Business Applications on BBC	£7.95
Computing for All the Family	£6.45
CP/M Bible	£16.00
CP/M Handbook with MPM	£13.95
CP/M Soul of	£14.95
CP/M The software BUS	£8.95
Creating Adventure Programs on the BBC Micro	£4.95
Creative Animation & Graphics	£7.95
Creative graphics on BBC Micro	£7.50
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
Disc Programming Techniques	£7.95
Discovering BBC Micro Machine Code	£6.95
Discover FORTH	£13.95
Easy Programming for the BBC Micro	£5.95
Electron Machine Code for Beginners	£6.95
Exploiting BBC Basic	£6.95
Exploring FORTH	£6.95
Filing System & Databases for the BBC Micro	£7.95
Further Prog. for BBC Micro	£5.95
FORTH on the BBC Micro	£7.95
Forth Programming	£14.40
Functional Forth for the BBC Micro	£5.95
Games BBC Computer Play	£6.95
Getting more from your BBC & Electron	£6.95
Graphics for Children	£7.95
Graphs & Charts on BBC Micro	£7.50
Graphic Art for BBC Computer •	£5.95
Hackers Handbook	£4.95
Handbook of Procedure & Functions for the BBC Micro	£6.95
Introducing CP/M on the BBC Micro Z80 2nd Processor	£9.95
Interfacing Projects for the BBC	£6.95
Introducing the BBC Micro	£5.95
Introducing LOGO	£5.95
Introduction to FORTH	£8.95
Introduction to PASCAL	£16.50
Let your BBC teach u to program	£6.45
LISP	£9.25
LISP, A Beginners Guide to	£10.95
LISP Cassette	£15.50
Logo Programming	£8.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering CP/M	£16.50
Micronet Handbook	£6.95
Practical Programs for the BBC Micro	£6.95
Programming the 6502	£13.95
Programming the BBC micro	£6.95
Programming the Z80	£16.95
Programming with Graphics	£5.95
Sensing & Control Projects for the BBC Micro	£5.95
Structured Prog. with BBC BASIC	£6.50
The Complete FORTH	£6.95
The Complete Programmer	£5.95
The Epson FX/KAGA PRINTER Commands REVEALED	**£5.95**
Using Floppy Discs with BBC Micro	£5.95
Viewsheet User Guide	£3.50
Using BBC Basic	£6.95
Wordstar & CP/M made easy	£7.45

BEEB VIDEO DIGITISER

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Features offered by this package include:

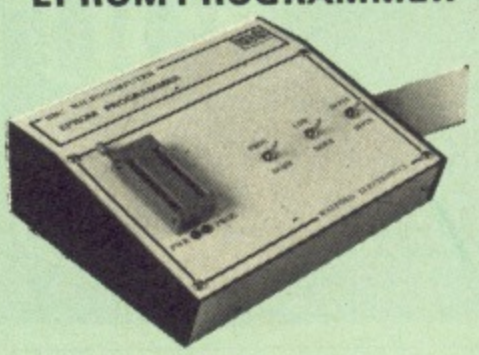
- The adding of pictures or written text to typed documents.
- Unattended recording of scientific data.
- Entry of real images into graphics programs.
- Generation of computer images.
- Slow scan television; sending images via a modem or radio.
- Security.
- Input from any video 1v video source.
- Full resolution in Modes 0,1 or 2.
- 1.6 seconds scan time.
- Up to 8 grey levels
- Manual or Auto level control
- Connects to user port

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£95 (Carr. £3)

(Price includes: Digitiser Unit, ROM & a comprehensive Manual.)

EPROM PROGRAMMER



The Watford Electronics' EPROM programmer for the BBC micro is a high quality self contained package. Programs all popular EPROMs from 2K to 16K: 2716, 2516, 2532, 2564, 2764 and 27128. All manufacturers' specifications have been followed to program EPROMs at the correct speed – wrong timings could destroy your EPROMs. The unit has its own power supply so does not put heavy loads on the BBC power supply as do some other units. Connects directly to the 1MHz bus following all Acorn recommendations on addressing and bus loadings.

SOFTWARE PACKAGE
The software is supplied on an EPROM which plugs into the Micro and is instantly available with a single command (no time wasting as on Cassette/disc loading). It is a fully purpose designed and ingegrated package to simplify ROM development. The system is menu driven with many prompts to avoid any accidents.

Software facilities include:
Load File – Save File – Down Load EPROM – Program EPROM – Verify – Blank Check – Editing of memory contents prior to programming.
Also included is an automatic system to allow Basic programs to be put in EPROM and accessed through the *ROM filing system. More than one program may be put in an EPROM. All these facilities and more are explained in the comprehensive and clear 15 page manual.

SPECIAL OFFER £69
(£3 carr.)

LOW COST 'DIN' EPROM PROGRAMMER

A high performance, low cost, self contained 'DIN' EPROM PROGRAMMER for the BBC Micro. Plugs into the BBC Micro's user port.

The features are:
- Will program 2716, 2732, 2532, 2764 & 27128 EPROMs.
- Copy Eprom into memory and compute checksum.
- Blank check EPROM.
- Program EPROM from memory.
- Verify programmed EPROM and display checksum.
- All * commands may be used from menu mode.
- High speed programming on 2764 & 27128.
- Machine code SOFTWARE supplied in ROM.

Only: **£49.50** (carr. £2)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.
- **ERASER EB** – Standard version erases up to 16 chips. **£28**
- **ERASER GT** – Deluxe version erases up to 28 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30**
- Spare UV tubes. **£9**

Continued ⟶

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£16
Delta 14B Single Joystick	£12
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc/Tape	£7

ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

Price: **£2**

British Micro's GRAPH PAD II

Only **£49**

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£9.50**

FLEXIBLE KEYBOARD CONNECTOR

A 'Keyboard to Micro' replacement jumper lead.

£4

ATTACHE CARRYING CASE for BBC Micro

The Attache carrying case is attractively finished in mottled antique brown leatherette. The case is made of tough plywood, providing a very solid and safe way to carry your BBC micro. There is room provided to fit all the leads necessary behind the computer and manuals in the front.

Locks supplied with two keys. Price **£11** (£2 carr.)

DATA RECORDER

Top quality slimline portable cassette recorder designed specifically for use with home computers. Mains/Battery operated with tape counter.

£20

DATA CABLE to connect recorder to BBC **£2.00**

DATA CASSETTES

Top grade tested C12 Data cassettes supplied in library cases **35p** each; 10 for **£3.20.**

CONNECTING LEADS

(All ready made and tested)

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**

DISC DRIVE POWER LEADS

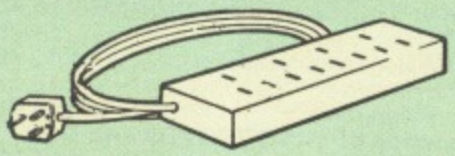
Supply from BBC power supply to standard Disc Drive connector.

Single **£3.00** Dual **£3.75**

MISCELLANEOUS CONNECTORS

	Plugs	Sockets
RGB (6 PIN DIN)	30p	45p
RS423 (5 pin Domino)	40p	50p
Cassette (7 pin DIN)	25p	65p
ECONET (5 pin DIN)	20p	30p
Paddles (15 pin 'D')	110p	215p
BBC Power Plug 6 way	80p	–
Disc Drive Plug 4 way	75p	–

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug.

£9.99

CREDIT CARDS 24 HOUR HOT LINES
ACCESS 0923 50234
VISA 0923 33383

SPARES for BBC Micro

Keyboard	**£46;**	Keystrip	**£2**
Power Supply	**£45;**	Case	**£25**
UHF Modulator	**£4;**	Speaker	**£2**
Speaker Grill	**£1;**	Keyswitch	**£2**

28 pin ZIF SOCKET (Textool) **£6.95**

28pin DIL HEADER PLUG

SOLDER type	**£1.50**
IDC CRIMP type	**£1.95**

RIBBON CABLE

28way **55p/ft;** 34way **60p/ft.**

8way DIP SWITCH **£0.85**

CHIP SHOP

7438	**40p;**	74LS00	**25p**
74LS04	**25p;**	74LS10	**25p**
74LS123	**80p;**	74LS163	**70p**
74LS244	**80p;**	74LS245	**£1**
74LS393	**£1.20;**	4013	**60p**
4020	**£0.90**	4816	**£1.00**
DS3691	**£3.50**	DS88LS120	**£3.00**
LM324	**£0.45**	UPD7002	**£4.40**
6502A CPU	**£5**	65C02 CPU	**£9.50**
6522	**£3.40**	6845SP	**£6.75**
SAA5050	**£8.75**	SN76489	**£5.50**
2764-250nS	**£2.00**	27128-250nS	**£3.00**
6116LP-2K	**£2.75**	6264LP-8K	**£4.00**
8271	**£45**	ACORN DNFS	**£15**
ACORN OS 1.2	**£6**	ACORN BASIC 2	**£16**
Serial ULA	**£13;**	Video ULA	**£15**
Acorn BCPL	**£50;**	Acorn COMAL	**£43**
Acorn FORTH	**£43;**	Acorn LOGO	**£60**
ICON Master	**£29;**	ISO Pascal	**£60**
LOGOTRON LOGO	**£55**	MUROM	**£17**
ROMIT	**£29;**	SLEUTH ROM	**£24**
TERMULATOR	**£30;**	Toolkit Plus	**£33**

ISLAND LOGIC MUSIC SYSTEM £25

ALNOOR ARABIC ROM

Now available from stock, ARABIC ROM and Keytops for the BBC Micro. Please write in for further details.

Acorn's GRAPHICS ROM
£25

Glentop's 3D GRAPHICS Development System
Only: **£22**

BEEBFONT ROM

BEEBFONT is a remarkable and different concept in BBC software. It allows you to display text on the screen in 13 different styles. It is supplied complete with a Spooler and Editor on 40 or 80 track disc.
(Please write in for technical details).

ONLY **£25**

ROM MANAGER

Probably the most powerful way of expanding the BBC micro is from the use of Sideways ROMs. One problem faced by the avid ROM collector is that of ROM command clashes. The solution is very simple in the form of the ROM that "Provides comprehensive management of all your installed ROMs". (Quote from BEEBUG November '84.)

Basically, ROM Manager offers you the ability to turn off any installed ROM, or to send any * command to any specific installed ROM. It is said that imitation is the sincerest form of flattery – Acorn's BBC Plus features many of the abilities of this powerful ROM.

Many more facilities available.

Price **SPECIAL OFFER £18**

ACORN MUSIC 500

The most powerful Music Synthesiser available. Designed for expansion in mind. Has own powerful music programming language. Supplied complete with manual and Tape containing AMPLE language & 15 demo tunes to start you up. (These are listed as example programs).

As a Christmas present from Watford, this unit is Astounding value for money at the special price of

***£99** (carr £4)*

Call in at our shop for a demonstration on any of the items listed in this advert† Be satisfied before your buy. You may write in for a technical leaflet on any of our products. (An SAE will be appreciated.)

Prices subject to change without notice and available on request.

MAIL ORDER AND RETAIL SHOP. TRADE AND EXPORT INQUIRIES WELCOME. GOVERNMENT AND EDUCATIONAL ESTABLISHMENTS OFFICIAL ORDERS ACCEPTED.
CARRIAGE: Minimum £1 on all cash orders. On bulky items, Securicor charge applies.

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

SHOP HOURS: 9.00am to 6.00pm. Monday to Saturday. (Ample Free Car Parking Spaces)

Watford Electronics

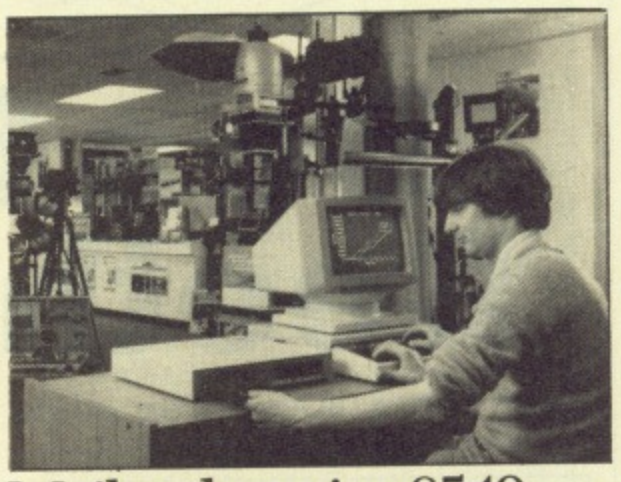
Dept. BBC, JESSA HOUSE, 250, Lower High Street, WATFORD, ENGLAND
Credit Card Orders TEL: ACCESS (0923) 50234 VISA (0923) 33383
Telephone: (0923) 37774; Telex: 8956095 WATFRD

Torch mail order price breakthrough

1986 SPECIFICATION TORCH UPGRADES, DIRECT FROM THE MANUFACTURER AT SPECIAL MAIL ORDER PRICES.

◂ ZEP 100
Z80 extension processor
Free software and carry case.

ZDP 240 ▸
Twin floppy discs and Z80 processor
Runs BBC-MOS and CP/M compatible software using high quality, double-sided 400K disc drives. Allows storage for BBC DFS and CP/M programs.

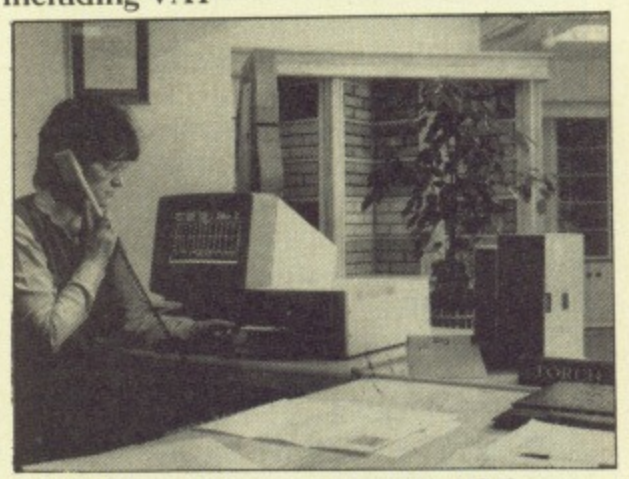


Mail order price £229
including VAT

Mail order price £549
including VAT

◂ HDP Z80
Hard disc, floppy disc and Z80 processor
Adds a massive 20 Mb of hard disc storage, ideal for small business and education environments.

Torch Graduate ▸
The only IBM compatible upgrade for the BBC Microcomputer
MS-DOS O/S, 8088 16-bit processor, 256K RAM plus twin 360K disc drives.



Mail order price £1,999
including VAT

Mail order price £499
including VAT

The official range of upgrades for the BBC Model B Microcomputer now has an even higher specification and a price tag lower than ever before. Better O/S firmware, improved utilities, new user guides plus free software with all models.

Complete the order form today or telephone (0223) 841000 with your VISA/ ACCESS card number.

Torch Z80 owners send a cheque for 1986 upgrade pack, only £29.95 including VAT and P & P.

TORCH COMPUTERS

Torch Computers Ltd., Abberley House, Great Shelford, Cambridge CB2 5LQ.
Tel: (0223) 841000

To Torch Computers Ltd., Abberley House, Great Shelford, Cambridge CB2 5LQ.

		Unit Cost	Total
Quantity ____	ZEP 100(s)	@ £229.00	£ ____
Quantity ____	ZDP 240(s)	@ £549.00	£ ____
Quantity ____	HDP Z80(s)	@ £1,999.00	£ ____
Quantity ____	Torch Graduate(s)	@ £499.00	£ ____
Post and packaging £19.50 per order			£19.50
Cheque enclosed for		TOTAL	£ ____

or charge my Access ☐ Visa ☐

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature ____

Name ____

Address ____

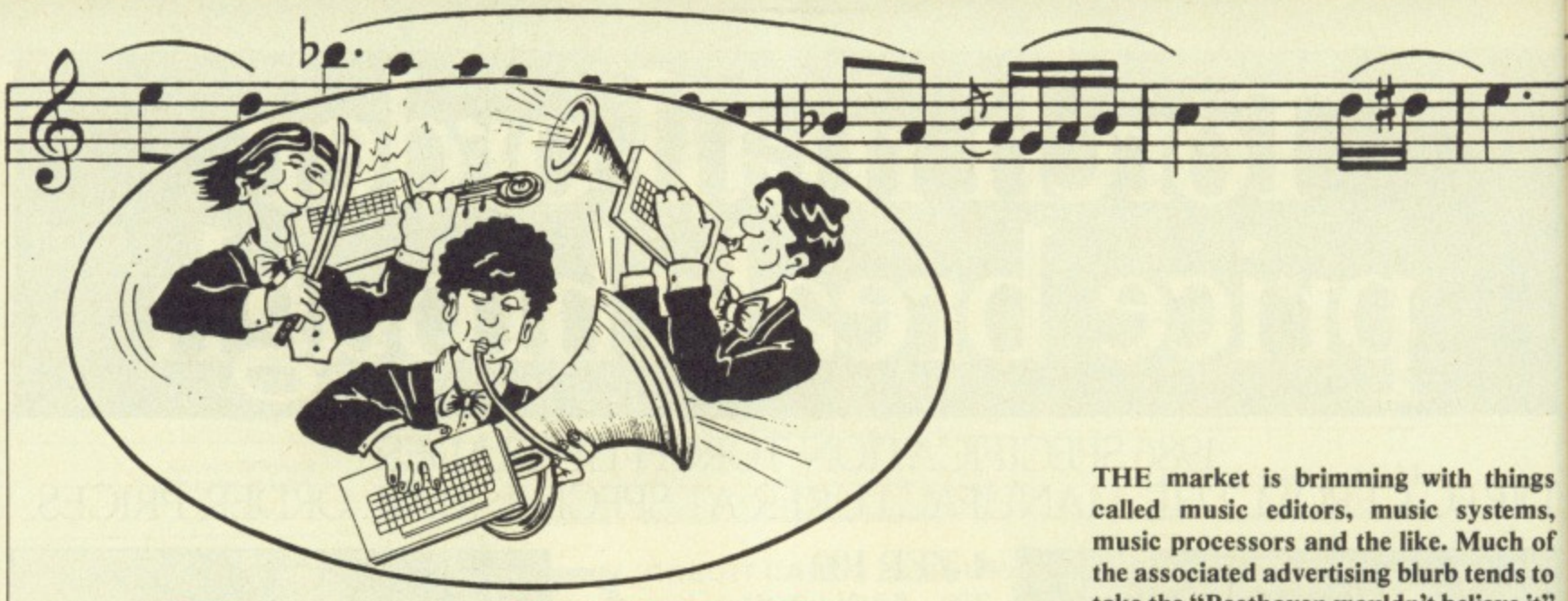
____ Tel: ____

Allow 7 days for despatch of goods.

MU1

MAIL ORDER FOR A LIMITED PERIOD ONLY

The Graduate is manufactured by Torch Computers under licence from Data Technologies Ltd. Product names referred to are trademarks of the companies of origin.



Be a BBC Beethoven

with this step-by-step guide by GABRIEL JACOBS

THE market is brimming with things called music editors, music systems, music processors and the like. Much of the associated advertising blurb tends to take the "Beethoven wouldn't believe it" line, assuring us that no understanding of music is necessary to release the composer lurking within us.

Even taken metaphorically, this is nonsense. Musical tools for computers, without exception, require some knowledge of musical theory. So if you know nothing at all about the subject why not start with the 10 minute course below.

If you don't feel you need it, but are

A 10-minute music course for the absolute beginner

MUSIC is pitch (how high or low a note is) and rhythm. There's no need to define rhythm, it's instinctive. Tap out the rhythm of "Happy Birthday to You", and most people will recognise the tune. Play the notes with the right pitch but the wrong rhythm, and few people will get it.

RHYTHM

Most music is divided into bars. A bar contains a given number of units, called beats. The most common beat is the crotchet.

- Half a crotchet is a quaver.
- A quarter of a crotchet is a semi-quaver.
- Two crotchets make up a minim.
- Four crotchets make up a whole note, usually called (as if deliberately to confuse us) a semibreve.

There's nothing terribly difficult about that, except that the names may be strangely familiar garbage to you. It's worth learning what they mean, however, for they crop up all the time.

If a bar is meant to contain, say, four beats, it can be made up of any combination of the above. For example, it could contain: 1 minim (= 2 beats) + 2 quavers (= 1 beat) + 1 crotchet (= 1 beat): total 4.

A period of silence is called a rest, and is measured in beats. A minim rest, for example, is a period of silence lasting two beats.

The time signature (which may look something like $\frac{3}{4}$) tells you how many beats there are in each bar. The lower figure indicates the unit, the upper figure how many of them.

The figure 4 represents a crotchet (because four crotchets make up a whole note, or semibreve – in fact in the United States a crotchet is called a quarter note). So $\frac{3}{4}$ means three crotchets to the bar, $\frac{6}{8}$ means six quavers to the bar, and so on.

The speed at which beats are played (as opposed to the number of beats in a bar) is called the tempo. This is measured in beats per minute.

PITCH

The standard way of naming the pitch of notes is to use the letters of the alphabet from A to G, then to start again at A – eight notes, including the two ends, or an octave.

Notes go up or down in steps called intervals. The interval between a note and the one immediately above or below it is called a tone – except between B and C, and E and F, where it is a semitone (half a tone). There are reasons for this anomaly, but let's not get bogged down in that.

All tones can be divided into two semitones. If you higher a note by a semitone, you sharpen it. If you lower it be a semitone, you flatten it. So F sharp, written F♯, is a semitone below G. G flat, written G♭, is a semitone above F.

In fact they're the same note with different names, and a loose analogy might be deciding whether to round 0.5 up or down. There are reasons for deciding on a sharp rather than a flat, but let's give that particular by-road a miss too.

Sharps and flats can be toggled off by naturals, the symbol for which is ♮. So G♮ means plain old G (it was sharpened or flattened, and you now want it to return to its original state).

Sharps, flats and naturals are called accidentals. There are other accidentals, but they're less important.

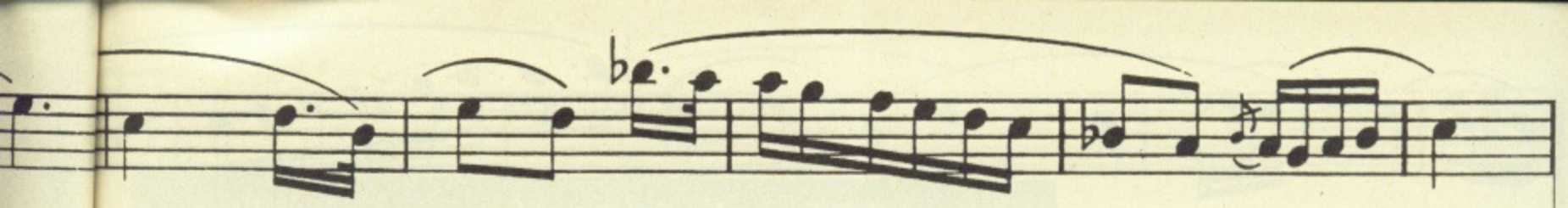
KEY SIGNATURES

Suppose you want, say, all Fs to be sharp, or perhaps all Bs and Es to be flat. Clearly it makes sense to indicate this just once at the beginning of a passage of music.

A key signature tells you which notes are sharpened or flattened throughout, in other words what key the music is in. It also tells you which is your "home" note. This is often the last note of a piece of music.

So, for instance, in the key of G, the home note is G, and all Fs are sharpened.

There's more to musical theory than this, of course. But you now know the bare minimum.



still confused about BBC Micro music, read straight on.

Music-making packages for the stand-alone BBC B are more or less friendly front ends to its sound chip, and can be classed under the general heading of music editors.

You'll sometimes see them referred to as music processors, but the experts prefer to reserve this term for the musical equivalent of word processors.

The purpose of a music processor is to send the sticks, blobs and squiggles of standard musical notation to a printer, without necessarily involving the sound chip at all.

Music editors, on the other hand, are synthesisers – they synthesise (create artificially) the sounds made by natural (ordinary) musical instruments, and other sounds besides. They are therefore buffers between you and the BBC's hostile SOUND and ENVELOPE statements – the panel (right) tells you what these statements do.

Since ENVELOPE deals with changes in note information, it can best be represented graphically.

Some editors display graphs only of pitch, others only of amplitude. In some the display is little more than cosmetic, in that any editing has to be done back at the level of the ENVELOPE statement.

In the most sophisticated you can alter parameters without having to enter any numbers – such as by using the cursor keys – see the new shape and immediately hear the result.

The SOUND parameters are not concerned with change, so there's no point in plotting them. Rather, music editors shield you from them with symbols.

These symbols may either be those of standard musical notation or simple letter names with special characters for accidentals, rests, note duration, and so on. If you haven't understood that, go back to the ten minute course, and extend it to 15 minutes!

The two best-known editors for the BBC Micro, and in my view the best overall, are Island Logic's The Music System (TMS) and Beebugsoft's Murom. In many ways they typify the two approaches to music editing, since one uses standard notation while the other avoids it.

The standard notation favoured by TMS has the advantage that it can be read and understood by any musician. But, if you haven't been brought up with it, it can be hard to learn so well that it's second nature to you.

Editors which avoid standard notation use a variety of formats for note display, most of which are satisfactory once you get used to them. Murom uses a window on a four-column vertical "sheet" of note letter names, with one column for each channel.

This neatly solves one of the recurrent problems of music editing on a micro, that of note alignment between channels. With the Murom system you actually see the duration of a note, not a symbolic representation of it. The longer a note is, the more slots it occupies on the sheet.

You can therefore synchronise rhythms between the four channels at a glance. This is more difficult to achieve with standard notation packages, though TMS does it better than most.

The choice between the two, and therefore between the many packages they represent, of course boils down to individual requirements. But for a broad judgement it's worth bearing in mind that entering notes when alignment is less likely to cause problems – for example when copying from a printed score – is on the whole simpler with TMS, while the Murom approach to note input generally makes for easier creative work.

The method of note display is not, however, the only point of comparison between these two programs.

Since Murom is ROM-based most of the RAM can be used to store notes, in fact more than 8,000. TMS has to rely on linking saved files.

On the other hand, TMS handles repeats and common sections with little extra use of memory, whereas with Murom repeated sections have to be copied to a new area of the sheet, needlessly taking up space. Nevertheless, in practice you can hold more played music in RAM with Murom than with TMS.

When it comes to editing envelopes TMS comes out on top. Its matched pitch and amplitude graphs can be edited interactively. With Murom,

→

SOUND and ENVELOPE

ENVELOPE is a complex statement, but basically handles only two sets of parameters, both concerned with change:

- A set of parameters controlling changes in the pitch of a note – to what extent it goes higher or lower.
- Another set concerned with changes in its amplitude – how loud or soft it becomes.

The SOUND statement has four parameters, channel, amplitude, pitch and duration. Two of these, amplitude and pitch, are also part of ENVELOPE, but in SOUND they are simply starting points. They set initial levels which can then be refined by ENVELOPE.

Let's take an example. Suppose you have defined a note with the SOUND statement to be of a given pitch and amplitude.

That same note played, say, on a guitar, would change in amplitude after the string had been struck. It would be loudest at first, then die away.

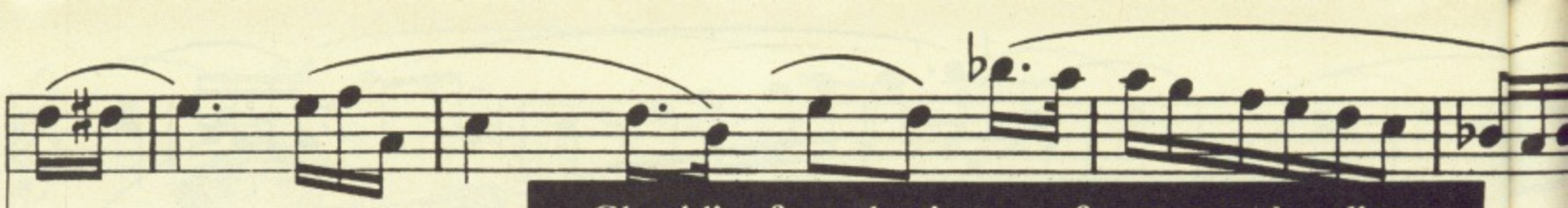
Equally, a note played on a guitar can be made to "wobble" slightly (change pitch up and down a little) by moving the finger holding down the string. Instrumentalists often make notes wobble to produce what is called vibrato.

You achieve such changes in amplitude and pitch on the BBC Micro by applying an envelope to a SOUND statement.

The duration parameter of the SOUND statement refers simply to how long a note lasts before it stops.

Channel refers to any one of the BBC Micro's four sound channels. Three of them are for pitched notes, and one for notes of indeterminate pitch, such as drum and cymbal sounds.

Each channel handles a single sound, but all four work concurrently, so notes can be sounded together, like four players in a band.



From Page 49

editing has to be done on a separate screen.

At the heart of both packages is a sequencer – a device for storing sequences of notes. In TMS with its magnificent graphics, the sequencer takes the form of a four track tape recorder represented on screen. With Murom the sequencer is essentially the program itself, since entering a note implies storing it as part of a sequence.

Both packages have a transposition facility. both allow real time input by configuring the keyboard as a piano, as well as "step-time" input – note by note, at your leisure.

Both will save music in BBC Micro format, so it can be re-played without the program itself being present. Murom's use of interrupts also allows its music to be played while the machine is performing other operations, such as loading from cassette or printing.

On the whole, TMS scores highly on presentation. But its full potential can only be realised by those familiar, or prepared to become familiar, with standard notation. What is more, the program by no means covers every nuance of such notation – nor do any of its direct competitors – and this limits its flexibility.

Murom scores on simplicity of note input, but is less enjoyable to use than TMS. Screenfuls of numbers and note letter names can be daunting.

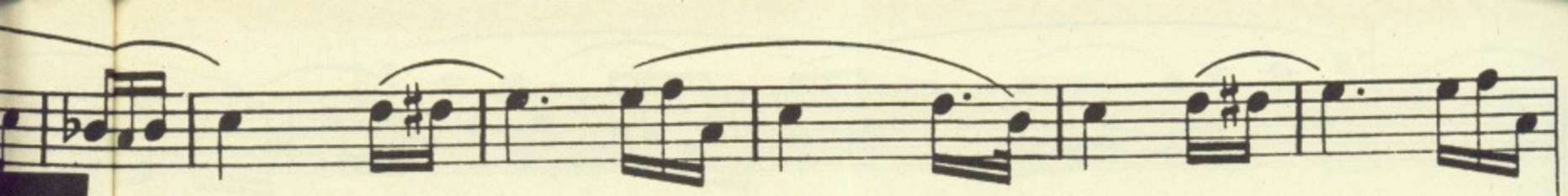
The real problem in selecting an editor is that you can't really judge one until you've used it for a while. You're not likely to make a ruinously expensive mistake – most cost well under £30 – but you could waste time learning the quirks of a particular package, only to find in the end that it doesn't suit you. The checklist opposite should at least help clarify your requirements.

One last piece of advice: Go for a straight software package before plunging headlong into the world of add-ons. For the most part, add-ons are for the serious user, not least because many of them cost almost as much as the BBC Micro itself, and some of them much more.

They offer far, far wider possibilities than software music editors . . . but that's another story.

Checklist for selecting a software music editor

Are you unfamiliar with standard notation, and not prepared to learn it?	*Obviously, choose a package which avoids it.*
Do you want a very user-friendly package in order to create the occasional piece of music?	*Allow yourself to be highly influenced by screen presentation!*
Is your prime objective to compose your own pieces?	*Look carefully at both real-time and step-time input facilities. A package which displays all four lines simultaneously on screen is preferable.*
Will you want to be able to play music without the package present?	*Check that files can be saved in BBC format. An interrupt-driven program is useful.*
Are you primarily interested in experimenting with sound effects?	*A good envelope editor is essential.*
Are you not accomplished enough as a musician to benefit from real-time input via the keyboard configured as a piano?	*Do not be too influenced by skilled demonstrations of real-time input – it takes a lot of practice.*
Are you going to be entering notes from printed scores?	*Choose a package with good graphics and preferably one which uses standard notation on screen.*
Do you need hard copies of music in standard notation?	*Check that the editor has a print facility compatible with your printer. Check that print quality and the range of symbols are adequate for your needs.*
Is it important to you to be able to create long pieces of music, say more than a few minutes not including repeats, common sections and so on?	*Go for a ROM-based package, or check that the linking facilities are adequate.*
Is a ready-made library of sounds and tunes important to you?	*If possible, hear the pre-set sounds before buying. Some are unimpressive.*
Are you going to use the package for teaching purposes?	*Check the accuracy and range of musical symbols, if used. In many packages the range is severely limited.*
Will the music you create be, for the most part, limited to intervals of a semitone?	*For extensive use of intervals of less than a semitone (not including special envelope effects), do not opt for standard notation. Check that the input routine allows easy pitch adjustments.*
Do you intend to "play" your BBC Micro with other instruments?	*Check that the package has transposition and tuning facilities. Real time tempo change can be useful. Real time input may be preferable, but is not essential.*
Do you enjoy working with long data statements, and writing your own programs from scratch?	*Remember that at the level of the SOUND and ENVELOPE statements, you can do everything a music editor can do. You may have more fun by not buying one!*



PLAY alonga Alan

Take the toil out of your micro music making with this easy to use music editor by ALAN HAMPSON

WE all know the BBC Micro is capable of creating superb musical effects. However if you've ever tried using the SOUND statement you'll know that these effortless passages involve a considerable amount of work.

In order to make the task less daunting, especially if you're entering from sheet music, here's an easy-to-use music editor, called Play.

Its main features are:

- Up to three channels (voices).
- Music entered bar by bar for easy editing.
- Up to 60 bars or 480 notes per channel – and can be extended.
- Choice of 15 key signatures.
- Choice of nine predefined playback envelopes (four for tape users).
- Choice of 20 tempo settings.
- Tunes may be loaded/saved on tape or disc.

The letters A to G represent the seven basic notes of the scale, with the default pitch of A being the first above middle C.

The octave is considered to run from A to A with an octave change between the G and the next higher A.

To change octave up or down the > and < symbols are used, so a rising A scale becomes ABCDEFG>A. Similarly, a descending C scale would be CBA<GFEDC.

At any time spaces may be used to separate notes to improve legibility.

The symbols#, - and N are used to indicate sharp, flat and natural respectively. They should be entered immediately after the note concerned, for example: A- (A flat), C# (C sharp), EN (E natural).

To avoid the need to enter sharps or flats throughout a piece, other than accidentals, the program will ask you to enter a key signature whenever you enter a new piece of music.

This should be entered as the number of sharps or flats in the key, for example, 2F (Bb major/G minor). The full list of available keys is shown in Figure I.

For C major or A minor, simply press Return. The sharps or flats belonging to the key will be catered for automatically.

The following symbols represent notes of the given durations:

W	Whole	(semibreve)
H	Half	(minim)
Q	Quarter	(crochet)
8	Eighth	(quaver)
S	Sixteenth	(semiquaver)
T	Thirty-second	(demisemiquaver)

The convention used throughout is that a note's duration is assumed to be the same as that of the previous one unless otherwise indicated.

So the first entry on each channel should be a time value symbol. This duration will then be given to every subsequent note entered until you enter a different time value.

This saves having to enter a duration for every note, since most music will contain, here and there, groups of notes of equal duration.

Notes may in addition be "dotted", that is, the duration is temporarily extended by half the original length, by entering a full stop after the note concerned.

As an example of how to enter notes and time values, consider the first few notes of the National Anthem, here played in the key of C.

Q C C D B. 8 C Q D

(the spaces are for clarity)

The sequence here is:

Q	Selects crotchets.
CCD	First three notes (all crotchets).
B.	Fourth note dotted (crotchet and a half).
8	Selects quavers.
C	Fifth note (quaver).
Q	Back to crotchets.
D	Sixth note (crotchet).

The letter X is used to denote a rest, or silences. Its duration follows the same convention as for the notes A to G, it can thus be dotted and so on. However any pitch symbol – sharp, flat or natural – will be ignored since it has no meaning when applied to a rest.

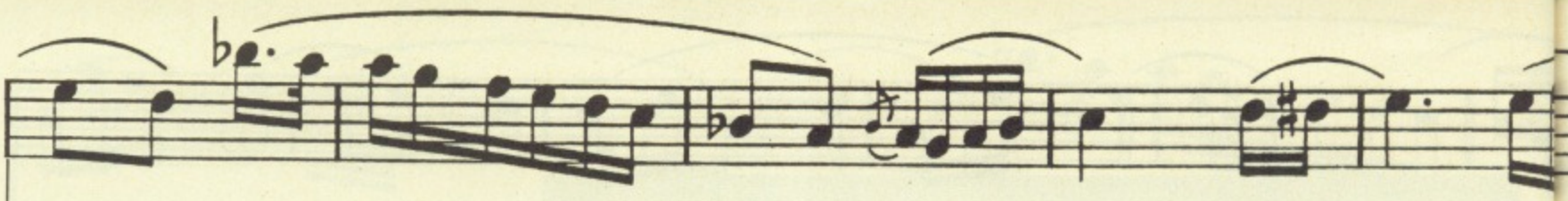
If a piece of music has one voice beginning at, say, bar one and a second voice which does not come in until bar two, then the first bar of voice two should contain rest(s) of the appropriate duration, so as to maintain proper synchronisation.

A trill, where the note alternates rapidly between its normal pitch and a semitone above, may be specified by entering the † symbol immediately after the note to be trilled.

Trills should not be used by tape-based users, as they rely on the

♭ FLAT KEYS	ENTER	♯ SHARP KEYS	ENTER
F major or D minor	1F	G major or E minor	1S
Bb major or G minor	2F	D major or B minor	2S
Eb major or C minor	3F	A major or F minor	3S
Ab major or F minor	4F	E major or C minor	4S
Db major or Bb minor	5F	B major or G minor	5S
Gb major or Eb minor	6F	F major or D minor	6S
Cb major or Ab minor	7F	C major or A minor	7S

Figure I



From Page 51

extended envelope area, which will be overwritten when loading or saving tunes.

Octave change and time value symbols should always appear before the first note which will be affected. All other symbols appear after the note affected.

If more than one such symbol is required, for example F. , the actual order within themselves is unimportant.

Listing I which must be saved as (PLAY1) should be CHAINed. This will set up the envelopes and CHAIN the main program, Listing II.

This first clears the screen and prints a reminder of the symbols used which stays at the top of the screen throughout the session.

If you have a disc system a catalog will be displayed next – tape users should omit line 80. In all cases the program then asks for a filename to load. If Return is pressed without a name, the program assumes that you are creating a new piece and asks for the key signature.

If a filename is given that file is loaded into memory and the tempo, key and number of bars displayed.

In either case, the program then offers the main option menu which may be returned to at any time by pressing Escape. An option is selected by pressing the appropriate letter, so let's go through them:

Copy (C)

This enables the contents of a bar to be copied to another bar. You are asked to enter the number of the bar from which to copy, then the bar number into which the copy will be made: each should be followed by Return.

The program will then ask, voice by voice, whether that particular voice is to be copied. Typing Y or N is sufficient.

Having prompted for all three voices, the program continues into the next bars automatically, thus allowing a group of bars to be copied.

When you have copied all you want, simply press Escape to choose another option.

Edit (E)

This is the procedure for entering new pieces or editing existing ones involving printing the contents of each voice within each bar and asking whether you want to change them.

You are first asked which bar you want editing to begin at. Enter this followed by Return. (If Return alone is entered bar 1 is assumed.)

Voice 1 of this bar is then displayed. If the contents are null, as for a new piece, the program prompts "Insert?", after which you may enter the notation for that bar/voice, followed by Return.

Where information is already present, the prompt is "Change to?": The new details may then be entered.

The cursor, Delete and Copy keys

QUAL-SOFT **THOUGHTWARE** **Sports simulations**

"Thanks for a soccer game that doesn't assume all soccer fans are mentally retarded or only 6 years old". W. Whitworth, Stoke-on-Trent.

"I find the packaging of this game beaten by only Revs and Elite, and the contents of the game beaten by none". Jason Sinclair, Leeds.

Qual Soft comment: We are pleased to be compared with these excellent games and would point out that we are also **£5 CHEAPER THAN EITHER!!!**

In 1966 Alf Ramsey proved that English club soccer players, with intelligent management, could not only dominate European club football, but could take on, and beat the rest of the world at International level. Could you do the same in ....

MEXICO '86

A WORLD CUP MANAGEMENT SIMULATION

Tape 1 (Qualifiers) + Tape 2 (Finals) + 20 Page Booklet **£9.95**

DISC Qualifiers + Finals + 20 Page Booklet **£12.95**

Summer 1984 and English International football is at its lowest ebb. We have failed to qualify for the European Nations Cup, and had a string of very poor International results. In a few months we will set out on the '86 World Cup qualifying trail. You have been given the most important job of restoring English pride in their football. You have a match in Paris, the USSR at Wembley, and a South American tour, to assemble a team, first to qualify, and then to beat the world's best in Mexico.

TAPE 1 (Qualifiers)

★ Current squad of 16 players + 20 user defined players.
★ Friendlies in Paris, at Wembley + South American tour.
★ ANY team formation you choose. 2 from 5 substitutes.
★ In match tactics: any no. of individual player adjustments.
★ Your qualification group: full results and table.

TAPE 2 (Finals)

★ Choose a 20 man squad to take to the finals.
★ Group of 4 prelims. 16 to final knockout comp.
★ Extra Time, PENALTY SHOOT-OUTS, where relevant.
★ Formation and strength information on opposition.
★ 2 from 9 substitutes (the FA tells us so).

ENGLAND'S GAMES: FULL PITCH, 22 MAN, 3D GRAPHICS & SOUND EFFECTS

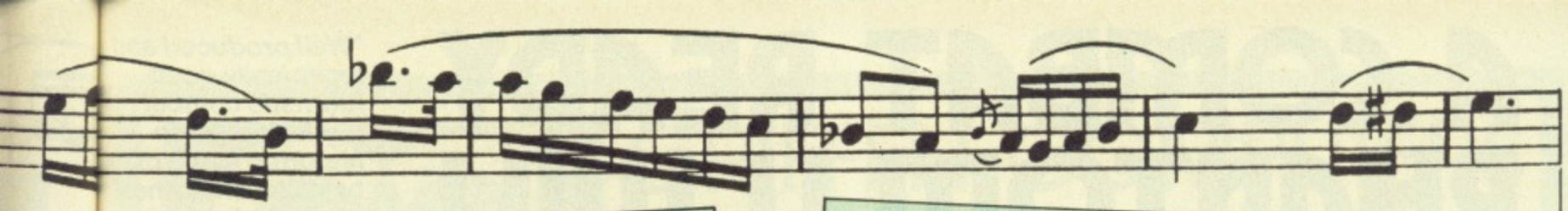
QUAL-SOFT comments: With 5 levels of play, 12 depths of sophistication, and "fun" graphics, this game can be enjoyed by an 8 year old youngster as a "fun" game, and by the most sophisticated as a tactical/strategy challenge of the highest order.

QUALSOFT GUARANTEE: We will send your package by 1st class letter post on the day we receive your order with PO, cheque or ACCESS card authorisation. Programs are IN STOCK because we manufacture them!

QUAL-SOFT, Dept. MU 18 Hazelmere Rd., Stevenage, Herts SG2 8RX. **Tel: 0438 721936**

Please supply: MEXICO '86
Electron ☐
BBC 'B' ☐ (T) ☐ (40) ☐ (80)

Name: .....
Address: .....
.....
Access No. (if applicable) .....



PROCEDURES

chan1	Plays a note on channel 1 when ready.
chan2	Plays a note on channel 2 when ready.
chan3	Plays a note on channel 3 when ready.
copy	Copies contents of one bar to another.
edit	Edit or insert a number of bars.
flat	Sets basic pitch values for flat keys.
getkey	Input/validate new key signature.
key	Decides whether sharp or flat.
pitch	Adds pitch value of a note to note table.
play	Performs the whole piece.
read	Loads a new file from tape/disc.
save	Saves bar contents to tape/disc.
scan	Converts bar contents into note table.
scbar	Compiles contents of one bar/voice.
seek	Process one symbol.
sharp	Sets basic pitch values of sharp keys.
tempo	Changes tempo setting.

VARIABLES

C%	Current channel.
D%	Current duration.
E%	Current envelope.
M%	Indicates maximum notes have been used.
N%	Value of 'natural' for the chosen key.
O%	Current octave.
S%	Indicates whether scan (compilation) required.
T%	Current tempo.
a$	Contains list of valid symbols.
b$(2,mb%)	Holds bar contents (text).
d%(6)	Basic duration values.
f$	Filename for read/save.
k$	Current key signature.
mb%	Maximum bars allowed per channel.
mn%	Maximum notes allowed per channel.
n%(5,mn%)	Note table for playing.
p%(7)	Default pitch values.

may be used to alter the contents, as for a Basic program.

If no change is required to a particular voice within a bar just press Return with no other details. The contents will be left alone.

A single space, followed by Return may be entered to delete the contents.

Having entered the new or amended details for voice 1, the program automatically continues with voice 2. After all three voices have been displayed, voice 1 of the next bar is displayed, and so on.

When you have finished the last line you wish to edit or enter, press Escape to return to the menu.

New (N)

This is used to start on a new piece of music, effectively re-running the program from the beginning. The Save option is called first to ask if you wish to save the piece currently in memory when a filename will be requested. Just press Return if you don't wish to keep the bar contents.

Play (P)

This option plays back the music in memory. If the piece has just been loaded, or the bar contents have been changed by Copy or Edit, the message "Compiling . . ." appears.

This is because the bar contents have to be converted into the numerical form expected by the SOUND statements.

This compilation may take up to a minute, depending on the length and complexity of the piece. Please wait and don't despair!

When ready the number of bars and voices in use are displayed and you may then select an envelope by pressing a number from 1 to 9 (1 to 4 for tape users), after which the piece is played.

After one complete performance you are returned to the main menu. If the bar contents are unchanged since the last Play no further compilation will be required and the piece may be played again straight away.

Save (S)

This allows you to save the bar contents on disc or tape. Simply enter the filename by which the piece is to be known and press Return. The program saves the file and acknowledges this by printing OK.

If Save was chosen as an option, the program then returns you to the main menu.

This procedure is also used by the New and eXit options, which then continue their own processing. No save takes place if just Return is pressed.

Tempo (T)

This lets you alter the tempo of a piece before playback. Tempo is arbitrarily given a number in the range 1 (very slow) to 20 (very fast).

Whenever you enter a new piece the tempo will be set by default to 10, normally a fairly slow pace.

By alternately playing the piece and resetting the tempo, you should find the speed most suited to your taste.

The action of changing tempo does not alter the bar contents in any way, and so does not cause re-compilation.

Whenever you save a file of music the current – last set – tempo will be recorded as part of the file. The chosen tempo is thus preserved for when you next load that file for future performances.

eXit (X)

This quits the program and returns you to Basic. Again you are offered the chance to Save the bar contents before leaving the program.

PLAY was designed to run with the Acorn DFS installed, PAGE having the default value of 6400 (&1900). Under these conditions, a maximum of 60 bars or 480 notes, whichever is the lesser, has been found to work satisfactorily. However you may wish to extend these limits by resetting PAGE to &1300 before loading the program – this will still allow disc users to load and save files. The values of *mb%* and *mn%* (line 10 of Listing II) may then be given higher values. No other program changes are necessary. Similarly, the envelopes set up in PLAY1 (Listing I) may be altered to suit personal taste.

Tape-based users should find that the program works satisfactorily except in the matter of envelopes, which are restricted to four, and trills, which use envelope 15.

A possible way round this is to have alternative PLAY1 versions, which each define only four envelopes, and to change lines 290, 380 and 470 to use, say, envelope 4 for trills.

Full listing starts on Page 164

A COMBAT READY PHANTOM II WILL COST YOU £14M

"Well produced and technically good futuristic combat flight simulation featuring some of th best and smoothest 3D graphics I've come across on the Beeb." –
Computer Trade Weekly

RATED 8 OUT OF 10 FOR QUALITY, GRAPHICS, PLAYABILITY & VAL

More than 'just' a very fast full-flight Simulator 'Phantom Combat' offers the excitement and energy of 1500 mph air to air combat in high resolution 3D colour graphics. This 100% machine code package has been written by a military flight simulator software engineer together with the B.A. captain who wrote the best selling '747' simulator for Doctor Soft.

A SIMULATOR INSIDE A SIMULATOR

In one of the training modes (formation mode: FORM) it is **actually possible to fly the Phanton AND control the Enemy aircraft** which can be clearly seen flying in 3D outside your fully equipped cockpit. Alternatively, a friend can pilot the armet (on separate keys) while you attack.

THE ADVERSARY

Now, at last, enemy aircraft are NOT shown as arcade 'sprites', **they are computer drawn, navigated and 'flown' at a smooth 15 Frames per second**. The delta outlines reflect Soviet Mig 21 (Fishbed)/9Su 15 (Flagon) performance. In combat mode (CBAT) they fight back, intelligent and dangerous.

INSIDE

Instrumentation is comprehensive with a wealth of clear and precise displays, **featuring both analogue and digital readouts**, eg speed in knots as shown on a dial AND digitally, with a separate Mach number display; radar computed target range altitude and bearing shown; target pointer and gunsight; military 'Tacan' navigation (Tactical air navigation) etc.

'OUTSIDE'

External views includes Horizon, other aircraft, a network o ground detail points, **separate landing runways an animated 'strobe' approach lighting**. NO 'chunky' pixels, a objects are drawn in fine, high resolution coloured line **The view is recomputed and redrawn 15 times ever second**.

AIR TO AIR COMBAT

Warning There are no 'lives' but your single one, your scor is zeroed and the program restarted if you are shot down c crash. This motivates you to try and 'bring home' damaged aircraft. May different forms of damage can occu Most are survivable, eg a gear up runway landing if smoot enough. **If you can't land, use the EJECTION seat an survive.**

THE BEST ALTERNATIVE?..

£9.95

PHANTOM COMBAT
Flight Simulator
3rd generation flight software
by Nick Brown and Roger Selby

DOCTOR SOFT
simulations
Doctor Soft Advanced Software

P.O. Box 66 · East Preston · Littlehampton
West Sussex BN14 2TX

Telephone: (0903) 770044
Accounts: (0903) 776000
Telex: DocSoft 878152 (WCTC)

Available at your Local Dealer, distributed by Microdealer, Leisuresoft, & Centresoft. Also direct from Doctor Soft:

MAIL ORDER
FIRST CLASS BY RETURN, POST FREE

BBC ☐ ELECTRON ☐ BBC DISK* ☐

*Add £3 for disk version. Cheques/PO payable to "Doctor Soft Ltd" or state Access No. Overseas: add Airmail at cost.

Name .....

Address .....

.....

MU1

BBC 32K
ELECTRON versions

GRIFFEN COMPUTERS

CASTLE WALK, LOWER STREET,
STANSTED, ESSEX CM24 8LP

TEL. 0279 812295

PLEASE NOTE NEW ADDRESS

SPECIAL OFFERS

HITACHI 27128 16K EPROM	**£2.95**
HITACHI 2764 8K EPROM	**£1.95**
HITACHI 6264LP-15 RAM	**£3.75**
INTEL 8271 CONTROLLER	**£43.95**
ACORN DNFS KIT	**£68.95**

Unlabelled discs – box of 10
80tr d/s 96tpi £11.95 (b)

ACORN 1770 DFS UPGRADE KIT
Kit comes complete with daughter board, chip set and software. Enables ADFS to be fitted. Includes many new commands e.g. *FORM *ROMS *FREE *MAP etc.
£48.95(b)

ACORN ADFS UPGRADE
A rom upgrade allowing unlimited file names and hierarchical directory structure. Treats each drive as one side increasing capacity to 1.28 Mbytes on dual 80tr d/s drives. **£28.95 (a)**

VIEW – Version 2.1 of Acorns word-proces-
sor. Allows 80 column editing, printing direct from memory etc. **£47.95 (b)**

VIEW PRINTER DRIVER GENERATOR – Allows you to tailor a printer driver to your own printer. Comes with drivers for FX80, Juki 6100, Olivetti JP101 and others.
Disc – **£11.00 (a)**
Cassette – **£9.50 (a)**

VIEW 3.0 – A version of View suitable for the BBC+. Comes with a cassette version of the Printer Driver Generator. **£7.95 (c)**

HI-VIEW – A disc based version of this popular word processor for the 6502 second processor giving 47k of user memory. **£44.95 (b)**

VIEWSHEET – Acorns spreadsheet rom giving 255 rows by 255 columns, multiple windows, works in any mode, wide use of function keys, fully compatible with View. **£47.95 (b)**

VIEWSTORE – Acorns new database new database rom. Works in any screen mode, many powerful sorting facilities, can be spreadsheet or user defined card layout. Max record size is 60k. Output can be sent to View and Viewsheet. Comes with comprehensive manual, utilities disc etc. **£54.95 (b)**

GRAPHICS ROM – Acorns new 16k graphics rom giving many new commands for extensive graphics. Circles, ellipses, arcs, rectangles, parallelograms, segments and sectors etc are all available. Comes with manual and utility cassette.
State B or B+ version. **£27.50 (b)**

BASIC EDITOR – Acorns new editor rom allowing all the normal wordprocessor facilities to be used on basic programs. Features include block copy, block move and use of labels. **£128.95 (b)**

TERMULATOR – A terminal emulation rom. Emulations provided are VT100, VT52, 4010, teletype, hardcopy and a special BBC terminal. Comes with user guide and a set of function key strips. **£31.95 (b)**

ISO-PASCAL – A full implementation of the ISO standard supplied on two roms with two comprehensive guides. 6502 disc version also supplied. **£59.95 (d)**

LOGO – A full implementation of the Logo language supplied on two roms. Comes with manuals, user guide, examples disc and reference card. **£59.95 (d)**

COMAL – A full implementation of the International Standard for Comal. Comes with comprehensive manual. **£45.00 (d)**

INTERSHEET – The first of the ROM-LINK integrated rom packages from Computer Concepts. Menu driven, 40/80/105 column display, very fast, can be used with View or Wordwise, up to 16 spreadsheet in memory at one time. Supplied on two roms with reference manual, function key strip and quick reference card. **£47.95 (b)**
INTERCHART – The second ROM-LINK package and designed for Inter-sheet giving Bar, Pie and Line graphs. **£31.95 (b)**
ACCELERATOR – The most comprehensive compiler yet for the BBC micro. Compiles nearly all Basic, including floating point arithmetic. Compiles to intermediate G-code or to machine code. Comes on two roms with manual, disc and quick reference card. **£57.95 (b)**
WORDWISE – The standard BBC word processor still very popular allowing all normal features for low cost. **£35.45 (b)**
WORDWISE-PLUS – The new 16k version of Wordwise giving added commands for better use. Using its own language mail merging, indexing, continuous processing and multi column text can be utilised. **£44.95 (c)**
SPEECH ROM – Using the Phoneme system this allows infinite speech. Both pitch and emphasis can be changed and if wanted it can also sing. Requires the Acorn Speech Processor. **£28.95 (b)**
PRINTMASTER – This rom allows Epson or Star printers to be fully utilised easily. Includes a versatile screen dump, enlarged text, various text manipulation commands. **£27.50 (b)**
DISC DOCTOR – Still a very popular disc utility rom giving many extra commands to any DFS. **£27.50 (b)**
GRAPHICS ROM – Computer Concepts graphics rom giving many new graphics commands including Sprites and Turtle graphics. **£27.50 (b)**
BROM – A basic utility rom which includes one of the best basic editors available giving true screen scrolling. Extended error handling which uses the editor, rom management, many useful features. A very good toolkit rom. **£29.95 (b)**
BETABASE – A very useful database program allowing up to 65000 records to be held. Many features include versatile printing, powerful sorting routines, outputs can be compatible with wordwise or View. **£21.95 (b)**
BETABASE UTILITIES – Adds many more features to Betabase including full disc sort, mail merging and many more. **£11.00 (a)**
REPLICA III – Now enhanced to transfer even more of your tapes to disc. Now uses a data disc so you need only buy one! Even works on the BBC Plus. **£13.95 (b)**
BETA-ACCOUNTS – The first of this integrated suite of programs allows Invoices and Delivery notes to be issue. 80 Column editing, sales ledger sheet automatically generated, multiple VAT rates. Can be used with Betabase. **£21.95 (b)**
PROFILE–A procedure library allowing up to 100 procedures on a disc, easy merging of procedures with basic programs. **£11.00(a)**
FONTWISE – A new font program allowing up to ten different fonts to be used with Wordwise or ascii text using an Epson compatible printer. **£11.00 (b)**

WORDEASE – A utility disc for Wordwise-plus giving many new features to this best-selling wordprocessor. Includes label printing, disc menus, versatile copy routines etc. **£19.95 (b)**
SPELLCHECK – A disc based spelling checker for either Wordwise or View. Includes a dictionary of 6000 words. **£16.20 (b)**
SLEUTH – A comprehensive basic debugging rom. It allows single stepping of basic programs, dual screen facility, breakpoints etc. **£26.25 (b)**
EXMON II – A very advanced machine code monitor which now includes dual screen facility and a full screen memory editor. Also includes single stepping and breakpoints. B/E **£26.25 (b)**
ADVANCED DISC TOOLKIT – Probably the most compatible toolkit rom available. It works with the Electron, BBC B, BBC B+, 6502, Z80, DFS, DFNS, 1770 DFS, ADFS. It adds more than 30 extra commands to the BBC. **£33.00 (b)**
HELP II – Now extended to 16k, contains ALL Basic keywords, ALL VDU codes, ALL FX codes. **£29.95 (b)**
SPELLCHECK III – Now even better. 2000 words held in rom, dictionary can contain up to 17000 words on a 100k disc. Much faster than before. Test timings give 2000 wpm. **£34.95 (b)**
ICON MASTER – Easy to use Icon design utility. Icons can be used from within your own programs and are compatible with AMX mouse and AMX Icons. **£31.95 (b)**
DUMPMASTER – A new extended printer dump rom, now supporting more printers than ever. Extra rom utilities include windows and vertical dumps. **Rom £28.95 (b)**
Disc £13.95 (b)
TOOLKIT PLUS – An updated version of the popular Toolkit rom including a syntax checker and a full screen editor comparable to any other available. **£36.95 (b)**

A.T.P.L. ROM EXPANSION BOARD **£37.95 (b)**

ALL PRICES INCLUDE V.A.T. at 15%
Dealer enquiries welcome
Educational orders welcome

All orders are despatched within 24 hours, stock allowing by 1st-class letter post.

Postage rates – (a) 50p (b) 75p (c) £1.25 (d) £2.00

B/E=BBC/Electron

See us on Prestel – Page 60043754 VISA

GET IN THE PICTURE WITH BEEBUG

JOIN BRITAIN'S LARGEST COMPUTER USER GROUP TO GET THE MOST FROM YOUR BBC MICRO

- **JOIN BY SENDING £11.90 FOR 1 YEAR MEMBERSHIP (10 MAGAZINES)**

OR £6.40 for 6 MONTHS MEMBERSHIP (5 MAGAZINES).

OR SEND £1.00 FOR A SAMPLE ISSUE (UK ONLY)

- **UK ONLY — OVERSEAS PRICES ON APPLICATION**

- **MAKE CHEQUES PAYABLE TO BEEBUG PO BOX 109 HIGH WYCOMBE BUCKS.**

- ***NEWS***
- ***GAMES***
- ***REVIEWS***
- ***UTILITIES***
- ***GRAPHICS***
- ***SOFTWARE***
- ***DISCOUNTS***
- ***PROGRAMS***
- ***HINTS & TIPS***
- ***USER GROUPS***
- ***INFORMATION***
- ***APPLICATIONS***
- ***SPECIAL OFFERS***
- ***TEN MAGAZINES PER YEAR***
- ***TECHNICAL SUPPORT***

Software that's boxing clever

MIKE COOK reports on the PMS RAM Module

THE original specification for the BBC Micro had provision for paged memory to be attached to the 1MHz bus, but until now no one had produced a device.

However Permanent Memory Systems has come up with the goods in the form of a non-volatile RAM module. Non-volatile means it will remember what has been put into it even when the computer is powered down or the module is disconnected.

This system is not to be confused with any sideways system that utilises 16k banked switched memory nor the so-called shadow systems.

The module is a small box 3½in by 5½in by 1¼in with 9in of ribbon cable and a plug for the auxiliary power socket. Options include a smart black carrying case and lead to allow the module and disc to be plugged into the auxiliary power socket.

Electronically the system consists of 64k of static RAM with battery backup. The computer sees it as 256 bytes of memory in page &FD with any one of 256 banks being selected by a memory location in page &FC.

Described like this you might think that it is not exactly the most interesting add-on currently available, but you would be wrong. You see, what makes this shine is the remarkable software – second processor compatible – that transforms this box into many useful configurations.

The first and perhaps the most potentially useful is the software that makes the module work like a disc.

I am sure that those of you with discs have experienced the frustration of arriving to demonstrate your latest piece of whizz bang software only to find your friend's system does not have a disc drive.

Or have you used an Econet system at school and then wanted to take your program home and found no separate disc drives are available?

Well, the ROS will be the answer. ROS stands for Ram Operating System and it allows the PMS RAM module to act just like a disc drive, storing and retrieving programs.

You can unplug the module and take it to another computer and run your programs even if it has no disc interface fitted.

As if this were not enough, access to this pseudo disc is many times faster than to a real one. This speeds up programs that access disc files.

Having taught students to work with disc data files I suspect the module will considerably save on the wear and tear of disc and media during the normal "run, file open and crash" sequence they are locked in for many weeks.

All the disc features are available without re-setting PAGE as the system uses the cassette operating system's BPUT buffer. However should you wish, this is relocatable when the system is initialised.

On the whole ROS commands work just like the disc variety. The most notable exception to this is *DELETE which just marks a file as deleted.

It will continue to show in the catalogue but with a D to indicate it is deleted. The space occupied by the file will only be released by a *RCOMPACT command.

The software supplied with the module contains other DISC/ROS programs, including one to transfer files directly from one filing system to the other.

Unfortunately the only disc system it will work with completely is the Acorn DFS. It refused to work with my Watford DFS and even crashed when the Watford was fitted but the Acorn system was active.

However it was not so serious as I could transfer programs by loading them from disc, switching to the ROS and saving them to the module. I am told that the software is continuously under review, and users will be able to get the new updates for the cost of a disc and postage.

There are also programs to test out the module's memory as well as to transfer the whole module's contents to a large disc file, which can then

→

From Page 57

be loaded back from disc into the module.

The PMS module doesn't stop at providing an alternative filing system, though. For a start there is a program to convert it into a 64k printer buffer so that you can get down to writing the next review while your last one is printing out.

And have you ever been working in a word processor and wanted to check something out in a spreadsheet? Well, with the PMS module you can dump the whole of the computer's memory and run your spreadsheet.

When you have finished the memory can be reloaded and you will be back in the wordprocessor exactly where you left off.

Another utility allows single disc owners to back up a 40 track disc with only two swaps without corrupting any Basic program in the computer.

The module has great potential for developing programs with dynamic overlays. That is, writing the program in sections and only loading the section currently needed into the computer.

"Large programs can be squeezed into a small system"

In this way very large programs may be squeezed into a small system.

There is a utility to help this that allows Basic functions and procedures to be resident in the module and pulled in automatically when needed. You can do this with discs, but the time taken for swapping data is very long in comparison with this module.

All in all, a most interesting development. However, I did have some difficulties with the system.

I have already mentioned the fact that only the Acorn DFS is currently supported. In addition, there are no wild cards characters in the ROS commands.

These were lost because of a trade-off between performance and useable memory space. With the ROS installed in the module there is just over 59k left to store your files.

Another problem occurred when entering the ROS: I found that all the strings in the user definable function keys were lost.

I was told this was done to prevent an error if the Break key has been re-programmed. By omitting a line in the initialisation program the function keys are not cleared.

VERDICT: All in all this is a gem, albeit flawed. But the flaws are certainly worth living with. This unit will become standard in schools, and is a must for people who want the ultimate in media portability.

Microdis

FREE CABLE AND PAPER

Dept MU 186, 46 MIDDLE STREET, BLACKHALL, HARTLEPOOL, CLEVELAND TS27 4EA Tel: 0783 872430

Sorry, office only – No callers without appointment

NOTE: ALL PRICES INCLUDE VAT AND CARRIAGE

DOT MATRIX PRINTERS	Ex VAT	Inc VAT & Carriage
Canon PW1080A (nlq)	231.09	269.00
Canon PW1156	331.92	384.95
Epson GX80 (inc. BBC interface)	236.27	274.95
Epson LX80 (new) 100cps Normal, 22cps NLQ. Friction	199.75	232.95
Epson LX80 Tractor Attachment	16.63	19.95
Epson LX80 Sheet Feeder	47.57	55.95
Epson FX80 (160cps)	316.27	366.95
Epson LQ1500 (200cps, professional)	825.22	949.60
Epson P40 (Thermal, 80 col)	74.53	86.95
Star SG10 120 cps/nlq	219.75	255.95
Star SG15 15½" carriage	310.18	359.95
Juki 5510 186cps/nlq (colour option)	244.81	284.95
DAISYWHEEL PRINTERS		
Quen Data/Daisystep 2000	196.99	229.95
Juki 6100	283.12	329.00
Juki 2200 printer/typewriter	240.61	279.25
COLOUR PRINTERS		
Seikosha GP700A (Special offer – few only)	230.00	269.88

FREE! FREE! FREE!
WITH EVERY PRINTER
– LISTING PAPER + BBC LEAD
(£6 extra for Amstrad lead – phone for other leads)

LISTING PAPER		
60 GSM (listing) 9.5" x 11" 2000 sheets	10.50	17.25
80 GSM (letter grade) 9.25" x 12" 2000 sheets	13.40	20.58
Labels – Box of 8000 (2 abreast on 9.5" backing with central perf.)	34.51	44.86
MONITORS – Green		
Sanyo 12N	69.00	83.95
Sanyo 12H (hi res)	89.50	107.70
Philips 7502 (Green)	71.38	84.95
Philips 7522 (Amber)	75.73	89.95
Colour 14" Screen		
JVC High Resolution	171.38	199.95
Philips TV/Monitor	200.08	232.95
MICROVITEC RGB MONITORS (BBC)		
1431 (472 x 585 dots)	180.08	209.95
1431 APMS4 (with audio & PAL)	195.50	229.95
1451 (653 x 582 dots)	232.25	269.95
1451 APMS4	294.95	343.95

INCREDIBLE DISC DRIVE PRICES

HIGH QUALITY DISC DRIVES BY OPUS with free 2 year warranty	Ex VAT	Inc VAT & Carriage
BBC SX (Uses BBC's Power Supply)		
SX100L 40 track single side Low cost	59.51	69.95
SX100 40 track single side (100K)	68.20	79.95
SX200D 40 track double side (200K)	76.90	89.95
SX400S 80 track double side (400K) 40/80	82.98	96.95
Dual Ex PSU		
DX200 Dual 40 track single side	129.67	149.95
DX400 Dual 40 track double side	155.16	179.95
DX800S Dual 80 track double side 40/80	159.51	184.95
With Built In Power Supply		
S100 40 track single side (100K)	81.25	94.95
S200D 40 track double side (200K)	107.33	124.95
S400S 80 track double side (400K) 40/80	98.64	114.95
Dual Drives (with Power Supply)		
D200 2 x 40 track single side (200K)	155.16	179.95
D400S 2 x 80 track single side (400K) 40/80	198.64	229.95
D400D 2 x 40 track double side (400K)	203.85	235.95
D800S 2 x 80 track double side (800K) 40/80	172.55	199.95

NOTE – All 80 track drives have a 40/80 switch!

Challenger 256k (upgradeable to 512K RAM) with 80 track double sided drive and disc interface	172.55	199.95
Challenger 256K to 512K Upgrade	49.95	58.45

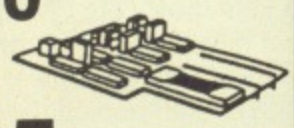
MEDIA – ARCHIVE DATA – EX DYSAN FACTORY! (Fully guaranteed)		
High quality diskettes 5.25" boxed in 10's with plastic library case		
40 Track SSSD	8.65	10.50
40 Track DSDD	19.04	10.95
80 Track SSSD	12.35	14.75
80 Track DSDD	11.26	13.50
3" Disc (10)	36.87	42.95
HEAD CLEANING KITS		
3M Standard	12.50	15.95
Rexel Drive/KBD/VDU Cleaning Kit	19.11	22.95
OTHER BBC PERIPHERALS		
Penman plotter/turtle/mouse	213.35	249.95
Teletext Receiver	187.63	217.29
6502 Second Processor	176.18	204.13
Z80A Second Processor	311.63	359.89
ATPL ROM Board	37.95	44.95

BBC ROM UTILITY SOFTWARE			
Wordwise	(Word-processor)	30.54	35.95
Wordwise Plus	(Word-processor)	39.95	46.75
View	(Word-processor)	40.54	47.45
View III	(Word Processor)	56.63	70.15
Ultracalc II	(Spreadsheet)	56.63	65.95
Printmaster	(Printer graphics)	23.58	27.50
Graphics ROM	(Extensions to Basic)	23.58	27.50
Help	(on Basic keywords etc)	23.10	26.95
Sleuth	(Basic debugging tool)	26.08	30.45
Communicator	RS432 & terminal)	47.76	55.39
Disc Doctor	(Disc utility)	23.51	27.50
Replica 2	(Backup tape to disk utility)	10.04	12.00
Betabase	(Database Disk)	19.60	23.00
COMPUTERS			
BBC B+ 64K		380.47	439.95
BBC B+ 128K		415.75	479.95
Electron YTV Pack (with recorder, games etc)		106.65	124.95

Softlife Eprom Programmer Programs 2764/2764A/27128/27128A. The 27128 programs in 46 seconds. Plugs into user port off BBC, no other cables at all required. Complete with ZIF socket and intelligent software 55.95 66.00

QFS 2.0

BBC DISC INTERFACE



£69.95

- Acorn compatible, single density (10 sectors per track).
- Double Density (18 sectors per track).
- Runs protected software (Elite, Mini-Office, etc).
- 16K ROM includes FORMAT.
- Manual and simple fitting instructions.

TECHNOMATIC

ACORN COMPUTER SYSTEMS

BBC B PLUS with DFS	£369 (a)
BBC B PLUS with 128K	£415 (a)
BBC B PLUS Econet (No DFS)	£370 (a)
BBC B PLUS Econet & DFS	£420 (a)
BBC Model B + DFS	£360 (a)
BBC Model B + Econet	£335 (a)
BBC Model B + Econet + DFS	£399 (a)
BBC Dust Cover	£4.50 (d)

UPGRADE KITS

Acorn DFS Kit	£80 (d)	1.2 OS ROM	£7.50 (d)
Econet Kit	£55 (d)	DNFS ROM	£17.50 (d)
BASIC II ROM with User Guide			£22.50 (d)
1770 DFS Upgrade for Model B			£43.50 (d)

ADFS is Acorn's long awaited double density disc interface system. The hierarchical filing system on the ADFS allows almost unlimited number of files. Treating a double sided disc drive as one drive allows storage of much larger files and greatly enhances the storage efficiency. Will read 40T discs on 80T drives.

ADFS ROM (for B with 1770 DFS & B plus) £26 (d)

ECONET ACCESSORIES

Econet Starter Kit	£85 (b)		
Econet Socket Set	£34 (c)	Printer Server Rom	£41 (d)
File Server Level I	£75 (d)	10 Station Lead set	£26 (c)
File Server Level II	£210 (d)	Adv. Econet User Guide	£10 (d)

BITSTICK CAD PACKAGE

The renowned 'BITSTICK' graphic CAD package. Using the on-screen menu and colour pallette, it can draw freehand as well as lines and shapes with great accuracy. Any part of a drawing may be magnified many times, and up to 48 drawings may be saved on a disc. In total, a friendly yet sophisticated CAD system offering tremendous value.

BITSTICK I £305 (a)

ROBOCOM BITSTICK II: This bitstick comes with Bitstick I software upgraded to allow for auto dimensioning, scaling £775 (a)

Upgrade for Bitstick I to II £450 (b)

ACORN's multiplotter driver for Bitstick graphics (All popular plotters included) £79 (c)

Epson FX80 screen dump routine for Bit Stick I £35 (d)

Epson FX80 dump for Bitstick II £39 (d)

ACORN WINCHESTER DRIVES

Acorn Hard Discs are now available in 10 and 30 Mbyte versions. The drive plugs into the 1 MHz bus. The ADFS filing system with its hierarchical filing structure provides excellent file management facilities. Data transfer rate of 1Mbit/sec and average seek time of 85 ms provides the user very fast access to very large amounts of data. File Server Level III can be installed on the Hard Disc before delivery.

10 Mbyte Winchester Drive £1350 (a)

30 Mbyte Winchester Drive £1950 (a)

File Serve Level III already installed

ACORN 2nd PROCESSORS

The Z80 2nd Processor converts your BBC into a CP/M business computer. Complete with comprehensive free software. £299 (a)

The 6502 2nd Processor provides both an increase in speed and memory. £169 (a)

TORCH PRODUCTS

ZEP100 Z80 Card with PERFECT Software + Z80 Basic... £275 (a)

ZDP240 ZEP100 + TORCH Disc Pack... £525 (a)

HDP240 ZEP100 + 20Mb Hard Disc + 1 × 400K floppy. £2150 (a)

UNICORN 68000 68000CPU + 512K RAM + UNIX OS + HDP240 with Z80B CPU... £3450 (a)

TECHNOMATIC XMAS BARGAINS

Look out for the special symbols on all our pages or phone

TECHNO-LINE Viewdata

01-450 9764

24 hours, 7 days a week

(1200/75 Baud-Prestel type protocols)

EPROMs/RAMS

2764-25.....£2.00 (d) 27128-25.....£3.00 (d)

6264LP-15.....£4.00 (d)

ACORN 32016 CO-PROCESSOR

Acorn Cambridge Co-processor combines with the BBC micro to provide full 32 bit processing. The National Semiconductor 32016 processor performs all language and application processing, the NS32081 floating point processor maximises the performance and provides support for IEEE standard fp handling.

The specially developed operating system PANOS, provides efficient interfacing between the languages and the hardware and software of the BBC micro incl. the variety of ACORN filing systems: DFS, ADFS and NFS. PANOS provides a variety of utilities including a full screen editor and a linker providing acces to both library routines and cross language linking.

FORTRAN 77, PASCAL and C languages with mainframe type implementations, fully compiled and provided with appropriate library support are included. Other languages include, Cambridge LISP with its compiler, a 32016 assembler and a 32bit interpreted implementation of BBC BASIC with full screen editor. 1 Mbyte of RAM is included as standard.

32016 CO PROCESSOR (Currently available from stock) £1399 (a)

Please phone or write for full specifications on the Cambridge Co-processor and Cambridge Workstation.

MULTI-FORM Z80 2nd PROCESSOR

MULTIFORM is a second processor with a difference! It is capable of running virtually all CP/M-2.2 based software in almost any format on a 5.25" disc system. It will operate with single or dual, 40 or 80 track single or double sided drives and with Acorn single and double density DFS.

The second processor package is supplied with a 64K ram card, OS/M operating system in rom and a utility disc. The utility disc contains terminal emulations for the two most popular CP/M formats, a library with a variety of CP/M format configurations and a program for creating new configurations. It is mains powered and interfaces with the BBC through the 1MHz bus.

On a dual drive system, two separate CP/M formats can be run simultaneously, making data exchange between two CP/M formats simple.

MULTIFORM is an indispensable tool for any establishment that operates a variety of CP/M format machines, or for anyone who holds a library of CP/M packages or anyone contemplating converting his BBC micro into a CP/M machine and wishes a total freedom in purchasing the software packages.

MULTIFORM Z80 £299 (a)

(please specify the type of DFS in use)

META-ASSEMBLER

Both an editor and Macro-Assembler. Meta can assemble most 65xx, 68xx, 6804, 6805/6305, 6809, 8048, 8080/8085, Z80, 1802 and more. (Free updates due very soon — 68000 series, 8088/8086, Z8000 etc.) Many advanced features including Macros, conditional assembly, Global/selective search etc etc. Includes 16K Eprom, disc, function key card, and comprehensive manual. Please phone for comprehensive leaflet.. **Meta-Assembler** £126 (c)

MUSIC 500/SYMPHONY

Acorn's MUSIC 500 is a sophisticated music composition aid and sound effects generator. Phone for leaflet. **Music 500** £160 (b)

SYMPHONY KEYBOARD from ATPL is a professional 4 Octave keyboard with sophisticated software.

Symphony Keyboard £86 (a)

Synth-500 disc allows its use with Music-500 **Synth-500 Disc** £8 (d)

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

TECHNOLINE
24 hour Viewdata
Service 01-450 9764

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00.

PRINTERS

ALL PRINTERS HAVE A 12 MONTH GUARANTEE

EPSON DOT MATRIX PRINTERS: EPSON — the high quality range of dot-matrix printers that set the standard in the industry. A wide range of interfaces ensure that these top-of-the-range printers can be used with most computers.

RX 80T **£169 (a)** RX 100 **£305 (a)**
FX80 (std) **£245 (a)** FX80+ **£279 (a)**

NEW FX105 (NLQ facility) **£449 (a)**

Epson LX-80 NLQ: A new low-cost high performance dot matrix printer from Epson. Its many features include Near Letter Quality, Draft mode, programmable characters, a variety of print styles, graphics etc. Supplied with friction feed.

LX-80 **£195 (a)** Optional Tractor Feed **£20 (c)**

Epson JX80 Colour A full colour dot matrix printer with colour text and graphics as well as many advanced printer features.

JX80 4 Colour **£435 (a)**

KAGA NLQ PRINTERS
A top quality yet very competitively priced printer with a Near Letter Quality mode. Includes all the features of Epson FX and uses the same control codes. Extra socket provided on the pcb for installing either 8K RAM or 8K EPROM for custom made font.

KP810 (80 col) **£215 (a)** KP910 (156 col) **£310 (a)**

SEIKOSHA SP-10000
A low cost attractively packaged printer includes many novel features including NEAR LETTER QUALITY mode and automatic single sheet loading. Variety of fonts, 100 cps, both friction and tractor as standard.

Seikosha SP-1000 **£159 (b)**

CENTRONICS GREAT LITTLE PRINTER: A new compact printer from Centronics featuring full Epson compatability, NLQ mode, a variety of fonts, graphics, and both centronics and serial interfaces fitted as standard. Friction feed as standard. **GLP £99 (b)** **Tractor Feed £15 (c)**

BUFFALO 32K Buffer for EPSON PRINTERS

This compact 32K buffer can be fitted internally on any EPSON printer within a few minutes. It does not require external power or any modification to the printer. It will hold about 15 A4 pages of text freeing your computer for other jobs in a fraction of the time it would normally have to wait for the printer to finish all that printing. Supplied with full fitting instructions.

Buffalo 32K Buffer £75 (d)

DAISY WHEEL

BROTHER HR15: * 14 cps * 3K Buffer * Two colour printing * Proportional spacing * Underline * Bold * Shadow print * Super/Sub script + many other features.

BROTHER HR15 **£285 (a)**

JUKI 6100: * 15 cps * 2K Buffer * Switchable 10/12/15 cpi * Proportional printing * Linear Motor for max reliability.

JUKI 6100 **£279 (a)**

PERIPHERAL & COMPUTER SHARERS

We now offer an extended range of peripheral sharers to allow the user to switch between computers, printers and modems. High quality switching mechanisms housed in fully shielded metal cases ensure reliability. No external power input required.

All lines on the sharers are fully switched (36 on parallel and 25 on serial)

	Parallel	Serial
3 Computers to a Printer	36V36-3 **£69 (c)**	25V25-3 **£64 (c)**
4 Computers to a Printer	36V36-4 **£85 (c)**	25V25-4 **£74 (c)**
2 Computers/2 Printers x-over	36V36-X **£69 (c)**	25V25-X **£69 (c)**
BBC Cable Set 3 to 1 (1m ea.)	**£32 (c)**	**£34 (c)**
BBC Cable Set 4 to 1 (1m ea.)	**£39 (c)**	**£41 (c)**

Computer Sharer:
1 computer to 2 printers fitted with Cable for BBC TCS26 **£19.50 (c)**

GRAPHICS PLOTTER

Basic 3 colour flat bed plotter **£270 (a)**
Opto Sensor **£78 (d)** Drill Router **£79 (c)**
Basic Plotter can be powered from BBC psu
External 12V psu **£41 (c)** External 12V psu (for drill router) **£78 (c)**

PRINTER ACCESSORIES

EPSON
FX80 plus sheet feeder **£129 (b);**
LX80 sheet feeder **£49 (b)**
Paper Roll Holder **£17 (d)**
FX80 Tractor Attachment **£37 (c)**

Interfaces:
8143-RS232 **£28 (c);**
8148 RS232 + 2K **£57 (c);**
8132 Apple II **£60 (c);**
8165 IEEE + Cable **£65 (c).**
Serial & Parallel Interfaces with larger buffers available.

Ribbons: RX/FX/MX80 **£5.00 (d);**
RX/FX/MX 100 **£10 (d);**
LX80 **£6 (d)**
Spare pens for H180 **£7.50/set (d)**

KAGA TAXAN: RS 232 Interfa
+ 2K buffer **£78 (c);**
Ribbon KP810/910 **£6 (d)**

JUKI: RS232 Interface **£65 (**
Spare Daisy Wheel **£14 (d);**
Ribbon **£2.50 (d);**
Sheet Feeder **£182 (**
Tractor Feed Attach **£129 (a)**

BROTHER HR15: Sheet Feed **£189 (a)** Tractor Feed **£99 (a)**
Ribbons Carbon or Nylon **£4.50 (**
Red Correction Ribbon **£2 (d)**

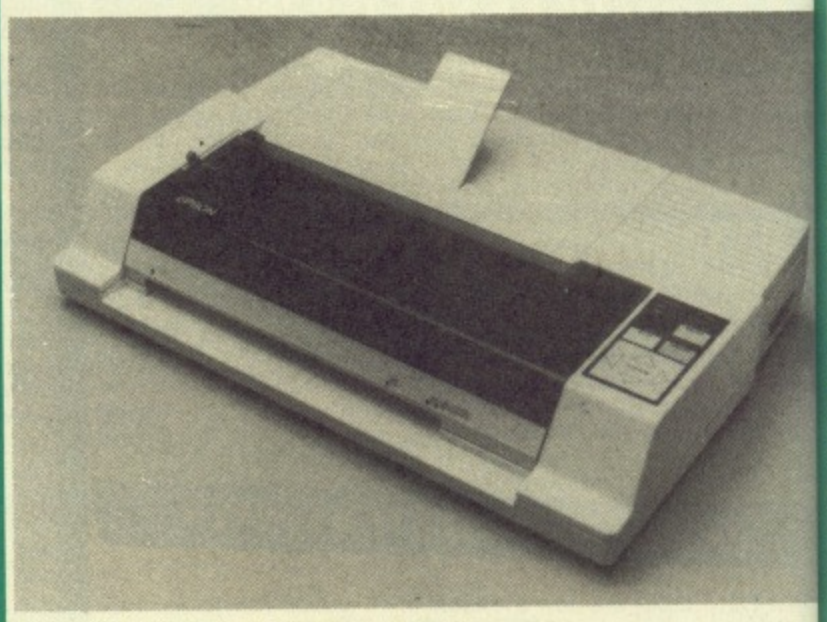
BBC Printer Lead:
Parallel (42") **£7 (d);** Serial **£7 (d**
Printer Leads can be supplied to a other length.

Plain Fanfold Paper with extra fine perforation (Clean Edge):
2000 Sheets 9.5" × 11" **£13 (b)** 2000 sheets 14.5" × 11" **£18.50 (b)**
Labels per 1000s: Single Row 3½" × 1 17/16" **£5.25 (d)**
Triple Row 2-7/16" × 1 7/16" **£5.00 (d)**
Dust Covers: FX80 **£5.50 (d),** FX100 **£7.50 (d),** Kaga KP810 **£6 (d),** KP910 **£7 (D)**

EPSON HI-80 PLOTTER

EPSON technology has once again scored a first by introducing sophisticated A4 size plotter that does not need specialised software programming skills to operate it and yet keep the cost within the reaches all computer users. Features include 4 pens at a time — upto 10 colours choose from, a variety of pen nibs, high speed plotting. Powerful softwa command codes include single commands to plot circles, ellipses or triangl Line or bar graphs and pie charts can be plotted in a variety of exciting sty very simply by keying in the data into the computer. Detailed leaflet request.

Epson Hi-80 Plotter £345



PRINTER SHARER/BUFFER

A unique sharer/buffer that provides a simple solution to improve system utilisation. It can be connected to up to three computers and it will automatically switch between the computers to scan for data — no manual switching required. High speed data input rate to the buffer cuts down the normal waiting time for the computers for the printing operation to complete and thus allowing the computers to be used for other uses. The 64K buffer would hold over 30 A4 pages of text.

Facilities include: COPY, PAUSE AND RESET. LED indication for percentage of memory available and data source. Mains powered. Send for detailed specification.

TSB 64 Buffer/Sharer **£199 (a)**
BBC Cable Set **£30**

MONITORS

All monitors supplied with BBC lead

MICROVITEC

All 14" monitors now available in plastic or metal cases, please specify your requirement.

14" RGB		14" RGB with PAL & Audio	
1431 Std Res	£185 (a)	**1431** AP Std Res	£199 (a)
1451 Med Res	£225 (a)	**1451** AP Med Res	£275 (a)
1441 Hi Res	£385 (a)	These monitors can receive TV programs thru a Video Recorder	

Swivel Base for Plastic 14" Microvitecs **£20 (c)**

20" RGB with PAL & Audio

2030CS Std Res **£380 (a)** **2040CS** Hi Res **£685 (a)**

KAGA TAXAN 12" RGB

VISION II Hi Res **£225 (a)** **VISION III** Plus **£330 (a)**

SUPERVISION III Plus **£330 (a)**

MITSUBISHI 14" RGB Med RES IBM & BBC Compatible **£229 (a)**

MONOCHROME MONITORS:

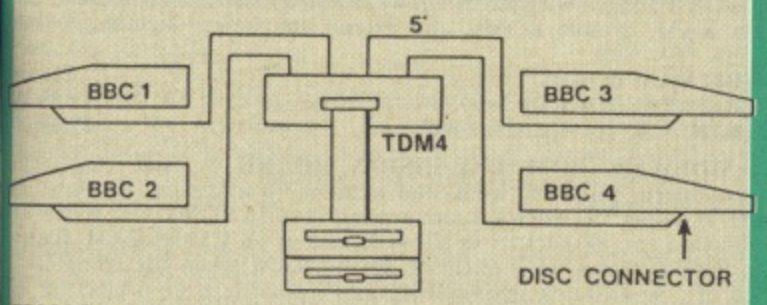
SANYO DM8112CX Hi Res 12" Green Screen **£86 (a)**
KAGA KX1201G Hi Res 12" Etched Green Screen **£92 (a)**
KAGA KX1203A Hi Res 12" Etched Amber screen **£105 (a)**
PHILIPS BM7502 12" Hi Res Green Screen **£75 (a)**
PHILIPS BM7522 12" Hi Res Amber Screen **£79 (a)**
Swivel Base for Kaga Monochrome fitted with Digital Clock **£21 (c)**
Monitor Plinth for the BBC **£9.75 (b)**
Double Tier Plinth for BBC and flat pack dual drive **£19.50 (b)**
BBC Leads Kaga RGB **£5(d)** Microvitec **£3.50 (d)**
Monochrome **£3.50 (d)**
Multi Output Video Adaptor: Allows up to 4 RGB Monitors to be connected to the BBC. Fully buffered **£48 (d)**

TOUCHTEC-501

Designed for use with Microvitec metal cased monitors, and using the RS-423 socket, this unit brings genuine touch-screen operation to your BBC. Ideal for the educational market. Supplied with a users handbook and utilities disc containing starter programs and development software. **Touchtec 501 £260 (b)**

DISC DRIVE MULTIPLEXER

The cost-effective alternative to networking! A self-contained unit that enables up to four computers to be connected to one single or dual disc drive. No hardware modifications — simply plugs into the computers disc interface connectors. No ROMs or other software needed. All DFS commands work as normal. The switching of drives between computers is totally automatic and completely invisible to the user. This unit is ideal for installing in classrooms and other situations, where networking is not planned or necessary, or where costs must be kept low. In many cases software needs to be shared, although full networking complexity and cost is not needed. Several of these units can be connected in series to allow more computers to access the same discs, i.e. two quads connected together will allow 7 computers to share 1 drive. Units are supplied with 5' of cable per outlet as standard. Mains powered.



TDM4 Quad Unit (up to 4 computers) **£135 (a)**
TDM2 Dual Unit (2 computers) **£75 (b)**

DISC ACCESSORIES

Single Disc Cable **£6 (d)** Dual Disc Cable **£8.50 (d)**

DISC STORAGE CASES

10 Disc Library Case **£1.80 (d)** 30 Disc Case **£6.00 (c)**
10 × 3½ Disc Box **£3.50 (d)**

LOCKABLE CASES

40 Discs **£14 (c)** 70 Discs **£15 (c)** 100 Discs **£16 (c)**

DISC DRIVES

Your computer installation can look like this with our PD800P drive

This highly successful drive offers unique features:

New slimline Mitsubishi mechanisms with ultra low power consumption (only 8 watts per mechanism), front locking lever and capable of single or double density operation. Ultra fast track access times and head settling times.

40/80 switchable with switches located on the front panel. A generously rated switch-mode power supply ensures reliability with minimum heat dissipation for long periods of operation.

The mechanisms are set inside a sturdy monitor stand painted in 'BBC-matching' beige. Its 'looks' are enhanced by its black front panel, with attractive enamel-white markings.

These disc drives with a built-in monitor plinth provide a compact installation and give a professional look to the system.

As with all standard TECHNOMATIC drives it comes complete with a data cable, a mains lead with a suitably fused 13A moulded plug, manual and a formatting disc.

PD800P 2 × 400K drive £260 (a)

Our other TECHNOMATIC drives are housed in smart metal casings painted with BBC beige colour and are supplied complete with data and power cables ready for connection to the computer. Drives with mains power supply are fitted with a mains lead and a suitably fused 13A moulded plug.

All 80T drives are fitted with the new model Mitsubishi mechanisms and are supplied with 40/80T switches as standard and at no extra cost.

Single Drives:

1 × 100K 40T SS : **TS100 £69(b)** **PS100 with psu £89 (b)**

1 × 400K 40/80T DS : **TS400 £99 (b)** **PS400 with psu £120**

Dual Drives: (with integral psu) Stacked Versions:

PD200 2 × 100K 40T SS **£195 (a)**
PD800 2 × 400K 40/80T DS **£199 (a)**

3.5" Drives:

These compact drives, used with most of the new 16 bit micros offer fast access times and high performance with minimum of power consumption. The mechanisms are 80 track double sided and are capable of both single and double density operation. The single drive is offered in a dual case with a blanking plate for future upgrading. The drives come complete with cables, manual and formatting disc.

TS35 1 × 400K 80T DS **£99 (b)** **TD35** 2 × 400K 80T DS **£172 (b)**

3M FLOPPY DISCS

Authorised Distributor
Data Recording Products

3M

Industry standard high quality discs with guaranteed error free performance for life. Discs in packs of 10:

5¼" DISCS

40 T SS DD £13 (d) 40 T DS DD £18 (d)
80 T SS DD £22 (d) 80 T DS DD £24 (d)

3½" DISCS

80 T SS DD £30 (d)
80 T DS DD £38 (d)

20% off the price for every pack purchased with a drive

DRIVEHEAD CLEANING KIT

The **FLOPPICLENE** drive head cleaning kit is an ideal way to ensure the optimum performance of your drives. The use of disposable cleaning discs eliminates the risk of contamination and abrasion of sensitive driveheads. These risks are normally inherent in the reusable drivehead cleaning kits.

Floppiclene with 20 disposable cleaning kits. **£14.50 (b)**

TECHNOMATIC

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

TECHNOLINE
24 hour Viewdata
Service 01-450 9764

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00.

COMMUNICATIONS

MINOR MIRACLES WS2000 A world standard modem, having BT approval, covering V21, V23, (BELL 103/113/108 outside the UK) and including 75,300,600, 1200 Baud ratings. What possibly gives this modem its biggest advantage is its option of computer control. A 25Way RS232 input as well as possible computer controlled auto/dial/auto-answer makes this modem unique. **WS2000** £115 (c) BBC Serial Cable £7.

WS2000 Auto-Dial card: includes an integral loudspeaker for monitoring of the phone line £30 (d).
BBC User Port cable (for modem control) £4.

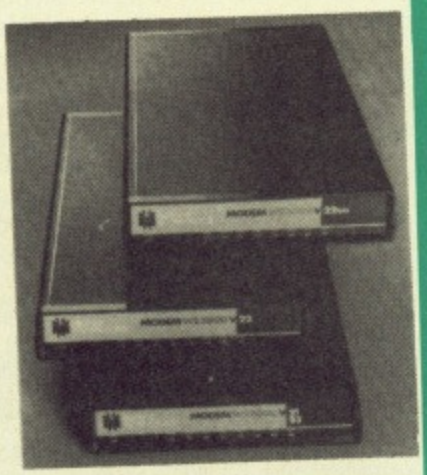
SKI KIT (Allowing total control of the modem by your computer) £10.

DS1 Disc (for Commstar): When used with the Auto-dial card, SK1 Kit, and a user port cable, this software will dial out to Prestel, enter your password etc. and leave you in Commstar. Will also store many bulletin board telephone numbers and protocols for autodialling **£10.**

WS2000 Auto-Answer Card £30(d).
(Please note that the A/D & A/A Cards are still awaiting BABT Approval.)

DATA-BEEB An advanced communication ROM from Miracle Technology. Its many features include both Viewdata (Prestel) and Terminal modes, Auto-Answer and Auto-dial for fully expanded WS 2000's etc. Macro facilities allow flexible use of its many facilities e.g. automatic dialling, log-on, going to a specific page, printing it, and going off-line, all in one operation. £22 (d)

NEW WS-3000 RANGE — the new professional series. All are intelligent and 'Hayes' compatible, allowing simply 'English' commands to control its many features. All models feature Auto-Dial with 10 number memory, Auto-Answer, Speed Buffering, printer port, data security option etc. All models are factory upgradeable.



WS3000 V2123 (V21 & V23 + Bell) £295 (a)

WS3000 V22 (as above plus 1200 baud full duplex) £495 (a)

WS3000 V22bis (as above plus 2400 baud full duplex) £650 (a)

The WS3000 range all have BT approval.

CONNECT-3000 AN ESSENTIAL UTILITY FOR THE WS3000 OWNER — a dedicated control package specially written to optimise the potential of the WS3000 series of modems. It provides a friendly menu-driven 'front-end', for the superb but rather complex multitude of facilities of the 3000 — no need to remember register nos. or complex command codings etc. It provides easy control for Prestel, Terminal, Auto-Answer/Dial use, while a unique 'default' facility provides automatic, pre-defined screen presentation. Works in conjunction with ALL communication software, including Commstar, Data-Beeb, Termulator, Termi, Communicator etc.
40/80 Disc £16.50 (d) **ROM** £19.50 (d)

BUZZ BOX This pocket sized BT approved modem complies with V21 300/300 baud and provides an ideal solution for communications between users, with mainframe computers and bulletin boards. Suitable for use with Open University computer. Battery/mains powered.
Buzz Box £55 (c) Mains Adaptor £10 (d) BBC Data Lead £8 (d)

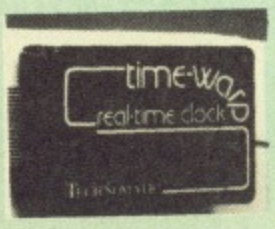
COMMSTAR An ideal communications rom for both Prestel and bulletin boards. Facilities include Xmodem, clock etc. £20 (d)

TERMULATOR An advanced terminal emulator on a 16K Rom. Emulations include VT52/100, Tektronix 4010 etc. Allows a BBC to be used as a terminal for almost any mainframe computer or computer network. £25 (d)

COMMUNICATOR This is a full 80 col VT100 terminal emulation program on 16K eprom. It is a more advanced program than TERMI and features easy to follow screen menus. The rate at which data is sent or received is easily set up with rates up to 19200 Baud with 80 column text. Allows files to be transmitted from disc, or a copy of incoming data to be sent to a file or to a printer. (Communicator is not suitable for PRESTEL). £49 (d)

REAL-TIME CLOCK CALENDER

A low cost unit, allowing the facilities of units costing far more. Built to professional standards, it opens up the total spectrum of Real-Time applications. Possibilities include desk diary/planner, calender, continuous display of on-screen time and date information, automatic document dating, precise timing and control in scientific applications — its uses are endless. Simply plugs into the user port — battery backup is supplied as standard. A full manual as well as extensive software including a simple demonstration diary/planner application program on disc. £25 (c)



EPROMER II

A sophisticated eprom programmer that handles the full range of popul single rail eproms (incl 27256) and allows the user full control of t programming process.
Its powerful menu driven software makes the programming of epro simple, efficient and eliminates the need to have fiddly switches for selecti eprom types, programming voltage or method. The features include:

* Integral power supply ensures no power drain from the computer.
* Interfaces through 1 MHz bus, fully buffered.
* Clear and simple instructions displayed on the screen make t programming easy for both the first time user and the advanced user.
* Eproms upto 16K (27128) programmed in single pass.
* Selectable programming voltage 25/21/12.5V
* Selectable programming method — normal or high speed algorithmi High speed programming enables 27128 to be programmed in just over mins. Normal programming skips addresses with FF data to increa programming speed. Automatic verification on completion programming.
* User can select any section of the eprom from a single byte to its f address range to Blank Check/Read/Program/Verify enabling progra development/changes very simple.
* Full screen editor with HEX/ASCII input.
* Data input from keyboard/Tape/Disc/Eprom.
* Software interface for integration of user's special requirements.
* Constant display of all options selected.
* Several BBC BASIC programs can be entered on a single eprom.
* Checksum facility allows for easy identification of programmed roms.
* Enter OS Commands from within the epromer program.

EPROMER II with Manual & Software on disc £99 (b)
ROM based software £10

UV ERASERS

UV1T Eraser with built-in timer and mains indicator. Built-in safe interlock to avoid accidental exposure to the harmful UV rays. It can hand up to 5 eproms at a time with an average erasing time of about 20 mi £59 (

UV1B as above but without the timer. £47 (

ROM/RAM EXPANSION SYSTEMS

ARIES B-32 BOARD: Features 32K of RAM and a 16K ROM socket. RA can be configured as 20K or 16K as shadow RAM and 12K or 16K or 3 sideways RAM. New commands include comprehensive sidewa ROM/RAM management system, simplified direct access to screen RA and the ability to move/swap the contents of any area of memor ROM/RAM management system allows RAM allocation, list ROMs, lo sideways RAM, disable ROMs, and extend any buffer including prin buffer. £80 (
AIRES B32 RAM BOARD £40 (
ARIES B12 ROM BOARD £7.50 (
ARIES B12C Adaptor Board for B12

ATPL SIDEWISE ROM EXPANSION BOARD A well construct expansion board, simple to instal and requires no soldering. All buses a buffered. It allows full sideways rom expansion to 16 ROMs. One socket h been split into two 8K sockets to allow the use of 8K CMOS RAM. Batte backup option allows data retention in the RAM when the computer switched off. Several link selectable options including write protect for t RAM. ATPL Board £32 (d) Battery Backup Kit £18 (d).

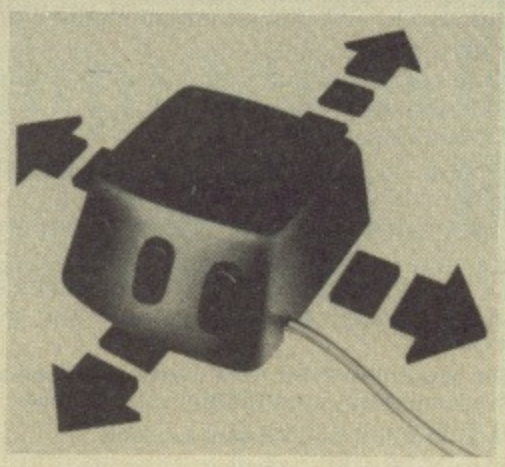
ATPL Board for BBC PLUS 10 × 16K ROMs £29 (d)

COMPUTER VILLAGE CV-16 Rom Board £38 (

RAMROM-15 The advanced sideways ROM/RAM expansion system. This an external unit, using high quality construction, attractively packaged in BBC coloured metal case, allowing easy access to all the sockets. soldering is required. Allows 11/12 additional sideways ROMs to be fitt with an option of up to 16K sideways RAM. All commonly available RA can be used i.e. 4801/6116/6264 or xx128. Battery back-up fitted standard. For development work and further expansion, most of the 6 processor signals are available. Supplied with utility disc and full instructi manual. £71 (

TECHNOMATIC

AMX MOUSE with SUPERART



The mouse will now be available with enhanced software, the 'SUPER ART' which is compatible with 6502 2nd processor, the ARIES RAM board, BBC + shadow mode, tape and ACORN DFS and ADFS. Allows full use of colour in mode 1. Disc users can create colour pictures in A4 size with dot resolution by scrolling the screen window. Other facilities include, colour pattern editing, use of icons, additional text styles, superb zoom in colour.
There is a variety of optional software to make the mouse one of the most versatile peripherals that can be added to the BBC micro.

AMX Mouse with Super Art £69 (d)
AMX Super Art Package on its own £43 (d)
AMX PAGEMAKER provides a high resolution A4 Typesetting and Artwork system. £47 (d)
AMX 3D ZICON will let you transform three dimensional vector data and translate them into 3D on screen graphics. £21 (d)
AMX DATABASE is a new filing system with 1000 records per file and unlimited number of fields per record. £21 (d)
AMXXAM This program enables you to create multiple choice exam papers which can include pictures created on ART, building the finished pictures into quiz etc. £21 (d)
AMX Original ART + Utilities package £11.50 (d)
AMX DESK £21 (d)

MARCONI RB2 Tracker Ball with icon master £57 (b)

ACORN TELETEXT ADAPTOR £125 (a)

ACORN IEEE INTERFACE

This interface enables a BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard, at a lower price than other systems, but without sacrificing any aspect of the standard. The interface can link up to 14 IEEE compatible devices. Typical applications are in experimental work in academic and industrial laboratories, with the advantage of speed, accuracy and repeatability. The interface is mains powered and comes with cables, IEEEFS ROM, and user guide. £278 (a)

DATABASE MANAGMENT SYSTEMS

GEMINI DATAGEM features include * almost unlimited file size (max 10Mbyte) * supports up to 4 drives * Max of 5000 records per file * max 6K record size * max of 62 fields * generates form letters from records.
Please ask for leaflet. £49 (c)

VIEWSTORE An exciting, powerful database with many features: Display can be 'spreadsheet' or 'card-layout' type. Powerful selection and sorting utilities. Any screen mode can be used. Data can be sent to View and ViewSheet. Maximum file size 4096MByte! Maximum record size 60K. £44 (d)

STARdataBASE A fast machine code, true random access database program in a 16K Eprom. Up to 4096 records in a file, up to 69 fields in a record. The record layout is totally user defined. Entirely menu driven — thus very user friendly. Extremely fast searches are possible using the Keysearch facility. Mailmerging from View and Wordwise, and address labelling. Its printer configuration suits any BBC compatible printer. £49 (d)

MASTERFILE II The new version of the popular general purpose file management system. It allows large amounts of information to be stored and processed. It is extremely powerful yet flexible to use. It allows up to 17 fields per record, and the only limitation as to the number of records is the capacity of the disc. Typically, using 5 fields, about 2000 records may be stored on a 100K disc. This latest version features many new facilities including use with WORDWISE/VIEW **£16.50 (d)** Disc (80 or 40T).

CP/M SOFTWARE FOR TORCH & ACORN Z80 PROCESSORS

We can now supply almost any CP/M based software package in a format suitable for the Torch Z80 and Acorn Z80 second processors.

Please phone for our new professional software catalogue

WORDSTAR PROFESSIONAL The advanced word processing package comprising of WordStar, MailMerge, StarIndex and SpellStar, a total combination offering substantial savings on individual prices. WordStar is the best selling word processing program on the market. Extensive operator aids include a comprehensive yet friendly manual, step-by-step training guide, command cards, on-screen menus with four levels of help messages etc. etc. SpellStar checks text files against its 20,000 word-plus dictionary. You can both add to the dictionary and create specific supplementary ones. Mailmerge is ideal for mailing applications where lists are selected on a range of criteria. It enables the fast production of personalised form letters, mailing labels, invoices, etc. StarIndex creates alphabetical indexes, tables of contents, paragraph numbering and much more.

WORDSTAR PROFESSIONAL £285 (a)
WORDSTAR £275 (a) MAILMERGE £145 (a)

DBASE-II Undoubtedly 'The Database', can be used for an almost limitless number of business applications, ranging from mailing list preparation and maintenance through to running accounting ledgers and payrolls. In addition to standard database features it provides much more. An on-disc tutorial takes you from setting up a simple file all the way through to setting up custom screens and reports. Automatic calculations may be performed on data, and fields or entire databases may be modified or replaced with single, English-like basic commands; Dbase-II can therefore be used by general personnel having no programming knowledge. It can be tailored to suit a variety of professions and individual needs, with files such as accounting, payroll, time billing, job costing, scheduling and mailing lists. It can access several files at a time. It is fast, flexible and powerful. £299 (a)

SuperCalc-2 A powerful decision making tool which helps to solve complex 'What if...' financial modelling and forecasting questions. With a working area of 63 columns and 255 rows, Supercalc 2 takes full advantage of colour and full memory. It allows consideration of different spreadsheet files, sorting, a wide choice of formats. Full documentation with easy to follow lessons and single key commands make the use of Supercalc2 very easy. Separate windows provide for display of results and formulae simultaneously. Calendar and date calculations simplify calculations on loan repayment and periods. £165 (a)

SAGE — packages include accounting, payroll etc. please phone for details.

Pro-Pascal A full implementation of the International Standard for Pascal (ISO 7185) apart from the optional conformant parameters feature. In addition to the standard features of Pascal, Pro Pascal includes: dynamic strings for character and string manipulation, 9 digit integers and random access file handling for data processing applications, single and double precision floating point arithmetic, an assembler level interface for systems programmers, and separate compilation of program segments for building libraries of commonly used procedures and enabling very large object programs to be constructed. Pro Pascal is a 3 pass compiler, converting a source program into efficient Z80 machine code. The package includes a compiler, run-time library, link editor, library manager and cross referencing utility. £299 (a)

BSTAM A telecommunication facility used for transmitting any size CP/M file. £149 (b)

Other packages available include CIS-COBOL, INFOSTAR, DMS +, FMS, SAGE, ATITUTORIALS, MACRO-80 etc. Please telephone with your requirements.

PROFESSIONAL SOFTWARE PUBLICATIONS

Wordstar Made Easy	£13.95 (d)
Understanding dBASE II	£17.95 (d)
Multi-plan Made Easy	£18.95 (d)

TORCH GRADUATE IBM SOFTWARE

We are able to supply most popular software packages including: WORDSTAR, WORD, EASY-WRITER, DBase-II & III, LOTUS-123, VISICALC, SAGE etc. Please telephone with your requirements.

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

TECHNOLINE
24 hour Viewdata
Service 01-450 9764

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00.

ROMs/SOFTWARE

WORD-PROCESSORS

VIEW Acorn's version V2.1 word processor rom. **£41 (c)**

VIEW VERSION V3.O Also compatible with BBC + Complete with Printer Driver Generator. **£65 (c)**

HI VIEW Disc based version of VIEW word processor for use with the 6502 2nd processor. Allows 47K of user memory. **£36 (c)**

VIEW INDEX Disc based program to create an index from VIEW text files. Ideal for anyone concerned with writing extensive reports or books. **£10 (d)**

VIEW PRINTER DRIVER GENERATOR: Create a driver for any printer. **£7.50 (d)**

£28 (d)

WORDWISE

WORDWISE PLUS The new advanced Wordwise on a 16K eprom, for the more specialised users who require added features and flexibility. Four new programs are also supplied allowing mail-merging, index generating, two-column text printout and continuous processing. **£41 (d)**

WORDEASE A rom based utility for the Wordwise plus. **£24.50 (d)**

NEW

SPELLCHECK III A 16K rom based program for View and Wordwise plus. Contains 2000 words on the rom and 6000 (expandable to 17000) on disc. **£31 (d)**

SPREADSHEETS

VIEWSHEET Acorn's spreadsheet provides 255 columns and 255 rows and will operate in any mode. Windows can be created which can then be rearranged to provide any print format required. Function keys provide for easy entry of commands. Printer control codes can be used using the printer driver. Fully compatible with VIEW and the 6502 2nd Processor. **£41 (d)**

INTERSHEET The new spreadsheet from Computer Concepts. Many advanced facilities including 105 character display, several spreadsheets may be used at once, may be used with View & Wordwise etc. etc. **£42 (c)**

INTERCHART Graphics Package for the Intersheet. **£27 (d)**

LANGUAGES

META-ASSEMBLER (full details on page 1) **£126 (c)**

ACORN P-SYSTEM A portable operating system supplied complete with USCD PASCAL and FORTRAN 77. **£249 (b)**

6502 DEVELOPMENT PACKAGE A Macro-Assembler with utilities for use with the 6502 2nd Processor. Enables the serious programmer to develop large programs in assembly language. **£32 (d)**

NEW

ACORN MICRO-PROLOG: The logic programming language seen as the language for programming in the future and used extensively in the artificial intelligence field. A simple 'front end' is supplied to make syntax more user friendly for new users. 16K Rom, manual and extension modules. **£69 (c)**

NEW

ISO-PASCAL Acorn's full implementation of International Standard Pascal on two 16K ROMs. Disc Version for use on 6502 2nd Processor also supplied. Comprehensive manual. **£46 (a)**

ISO PASCAL Stand ALONE GENERATOR **£30 (d)**

ACORN LOGO A full implementation of the Logo language from Acornsoft. Supplied as two ROMs with a tutorial course and technical manual. **£46 (b)**

LOGOTRON logo **£57 (c)**

BCPL A full implementation of the BCPL compiler language consisting of the language of ROM, disc containing the BCPL compiler, a screen editor, a 6502 assembler, other utilities and programming aids and examples of BCPL code and a 450 page manual. **£46 (b)**

BCPL CALCULATIONS PACKAGE Supplied on disc, it supports floating point, fixed point and fast integer calculations. It includes the BCPL calcultion files, example files and a comprehensive user guide. **£17.30 (d)**

BCPL STAND ALONE GENERATOR **£32 (d)**

ACORN LISP Rom **£34 (d)**
FORTH **£34 (d)**
COMAL **£34 (d)**

MICROTEXT The authorising system from the National Physical Laboratory. **Disc £53 (b) Cassette £40 (b)**

G:FORTH An advanced implementation of FORTH which follows the 79-Standard specification on a 16K ROM and has a full double number extension set. It incorporates an editor, 6502 assembler, very fast turtle graphics and supports extensive string and file handling. It contains 540 predefined words including those for reading joystick ports, produce sounds, set and read the time and produce random numbers. Fully compatible with disc or tape filing systems and works in any mode. Package comes complete with a USER GUIDE, Introduction to FORTH and 16K GFORTH ROM. **£30 (d)**

OXFORD PASCAL A fast, compact P-Code compiler, that fully utilises BBC Graphics and sound, contains a powerful editor, and produces 'standalone' software. **£35 (c)**

UTILITIES

ACCELERATOR From Computer Concepts — Finally, a comprehensive compiler that will compile existing BBC Basic programs, simply, and in most cases, without alteration. Compiles to either intermediate code or machine code. Supplied with two Roms, manual, utility disc etc. **£48 (d)**

SPEECH ROM From Computer Concepts — allows infinite speech with the Acorn speech system using simple * commands. Pitch and emphasis can be altered — even singing is possible! **£24 (c)**

SPEECH PROCESSOR ROM **£12 (d)**

DISC DOCTOR Computer Concept's popular disc utility ROM which adds 20 commands to the DFS system. **£21 (d)**

ACORN GRAPHICS ROM GXR **£22.50 (specify BBC B or BBC B PLUS)**

PRINTMASTER The ROM that features the most versatile screen dumps for the Epson MX/RX/FX80 and KAGA PRINTERS. Includes mode 7, magnification, character definition, enlarged text, etc. — in short — this ROM does it all! **£23 (d)**

BROM The new utility ROM from Clares — a Toolkit ROM that gives you full screen editing. Many extra functions are included. **£23 (d)**

REPLICA II 40 & 80 Track Versions available. **£9 (d)**

EXMON-II Advanced M/C Monitor. **£22 (d)**

NEW

TOOLKIT plus Advanced version of the original Toolkit. **£33 (d)**

TOOLKIT Adds 27 new commands to BBC Basic. **£17 (d)**

ROMIT Helps create RAM disc and puts BASIC and assembler programs into eprom. **£28 (d)**

SLEUTH Basic Debugger **£21 (d)**

HELP ROM based comprehensive on screen HELP facility to aid and speed up programming. **£19 (d)**

HELP II Advanced version of the original HELP rom. **£26 (d)**

DUMPMASTER Disc based dumps for many printers. **£9 (d)**

DUMPMASTER II 16K rom with dump routines and a variety of features for about 40 different printers. **£26 (d)**

ICON MASTER This rom automates the creation of an icon driven user interface. **£28 (d)**

HERSEY CHARACTER Font generator **£11.00 (d)**

BILLBOARD A useful program that enables your BBC to produce superlarge 'Billboard' type characters i.e. a continuous horizontal scrolling of super-large characters. **£15 (d)**

DISCMASTER Disc Utility. **£15 (d)**

BEEBUG SUPERPLOT Cass £7.50 (d) **BEEBUG DESIGN £15 (d)**

When ordering software on disc please specify track format (40/80)

BOOKS
15% off any book

(No VAT, p&p £1.50 per book)

CPU/Assembly Language Books

6502 Assy Lang Prog	£19.95
6502 M/C for Beginners	£ 5.95
6502 Advanced Programming	£11.95
6502 Programming	£13.95
6502 Reference Guide	£ 9.95
8086 Book	£23.95
Z80 Applications	£14.50
Advanced Z80 M/C Prog	£12.95
6809 Assy Lane Programming	£ 8.95
Programming the 8086/88	£14.95
CPM Handbook	£ 9.95
Mastering CP/M	£ 9.95
Programming the 6809	£8.95
Programming the Z80	£16.95
Z80 Ass./Lang Prog	£19.95

LANGUAGES

BBC Micro Sideways Roms B. Smith	£ 9.95
ISO Pascal Acornsoft	£12.50
COMAL	£12.50
Interfacine and Robotics	£15.95
Understanding DBase II	£18.95
Wordstar Made Easy	£16.95
Intro CP/M on Z80 2nd Processor	£ 9.95
Basic Rom User Guide (Adder)	£11.95
Introduction to PASCAL	£16.50
Prog the Micro with PASCAL	£ 8.50
The UNIX Book	£12.50

BBC Micro Books
Books for Beginners:

BASIC programming on the BBC — Cryer	£ 5.00
BBC BASIC	£ 4.00
BBC BASIC for Beginners	£ 4.00
BBC Micro for Beginners	£ 4.75
BBC User Guide Acorn	£15.00
BBC PLUS User Guide	£15.00
Century Computer Prog	£ 9.95
Drawing Your Own BBC Programs	£ 6.95
Easy Prog for the BBC Micro	£ 5.00
Friendly Computer Book	£ 3.50
Gateway to Computing BBC1	£ 4.95
Gateway to Computing BBC2	£ 4.95
Introducing the BBC Micro	£ 4.50
Mathematical Programs in BBC Basic	£ 7.95

Languages/Programming

Advanced User Guide	£12.50
Adv BASIC Rom User Guide	£ 7.50
Advanced Prog Tech for BBC	£ 8.9
Applied Ass./Lang on the BBC	£ 7.9
Ass./Lang Made Easy for BBC	£ 5.9
Assy. Lang. Prog. made easy	£ 5.9
Applied Assembly Lang on BBC	£ 7.9
Applied Ass./Lang on the BBC	£ 9.9
BBC Micro Advanced Programming	£ 9.9
BBC Micro Sideways ROM's RAM's	£ 9.9
BCPL User Manual Acorn	£15.0
Discovering BBC M/C	£ 6.9
Guide to the BBC ROM	£ 9.9
Exploiting BBC BASIC	£ 6.9
FORTH Acorn	£ 7.9
Further Programming for BBC	£ 4.9
Micro Prolog Manual	£12.9
LISP Acorn	£ 7.9
Programming the BBC	£ 6.9
Structured Programming	£ 6.9
S-PASCAL Acorn	£ 7.9
Using BBC BASIC	£10.0
Word Processing on BBC (Wordwise + Epson)	£ 5.9

SOUND & GRAPHICS

Advanced Graphics with BBC	£ 6.9
BBC Graphics & Sound	£ 7.9
BBC Micro BASIC, Sound & Graphics	£ 7.9
Creative Sound on the BBC	£ 9.9
Graphics on the BBC Micro	£ 6.9
Turtle Graphics	£ 7.9

EDUCATIONAL

BBC Micro in Education	£ 6.9
Prog for Education (Pri.Sch)	£ 5.9

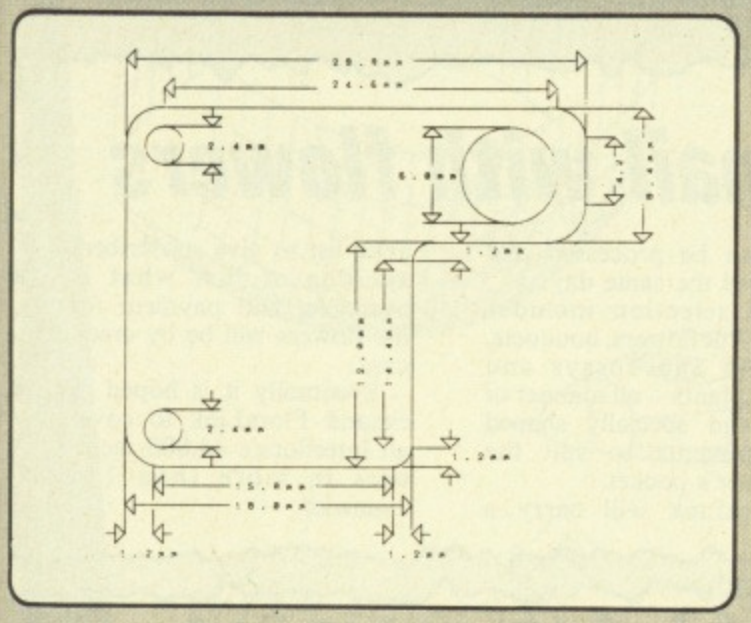
DISC DRIVE SYSTEMS

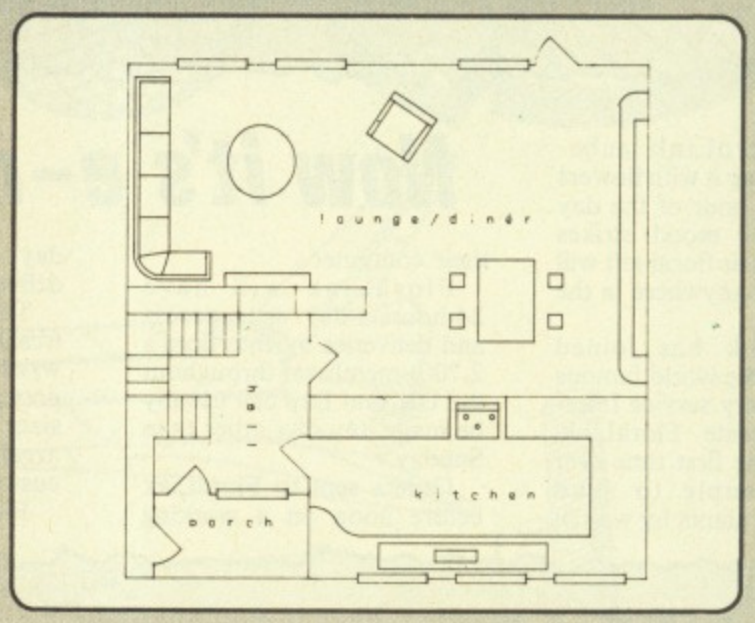
Advanced Disc User Guide	£14.9
BBC Micro Disc Companion	£ 7.9
Disc-Drive Projects for Micro's	£ 5.9
Disc Book	£ 3.9
Disc Programming Techniques	£ 7.9
Disc Systems	£ 6.9

APPLICATIONS

BBC Filing Systems & Databases	£ 7.9
BBC Software Projects	£ 6.9
Business Programming on BBC	£ 7.9
Business Applications on BBC	£ 7.9
DIY Robotics & Sensors	£ 6.9
Interfacing Projects for BBC	£ 6.9
Making Music on the BBC	£ 5.9

NOVACAD
Computer Aided Draughting for the BBC Micro





A sophisticated CAD package with unique facilities which until were confined to custom built CAD packages.

Whether you want to draw a complex electronic circuit diagram or plan your new kitchen or simply draw a cube NOVACAD will help you do it better and more easily.

All you need is a BBC micro model B fitted with Acorn DFs and a single disc drive. If you have a 6502 2nd processor and a dual disc drive then NOVACAD's capabilities are further enhanced.

* Very user friendly with all commands and controls from the keyboard. Special windowing techniques make available to the user almost one million dots allowing a lot more detail to be put on the drawing than one would normally expect the BBC to be capable of. (Mode O screen display only 1/6 the number of dots). The drawing can be 4 windows across and 5 up.
* Libraries of user defined ICONS such as electronic symbols can be created easily and edited even in the middle of drawing another diagram. ICON size is not limited to a number of pixels. An ICON can contain up to 500 lines, so complete drawings or sections of large drawings can be saved as ICONS for use with other drawings.
* ICONS can be called by name from a library into any part of the diagram and can be moved, enlarged, reduced, rotated in 90° steps and have mirror images made before being finally positioned.
* The zoom facility allows the user to magnify any section of a drawing by up to 20 times to make it easier to insert details.
* User definable grid helps the user set his own scaling for the drawings.
* Horizontal and vertical displacements can be measured in any user defined scale.
* Any two colour can be used in mode 4.
* Up to '8 levels' can be used to produce multi layer drawings, and then user can decide which levels are to be displayed. This can be particularly used in pcb drawings, architectural drawings with details of the services behind the walls displayed only when required and many other such applications.
* Text can be added at any position vertically or horizontally.
* Use of 2nd processor will allow use of 4 colours, higher pixel density drawings and considerably faster operation. (NOVACAD without the 2nd processor is faster than any other CAD package we have seen for the BBC).
* Powerful delete facilities allow deletion of single lines or whole sections with minimum of key presses.
* Printer dump for Epson compatible printers incorporated in the software which allows a full or a sectional screen dump.
* An optional plotter utility will allow output to a range of popular plotters for high quality diagrams.

NOVACAD will prove to be an invaluable teaching aid in technical schools and colleges and for anyone involved in draughting it will be an ideal labour saving tool.

NOVACAD package with 16K ROM, Utility disc and a comprehensive manual £79 (c).

Novacad compatible with Tracker Ball £99 (c).

Upgrading of existing ROMs and DISCS £20 (d).

Plotter Utility Program £21.50 (d).

BBC COMPUTER SPARE PARTS (Carriage code (d)

Complete Keyboard	£52	6502A 2MHz CPU	£6.50	UPD7002	£5.00	74LS163	£0.75
Power Supply Unit	£52	65CO2 CMOS CPU	£12.00	DS3691	£3.50	74LS244	£0.80
Keyswitch	£1.75	6522 VIA	£3.50	7438	£0.40	74LS245	£1.10
Keyboard Connector	£4.50	6522A 2MHz VIA	£5.50	74LSOO	£0.24	74LS373	£0.90
Video ULA	£18.00	LM3 24 op-amp	£0.45	74LSO4	£0.24	74LS393	£1.00
Serial ULA	£14.00	SAAO5O-Teletext	£9.00	74LS10	£0.24	8271	£48.00
UHF Modulator	£4.50	6845SP CRT Controller	£6.50	74LS123	£0.80	88LS120	£3.00

TECHNOMATIC

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
(close to Dollis Hill⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road⊖)

TECHNOLINE
24 hour Viewdata
Service 01-450 9764

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00.

MicroLink
in association with
TELECOM GOLD

No. 5 January 1986

NEWSFILE

Now it's e-mail with flowers

NOW MicroLink subscribers can say it with flowers at whatever hour of the day or night the mood strikes them, and their floral gift will be delivered anywhere in the British Isles.

MicroLink has joined forces with the world famous flower delivery service Interflora to create FloraLink, which for the first time ever enables people to send flowers and plants by way of their computer.

FloraLink will have 24-hours-a-day open access and deliveries by Interflora's 2,700 members throughout the UK and Eire can usually be made any day other than Sunday.

Orders sent to FloraLink before noon on a working day can be processed and delivered the same day.

The selection includes freshly cut flowers, bouquets, wreaths and sprays and potted plants – all manner of sizes and specially shaped arrangements to suit the customer's pocket.

FloraLink will carry a price list to give subscribers an idea of just what is available, and payment for the flowers will be by credit card.

Eventually it is hoped to expand FloraLink to cover all Interflora's 44,000 members in more than 130 countries.

THE MicroLink family is getting bigger and bigger. Electronic mail users in Eire and New Zealand can now be reached directly through MicroLink.

Subscribers can communicate with them just as easily as they can with other users in the UK.

All that's needed is the system code number – like MicroLink's 72 – of the person in Eire or New Zealand to be put in front of their ID number.

Fourteen countries are now part of the international electronic mail network – Australia, Canada, Denmark, Eire, Germany, Hong Kong, Israel, Korea, the Netherlands, New Zealand, Puerto Rico, Singapore, UK and USA.

YOUR chance to join MicroLink – turn to Page 122

Link to a train

WITH the aid of MicroLink an historic German built steam locomotive has been saved from the scrap heap and brought to Britain to feature in a permanent display of railway nostalgia.

Steam enthusiast Martin O'Keeffe used MicroLink's telex facility to negotiate a deal with Kolmex, a Polish import-export firm specialising in the sale of railway equipment.

What he was after was a narrow gauge loco that had been retired from its job of hauling sugar beet from the fields to a processing factory.

It had been built in 1918 by the firm of Henschel at Kassel in Germany for use by the German army on railway networks built by military engineers to supply the front lines in the 1914-18 war. O'Keeffe's research showed that the loco had been used by the Polish factory since 1937.

It is now the property of the North Gloucestershire Narrow Gauge Company, a small group of enthusiasts to which O'Keeffe belongs.

When it is eventually restored to mint condition the engine will be one of the feature attractions of the museum railway at Toddington in Gloucestershire.

There are a number of locomotives on display and O'Keeffe and his fellow train buffs operate them on open days during the summer.

Motivation for youngsters

CHILDREN with learning difficulties and disabilities are being taught with the aid of MicroLink.

The 76 pupils at Kaimes School in Edinburgh all have special needs in the educational sense – but that doesn't mean they miss out on information technology.

Micros have been in use at the school for several years and, apart from their value as teaching aids, are extremely popular with all age groups says headteacher Jennifer Ruddick.

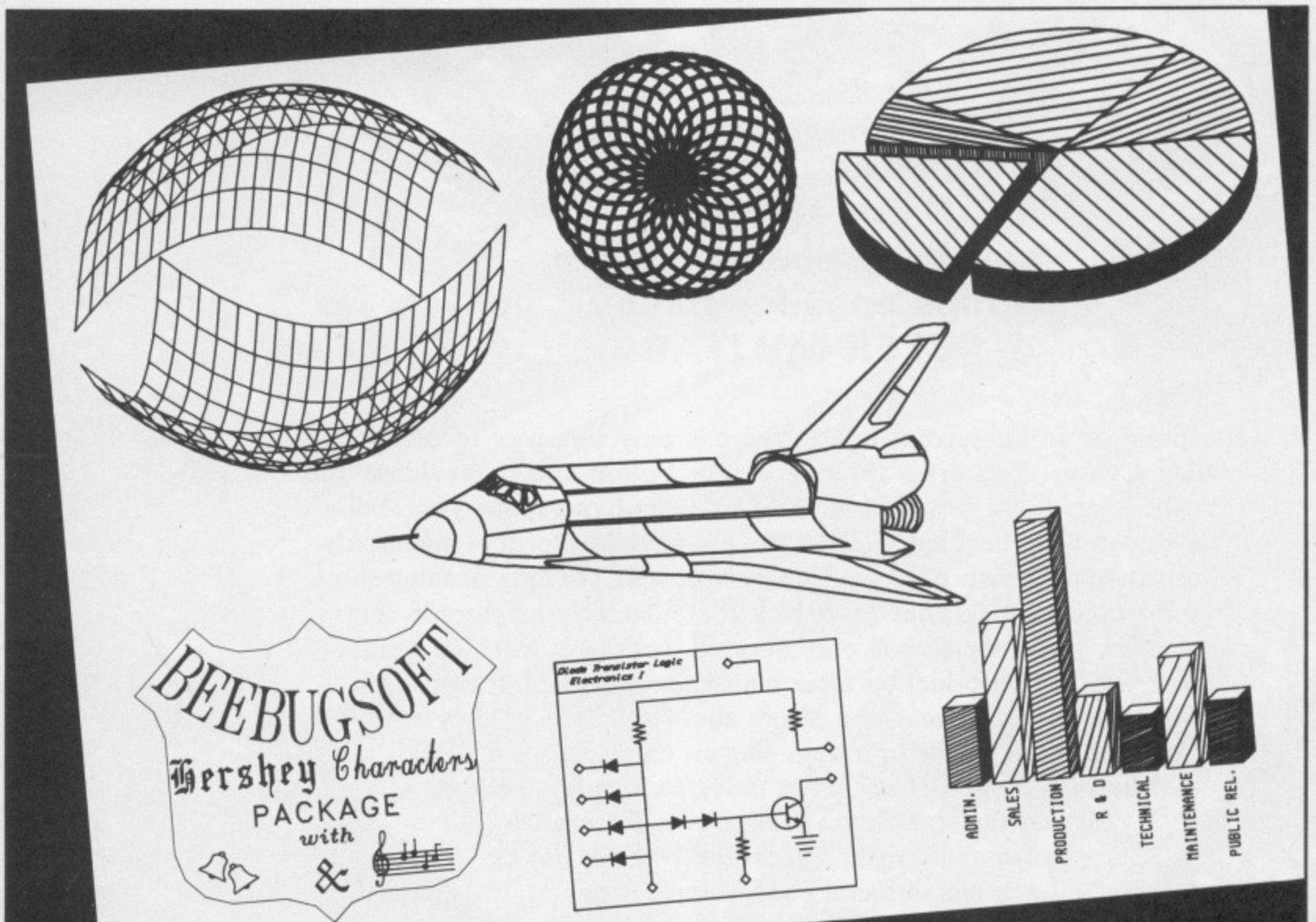
The primary age youngsters use the computers to help them learn simple maths and spelling, while children at the secondary level are taught the practical uses of micros and even some programming theory.

The school is a Prestel subscriber, which gives the youngsters access to a massive information database which is complemented by MicroLink's electronic mail services, computer industry news, UK bulletin boards list and telesoftware.

Asked if micros have advantages over more traditional methods of teaching children with learning difficulties, Miss Ruddick said: "Absolutely, although we naturally have a low ratio of teachers to pupils because of the children's special needs, our youngsters are much more motivated to learn through the use of micros than by blackboard, pen and paper".

The school uses a number of special programs, including the micro special pack from the Scottish MEP in Glasgow which helps learners of low ability to grasp the basics of the three Rs as well as preparing them for life after their schooldays.

"But we are just as interested in seeing what computers can do as in getting information from them", says Miss Ruddick. "We will use MicroLink's special features to help our pupils learn even more about practical applications of information technology".



All this can happen when you Plotmate your micro

Plotmate is new. Excitingly new.

It's a rugged, responsive flatbed plotter with a lot of built-in magic.

You can use it to create fantastic patterns. Some small as a postage stamp. Or big as an A2 poster.

It'll produce overhead transparencies for you. And all dimensions of graphs, diagrams and charts.

It'll also prepare maps. Then put the contours in.

And that's only part of it.

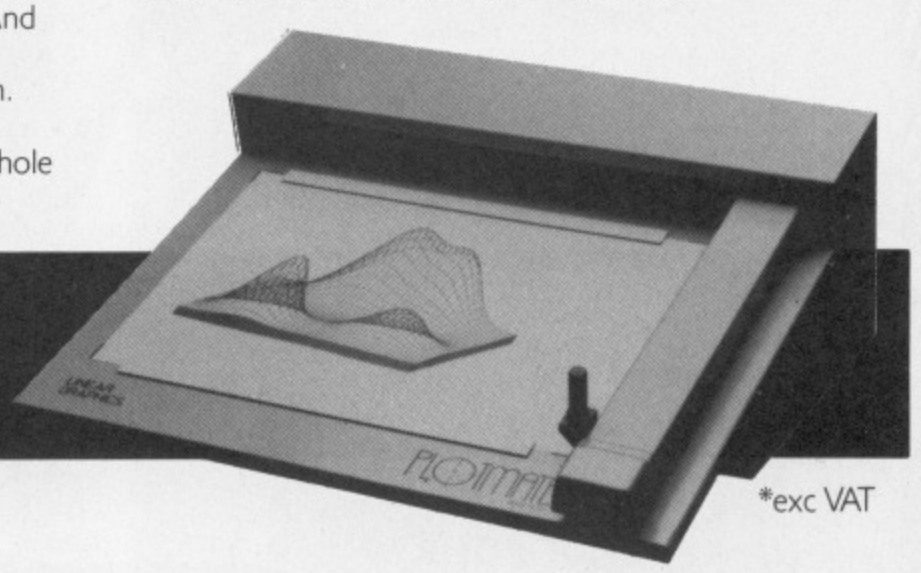
You should see its repertoire of characters – a whole sci-fi population for you to manipulate.

Plotmate software accepts all the colour, vector, character and graphics commands of your BBC micro.

You just plug it in and away you go. All for less than £300.*

FREE Write/phone for free P7 demo disc.

PLOTMATE



*exc VAT

LINEAR GRAPHICS LIMITED
28 Purdeys Way Purdeys Industrial Estate Rochford Essex
Telephone: 0702 541664 Telex: 995701 Ref 356

MEGAROIDS

Brave the perils of hyperspace in this high speed game by PETER MUJTABA

AS captain of an interstellar fighter there is only one way to escape the pursuing Cylons. You press the hyperspace button and immediately the turbo boosters burst into action. As you enter hyperspace you realise that your craft is heading straight for a megaroid storm – megaroids being asteroids which only exist in hyperspace. There is nothing you can do except guide your craft past the oncoming megaroids. But remember, your shields will only survive two direct hits. The game starts with an introduction after which the stars are drawn. This will take about 25 seconds. Sorry about this, but as they say, Rome wasn't built in a day, so you can't expect a BBC Micro to construct an entire universe in a few seconds. When the stars have been drawn the craft will appear as it enters hyperspace. It will not be under manual control until it has reached the required velocity.

VARIABLES

HI%	High score.
H%	Horizontal position of spacecraft.
D%	Determines the frequency of the asteroids.
P	Used in various loops and also in the main delay loop at line 180.
DIF%	Level of difficulty.
X%	Used in PROCmove to determine the actual colour of certain logical colours.
LIVE	Number of lives that the player has. It is initially set to 3.
S%	Score.
M1%,M2%,M3%	Used to determine whether an asteroid is in motion.
N%,N1%,N2%	Used in conjunction with ast$. It determines which asteroid character is to be printed.
B%,B1%,B2%	Determine the vertical positions of the asteroids.
A%,A1%,A2%	Determine the horizontal positions of the asteroids.

PROCEDURES

stars	Draws the stars. The flight path of each star is made up by printing successive stars in different logical colours. The stars are then animated using the VDU19 command.
move	Moves the stars. The actual colour of the logical colours is altered giving the effect of motion. If you wish to see the initial logical colours of the stars leave out PROCsetup at line 110.
asmb	Assembly language routine which prints the spacecraft on the screen.
char	Defines the characters and envelopes used.
left	Prints an asteroid on the left of the screen.
centre	Prints an asteroid in the centre.
right	Prints an asteroid on the right.
crash	Displays a crash and decreases the number of lives.
variables	Defines the initial value of the variables.
setup	Changes the actual colour of some logical colours so that only one star in each flight path is visible.
score	Each time an asteroid passes the craft 100 points is added to the score. The score is printed.
initial	Displays the craft – and various messages – as it travels in space and enters hyperspace.
end	Prints the player's score and the high score.
intro	Introduces the game.
instructions	Displays functional keys.
bonus	Adds a bonus of 1000 points to the score when a score of 5000 is reached.
difficult	Selects level of difficulty.
music	Plays a tune if a high score is obtained.

KEYS

X right
Z left
S start new game

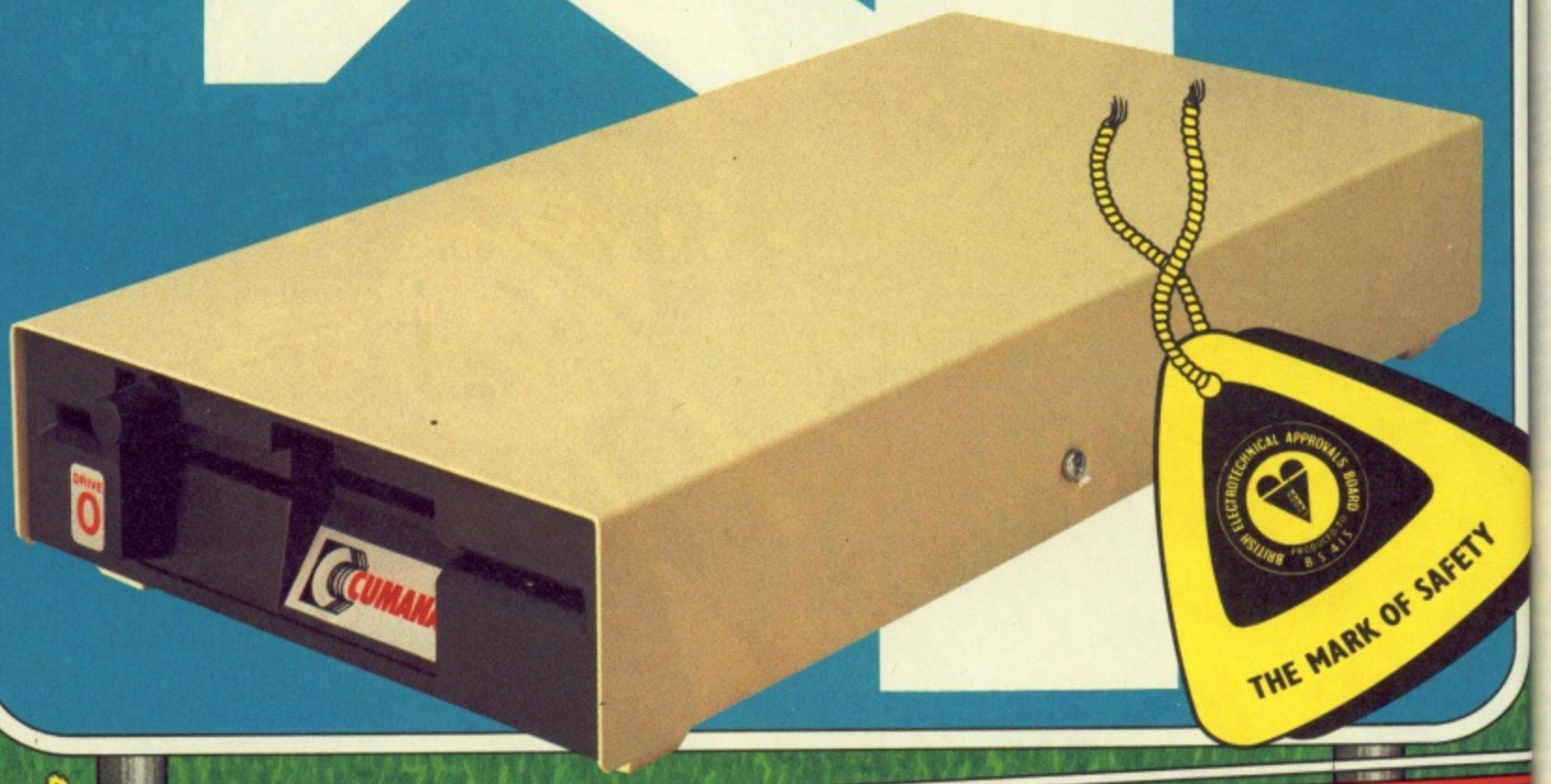
```
  10 REM MEGAROIDS
  20 REM (c) The Micro User
  30 MODE7
  40 HI%=0:H%=8
  50 VDU23;8202;0;0;0;
  60 PROCintro:PROCdifficult
  70 MODE2
  80 VDU23;8202;0;0;0;
  90 DIM CRAFT% 200
 100 DIM AST$(7)
 110 PROCchar:PROCvariables:PROCinst
ructions:PROCasmb:CLS:PROCsetup:PROCs
tars:PROCvariables:PROCinitial
 120 PROCmove
 130 D%=RND(15)
 140 VDU5
 150 IF D%=1 OR M1%=1 PROCleft
 160 IF D%=2 OR M2%=1 PROCcentre
 170 IF D%=3 OR M3%=1 PROCright
 180 VDU4
```

Turn to Page 167

Drive the M way

Cumana

False Economy



NEW Mitsumi Disk Drives From Cumana

Single Drives (100 K)

CSX	100M	(NO PSU)	£ 69.95
CS	100M	(INC PSU)	£114.95

Dual Drives (200 K)

CDX	200M	(NO PSU)	£169.95
CD	200M	(INC PSU)	£209.95

ORDER FORM (M-WAY) MICRO USER JANUARY

Please rush me
☐ CSX100M disk drive(s) at £ 69.95
☐ CS 100M disk drive(s) at £114.95
☐ CDX200M disk drive(s) at £169.9
☐ CD 200M disk drive(s) at £209.9

I enclose cheque/P.O for _____ or debit my
Access/Visa card no ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

NAME: _____

ADDRESS: _____

_____ TEL NO: _____

CUMANA®
The best name in memory

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

INFORMATION PROCESSING ON YOUR BBC COMPUTER!

WHY SHOULD THE BIG BOYS GET ALL THE INTEGRATED SOFTWARE?

For serious users of the BBC computer. Disc machines only.

What the reviewers say:-

DATASCRIBE IS BRILLIANT VALUE FOR MONEY—
John Vogler, A & B Computing, Sept 1985.

I SHALL USE SCRIBE FOR MOST OF MY WRITING—
John Dawson, Your Computer, Feb 1985.

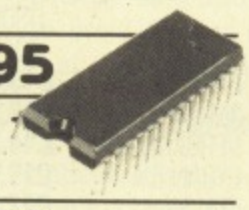
SCRIBE £59.95

THE PROFESSIONAL WORD PROCESSOR designed for the serious user * All operations fully prompted * No special knowledge of the computer system necessary * Document size NOT limited by computer memory * Automatic disc buffering ensures text is moved between disc and computer memory without user intervention * Up to 255 pages in a single document * 80 column display * On screen underline and right justify * See it as it will be printed. SCRIBE comes in a chip with 5 minute fitting instructions, utilities disc and manual. Integrates with Database.

DATABASE £49.95

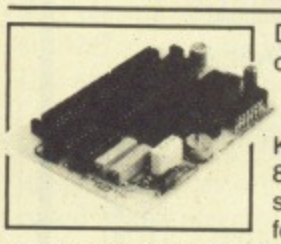
A superb record keeping system with an incredible operating speed. 96 fields per record * One record 2 Kb max * One field 900 characters max * 4000 records per database * 16 level conditional search * Record match * 8 automatic sub indexes * Total flexibility of output via report writer with ability to write back to the database * Maths pack * Semi programming language plus compiler. Integrates with Scribe to give conditional search with MAIL MERGE and high powered report formatting. Comes in ROM.

DATASCRIBE £95



Scribe & Database in a single chip! Contains all the features of both products and with an attractive saving on price and ROM space.

DOUBLE-DOS £59.95



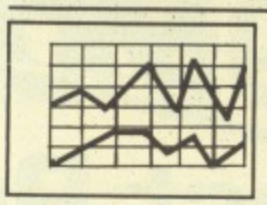
Double density disc interface. A high capacity database or word processor is enhanced , even further with this state of the art disc interface. The many features include * 720 Kb of CONTINUOUS file space on a standard 80 track disc drive * Automatically read standard Acorn files * Compensate for discs formatted in single density * Provide up to 159 files IN ONE DIRECTORY * Automatically read, write and format double sided drives to appear as one disc surface * Allow maximum use of MERTEC Scribe and Database. Very easy fitting — no soldering — full instructions provided.

SCRIBECHEC £24.95

TYPING/SPELLING CHECKER.

The fastest typing checker available. * 7200 word base dictionary in ROM plus room for your own 15,000 (approx) word dictionary on disc * Any number of dictionaries * Maintenance includes add and delete, list words between alpha limits and many more features * Check speed 1500 words per minute! * Any document length. Also available for wordwise & view.

DATASTAG £59.95 (COMING SOON)



STATISTICS AND GRAPHICS PACKAGE. (ROM BASED)

Coming soon. A highly professional system which integrates with Database. Allows you to store your data in any format and, using Database, present all or selected items of data for graphing and statistical analysis * Graphs include Pie, bar, histograms, line plot, scatter plot * Display between one and four graphs simultaneously * Automatic scaling and direct digital readout of graph co-ordinates * Statistics include all standard tests plus linear regression and correlation etc * seven non-parametric tests * Epson screen dump included with facility to add your own printer dump.

SCRIBE ASSEMBLER £24.95

Use Scribe as a super editor for the assembler. A powerful and professional package that will assemble standard 6502 source code plus many of the non-standard mnemonics from the BBC Basic's own assembler. NOTE — Scribe is required to use the assembler.

MINI ROM BOARD £14.95

Provides four extra ROM sockets. Easy fitting and without any of the overheating and space problems associated with large expansion boards.

SPECIAL COMBINED PACKAGE OFFER

Datastag & Database (in one chip) [1]	**£95.00**
Datascribe & Double-Dos [2]	**£139.00**
Datascribe & Scribechec & Datastag — fitted to the Mini ROM Board [3]	**£165.00**

Prices include VAT. Add 60p post and packing to your order.
Dealer and education enquiries welcome.

Purchasers of MCP software are provided with a free update service and an unmatched level of technical support. (Updates subject to postal charge.)

Mertec
MERLIN COMPUTER PRODUCTS

Please supply the following products/information. Please tick box.

SCRIBE ☐	QTY		£
DATABASE ☐	QTY		£
DATASCRIBE ☐	QTY		£
DOUBLE DOS ☐	QTY		£
SCRIBECHEC ☐	QTY		£
DATASTAG ☐	QTY		£
SCRIBE ASSEMBLER ☐	QTY		£
MINI ROM BOARD ☐	QTY		£
SPECIAL COMBINED PACKAGE [1] [2] [3]	QTY		£
		TOTAL	

I enclose £ Inc P&P
My credit card No. is
Visa ☐ Access ☐ Tick which

Name _____

Address _____

_____

To: **MERLIN COMPUTER PRODUCTS**
33/36 Singleton Street, Swansea SA1 3QN. Tel: 0792 467980

IMPORTANT NOTE: Please check with us if you decide to use any other disc interface than Acorn or Double-Dos with Scribe or Database.

LONDON'S LARGEST DISPLAY OF PRINTERS MONITORS COMPUTERS AND PERIPHERALS

DON'T TAKE A CHANCE **—COMPARE BEFORE YOU BUY**

OVER 40 PRINTERS ON DISPLAY—MOST ON DEMONSTRATION

HI VOLTAGE

UK's Best Printer Prices

OPEN MONDAY-SATURDAY 9 AM-6 PM

DOT MATRIX PRINTERS

Brother HR5	£78.21 + VAT =	**£89.95**
Brother M1009	£155.90 + VAT =	**£179.29**
Brother EP44 typewriter	£189.90 + VAT =	**£218.39**
Epson P40 Thermal AC/DC	£83.44 + VAT =	**£95.95**
Epson FX80/FX100/RX100	POA	
Epson LX80 NLQ (New)	£199.90 + VAT =	**£229.88**
Epson LQ1500 NLQ	£895.90 + VAT =	**£1030.28**
Epson JX80 Colour	£449.90 + VAT =	**£517.39**
Canon PW1080A NLQ	£289.90 + VAT =	**£333.39**
Canon PW1156A NLQ	£365.90 + VAT =	**£420.79**
Canon PJ1080A Colour	£479.90 + VAT =	**£551.88**
Commodore MPS801	£60.82 + VAT =	**£69.95**
Commodore MPS803	£86.91 + VAT =	**£99.95**
Panasonic KP1091 NLQ	£255.90 + VAT =	**£294.29**
Oki-Mate 20 Colour	£217.30 + VAT =	**£249.90**
Shinwa CPA80	£179.90 + VAT =	**£206.88**
Micro P. 165 NLQ	£260.78 + VAT =	**£299.90**
Seikosha GP50S (Sinclair)	£59.90 + VAT =	**£68.88**
Seikosha GP500A	£89.90 + VAT =	**£103.38**
Seikosha GP550A NLQ	£115.90 + VAT =	**£133.28**
Seikosha GP1000 NLQ	£199.90 + VAT =	**£229.88**
Smith Corona Fastext 80	£110.90 + VAT =	**£127.53**
Smith Corona D100, D200 NLQ & D300 NLQ		POA
Star SG10 (IBM) NLQ	£226.00 + VAT =	**£259.90**
Kaga Taxan KP810 NLQ	£249.90 + VAT =	**£287.39**
Kaga Taxan KP910 NLQ	£379.90 + VAT =	**£436.89**

DAISYWHEEL PRINTERS

Brother HR10	£249.90 + VAT =	**£287.39**
Brother HR15 (P)	£315.00 + VAT =	**£362.25**
Brother HR25	£609.00 + VAT =	**£700.35**
Brother HR35 + sheet feed	£819.90 + VAT =	**£942.89**
Daisystep 2000	£219.90 + VAT =	**£252.89**
Diablo 630	POA Silver Reed	POA
Juki 6000	£199.90 + VAT =	**£229.89**
Juki 6100	£324.90 + VAT =	**£373.64**
Juki 2200 typewriter P or S	£257.30 + VAT =	**£295.90**
Smith Corona TP1	£179.90 + VAT =	**£206.89**
NEC, Rioch, Qume, Tec		POA
Epson DX100	£315.00 + VAT =	**£362.25**
Commodore DPS1101	£165.17 + VAT =	**£189.95**
Uchida DWX 305	£199.00 + VAT =	**£228.85**

All popular interfaces, cables, etc. available from stock.
Custom cables made to order.
Let our experts match your computer to the printer of your choice.
Printers — All models parallel-centronics interface Serial RS232C available at same or slightly higher prices.

MONITORS

Microvitec Colour		
1431 DS STD RES RGB	£173.82 + VAT =	**£199.90**
1431 MZ STD RES Spectrum	£199.90 + VAT =	**£229.89**
1451 DS MED RES RGB	£229.90 + VAT =	**£264.39**
1451 DQ MED RES QL	£229.90 + VAT =	**£264.39**
1451 APDS MED RES RGB/Composite	£289.90 + VAT =	**£333.39**
1441 DS High RES RGB	£389.90 + VAT =	**£448.39**
1456 LI MED RES IBM PC	£395.90 + VAT =	**£455.29**
1456 DA MED RES Apricot	£299.90 + VAT =	**£344.88**
Ferguson Monitors Full Range		POA
Philips Monitors (Monochrome)		
BM 7502 Green	£73.82 + VAT =	**£84.90**
BM 7522 Amber	£78.17 + VAT =	**£89.90**
Philips Monitors (Colour)		
CM 8500 Comp. STD RES	£191.26 + VAT =	**£219.95**
CM 8501 RGB STD RES	£208.65 + VAT =	**£239.95**
CM 8524 RGB/Comp STD RES	£243.43 + VAT =	**£279.95**
CM 8533 RGB/Comp/IBM MED RES	£278.22 + VAT =	**£319.95**
CT2007 Monitor/TV	£173.82 + VAT =	**£199.90**

BBC COMPUTERS + SOFTWARE

BBC B	£299.90 + VAT =	**£344.89**
BBC + DFS	£346.90 + VAT =	**£398.95**
BBC B PLUS 128K	£429.90 + VAT =	**£494.39**

ROMS

View	£45.90 + VAT =	**£52.79**
Graphics	£27.90 + VAT =	**£32.09**
Disc Doctor	£27.90 + VAT =	**£32.09**
Wordwise Plus	£46.90 + VAT =	**£53.94**
Communicator	£57.90 + VAT =	**£66.59**
Printmaster	£27.90 + VAT =	**£32.09**
Caretaker	£27.90 + VAT =	**£32.09**
Logo	£59.90 + VAT =	**£68.89**
AMX Mouse	£68.50 + VAT =	**£78.78**
Hard tinted perspex dust cover	£11.90 + VAT =	**£13.69**
Acorn DFS	£86.91 + VAT =	**£99.95**
Opus Double Density DFS	£78.22 + VAT =	**£89.95**
Cumana and Opus Disk Drives		
1 x 100K	£84.74 + VAT =	**£97.45**
1 x 400K Switchable	£127.13 + VAT =	**£146.20**
2 x 100K	£186.48 + VAT =	**£214.45**
2 x 400K Switchable	£279.74 + VAT =	**£321.70**
Opus Disk Drives now with 2 Year Guarantee		
Torch 2 x 400K D. Drive	£173.87 + VAT =	**£199.95**

SUPERDISKS Prices per box of ten ex VAT

	SSDD 40TR	DSDD 40TR	SS96TP1 80TR	DS96TP1 80TR
BASF 5¼"	**£10.00**	**£17.80**	**£18.50**	**£21.00**
3M 5¼"	**£13.50**	**£19.50**	**£19.90**	**£23.90**
VERBATIM 5¼"	**£14.50**	**£18.40**	**£18.40**	**£24.50**
DYSAN 5¼"	**£15.90**	**£23.50**	**£23.50**	**£28.50**
TDK 5¼"	**£17.50**	**£16.90**	—	**£32.00**
SONY DS/DD 3½"		**£37.50**	MAXELL 3"	**£38.90**

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

PRINTER RIBBONS (Ex-VAT Prices)

Single prices, less 10% for 5+

Brother HR15 Corr	£2.90	Epson LX 80	£4.00
Brother HR15 MS	£5.50	Epson 100 Series	£4.50
Brother HR5	£2.90	Juki 6100 SS	£1.90
Brother EP44	£2.90	Juki 6100 MS	£2.70
Brother M1009	£3.90	Juki 2200	£2.40
Canon PW1080A	£5.90	Kaga KP810	£5.90
CBM 801	£6.90	Mannesman MT80	£6.50
CBM 802/1526	£6.50	Seikosha GP50	£6.90
CBM 1525	£4.50	Seikosha GP100	£4.50
CBM DPS1101 MS	£2.70	Seikosha GP500	£6.90
Daisystep 2000	£3.40	Seikosha GP700	£18.50
Epson MX/RX/FX 80	£3.50	Shinwa CP80	£6.50

Also in stock Diablo, Anadex, Qume, NEC, Ricoh & OKI Ribbons.

All equipment fully guaranteed—Credit terms available

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

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

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

Or you can Telex your order on: 946240 Attn 19001335

OPEN MONDAY-SATURDAY 9 AM-6 PM

ALSO VAST RANGE OF DISK DRIVES, JOYSTICKS, DISK BOXES, INTERFACES, SHEETFEEDERS, E

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

Prices correct at copy date. Subject to change without notice due to currency fluctuations etc. E. & O.E.

NEW SERIES

It's easy when you know how

PETE BIBBY kicks off a brand new series aimed at the computer novice

LIKE most things, using the BBC Micro is easy once you know what you're doing. The trouble is that if you don't know what you're doing, if you're a complete beginner, as we all were once, then it can all be a bit overpowering.

But if you take it step by step you'll find that what looks complicated is really quite simple, once it's explained.

And that's what this new series is all about – explaining what appears complicated and showing how simple it really is when tackled bit by bit.

Keyboard capers

TO begin, you'll find three keys to the left of the keyboard marked CAPS LOCK, SHIFT LOCK and SHIFT. Try pressing these and some of the letter keys at the same time and, among other things, you'll discover the following:

- When either Caps Lock or Shift Lock are on there's a red light to show it.
- Caps Lock gives capital letters when on, lower case letters when off. It alternates – or toggles – on and off as the key is pressed.
- While Shift is held down it gives the top symbol (if any) on any other keys pressed.
- Pressing Shift Lock leaves the shift effect on until it is pressed again. It's another example of toggling.

To the right of the keyboard is a key marked RETURN. When this is pressed it takes whatever you have typed in and attempts to send it to the computer. The theory is that the micro will obey whatever you have typed in, once you've finished it off with a Return.

Try it and see. The odds are that the micro won't like what you've typed in and will hurl back one of several uncomplimentary messages.,

Do not be deterred. Keep on messing about with the keyboard until you are familiar with the keys already mentioned. Who knows? you may just hit upon something that the micro will like and obey.

And if everything just stops, hit the key marked Break. This "resets" the micro, making it act as though it's just been switched on, allowing you to type in again.

Getting into PRINT

By now the micro has probably suffered enough. Give it something that it can understand by typing in:

```
PRINT "I can obey this!"
```

and pressing the Return key. Provided that you've typed in the line exactly as printed and remembered to press Return to tell the computer that you're giving it an instruction:

```
I can obey this!
```

appears on the screen. If at first you don't succeed, you can always type it in again.

And if you find that you've made a mistake in what you've typed you can use the key marked Delete to erase your error, always provided that you haven't pressed Return in the meantime.

Once you've got this line working, try each of these lines:

```
PRINT "I CAN OBEY THIS!"
PRINT "Any Message"
PRINT "Any character 1! #,a.z&"
PRINT This is wrong
print "So's this"
```

remembering to press the Return key after every one. No doubt you'll get some of the error messages that you got previously. Ignore them for the time being.

Try making up your own, similar, lines and understanding what happens. And in future remember to press Return without being reminded.

From these examples you should see that PRINT has a special effect. For one thing, the micro accepts it without complaint and actually does something.

What it does is to print out the message that comes in inverted commas immediately after the PRINT. So PRINT is rather a special word, one that the micro will understand and obey.

Also, whatever is found following PRINT , provided that it is enclosed in a pair of inverted commas, is displayed on the screen. No matter what characters or symbols are inside the inverted commas, they're all printed out.

To be slightly technical, the characters inside the inverted commas, be they letters, numbers, symbols or even spaces, make up what is known as a *string*. This is fair enough. After all, they're just a lot of characters strung together!

Notice that the inverted commas don't appear on screen when PRINT is obeyed. These are known as *delimiters,* indicating to the computer where the string begins and ends.

Readers with inquiring minds may wonder what happens if you want to display a string which has inverted commas inside it. The line:

```
PRINT "I said,"""";"Hello";""""
```

demonstrates the technique. (If your mind was devious enough to ask the question in the first place, it's devious

→

From Page 73

enough to figure out how the example works.)

The basics of Basic

As you'll have discovered, you can type in whatever you want at the keyboard – you won't hurt your computer – but the BBC Micro is very choosy about what it will condescend to obey.

There is a special set of words that will get it to do things. These words of power are known as Basic statements or commands. They have to be in capitals, as you'll find if you type in something like:

```
Print "Oops, small letters"
```

Also these statements are very particular about what comes after them. They have strict rules as to what they can operate on, known as the syntax of Basic. In the case of PRINT the rules say that if we want to display a string then that string should be surrounded by inverted commas. So, of the three Basic statements:

```
PRINT "any string
PRINT any string"
PRINT "any string"
```

only the last gets results. (If you're gazing at the screen wondering why nothing has happened, remember that you've got to tell the micro that you want it to look at what you've typed in. In other words, press Return.)

The Basic language is made up of lots of these commands or reserved words, such as PRINT. Each does a separate job and may be used in one or more ways, depending on the syntax. By learning these we can learn how to make the computer obey us. It will only respond to Basic instructions, not English. Note the difference between:

```
DISPLAY "a message"
```

and

```
PRINT "a message"
```

Once you've learnt Basic you've got a language with which you can communicate with the computer. Then you can try your hand at getting the micro to do what you want by programming it using this language. Notice that learning Basic and learning how to program are not the same thing.

Figuring it out

So far we've just used PRINT to tell the micro to display strings or messages enclosed in inverted commas. It can also be used to do sums. Try out the following Basic statements:

```
PRINT 1
PRINT 1+2
PRINT 8-2
PRINT 1*2
PRINT 8/2
```

As you can see, where there are no inverted commas the micro takes what follows the PRINT as an expression. It works out the result of this expression (or sum) and displays that. This means that:

```
PRINT 75+13
```

results in:

```
88
```

appearing on screen, not:

```
75+13
```

So print can be used to do sums. Notice that while the plus and minus signs are the same as in our school maths, the micro uses an asterisk, *, as the multiplication sign. In a similar break from convention it uses the backslash, /, as the division sign.

You're not just stuck to two numbers and an operator, as the +, –, * and / are known. You can have long lines of numbers and operators and even brackets. If you have doubts try:

```
PRINT 3+4+5
PRINT 3-4+5
PRINT 2*2*2
PRINT 2*2*2/4
PRINT 45+15/5
PRINT (45+15)/5
PRINT 2*3-(8/4+2)*3/2
```

The BBC Micro is very choosy about the commands that it will condescend to obey

So, depending on what follows it, PRINT operates in two ways. The first is as an electronic display, the second as an electronic calculator.

Program punctuation

Keen and eager readers may have noticed the difference between:

```
PRINT "a"
```

and

```
PRINT 1
```

besides the fact that one is used to display a string while the other is a number. The difference is that while letters and messages are printed at the left edge of the screen, numbers are treated differently.

The numbers are always displayed inset from the left. The rule is that the rightmost figure of the number is 10 character spaces in from the left. This means that:

```
PRINT 123
PRINT 12
PRINT 1
```

will have the 3, 2 and 1 all lined up under each other, 10 spaces in from the left of the screen.

If fact, when you switch on the display is divided into four fields, each of 10 characters each. Strings are printed aligned to the left of the display field, numbers to the right. This will be made clearer if you enter:

```
PRINT 1,2,3,4
PRINT "one","two","three","four"
```

From these lines you'll see that PRINT can have one or more items after it, separated by commas. These lists of things after the PRINT are known, logically, as the print list.

You don't have to have commas: there can be spaces, semi-colons or even apostrophes, and each acts differently. See if you can figure out

the rules from the results of:

```
PRINT 1,2,3
PRINT 1;2;3
PRINT 1;2;3;
PRINT 1 2 3
PRINT 1'2'3
PRINT ;1
PRINT
PRINT "a" "b" "c"
PRINT "a";"b";"c"
PRINT "a"'"b"'"c"
PRINT "a""b""c"
```

To summarise, a comma separates the print list into the screen fields, a semicolon "glues" them together, while an apostrophe starts on a new line for each item.

Don't worry too much about the different fields, as you need them they'll make more sense. If you want to know more about them there's an excellent article on PRINT by Nigel Peters in the July 1983 issue of *The Micro User*.

And what if the item after print exceeds 10 characters in length? Try it and see with:

```
PRINT "abcdefghijkl"
```

We've seen that PRINT can be used in two ways. Can we have it working in both ways at once? Again the micro is willing to answer your question in response to:

```
PRINT 1+2,"a sum"
PRINT "a string" number
```

As a basic Basic rule, if you want to know "what happens if . . ." try it out on your micro. You won't learn Basic just by reading about it, you'll have to try it for yourself.

You'll find that your micro makes a first class teacher, immediately reacting to any nonsense you've sent it! Mind you, it's lacking a little in tact.

Notice that in the first case:

```
PRINT 1+2,"is a sum"
```

put the 3 next to the i of "is". In this case it's obvious and easily remedied with:

```
PRINT 1+2," is a sum"
```

but it can lead to problems when using print lists such as:

```
PRINT 2*4,"111"
```

where the two pieces of output join together on screen.

A Basic rule: If you want to know "what happens if . . ." try it out on your micro

And that's where we'll leave it for this time. We've learnt that to talk to the micro, and to get it to do what we want, we have to use a language called Basic.

This language is made up of a group of reserved words which, when used in the proper way according to the rules or syntax of Basic, can control the micro.

We've explored one special – or reserved – word, PRINT, and seen how it can do two things, depending on what is in the print list, strings or expressions.

By now you should be able to distinguish between:

```
PRINT "3*4"
```

and

```
PRINT 3*4
```

and be able to get the micro to tell lies with lines like:

```
PRINT "1+1=";3
```

There's been a lot for you to type in and I hope that you won't stick to what I've got here, but try out your own examples.

Notice one thing though. Whatever we type in has been obeyed immediately after we've pressed Return. When it works like this we say that the micro is in command mode.

We've haven't yet written a program, even though we're learning a programming language. That comes next time, when we'll be looking at programs and why we can have:

```
PRINT "a"
PRINT 1
```

but not

```
PRINT a
```

PROBLEM

I HAVE an application in mind for my BBC Micro system on which I would like some advice. The project is essentially an outdoor data-logging exercise in which three signals will be presented to the analogue input.

Two of these signals are accelerometer outputs and will be digitally integrated twice with respect to real time to give real coordinates.

At regular intervals of perhaps 10 seconds the intention is to log the two coordinates and the signal from the third analogue input, and to write them to disc.

The two specific questions I have, relating to this scheme are:

- **Power supply: Will an electronic DC/AC convertor running from a car battery be suitable, and would any small variation in frequency or waveform of the AC adversely affect the micro or the disc drive?**
- **Timing: can I use the internal clock for real-time calculations, or will the writing to disc and polling the analogue inputs disrupt the timing?**

If the internal clock is unsuitable, can an external clock be used, bearing in mind the power-supply arrangements? – I.R. Hanby, Nottingham.

SOLVED

Second things first, the internal clock can be used on some disc systems without affecting the accuracy too much. If you find this is not good enough for you the real time clock (see Body Building, in The Micro User, February 1984) can be used.

As to the power supply, this is more tricky. It is a switched mode supply and so I would expect it to be sensitive to waveform but not frequency. It would be best if you could get it a clean sine wave, which is not the shape normally produced by converters.

As an alternative why not bypass the power supply altogether and derive the +5 and −5 volts from a series regulator on the 12v accumulator? The disc drives would need 12v which could be taken from the battery and +5v at about 1amp.

Mike Cook

MICROWORLD

· COMPUTER GROUP ·

EDUCATIONAL SPECIALIST

Microworld are Scotland's sole Scottish based distributor with vast experience of Econet and can offer installation, service, advice and supply throughout the U.K. Our London office is now open to service the entire country. Please call for our latest Educational Prices or phone for our list of dealers nationwide.

BRANCH NETWORK THROUGHOUT THE U.K.

LONDON

Park House
140 Battersea Park Road
London SW11 4NB
01 627 4840

GLASGOW

11 Bath Street
Glasgow
041 332 1116

EDINBURGH

12 Leven Street
Tollcross
Edinburgh
031 228 1111

ABERDEEN

77 Holburn Street
Aberdeen
0224 571735

Computers

Acorn Electron	£69.95
Acorn Electron + 5 Pack	£79.95
Acorn Electron + YTV Pack	£99.95
BBC Model B (ANBOI)	£339.00
BBC B PLUS (64K RAM) (Free Cumana CSXL100)	£499.00
BBC B PLUS 128K (Free Cumana CSXL100)	£529.00
Z80 Second Processor	£349.00
6502 Second Processor	£199.00
32016 Second Processor IMB RAM	£1,699.00
Amstrad CPC 464 mono	£199.00
Amstrad C6128 colour	£399.00
Sanyo 555 with SG-10 Printer Zenith monitor + Software	£899.00
RML Nimbus PC1	£1,195.00
RML Nimbus PC2	£1,695.00
RML Nimbus X10	£2,495.00
Nimbus Colour Monitor	£243.00
Nimbus Mouse	£110.00

Disk Drives

Cumana CSX100 40T, single, no psu	£79.95
Cumana CSX200 80T, single, with psu	£89.95
Cumana CSX400 80T, single, no psu	£99.95
Cumana CSL100 40T, single, with psu	£109.95
Cumana CS100M40T, single with psu	£109.95
Cumana CS400 80T, single, with psu	£129.95
Cumana CD200 40T, dual, with psu	£199.95
Cumana CD800/S 80T, dual, with psu	£239.95
Cumana CSX531, 3½" Disk	£59.95
Winchester 10mb Hard Disc	£1,499.00
Winchester 30mb Hard Disc	£2,099.00
Level III Software	£139.00
Disk Interface with DNFS Rom	£69.00
Torch Z80 Disk Pack	£599.00

All Cumana Drives come with cables, manuals formatter disc.

Monitors

Microvitec Standard	£205.00
Microvitec Medium	£289.00
Microvitec High	£435.00
Sanyo Standard	£179.95
BMC High Res. Green Screen	£109.95
Sanyo Green Screen	£89.95
Zenith ZVM Green	£85.95
Zenith ZVM Amber	£99.95

ROMs & Sundries

AMX Mouse superb plus software	£75.95
Wordwise ROM	£37.95
Wordwise plus ROM	£45.95
View ROM	£46.95
View Sheet ROM	£44.95
Disc Doctor ROM	£29.95

IN THE MARKET?

We at Microworld believe that our price to end user and education cannot be beaten and accordingly we give you our PRICE PROMISE
Phone now for details.
(Subject to conditions)

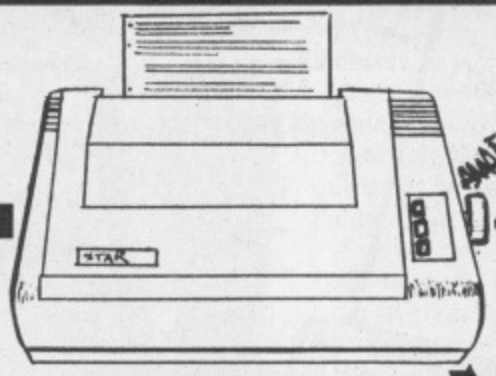
MICROWORLD

· PRINTER BARGAINS · CALL 01-627 4840 ·

star

FEATURES

1. 120cps — bidirectional logic seeking
2. Near letter quality mode
3. Inexpensive ribbons
4 Epson and IBM compatible
5 Easily accessible dip-switches
6 Friction and Tractor feeds
7 Standard parallel Interface
8 12 months guarantee and our 7 day Money Back Guarantee.



NEW SG-10 NLQ

ONLY £229 Inclusive of VAT

VERY VERSATILE
Also SG-15 NLQ Wide carriage
132 column version. Only **£369.00**

Canon PW-1080A

FEATURES

1 160cps — bidirectional logic seeking
2 NLQ mode 23×18 Matrix: 27cps
3 Full range of Epson FX80 Print Codes
4 Friction and Tractor feeds

CANON PW-1080A

OUR PRICE ONLY £279

RRP £319

JUKI 6100

FEATURES

1 18cps — bidirectional logic seeking
2 10, 12, 15 and proportional spacing
3 Bold, underline — Wordstar compatible
4 Many compatible daisy wheels available

JUKI 6100

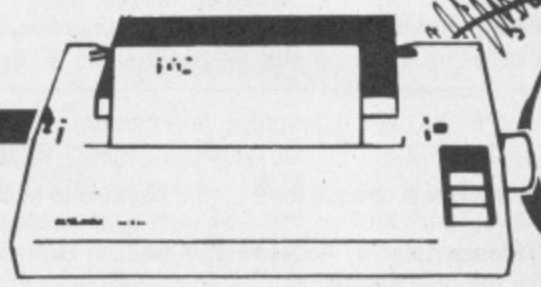
OUR PRICE ONLY £339

RRP £399

EPSON

FEATURES

1 100cps — bidirectional logic seeking
2 NLQ Rom Font as standard
3 Italics, bold, underlining and many more font styles
4 Compatible with most software
5 Tractor feed — only £25 extra.



EPSON LX80

OUR PRICE ONLY £239.95

RRP £295

MAIL ORDER SEE OVERLEAF

MICROWORLD

· LONDON CALL 01-627 4840 ·

Cumana CSX400
80 Track 400K Drive, 40/80 switched, complete only
£99.95
incl. VAT & Carriage

24 Hours Service

Cumana CSX531
3.5" Disk Drive, 40T, 100K, including power lead, cable formatter and Acorn DFS Kit with DNFS ROM
£109.95
incl. VAT & Carriage

Cumana CD800/S
40/80 track switched Dual Drive with PSU £349.95
Sale Price
£239.95
incl. VAT & Carriage
or with DFS
£299.95
incl. VAT & Carriage

CUMANA DISK DRIVE OFFERS

Cumana CSX 400
Disk Drive & DFS Kit only
£154.95
incl. VAT & Carriage

Cumana CS400
40/80 Track Switchable Single Drive Double Sided with PSU and Acorn DFS Kit was £219.95
NOW **£189.95**
incl. VAT & Carriage

VERY LIMITED OFFER
ACORN DFS KIT
A complete kit of parts with DNFS ROM
Mail Order Only
£69.00
incl. VAT & Carriage
(Fitting cost £15).

How to Order

Orders by post welcomed: please mail coupon with payment.
Telephone orders welcome: call 01-627 4840 (London) or 031-228 1111 (Edinburgh) or 041-332 1116 (Glasgow).
We also welcome Government and Educational orders.
All products supplied include our own 12 months guarantee backed by our own service centre staffed by fully qualified engineers.
Order with confidence, 7 days money back guarantee.
All charges include VAT and carriage charges by courier. Dealer enquiries and personal callers welcome. All offers stated here are available through any of Microworld's 50 dealers nationwide.
The right is reserved to alter prices without prior notice.
E&OE.

MAIL ORDER

To: Microworld Distribution, Dept. AU, Park House, 140 Battersea Park Road, London SW11
01-627 4840

Please send me _____

_____

_____

☐ I enclose a cheque for £ ..... payable to Microworld Computer Systems Ltd.

☐ Please debit my Access/Visa/American Express Account

No _____ Signed _____

Name _____ Address _____

_____

Gold conversion travelled well

IT'S time to get your tin hats out and lead the assault on the enemy territory in **Beach-Head,** from U.S. Gold.

This is one of the first conversions of their legendary Commodore 64 software, and it's great . . .

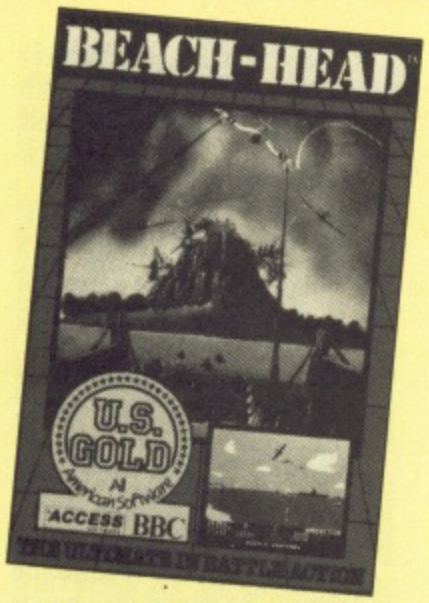
As the game begins, you are presented with a map of the area.

By moving the cursor which represents your forces, you can select one of two opening scenarios.

In the first you must guide your fleet through a narrow channel which is mined and is constantly criss-crossed by enemy torpedoes.

You score for every ship successfully negotiating the channel, but you inevitably lose a few ships.

The second option is to skip this section and proceed with a



full complement of 10 ships to the anti-aircraft game.

This part of the game is great fun – enemy aircraft dive at your ship with guns blazing.

As they approach, they increase in size and detail.

You now take on the role of gunner, moving the gun up, down, left and right, pumping out shells at wave after wave of fighters.

Speed and accuracy are essential here, as with each hit from the enemy your damage points increase.

Each time the total reaches 20 damage points you lose another ship.

The enemy planes defeated, their fleet now comes into play.

Once again you are a gunner, but this time the battle is ship to ship.

My first attempts at lobbing shells at silhouettes of enemy vessels were disastrous.

I then spotted a small notice on the display informing me of how long or short my last shot was – aren't computers wonderful? Having survived this melée, the surviving ships head for the beach and land their cargo of tanks – the number of tanks landed being proportional to the number of surviving ships.

The tanks must be guided through a tortuous maze of tank traps and gun emplacements.

Finally they reach their target – a huge gun mounted on top of a hill. The hill is protected by numerous guns which must be eliminated before the large gun is destroyed.

The graphics are excellent, and the fact that your performance on each level determines your fire-power on the next is a great idea.

Let's hope we see many more U.S. Gold conversions in the future.

James Riddell

Squares that can make an artist out of you

EVER since I first saw an Escher print with its cleverly-interlocking figures, I have been fascinated by the subject of tessellations.

The word derives from the Latin "tessarae", meaning mosaic or tile, and is used in the mathematical sense to mean the art/science of covering areas completely with the same repeated shape, leaving no gaps between.

The word "art" is justified, as this geometrical method, in the hands of an Escher, becomes just that.

The disc-based program **Tessellations,** from Cambridge Micro Software, does not guarantee to turn you into an artist – but its design makes it extremely simple to get fantastic results.

By offering several small menus it uses the minimum of keys – the cursors for drawing, Spacebar and Return for menu selection, Shift and Delete for fixing a line or erasing it.

On start-up a square appears. Selecting "T", for tessellation, covers the screen with squares like a tiled floor.

Nothing in that, perhaps, but the first menu allows the user to rotate the square, or stretch it laterally or diagonally.

The resulting parallelograms can also be tessellated all over the screen, creating the basic underlying framework.

Following this the user can then change the outline shape, from plain straight lines, in two stages – "horizontals" and "verticals".

On the top line of the basic parallelogram appear two cursors, a moveable square at one end and a cross fixed at the other.

The user directs the square around in stages, drawing its path by Shift presses. X-Y coordinates are given, and are needed, for really accurate geometrical work.

Any meandering line can be drawn in any of seven colours and the bottom line simultaneously repeats it.

The line must end at the cross, whereupon the same process is repeated at the sides.

The shape can then be edited if necessary.

Additionally, a pattern can be created which lies within the boundary.

This can be based upon any one of nine variations on the three basic laws of symmetry – rotation, reflection or displacement.

When a particular pattern type is called, any line drawn within the parallelogram is acted upon under its rules – mirrored for example, or perhaps threefold (like a cloverleaf).

Alternatively the outline can be left blank and only the "internal" pattern drawn. This would result in repeated shapes which do not join together in any way.

Calling tessellation put the drawing, to any desired scale, in the centre of the screen.

This area is then repeated pixel by pixel in all the corresponding areas dictated by the original parallelogram tessellation framework.

The speed of copying is dictated by the number of points laid out in the original and can be a bit slow, taking several minutes.

The basic underlying parallelogram pattern is not drawn but a clever bit of two-screen manipulation allows the user to call it up and see it superimposed.

I would thoroughly recommend this package, even though it is rather highly priced, to any school for work in areas of maths, art, home economics (for fabric designs) and any other application which requires the creation of superb repeating patterns.

Terry Hallard

Reading's a pleasure...

READ-Right-Away Reading Pack 2 is yet another cassette from the successful series of reading programs from Highlight Software. Like others in the series, it contains two similar games, and the accent is truly on games yet there is still a remarkable educational content.

Educational programs have long been renowned for their poor quality. However this sad state of affairs is rapidly changing, and this kind of program certainly helps.

It is almost an outstanding example, which makes the few minor snags even more noticeable and frustrating!

Pyramids, the first program, proved most useful when I tried it with a group of less able first year juniors, but it has also shown great value over a much wider range. There is an initial choice between 'easy' or 'hard' words, followed by the selection of a skill level from one to five.

A scene – somewhere in Egypt – is beautifully drawn with an incomplete pyramid. The idea is to supply the missing blocks by successfully combining a consonant blend at the bottom of the page with a word-ending in the pyramid.

Actually, the consonant blend is selected by moving two of the famous Wilson, Kepple and Betty group until they are correctly positioned.

Should a mismatch be made, it is likely that a native worker will fall dramatically to his death from the pyramid, but I guess you need to make a few sacrifices now and again ...

Sploosh is really very similar, but this time the scene is a swimming pool, with a variety of vowel pairs arranged at the top of the board.

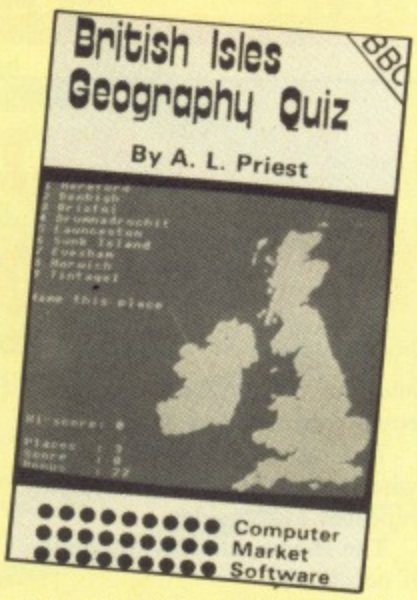
The graphics are superb, and the sound effects help, but I found some of the choice mechanisms rather repetitive, having to re-enter them every five goes.

A longer game would be welcomed. So would the chance to more easily get into the listing, in order to alter some of the choices, and to re-check the list of valid responses.

However, this is a creditable program, which young children will love for the graphics and which parents and teachers might find useful for the reading skills involved.

Phil Tayler

Quiz has style



A HIGH standard of programming is combined with simplicity of use in **British Isles Geography Quiz,** by Computer Market Software.

The program is based on the well-established idea of using computer graphics to generate a map while indicating a number of randomised locations to be correctly identified by a multiple choice quiz.

Unlike most of its predecessors, however, it has certain refinements. The use of simpler graphics in order to incorporate a large range of questions is one of its most noticeable.

Instead of representing a large number of countries in assorted colours the program uses two colours to produce a high resolution silhouette of the British Isles while still retaining enough memory to store 345 separate locations.

As one would expect with questions in multiple choice format, additional marks are awarded for speed and accuracy.

Each place is indicated by means of a cross-hair cursor at the end of a pointer and the player is given a maximum of 30 seconds in which to answer.

The score is determined by the remaining time as well as a figure calculated from the number of attempts required, of which a possible nine are allowed.

The program indicates any incorrect guesses on the table of possible answers, as well as pointing out the proper location of the places incorrectly guessed.

Overall this is one of the better presented and more easily used programs of its type and at its proposed price of only £1.99 it is well worth considering as a useful addition to almost any software collection.

Tarquin Thomas

Back to the galaxy

SOFTWARE firms are becoming rather sly these days when it comes to naming their products, and **One Last Game,** from Bevan Technology, is no exception. "When your games are all played out, it's time for One Last Game", says the blurb on the cassette insert. Nice one.

However although the title may be original the game isn't. Basically, it's a reworking of that old favourite Galaxians.

For those unfamiliar with it, this was the one where a phalanx of aliens trudges back and forth across the top of the screen, breaking off in ones and twos to float down and attack your laser base, while you try to shoot them down.

Bevan Technology haven't done a bad job of re-working it. For starters, they've changed the axis of the game so that the aliens appear on the right of the screen and your laser base floats along on the left.

Also they've added a scrolling landscape which, although not the smoothest I've ever seen, does give the impression that you're belting along at a fair rate of knots.

In fact the game has all the extras you could want: nice colour and good sound which can be switched off if not wanted, freeze frame in case the phone goes just when you're about to beat your previous best, and 20 different levels ranging from could-do-it-with-my-eyes-shut to downright-suicidal.

In a nutshell, this is quite a reasonable game on the Galaxians line, but thereby hangs the rub. Do we really need yet another version?

If that's what you're looking for, all well and good. This is quite well put together. But for originality, nought out of ten.

James Bibby

Beta-Base gets a boost

CLARES are branching out into accessories for Beta-Base and the seven programs on their Beta-Base Utilities disc will be of interest to all BB owners.

Two give Beta-Base entirely new features and the rest extend existing options.

Mail-Merge is the more important of the two new modules. Up to 16 fields can be inserted into an Ascii file prepared on a word processor such as View or Wordwise. The document is then automatically formatted before printing.

Compared with full mail shot programs, Mail-Merge offers only rudimentary facilities, but it is simple to handle, and is adequate for occasional use.

H-C Status is the other new module. It prints out the specification of a datafile with information on its fields and the number of records used and deleted. Your guess is as good as mine as to what H-C stands for.

Search+ is a considerable improvement on the standard option. For example, you can have up to nine strings in a search instead of five, and logical OR can now be used in search criteria combinations.

Search string length is increased from 10 to 20 characters, and the string can include wild cards. You can also search whole records without specifying fields. Finally, an interrupt facility generates a pause every time a match is found, during which the record can be printed or deleted from the final list.

Extended Label Printer too, has more and better features than its Beta-Base original. It will print up to three labels across the sheet instead of two, replace blank fields by the next line of the address, intelligently split a field that is too long then re-position the record accordingly and it will save and load print formats.

Disc Sort (single and double drive) can operate on any size of file, unlike the Beta-Base Sort which is limited to 500 records.

It also gives the option of ignoring upper and lower case, the lack of which can be an irritating restriction.

The double-drive version will work on two copies of a file simultaneously.

But the new utility will sort only into ascending order, so it doesn't quite make the original obsolete.

With the upgraded version of the standard Transfer facility you can transfer fields in any order from one file to another without necessarily maintaining compatibility between field types.

But there is no additional error-checking, so if, for example, you transfer a string to a numeric field, the string will be evaluated as zero, unless it begins with a +, a – or a digit.

Fast Pack is twice as fast as the normal compaction routine.

There is nothing revolutionary about any of these utilities, but they do improve the Beta-Base performance. The only real problem is that they are called from a menu which must be loaded separately from Beta-Base itself.

For some operations this means constantly having to change between the system disc and the utilities disc.

Nevertheless, the package represents a bold and praiseworthy experiment. All the utilities have been written by genuine Beta-Base users, who are after all the best people to judge what is required.

The result is that there are minor inconsistencies in screen presentation between modules, and a manual of patchy quality. But these things hardly detract from such a good idea.

Gabriel Jacobs

Promise kept

THE **Word Games with the Mr Men** program follows in the same promising steps as the earlier Mr Men programs from Mirrorsoft.

This time the number of the little characters is reduced to four, but the graphics execution is greatly improved.

Mr Noisy's Word Game features Mr Funny and Mr Silly as well as Mr Noisy, and the clear intention of the series of activities is to practise opposites and comparatives.

Any of nine activities can be selected from the menu. These include options in which the child can conjure up on the screen any of the characters in any given dimensions, so that a tall Mr Noisy can stand beside a wide Mr Silly.

The young children I tried this with enjoyed these activities.

However my favourite program, and that of many of my fellow players, was Read with

Mr Bounce. There is a menu with five choices and this time the intention is to encourage practice in reading through the repetition of a number of phrases as the games are played.

As various phrases appear on the screen the child has to react to the correct one by pressing the Space bar. Actually some of the games use a strange choice of 1 for yes, 0 for no, which takes a little getting used to.

A fine program with a very real educational purpose, yet an equally high enjoyment factor.

Phil Tayler

Ideas displayed

SCRATCHPAD, a disc based program from Innovative Software, is described as an ideas organiser. It's designed as an aid to sorting out your ideas when writing reports, articles, or even books.

Those who have ever written a piece of text of reasonable length will be aware of the importance of planning. Admittedly that most valuable of tools, the word processor, does allow you some room for error reorganising the structure of your work, when you have a flash of inspiration which should have been written three pages ago. However, retrospective remedies are never as satisfactory as a well planned whole.

So, whenever I write an article I sit down with pen and paper and note any relevant ideas as they enter my head. The result of this style of writing is three sheets of A4 covered with out of sequence scrawl. This must then be sifted, sorted, and re-written neatly.

Scratchpad aims to bring electronic order to this ideas chaos. You input your thoughts into idea cells labelled with a suitable name. Ideas can be up to 95 characters in length.

The next idea that you have may be totally unrelated to the first and will therefore be given a separate cell. Should any further ideas be related to your previous ones then they can be added to an existing cell.

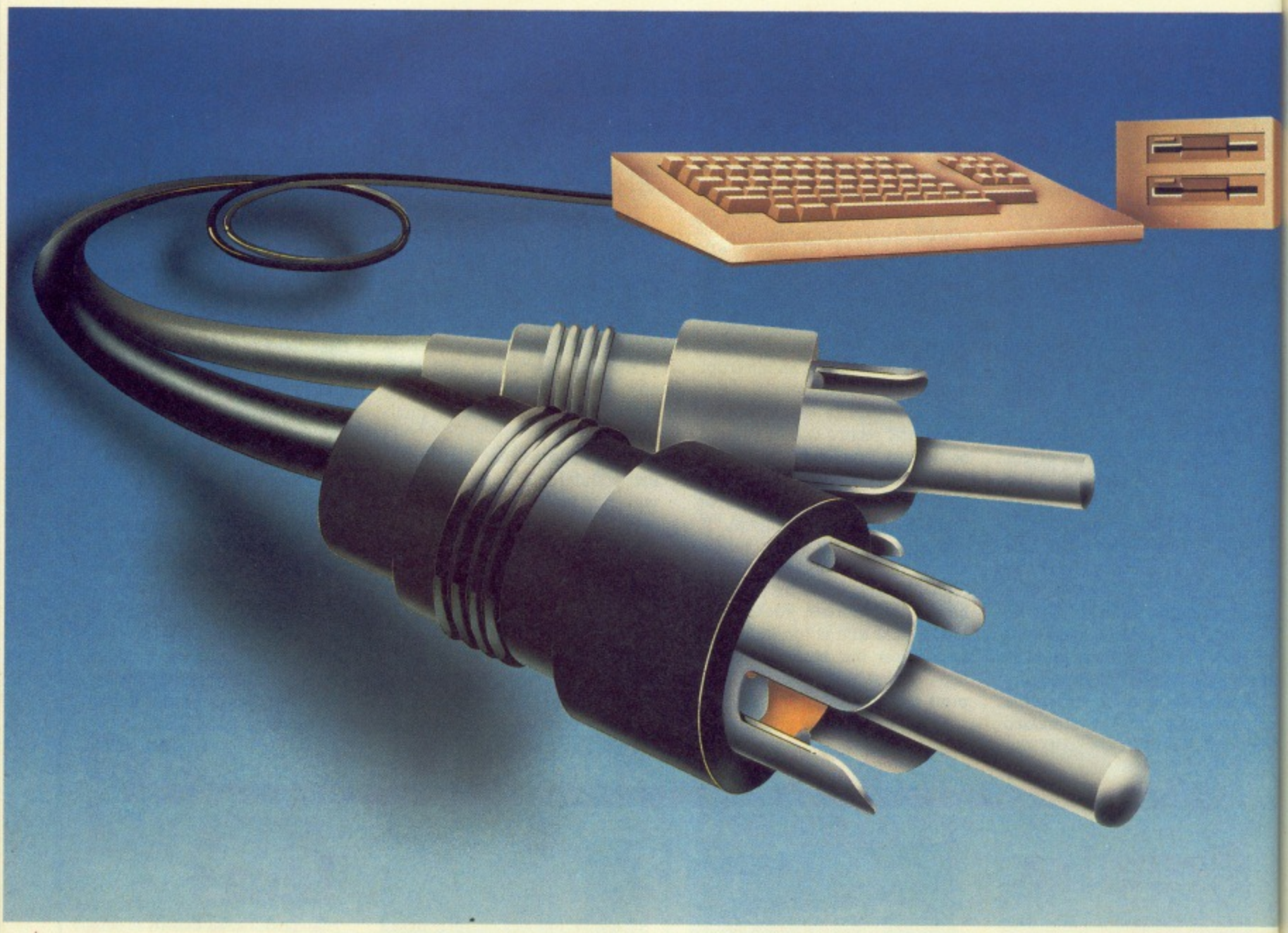
The rest of the program is devoted to editing, re-arranging and printing the ideas to produce a sound skeleton for your work.

Scratchpad is certainly a clever idea that might be a useful planning aid to the computer minded. I am not totally convinced that it is faster than my pen and paper technique.

However, the way it allows you to reorganise and display your output neatly, certainly beats my sheets of A4.

Carol Barrow

HOW DO YOU MAKE A COMPUTER SHARPER?



PLUG IT INTO A PHILIPS PERSONAL MONITOR.

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

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

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

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

NAME: _____ Tick if trade enquiry ☐

ADDRESS: _____

_____ POSTCODE: _____ MU1

PHILIPS. TAKE A LOOK AT OUR IMAGE.

PHILIPS

PHILIPS

Kestrel's super six

ALTHOUGH most of the number programs I've reviewed so far have excelled merely in their general level of mediocrity, I have persevered – and been rewarded with a super set of six programs from Kestrel.

They were written by a teaching headmaster, and it soon became obvious that he has a shrewd grasp of how the computer can be used as a positive aid in number work.

There were six programs on the review disc – entitled **The First Collection** although they are available separately, either on cassette or disc.

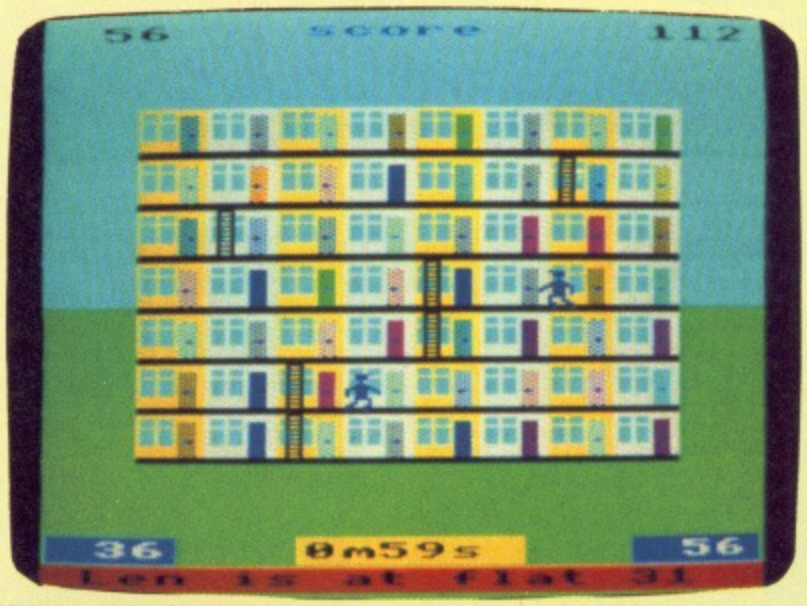
Swallows is simple in concept, using swallows on telephone wires to encourage children to use groups of 10 to assist addition. The screen display is immediately appealing to young children.

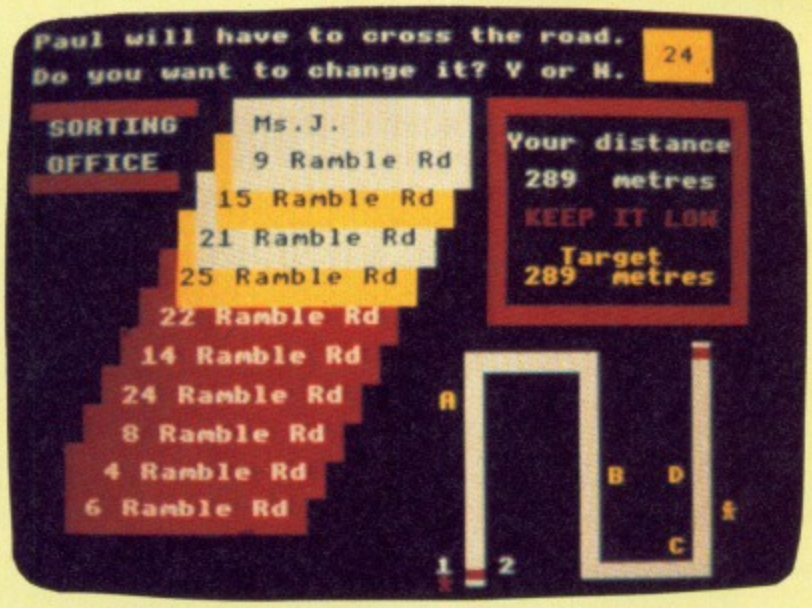
Spider is rather clever, using the idea of a spider chasing a fly to bring in directions, with clock notation, compass points, or bearings. Rather involved to get to grips with, it is nevertheless well worth persevering with.

Post has the child or children attempting to post letters in a block of flats, the size of which can be determined by the players.

As the postmen have to climb staircases linking different parts of the flats, the program practises rapid addition and subtraction, as well as coordinates and arrays.

Cider could be just another tables testing program, but the graphics, together with the reinforcement of table facts in a rectangular array, make this addictive and instructive. The quicker the answer is given, the more cider is made in the presses.





What is always informative when reviewing educational programs is to look at the treatment of wrong answers. Here, the box is refilled a row at a time, and that same question will reappear later in the game.

Spot is designed to practise coordinates through the medium of dot-to-dot type pictures. The next point in the outline picture is shown and the correct coordinates must be entered, before the line is drawn.

Children enjoy trying to predict which picture is going to appear, thereby developing oral skills also.

Ramble Road is excellent, involving a great amount of thought in the context of a very enjoyable game, in which mail has to be sorted before delivery.

Of the six, I would particularly recommend Cider, Spot and Ramble Road. In a review of this length I can only try to give a flavour of this superb disc, but I hope I have shown that this is one of the best collections of number programs I have seen.

Phil Tayler

Statistical procedures for students

PRESUMABLY software houses are running out of superlatives and acronyms for their products, so it's no surprise that a workaday little statistical package for students of business studies from Sapphire merely receives the accolade of **Superstat.**

This package allows the user to create data sets either as disc files or as data statements – the program being written in Basic – using either ungrouped or frequency data format.

The data can then be edited and a variety of statistical procedures applied to them, including the usual descriptive statistics – mean, median, range, standard, deviation and so on – together with histograms and cumulative normal distribution (ogives) for frequency data.

Under the heading of Forecasting, the package can apply a variety of time-series and smoothing techniques to sequential data.

Random deviates from a variety of statistical distributions can be generated, and the chi square goodness-of-fit test is available for testing a variety of null hypotheses, though surprisingly not that of the uniform distribution. Correlation and simple linear regression can be calculated for pairs of data.

The package has a number of good features, but with any interactive statistics program, especially one intended for students, ease of data input and editing is absolutely vital.

There really are too many short-cuts in the programming here. For example, there's no facility for editing an item of data as you type it in – hitting any non-numeric key gives an error and you start the item again. Also there's poor formatting of data when it's listed on the screen for checking.

Where there is more than one screenful of data you have to wait until all the screens have been presented before you edit an item (which could have been the first one).

Other drawbacks include limited data sets – 200 observations or 70 pairs – and lack of a graphics dump facility (you have to add your own PROCedure).

However I did like the various graphs that were produced, and the program does bring together an interesting set of statistical procedures which business studies students should find very useful.

Robert Sykes

Database proudly presents...

When it was launched in October, 1984, Mini Office was acclaimed as the most innovative software of the decade, creating new standards in serious programming – and at a price everyone could afford.

Since then it has become far and away one of the best-selling packages ever created for the BBC Micro, frequently displacing games from their position in the Top Ten. And, unlike most software releases, it is still as much in demand now as it was 15 months ago.

Which is why there has been so much speculation throughout the industry about what the much-rumoured Mini Office II would be like. After all, how do you beat a best-seller?

The answer is – by making it even better! And the new Mini Office II is certainly that . . . in every respect.

While still retaining upward compatibility with the original Mini Office, it is packed with a host of new features that have been made possible by the tremendous strides made in programming techniques in the last 12 months.

The result is the most comprehensive suite of business programs ever produced for the BBC Micro – and still the best value ever.

And it comes with a no-nonsense easy-to-follow guide to business computing that will take you step by step through all the many features, showing you how to use their huge potential to the full.

Some of the features of the new Mini Office II

With the word processor you can . . .

★ Select most features by menu or embedded commands. ★ Transfer records from database for personalised circulars. ★ Choose from three methods of display: 20 column (double size characters), 40 column, 80 column (20 and 80 columns only on 'B' Plus and 6502 Second Processor). ★ Centre, indent, tab, justify and merge text. ★ Insert, copy, move or delete blocks of text. ★ Select two editing modes: insert or overwrite. ★ Search and replace globally or selectively. ☆ Check typing speed in words per minute. ☆ See on-screen real-time clock, plus word and character count.

With the database you can . . .

★ Select five field types (Alpha, Decimal, Date, Integer, Formula). ★ Perform all arithmetic functions. ★ Search over multiple fields. ★ Mark individual records. ★ Use flexible printout routine. ★ Pass records to the word processor. ☆ Carry out powerful multi-field record sorting.

With the spreadsheet you can . .

★ Total rows and columns, with easy selection of criteria. ★ Copy formulae either absolutely or relatively. ★ Print out all or part of the spreadsheet. ★ Move directly to a specific location. ★ Select movement of cursor. ☆ Recalculate automatically or manually.

With the label printer you can . . .

★ Design any style of label with the versatile editor. ★ Select label size and sheet format. ★ Read directly from database files.

With the graphics pack you can . . .

★ Enter data directly or take from spreadsheet. ★ Use icon type menus. ☆ Choose pie chart, bar chart or line graph. ★ Display up to three line graphs simultaneously. ★ Display up to three bar charts side by side or stacked. ★ Choose bar charts in either 2D or 3D. ★ Draw compacted or emphasised pie charts. ★ Define your own style of shading. ★ Dump graphs directly to Epson or Seikosha compatible printer.

With the comms pack you can . . .

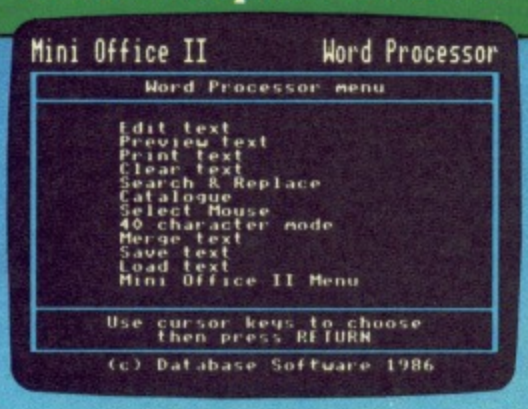
★ Access MicoLink or Telecom Gold with only two key presses. ★ Select protocols as required. ★ Change modes while on-line. ★ Store text directly to memory or disc. ★ Use one-key 'Stop' command.

With all the modules you can . . .

★ Use the AMX Mouse. ★ Choose foreground and background colour in most modes. ★ Make more efficient use of memory and faster response time thanks to machine code content. ★ Take advantage of the extra memory of the BBC B Plus and 6502 Second Processor.

★ **Features that were not in the original Mini Office.**

It's a word processor . . .



It's a database . . .

It's a spreadsheet . . .

It's MINI OFFICE II on the BBC Micro!

All 6 modulor

eSoftware

ORDER FORM ON PAGE 223

It's a graphics pack . . .

Mini Office II — Graphics

Graphics menu

Bar chart
Line graph
Pie chart
Load data
Save data
Edit data
Clear data
Select Mouse
Review data
Catalogue
Mini Office II Menu

Use cursor keys to choose
then press RETURN

(c) Database Software 1986

It's a comms pack . . .

Mini Office II — Communications

Communications menu

Microlink/T.Gold (1200/75)
MicroLink/T.Gold (300/300)
MicroLink/T.Gold (1200/1200)
Customised protocols
Select Mouse
Mini Office II Menu

Use cursor keys to choose
then press RETURN

(c) Database Software 1986

It's a label printer . . .

Mini Office II — Label Printer

Label Printer menu

Load file
Append file
Catalogue
Edit format
Load format
Save format
Print labels
Storage media.....Disc
Select Mouse
Mini Office II Menu

Use cursor keys to choose
then press RETURN

(c) Database Software 1986

ule: £14.95 (cassette), £16.95 (5¼" disc), £19.95 (3" disc)

Nightingale
The Modem

The facts speak for themselves, **Nightingale** is without equal in its field. It is undoubtedly the most popular multi baud rate modem available today. Whatever your communication requirements, the simplicity of use and the versatility of **Nightingale** will enable you to provide a solution whether the need is to extract information from Prestel, send telex's via Telecom Gold, download telesoftware or exchange files, **Nightingale** will do the job and a whole lot more besides.

Nightingale operates at the two most popular baud rates 1200/75 as used by both private and public viewdata systems and 300/300 baud for communication with remote mainframe, mini or micro systems. Also available in 'reverse viewdata mode' 75/1200.

Nightingale has passed the very rigorous tests required by the BABT and is fully approved for use in the UK. This not only means that you can rely upon the safety of the product because of the stringent manufacturing constraints, but also means that because it is a BABT approved product, you can be assured that your application to Telecom Gold, Prestel etc., will not be refused.

APPROVED for use with telecommunication systems run by British Telecommunications in accordance with the conditions in the instructions for use.
S/2592/3/E/500065

Commstar *The Software*

A fitting partner for the Nightingale modem, **Commstar** was nominated for the 1985 British Microcomputing awards, a remarkable achievement considering the very recent awareness of the true versatility of communications via the computer. With its powerful combination of Viewdata and ASCII terminal capabilities contained in one 8K Eprom, **Commstar** is probably the only communications Software you will ever need, as its many thousands of users will testify. Although it is unusually versatile, it is extremely easy to use as full advantage is made of the BBC's function keys and a comprehensive manual describes each of **Commstar's** features in simple terms. In addition to preprogrammed functions, items such as logon strings and passwords can be placed under the function keys to facilitate automatic access to the vast range of services which are now available.

The Competition

Pace have linked with the premier computer information provider on Prestel, MICRONET and Virgin Atlantic Airlines, all pioneers in their own fields, to offer you a challenge. A chance to try out your skills using your modem and play the 'Pace round Britain Quiz' on Micronet, and in so doing, an opportunity to win a fabulous holiday for two in New York.

This competition will be open to you between November 1st and February 1st if you buy one of our modems before the end of January. In addition, you will be given, free of charge, a full quarters subscription to MICRONET worth £10, and free registration to Microlink on Telecom Gold.

The prize includes a return flight to New York, 6 nights accommodation in a high quality New York Hotel, and spending money to the total value of £400.

Full details are contained with each modem.

micronet 800

Virgin atlantic

Nightingale Modem £119 plus VAT; Commstar Software £29.57 plus VAT; combination package £139 plus VAT

PACE

The products and information are available from good quality dealers throughout the country or direct from Pace. Payment accepted by cheque, Access or Visa.

We welcome Access
BARCLAYCARD VISA

Pace Micro Technology Ltd.,
Juniper View, Allerton Road, Bradford BD15 7AG.
Tel. 0274 488211 Telex 51564
Telecom Gold mailbox No. PCE 001 Prestel Mailbox No. 274729306

NO ONE MAKES A BAD DISC DRIVE

BUT WHO MAKES THE BEST?

Choosing between the many different disc drives now available for your BBC computer can seem a little confusing at first. After all any disc drive makes a tape-based system seem crude by comparison and the advantages of speed, capacity and reliability are overwhelming.

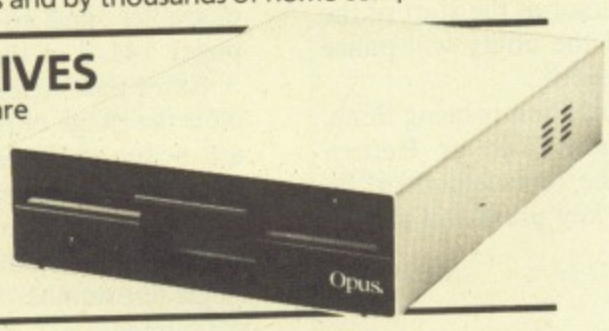
At Opus we've built our reputation on providing advanced disc drives for both the home and educational user and in our innovative approach to fast storage systems. All our disc drives use the very latest in Japanese disc drive technology and our drive mechanisms are carefully chosen for their reliability and performance. Opus drives are assembled and rigorously tested in our U.K. plants and our attention to quality control enables us to confidently offer the longest warranty of any disc drive supplier in Britain – a full two years. Just some of the reasons why you'll find Opus disc drives in all good computer stores across the country.

THE OPUS DISC DRIVE RANGE

Over the years we've extended our range of drives to provide one of the most comprehensive selections available and we constantly study new developments to ensure we stay ahead of the competition on disc drive design and engineering. As a result our products are now chosen by leading universities, colleges, and schools, research institutions, hospitals and businesses and by thousands of home computer users.

5¼" DISC DRIVES

All our 5¼" disc drives are half height and feature low power consumption, fast track to track access times and are manufactured to BS415 standards.



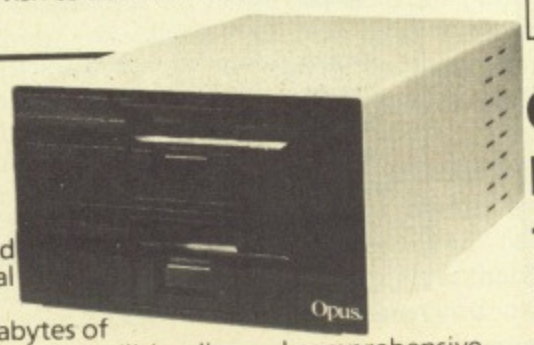
SINGLE DRIVES

Opus single drives are extremely quiet in operation and single-sided 40 Track models provide up to 250 K of unformatted capacity and double-sided, 80 Track hardware switchable drives a powerful 1 Megabyte.

All our single drives are suitable for use in single or double density format. We also provide a full range of single drives in a dual case with power supply should you wish to add a second drive at a later date. **Prices from just £79.95.**

DUAL DRIVES

The Opus range of dual disc drives are also available in single or double-sided form and feature their own power supply which is separately fused. In single density, Opus and dual drives provide 200, 400, 800 K of capacity with up to 1.6 Megabytes of storage available in double density. A utilities disc and comprehensive manual is supplied with all drives. **Prices from just £179.95.**



OPUS DDOS

The Opus range of disc drives for the BBC micro are backed by one of the most advanced and highly praised double density disc interfaces on the market. Voted fastest system by 'Acorn User' and favourite choice by 'A & B Computing', the Opus DDOS will help you get the most from your disc drive. It features utilities on ROM including Format and Verify, will handle tape to disc transfers and is compatible with an extensive range of leading software including 'Elite', Clares 'Replica II', 'Mini Office', 'View', 'Wordwise' and 'Wordwise +' together with most sideways ROM cards. Our interface offers automatic 40/80 Track selection, automatic density selection, has a unique mass copy routine and powerful machine code operating system giving up to 248 files. It's also 80% faster than single density systems.

WHO MAKES THE BEST DISC DRIVE?

Choosing the best disc drive might seem confusing at first but when you consider quality, performance, reliability, extended warranty and value for money, the choice is a lot simpler than you might imagine.

The first step is to call the Opus Hotline. We'll give you details of your nearest dealer, a rundown on our very latest price list and information on some really unbeatable Opus offers. Call the Hotline now.

☎ OPUS HOTLINE 0737-65080

OPUS BRITAIN'S LEADERS IN DISC DRIVE INNOVATION

Opus Supplies Ltd,
55 Ormside Way,
Holmethorpe Industrial Estate,
Redhill,
Surrey RH1 2LW.

Opus.

FIND & REPLACE

Disc or tape users will find this Basic utility from MIKE STALLYBRASS an invaluable aid for programming

ONE of the shortcomings of the BBC Micro is the very limited built-in editing facilities for Basic programs. This program is an attempt to remedy that failing.

It cannot edit Basic programs, but it can be used instead to generate up to three machine code utility programs that will allow you to find, and replace if you wish, any given fragment of text within a Basic program sitting in memory.

The three utilities that are generated are:

- Find: Primarily for disc users. It will find any fragment of text within a Basic program.
- Replace: Again, primarily for disc users. It will find, and optionally replace, any fragment of text in a Basic program with another.
- General-purpose: A utility, primarily for tape users. It combines the functions of the Find and Replace utilities.

A multi-purpose generator program has been used, as the three utilities have a lot of code in common. By using the generator the need to provide different assembly listings containing a lot of duplication has been avoided.

Using the utilities is very simple once they have been saved to disc or tape.

If you have a disc system, type *FIND [string] or *REPLACE [string] [string2] and the appropriate program will run, where [string] is the string to be found, and [string2] is the replacement string to be used.

If you are using a tape system, type *RUN GENUTIL to load and initialise the utility so that it can then be used without having to reload it from tape each time.

Thereafter, type *LINE [type] [string] ... and so on to use the utility, where [type] is an F for Find, or an R for Replace. The remaining parameters are as described for the Find or Replace utilities.

By default, each occurrence of [string] will be found, displayed on the screen with the cursor at the start of the found string, and the utility will pause until a key is pressed.

If a Replace operation is being done, pressing the Space, Tab or Return keys will cause the replacement to be made. Any other key press will simply cause the next occurrence of [string] to be found, without any replacement being done.

If the Escape key is pressed while a Replace operation is being done the utility will end at the current line without inserting any changes in the edited line back into the program.

The utility can, however, be restarted at the line where it was interrupted by typing *FIND, *REPLACE or *LINE as appropriate, without giving any parameters.

The string parameters for the utility must be delimited by spaces or quotes. If the required string contains any spaces the complete string must be enclosed in quotes " ... ". If the string is enclosed in quotes, then any quotes required within the string are represented by a pair of quote marks "".

The strings specified can also include control and other non-Ascii characters, by using the string escape character ¦ in the same way that it can be used in function key definitions "¦M" = Return, "¦¦" = ¦, "¦?" = Delete, "¦!" adds 128 to the following character, and so on – as detailed on pages 141/2 of the User Guide.

Extra parameters can be provided to limit the range of the program lines that are scanned (by default the complete program is scanned).

If more than one parameter is given they must be separated by commas. If a single line number is given only that line is scanned.

If more than one line is to be scanned

BASIC ROUTINES

getchb	Gets the next character pointed to by text-pointer B.
getnmb	Gets a number from the text pointed to by text-pointer B.
plnum0	Prints a 16-bit number in the integer accumulator.
plnum5	As plnum0, but with leading spaces to a field width of 5.
ptoken	Prints the character in the accumulator, expanding tokens.
instr0	Searches for one string with another (INSTR(a$,b$,c)).
tline0	Tokenises a line of text, ready for insertion into the program.
inslin	Inserts a line into the program.

(Details of the entry and exit conditions from all these routines are given in Table III.)

Table I

OPERATING SYSTEM ROUTINES

gsinit	Start the recovery of a string from the command just given.
gsread	Read in each character of a string in the command.
osargs	Find the location of the command line in memory.
osrdch	Get a character from the keyboard.
osnewl	Move to a new line on the screen.
oswrch	Write to the screen, or to the string buffer.
osbyte	Performs various *FX calls.
oscli	Interpret a star command.

Table II

BASIC ROUTINE REQUIREMENTS

getchb: Entry point &8A13 (Basic I), &8951 (Basic II). On entry, pointerB [that is (&19), Y where Y=(&1B)] points to the next character in the Basic program to be processed. On return A contains the next non-space character found, pointerB is updated, Y=PtrB-offset [(&1B)] and X is preserved.

getnmb: Entry point &A06C (Basic I), &A07B (Basic II). On entry, pointerB points to the second character of the presumed number, with A=first character, Y=PtrB-offset. On return pointerB is set to the first character after the presumed number. The carry flag, if set, indicates a number was found. The negative flag, if set, indicates it was real, with the result in the floating point accumulator (&2E-&35), otherwise the result is in the integer accumulator (&2A-&2D). A=&40 if the result was integer or &FF if it was real. X and Y are undefined.

plnum0 Entry point &98F1 (Basic I), &991F (Basic II). On entry place the number to be printed in the low two bytes of the integer accumulator. On return A=last char printed, X=&FF, Y is undefined.

plnum5 Entry point &98F5 (Basic I), &9923 (Basic II). On entry and return as Plnum0 above.

ptoken Entry point &B53A (Basic I), &B50E (Basic II). On entry A=character or token to be printed. On return A=last character printed, X and Y are preserved.

instr0 Entry point &AD38 (Basic I), &AD12 (Basic II). On entry the string being sought must be in the string accumulator (that is from &600 on, with its length in &36) and the searched string must lie on the bottom of the Basic stack (that is pointed to by (&4)), consisting of a length byte followed by the string itself. The lowest byte of the integer accumulator – &2A – contains the starting position in the searched string for the search. On exit &2A contains the position in the searched string at which a match was found, or 0 if no match was found. The searched string is discarded from the bottom of the Basic stack (&4,5 is adjusted upwards). A, X, Y are undefined.

tline0 Entry point &88D3 (Basic I), &8951 (Basic II). On entry (&37) points to the start of the line to be tokenised, which is terminated by a carriage return (&0D). On return the line is tokenised, starting at the same position. A, X and Y are undefined.

inslin Entry point &BCAA (Basic I), &BC8D (Basic II). On entry integer accumulator holds the line number to be inserted, &700 on contains the text, Y=offset from &700 of first character of line to be inserted. On return A=&0D, X and Y are undefined, and TOP is reset. Note that this may corrupt some variables, as a CLEAR is not performed.

Table III

then the start and end lines must be specified, or a comma given to indicate that the first and/or last lines of the program are to be used.

Finally, if an A (or a) is given after both line number parameters, the utility will cover all occurrences without pausing.

Thus to find the occurrences of the string "all" in line 200, pausing after each find is displayed, type:

```
*FIND all 200
```

Alternatively, to replace all occurrences of *"a% "* by *"A%"* from the start of the program to line 90, and without pausing for confirmation, type:

```
*REPLACE "a% " A% ,90,A
```

To keep the utilities as short as possible they make use of some of the routines contained in the Basic ROM and also some within the operating system. These routines are summarised in Tables I and II, with further details of the Basic routines in Table III.

I had originally hoped that all the utilities could be contained within two pages of memory. Unfortunately as debugging progressed so the utilities grew.

The Find utility just fits within two pages, but the Replace and general utilities both require three.

The utilities can be assembled to run virtually anywhere in memory, but can conveniently reside from &900 on disc or tape systems, or else from &B00 on tape systems if the tape buffer areas need to kept free.

	Basic I	Basic II
Find	7B4D	3C5E
Replace (Y)	AE5B	8586
(N)	D726	15A7
Gen Util	AFCD	7B4A

(Y) – Function keys will be reset
(N) – Function keys will not be reset

Table IV: Checksums

In addition, one paragraph – 16 bytes – of zero-page work space is needed, which can start anywhere between &4F and &F0, but for preference starts at &70.

I will not describe the operation of the program in detail, as the assembly listing has been reasonably well commented. Note that if you are typing in the listing you can omit all the comments in the assembler section which start with a backslash.

When you run the program, you can set your own value for the version of Basic that the utilities will use – by default, the version that is in your machine will be chosen – the area into which the code is assembled, the zero-page work area to be used, and the name of the file that will be saved ready to be *RUN.

Once the assembly is completed a checksum is displayed which can be used to confirm that the listing has been correctly entered. A check is also done that the assembled code is of the correct length.

If the default positions of the code and zero-page work areas are used then the checksums displayed should be those given in Table IV.

Note that the utilities can even be used from within a Basic program to list or even to dynamically change lines, but beware of making your program longer as that will corrupt your variables if LOMEM was initially set to TOP, as it is by default.

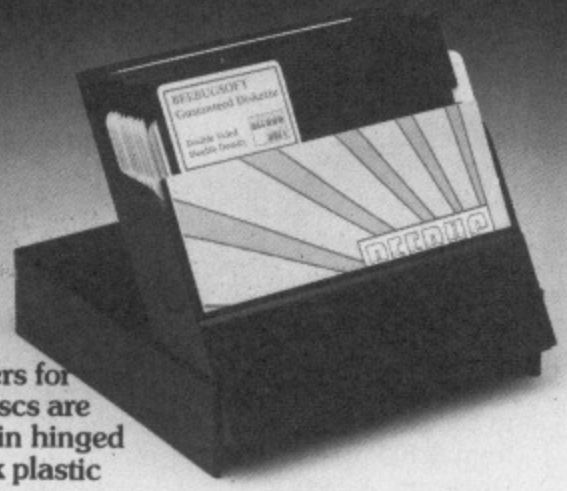
Full listing starts on Page 172

DYNAMIC DISCS

TESTED BY BEEBUG

BEEBUG, the largest independent computer user group in the UK, offer 100% tested discs supplied by one of Britain's leading disc manufacturers.

10 FREE LIBRARY CASE



Orders for 10 discs are sent in hinged black plastic library cases.

25 FREE STORAGE BOX

Orders for 25 are delivered in strong plastic Storage box with 4 dividers.

50 FREE STORAGE BOX

Orders for 50 are delivered in strong plastic Storage box with 4 dividers.

COMPARE PRICES

4 Types of Disc To Meet Your Exact Requirement

	48 TPI			DOUBLE DENSITY			
10	S/S	D/D	£14.90	10	D/S	D/D	£20.50
25	S/S	D/D	£34.90	25	D/S	D/D	£46.20
50	S/S	D/D	£59.30	50	D/S	D/D	£82.40

	96 TPI			DOUBLE DENSITY			
10	S/S	D/D	£20.50	10	D/S	D/D	£21.90
25	S/S	D/D	£46.20	25	D/S	D/D	£49.90
50	S/S	D/D	£82.40	50	D/S	D/D	£93.50

All prices include Storage Box, VAT and delivery to your door (UK)

Suitable for BBC Micro and all other computers using 5¼ inch discs including Atari and Commodore.

Fully Guaranteed – Not only by Beebug but by one of the UK's top disc manufacturers.

ORDER FORM

Official orders welcome
Access/Barclaycard
24 hrs line 0494 816666
Further information on helpline 0727 60263

Please supply me

_____ @ £ _____

_____ @ £ _____

_____ @ £ _____

Total cheque enc. £ _____

Name _____

Address _____

_____

_____

To Beebugsoft, PO Box 109, High Wycombe, Bucks. HP10 8NP

BEEBUG SOFT

Discussing disc copying

JAGDISH SAH takes the hassle out of disc to disc file transfer and renaming

ALL disc filing systems have a copy command to transfer files from one disc to another. It has the form:

```
*COPY <source> <dest.> <fsp>
```

For example:

```
*COPY 0 1 MYPROG
```

will transfer the file MYPROG from the disc in drive 0 to that in drive 1. Wildcards may be included in the filename to specify several files for transfer. For example:

```
*COPY 0 1 MY*
```

will transfer all files with filenames beginning with MY. The process appears to work quite satisfactorily if you have more than one disc drive.

With only one drive, both source and destination drives being 0, you have to swap discs for each file copied. This is very annoying when several files have to be transferred.

Obviously there is a need for a program which reads several files from the source disc into memory and then transfers them later to the destination disc in one go. This article describes such a utility.

It works by trapping the operating system command line interpreter (OSCLI) and checks for the new command *DCOPY, the syntax of which is:

```
*DCOPY <source> <dest.> <fsps>
```

For example:

```
*DCOPY 0 0 FILE1 D.FILE2 B.FILE3
```

will attempt to transfer the three specified files using drive 0.

It will read the files and store them in memory. Then it will prompt for the save operation of each file individually. Thus several files from one disc may be transferred to a single disc or to different discs.

At the end of the save operation it prompts for "Another copy?", thereby allowing you to make more than one copy without reading the original files again.

The example above transfers files involving only one disc drive. However the utility works equally well for file transfers between two different drives.

When the command is executed the source and destination drive numbers are displayed first. If an inadmissible drive is specified the program terminates with a "Bad drive" message.

As each file is loaded its name is listed on the screen. If the filename is too long or if the specified file does not exist on the source disc a message to that effect is produced.

The program will ignore such files and proceed with the rest of the command line.

Before loading a file it checks whether enough memory is available. If not, a "No room" message is displayed and the program enters the save phase immediately, ignoring the rest of the command line.

Two additional features are available with this command. Firstly, a warning message is displayed if the file being copied exists on the destination disc. This helps to avoid un-intentional overwriting of files.

Discopy works as well for single as double drive transfers

Secondly, it is possible to rename a file while copying it. An example of the command's syntax is:

```
*DCOPY 0 1 PROG1 A.OLDNAME*B.NEWNAME
```

Two files, PROG1 and A.OLDNAME, will be transferred from drive 0 to drive 1. In drive 1 the second file will appear under the name B.NEWNAME.

Several files can be included in the command line, renaming all of them or only a few of them. It is possible to copy a file on the same disc under a different directory. For example A.FILEXYZ may be copied as B.FILEXYZ.

An asterisk has been used in the command to separate the old filename from the new one. Before deciding on * as the filename separator I experimented with several other characters under three disc filing systems, the Acorn 0.90, Watford 1.3 and Amcom. I found that this was the only character which could not be included in the filename for a save operation.

It would have been nice to use /, or = as the filename separator, but since these are legal characters for a filename they could not be used.

Note the following points about the syntax of the command line:

- *If required, a directory specification may be included in the filename.*
- *You may include as many files in a single command line as you like, but the availability of file storage space may allow only the first few to be transferred.*
- *No wildcards (* or #) should be included when specifying filenames. If the program finds a * in the command line it will perform a rename operation.*

Perhaps the best way to include several files in the command line is to do a *CAT of the source disc and then to copy relevant filenames with the help of

→

From Page 91

the cursor and Copy keys.

Most disc filing systems have &1900 as the default PAGE value, so this has been used in the program as the start of the file storage area during copying.

If your DFS sets PAGE at a different value alter the variable *filestore* in line 140 accordingly. If you are not sure about it press Break and type:

```
PRINT ~PAGE
```

The variable *namelength* in the same line represents the maximum length allowed for a filename. Again this should be adjusted appropriately if it differs from 7 in your DFS.

For example, in the extended mode of the Amcom DFS it should be set to 16. Note that it is incremented by 3 in the next line to allow for a directory specification and to reserve space for the filename terminator (&0D). These values are correct in the program for the Acorn DFS.

Filenames, load and execution addresses and file sizes are stored in a memory area starting at &404. This area may extend upto &7FF if there is a need for it.

In case of a mismatch, I'm afraid it's a debugging session

Key in the program as listed. If you feel lazy you may leave out the REMs, comments and so on. Save a copy of the typed program before you RUN it.

The filename DCOPYMC will be used later to save the machine code generated so use DCOPY for the typed program.

For the sake of clarity meaningful variable names have been used with the underline character, _. The key for it is located next to the cursor arrows.

To avoid confusion I should mention that the minus sign has been used only twice in the program, in lines 380 and 3390. All other similar looking characters are underlines.

After saving the typed program RUN it. If you have made no typing mistakes you will be asked whether you want to save the machine code generated. If your reply is Y the object code will be saved automatically.

Since the program is fairly long a checksum has been used to indicate if there are any typing errors. Its correct value is 94545. This will match only if *code%* in line 190 is &900, as in the listing.

Altering *filestore* and *namelength* as suggested earlier will also result in a different checksum. If needed these could be changed after a checksum match has been obtained.

In case of a mismatch, I'm afraid it's time for a debugging session.

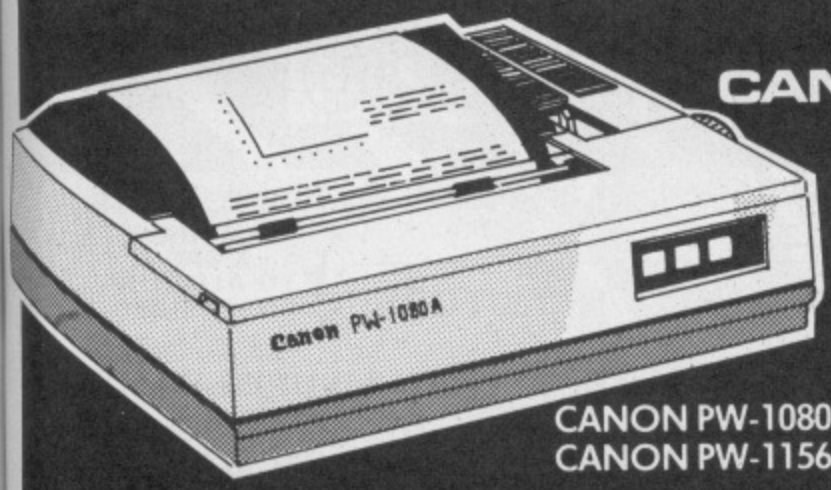
When you want to use the utility type *RUN DCOPYMC or just *DCOPYMC. This sets the trap for the command line interpreter. Now the *DCOPY command can be used as described before.

If you press the Break key the operating system destroys the trap for OSCLI so you will have to load the machine code file again.

Finally, I'd better point out that I have used &900 as the starting memory location for the machine code program. This will destroy any function key definitions. Under the Acorn DFS perhaps a more convenient place for it is &1100.

```
  100 REM DCOPY By Jagdish Sah
  110 REM (c) The Micro User
  120 REM call format: *DCOPY 0 1 FI
  LE1 D.FILE2 B.FILE3
  130 :
  140 namelength=7:filestore=&1900:ne
wname=&484
  150 himem=&6:namelength=namelength+
3:fileinfo=newname+namelength
  160 osfile=&FFDD:osbyte=&FFF4:osrdc
h=&FFE0:osnewl=&FFE7:osasci=&FFE3
  170 cmd_ptr=&70:fileinfo_ptr=&72:fi
lename_ptr=&74:filestore_ptr=&76
  180 temp=&78:oldrtn=&7A:no_of_files
=&7C:last_file=&7D:param_blk=&7E
  190 code%=&900
  200 :
  210 FOR I% =0 TO 2 STEP 2
  220 P%=code%
  230 [ OPT I%
  240 .init
  250 LDA &209:CMP #start DIV256:BEQ
exit
  260 STA oldrtn+1:LDA &208:STA oldrt
n
  270  \  set up new oscli routine
  280 SEI:LDA #start MOD256:STA &208
  290 LDA #start DIV256:STA &209:CLI
  300 .exit RTS
  310 :
  320 .out PLA:TAY:PLA:TAX:PLA
  330 .old_cli JMP (oldrtn)
  340 :
  350 .start
  360 PHA:TXA:PHA:TYA:PHA
  370 STX cmd_ptr:STY cmd_ptr+1
  380 LDX #(cmdend-command):LDY #0
  390 STY no_of_files:STY last_file
  400 \  check the command
  410 JSR skipsp \ ignore leading spa
ces
  420 .chkcmd
  430 LDA (cmd_ptr),Y \ get typed com
mand
  440 CMP command,Y \ compare with th
e correct value
  450 BNE out \ exit if command mis_m
atch
  460 INY:DEX:BNE chkcmd \ check for
all characters
  470 :
  480 PLA:PLA:PLA \ command correct,s
o tidy stack
  490 JSR osnewl:JSR update_cmdptr \
update command pointer
  500 JSR init_pointers \ set pointer
s for file storage etc
  510 JSR get_drive:STA in_dr \ get i
nput drive no.
  520 JSR get_drive:STA out_dr \ get
output drive no.
  530 LDX #input_drive MOD 256:LDY #i
nput_drive DIV 256
  540 JSR old_cli \ issue *DRIVE X co
mmand
  550 JSR osnewl
  560 :
  570 .load_loop
  580 :
  590 \ check if enough room for file
 information exits
  600 LDA fileinfo_ptr:CLC:ADC #10:ST
A temp
  610 LDA fileinfo_ptr+1:ADC #0
  620 CMP #8:BCC ok
  630 LDA temp:BNE noroom \ info bloc
k <= &800
  640 .ok
  650 JSR get_filename:BCS nxt_file
  660 JSR get_filesize:BCS nxt_file
  670 :
  680  \ check if enough room in file
 store
  690 JSR end_addr
  700 SEC:LDA himem:SBC temp
  710 LDA himem+1:SBC temp+1
  720 BMI noroom
  730 :
```

Turn to Page 191



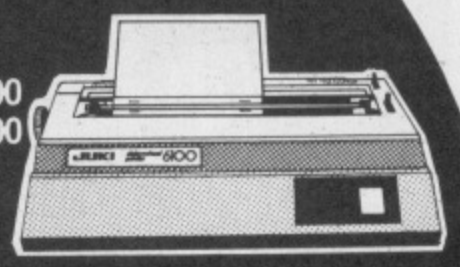
CANON PW-1080A

OR KAGA TAXAN KP810
NEAR LETTER QUALITY PRINTER

NLQ Mode 23 × 18 Matrix: 27 cps
Draft Mode 11 × 9 Matrix: 160 cps
Full range of Epson FX 80 Print Codes
Friction & Tractor Feed
Centronics Interface Standard
CANON PW-1156A Available
(Accepts 17" Paper)

CANON PW-1080A £265.22 + VAT = £305.00
CANON PW-1156A £360.00 + VAT = £414.00
See below for Printerpack prices

JUKI SPECIAL NOW FROM £329 inc. VAT
RING FOR DETAILS.



C.J.E. MICRO'S BBC PRINTERPACKS

For Star, Canon & Juki Printers include:
1. The Printer
2. Next Working Day Delivery
3. Cable to the BBC 1.25 Metres
4. Screen Dump Program (M/C Source)
5. Text Dump Program
6. Function Key set up Program.
7. Function Key Label Printing Program.
8. VIEW Printer Driver
9. 100 Sheets of Paper
10. Mains Plug with 3 Amp Fuse
11. Booklet giving details of using the printer with a BBC
12. Character Defining Program for Downloadable-character-set (draft mode)

CANON PW-1080A — **BBC PRINTER PACK £330 inc VAT**
CANON PW-1156A — **BBC PRINTER PACK £439 inc VAT**
JUKI 6100 — **BBC PRINTER PACK £400 inc VAT**
STAR SG10 — **BBC PRINTER PACK £295 inc VAT**

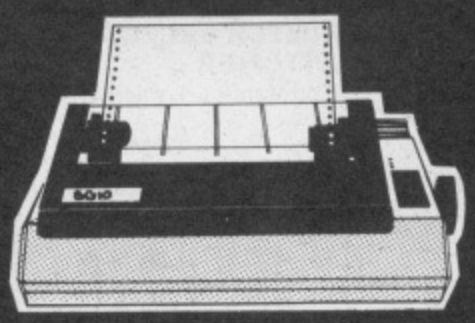
Low Prices

OFFICIAL ACORN APPROVED DEALER

JUKI 6100

One Year Warranty
20 CPS: BiDirectional & Logic Seeking
10, 12, 15 & Proportional Spacing
Wordstar Compatible
2K Buffer; 13 Inch Platen
Underline; Backspace + Lots more
Centronics Interface Standard
RS 232 Interface £54.00 + VAT Extra
Tractor Feed £119 + VAT Extra
Single Sheet Feeder £199 + VAT Extra

JUKI 6100 £330.43 + VAT = £380.00
See left for Printerpack prices



STAR SG10

NEAR LETTER QUALITY

NLQ Mode 17 × 11 Matrix
True Descenders 9 × 9 Matrix
120 CPS Bidirectional & Logic Seeking
40, 48, 68, 80, 96, 136 cpl
Italics, Emphasized, Double strike
Super & Sub Scripts
Downloadable Character Set
Hi-Resolution & Block Graphics
Friction or Tractor Feed
10" Carriage
See above for Printerpack prices

Centronics Interface
Standard RS232 Int.
£58.00 + Vat Extra

STAR SG10
£270.00
inc. VAT

RING FOR SAMPLE PRINTOUT, FULL SPECIFICATIONS & LATEST PRICES

Top Service

WIN A PORSCHE 924S when you buy a STAR SG10 from CJE
Written details on request.

FONTAID

NLQ Designer for Canon and Taxan Kaga NLQ Printers.

Design your own NLQ fonts or 'download' one of our 20+ predefined fonts. The FONTAID disk includes the following type styles:
Square, Outline, Gothic, Computer Type Style, Bold, Shadow, and Broadway.

Additional Disk 'A' includes:
Greek/Maths, Script, Proportional Spacing, Plain, Handwriting and 2 styles of (Elite, Condensed, Super Condensed).

FONTAID requires 6264 RAM Chip in printer.

FONTAID (BBC) £30.00
FONTAID (BBC) with 6264 RAM £36.00
FONTAID Additional Disk 'A' £15.00
Please state 40 or 80 track when ordering.
ROMS of individual fonts are available and can be used with any computer.
FONT ROMS ..... £18.00 each
P & P on FONTAID £1.00

Please phone for FONTAID leaflet and demonstration print out.

Coming Soon MULIT-FONT NLQ printing for Epson MX/RX/FX/LX and Epson compatibles.
Design your own font or use supplied predefined font.

Please phone for latest details.

EXPORT ORDERS WELCOME
VAT INCLUDED WHERE APPLICABLE
PHONE/CREDIT CARD ORDERS WELCOME
Postage 50p per order or as stated
Next day Delivery for Printers/Disk Drives £8.00
FULL RANGE OF CONNECTORS & CABLES AVAILABLE
PRICE LIST ON REQUEST

CJEmicros
Dept MU 1 , 78 Brighton Road, Worthing
W. Sussex BN11 2EN (0903) 213900

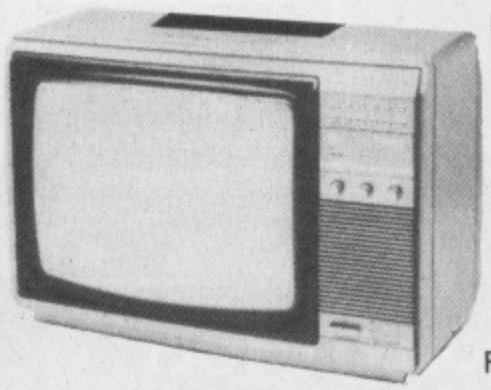
RINT QUALITY

CARE ELECTRONICS

UNIT 14, PEERGLOW INDUSTRIAL ESTATE, OLD'S APPROACH, TOLPITS LANE, WATFORD, HERTS.
☎ TELEPHONE: 0923 777155 ☎

A MERRY XMAS TO ALL OUR CUSTOMERS

PHILIPS MONITORS AND TV/MONITORS



MONO AND COLOUR 80/85 CHARACTERS PER LINE
★★ FREE
LEADS SUPPLIED FOR USE WITH BBC

★★ SUPER VALUE
ANTI-GLARE SCREEN
HIGH RESOLUTION
GREEN MODEL BM7502
@ **£82.80a** Inc. VAT
AMBER MODEL BM7522
@ **£82.80a** Inc . VAT
COLOUR/GREEN MONITOR
CM8524 with adjustable tilt-turn pedestal & LCD clock @ **£264.25a** Inc. VAT

NEW MODEL CF1114 @ £205.85a Inc. VAT

MEDIUM RESOLUTION TV/MONITORS
PUSH BUTTON CONTROL
14" MODEL 14CT2006 **£230.00a** Inc. VAT
REMOTE CONTROL
14" MODEL 14CT2206 **£258.06a** Inc. VAT
16" MODEL 16CT2216 **£302.45a** Inc. VAT

We can supply up to 26" TV/Monitors – please write or telephone for details.

HAVE YOUR 14" & 16" PHILIPS, PYE or FERGUSON TX COLOUR TV CONVERTED TO A TV/MONITOR
RGB CONVERSION KIT
@ £46.00d

★ Resolution better than 585 × 450 pixels.
★ Image clarity comparable to leading monitors.
★ Includes RGB lead for connecting with BBC.

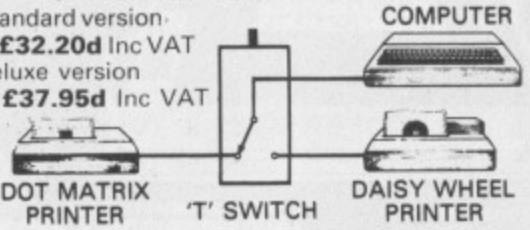
READYMADE LEADS:

RGB 6 pin DIN	@ 2.99c Inc
RGB 6 pin to 7 pin DIN	@ 4.14c Inc
RGB 6 pin to SCART	@ 7.82c Inc

REMOTE AND STANDARD TV'S MODIFIED IN OUR FACTORY
@ £59.80a

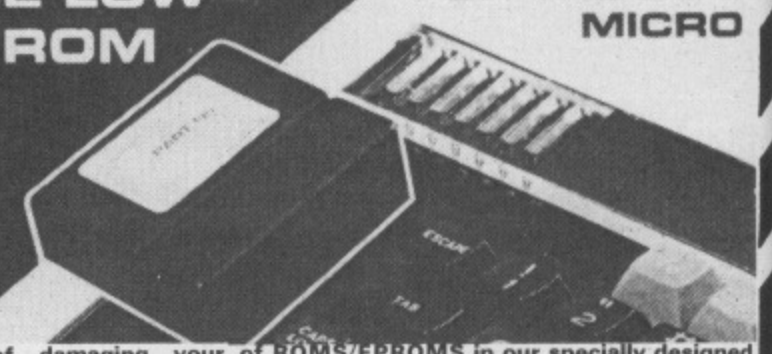
COMPUTER/PRINTER SELECTOR 'T' SWITCHER
* 26 pin as BBC * 2 printers to 1 micro
* 1 printer to 2 micros

Standard version @ **£32.20d** Inc VAT
Deluxe version @ **£37.95d** Inc VAT



THE CARE LOW PROFILE ROM MODULE SYSTEM FOR THE BBC MICRO

DEALERS ENQUIRIES WELCOME



Don't run the risk of damaging your ROMS/EPROMS or your BBC Micro. Whenever you want to remove ROMS/EPROMS from your BBC. Fit our Low Profile Rom Module System and save your collection of ROMS/EPROMS in our specially designed cartridges. The CARE LOW PROFILE MODULE SYSTEM has been designed not to take any power from your BBC Micro and allows you unlimited ROMS/EPROMS.

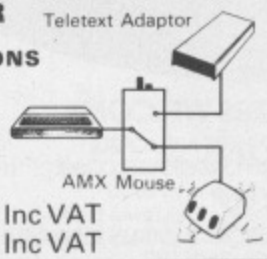
COMPONENTS! WIDE RANGE AVAILABLE

Acorn Disc Interface	@ 49.45c Inc VAT
Eprom 2764 250ns	@ 2.07c Inc VAT
Eprom 27128 250ns	@ 3.45c Inc VAT

Changing Leads is a thing of the Past!
USER PORT SWITCHER

THREE SWITCHED POSITIONS

* 20 pin as BBC
* 1 micro to 2 user port units



Standard Version @ **£32.20d** Inc VAT
Deluxe Version @ **37.95d** Inc VAT

★ **Unlike other systems:**
  ★ Won't get in the way when using the Keyboard.
  ★ Stops damage caused by shortcircuit due to metal objects e.g. paperclips falling inside.
  ★ Prevents damage caused by dust.
★ **Edge Card Socket** which takes all the wear, Gold Plated for extended life.
★ **FOR THE AMATEUR AND PROFESSIONAL USER**
★ **MANUFACTURED ENTIRELY IN THE UK.**
★ **Each System Contains:**
  ★ 1 Low Profile Assy. ★ 1 ROM Cartridge.
  ★ 1 Library Rack 6 way. ★ 5 Blank Labels.
★ **Prices including VAT.**
★ Complete Module System @ £15.87d
★ Spare Cartridge @ £2.99c
★ Library Rack to store 6 Cartridges @ £1.84c
★ 5 Cartridges @ £13.80c ★ 10 Cartridges @ £25.30c

Dual Power Supply Units for Disc Drives
★ Colour finished to match BBC Micro.
★ Comes complete with moulded mains lead
★ 6 pin BBC outlet or Dual power leads for disc drives. (Please specify when ordering).

High Rated @ 33.35b Inc VAT

CARE ELECTRONICS
TEL: 0923 777155

Prestel No. *5995007#
Viewdata No. 0923 777155

HOW TO ORDER:
By Post. Enclose your Cheque/P.O. made payable to **CARE Electronics.**
Or use your ACCESS. Allow 7 days for delivery. Please add carriage.

OPEN
9am-5pm MON-THUR
9am-4pm FRI/SAT

a) @ 10.00 c) @ 1.00
b) @ 5.00 d) @ 2.00

THE MICRO USER

Guide to playing...

Part 1

By
Commander L. Varga (Elite)
Commander C. Packer (Elite)

We hope this guide will help you to get to Elite. But remember, the Order of Elite is a fighting quality far beyond courage, macho and cool precision. Select wisely in battle and be strong.

Final briefing

Many offhand comments in the Elite manual are true, despite how silly some sound. It says that the Space Navy will pay a large bounty for any Thargon craft brought to them, but it doesn't mention that this is in fact possible by scooping up dead Thargon drone ships and selling them as "alien items".

It also fails to advise you that it is possible to pick up escape capsules and keep the occupants as slaves.

It does, however, reveal that Thargoid craft are believed to be able to hover in witch space, and divert through-coming craft. This has happened to us several times. A military laser soon puts a stop to that little game.

Another quote is "The missile launch mechanism is reliable and hardly ever jams" – but it can and does. It also carries the disclaimer "The O.S.A. takes no responsibility for the accuracy of information registered in the WorldData Link".

The meaning of this will become clear when you visit some of the democracies in the higher galaxies and find them pirate-infested, and also some of the anarchies, which can be devoid of all life.

The disc version of Elite is far better than the cassette mainly due to the large difference in size of program.

So if you haven't got a disc drive then Elite is the excuse you've been waiting for.

In the disc version are another 12 different types of ship, more activity at space stations, and – the major feature – the Space Navy. You remember them – the guys in the grey suits from The Dark Wheel.

After reaching Competent you will receive a message from Captain Carruthers, asking if you will do a little bounty hunting for him, namely to seek and destroy a stolen Navy prototype ship.

Later Captain Fortesque will ask for your services to run some top secret plans about the Thargoids across the galaxy. The only problem is that they are not so secret – the Thargoids know of them and ambush you repeatedly.

And, if, after all this help you still can't make the grade, next month's issue of The Micro User *contains a program that should send you well on your way!*

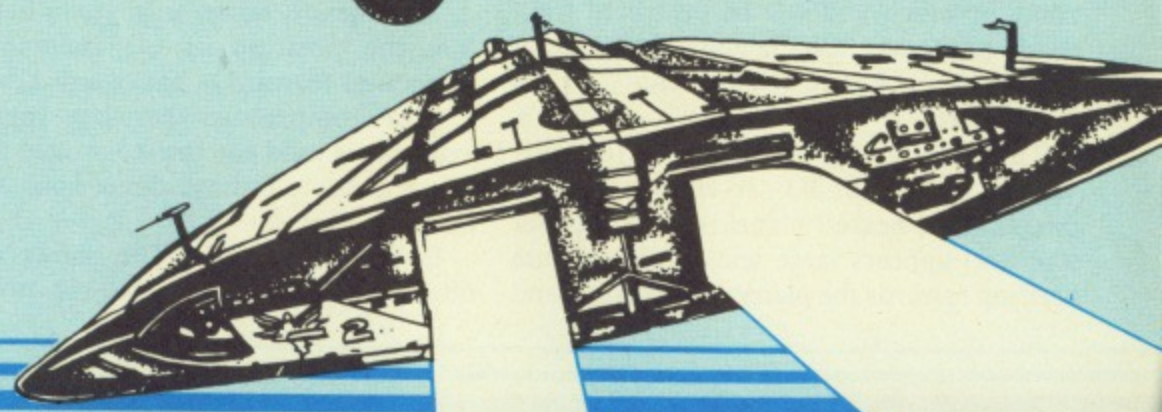
Our secret weapon

IN Part 2 of The Micro User Guide to Playing Elite, we are offering you a secret weapon to help you achieve victory. It's a complete program that will put you in a superior starting position, including a docking computer, better lasers, lots of money – and much, much more. We call it:

ELITE CHEAT

and will appear exclusively in the February issue of *The Micro User*.

Don't miss it!



IF there is a definitive arcade game for the BBC Micro, Elite is it. Since it burst onto the market it has become the most sought after, talked about and fought over game ever. No one would argue about its addictive qualities or its superb design. However, it must be said that it's not the easiest game to get started with. So in case you've been baffled by the initial difficulties, this two-part Micro User guide should tell you all you want to know.

Now let the great adventure begin...

Instrumentation

The first thing is to learn to use the ship's instruments. The bar charts are fairly straightforward – the longer the bar the more of the particular quantity, for example speed or energy.

The two scales marked RL and DC have the zero mark in their centres, and show the extent to which you are climbing, diving or rolling.

If the large E light appears this means that someone is using an ECM anti-missile system in your area.

If the large S appears this tells you that you have entered the space station safety zone, in which you will be protected from space pirates by the Galactic Corporation Police. Study Figure I and identify all the instruments on your screen.

The compass is just like the terrestial variety but is in 3D. It shows in what direction the nearest planet is. If the pointer (the dot) appears large and bright you are heading towards the planet. If it is small and dim you are heading away. If the safety zone S is lit the compass shows the direction of the nearest space station.

Now on to the most complicated, and also most useful, piece of instrumentation, the 3D scanner.

This is just like an Earth radar, but in three dimensions. Figure IIa shows an Earth radar display with your ship at its centre. The cross represents an enemy ship, which in this case is to the right and behind you.

The problem with this display is that it only shows the position of the enemy in two dimensions, not how far above or below you it is. Turning this radar through 90 degrees (Figure IIb) so that we are looking at the back of your ship, we can now see that the enemy is above and to the right.

This means, however, that we have now lost the position of the enemy in the horizontal forward – backward direction.

If a compromise between these two extremes is used and the radar tilted through 45 degrees, all three dimensions can be shown – almost.

Look at Figure IIc. This shows a radar tilted through 45 degrees but the problem is

and pirates will appear on the scanner. Turn your ship so that they are directly in front of you, and blast away, killing off as many as you can.

Don't slow down – if you have to get them in view speed up again as quickly as possible. Once you have flown through the pack they will separate and you can pick them off one at a time.

Wait for the energy banks and shields to recharge fully after you have killed all the pirates – not even one of the Elite can survive combat with empty energy banks.

When fully charged jump drive again and kill some more.

You may find that some ships release a lot of cargo canisters when they explode.

If you have a fuel scoop you can pick them up, but it isn't worth it. They are worth far more to you if you shoot them – they are sitting ducks, but kills are awarded for them just as for ships.

If you do pick them up you will probably find they contain narcotics or slaves, and the GalCop police will be right after you.

If at any time during combat the pirates start to get the better of you, say your energy is down to bank 3, then it's time to leave the party. Press H – now you see why hyperspace is programmed before starting combat – and flip over (X) so you are flying away from the pirates.

This is so that the pirates shoot at your rear shields, which are usually full, and not at the main energy banks. This way it is unlikely they will blast through the hull of your ship before you vanish into hyperspace. When you arrive turn to face the planet and accelerate to full speed. Do not jump drive – you will encounter more pirates if you do, and you will almost certainly die before reaching the safety zone.

Once your shields are at full it is safe to jump drive. The reason for choosing a democracy will become very clear to you now, as all other systems are crawling with pirates, added to which are the extras mentioned above, which I believe follow you through hyperspace.

Dock with the space station as soon as you can. Breathe a sigh of relief. Refuel, and return to combat for more action.

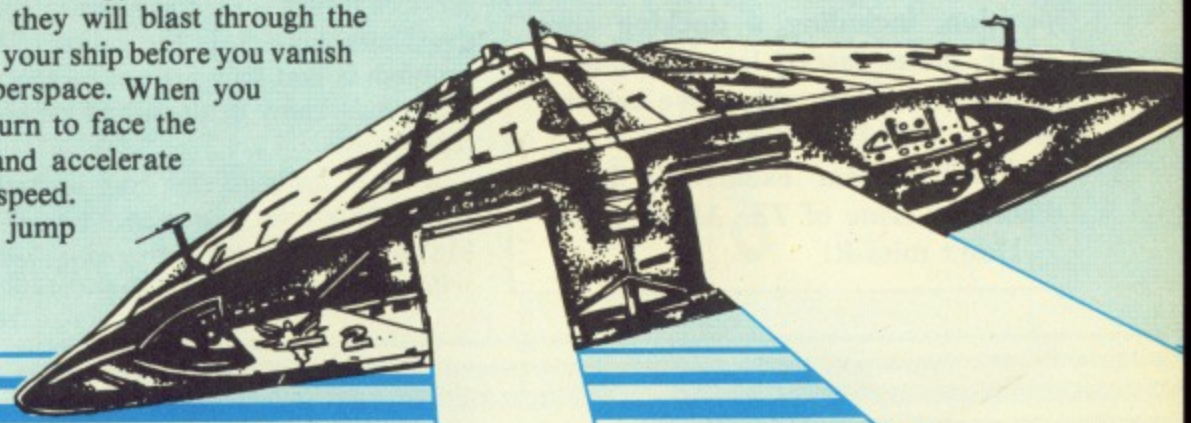
After a few rounds of action you will notice that your rating has changed. It is however a mistake to think that it will only take another 15 minutes to get to Elite, for it won't.

Your rating is based on the "Right on Commander" messages which appear on your screen. You are awarded one for every 256 pirates you kill.

The rating system has nine levels – Harmless, Mostly Harmless, Poor, Average, Above Average, Competent, Dangerous, Deadly and finally Elite.

It will take one "Right on Commander" to get from Harmless to Competent. Another two will take you to Dangerous. To reach Deadly you need another eight, and to reach Elite a mammoth 16.

Don't let the prospect of having to kill around 7,000 ships put you off – just don't think about it.



. . . and Tactics

At this stage you'll need a very useful technique – cheating! We have read many letters from Commanders who have got to this stage, but complain that after three or four runs they get killed by space pirates and have to start all over again.

A possible solution to this problem is to save the game, but this is tedious at best. A better method is to press @ every time you land to save the game, but on tape machines don't actually record the data, and on disc versions just press Return when the computer asks "Which drive?"

The effect of this is that your current status becomes the default status, and this means that if you are killed you will be returned to the last space station you visited with all your cargo, credits and weapons still intact, without having to load a new commander.

You need only save the game at the end of each playing session. This technique can do wonders for your sanity.

Provisions

With all the cash that's rolling in by now you'll want to buy some goodies for your ship.

The first item on your shopping list should be a large cargo bay to double your cargo space, and therefore your profit.

It will set you back 400 credits and it is best to wait until you have at least 650 credits before making your purchase so you have enough left to continue trading profitably.

On the tape version a docking computer is a good second buy. If you have disc you will find the docking computer very slow, but if your docking is a bit shaky then it's best to buy one.

Next is a front beam laser. Make sure you have at least 1300 credits before buying your second item. After this it's basically a case of what takes your fancy, but beam lasers to the right, left and rear are recommended, along with an ECM system and energy units. On the disc version a front military laser is a must.

Combat

Your rating is based on the number of ships you successfully encounter. The more pirates you kill, the higher your rating.

Do not shoot at traders – they are easy targets, but your criminal record will suffer and GalCop police Vipers are not such easy targets.

It follows from this that you need somewhere where you can kill people without anyone minding too much, for example an anarchy.

What you need to find is an anarchy within 3.5 light years (two hyperspace jumps on one tank of fuel) of a democracy. The democracy gives you a safe refuge with a crippled ship when you hyperspace back all shot up.

So once you have fully armed your ship find a democracy with an anarchy close by. Refuel there, and fly to the anarchy.

As soon as you arrive set the hyperspace pointer to the democracy. Now fly directly away from the planet – the compass should be centred, the dot small and dim.

The reason for flying away from the planet is that if you didn't you might fly into the safety zone and shoot a harmless trader to bits by accident.

Accelerate to full speed and jump drive. After a few moments the jump drive will stall

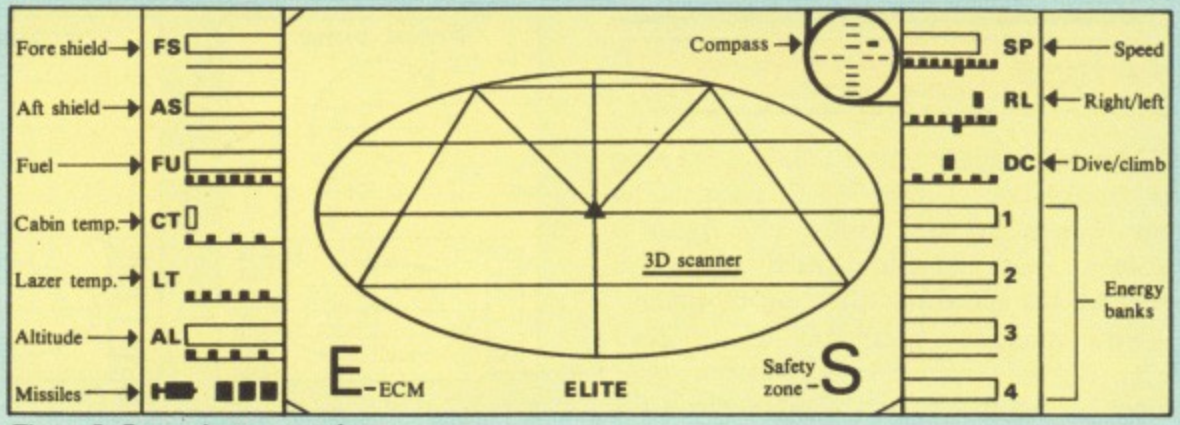


Figure I: Screen instrumentation

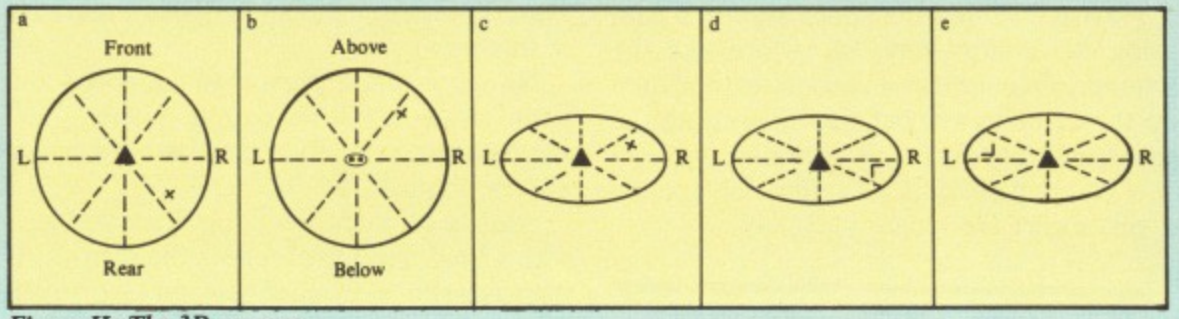


Figure II: The 3D scanner

that the cross could be at the same height as you and on your right; or in front, lower, and on the right; or behind, higher and on your right. Clearly as it stands this is not useable.

The problem is overcome by using "sticks and notches". The stick shows the height difference between you and the enemy ship and the end without the notch shows where the ship is in the horizontal plane. Using this system (Figure IId) the position of the enemy, represented by the notch, can be clearly seen. In this example the enemy is behind, above and to the right of you.

In Figure IIe the enemy is in front, to the left of and just below you.

The scanner shows everything except planets, suns, generation ships, dredgers and explosion debris. There is no scaling – the notch representing a space station 1km across and that representing a cargo canister 1m across will look exactly the same on the scanner.

Flight

The next stage in your training is learning to control your Cobra Mk 3. Launch the ship by pressing f0, and just let it fly for a moment. Press and hold / until the ship stops – watch the speed bar chart on the panel.

Now randomly press any of the keys S,X,<,> (the direction keys), watching their effect on the movement of the stars in the window. Continue for a few moments with the random motion of the craft.

Now try to find the space station again, using the control keys as before and the scanner. Practice this several times, and then do the same again, but this time using the speed controls (Space, /) as well.

If you find this difficult at first don't panic, it gets easier the longer you play.

Docking

The greatest problem all beginners face is space docking. The frustration this can cause has made many people throw away their copies of the game. If you are one of these, retrieve it now. Believe it or not docking is dead easy.

Firstly find a suitably quiet planet and hyperspace to it. If you are playing for the first time try Leesti. To get there press f0 to launch from the Lave space station, press f4 to call up the hyperspace map, and use the cursor keys to move across to Leesti.

Press f0 again to return to the front view and press H to engage the hyperdrive. When you arrive find the planet, a hollow sphere, using the compass.

Use the direction keys to move the centre of the planet roughly to the centre of your view. The screen should look like Figure III at this point.

Now accelerate (Space) to full speed and jump drive (J) towards the planet. You should now pray that there are no space pirates about.

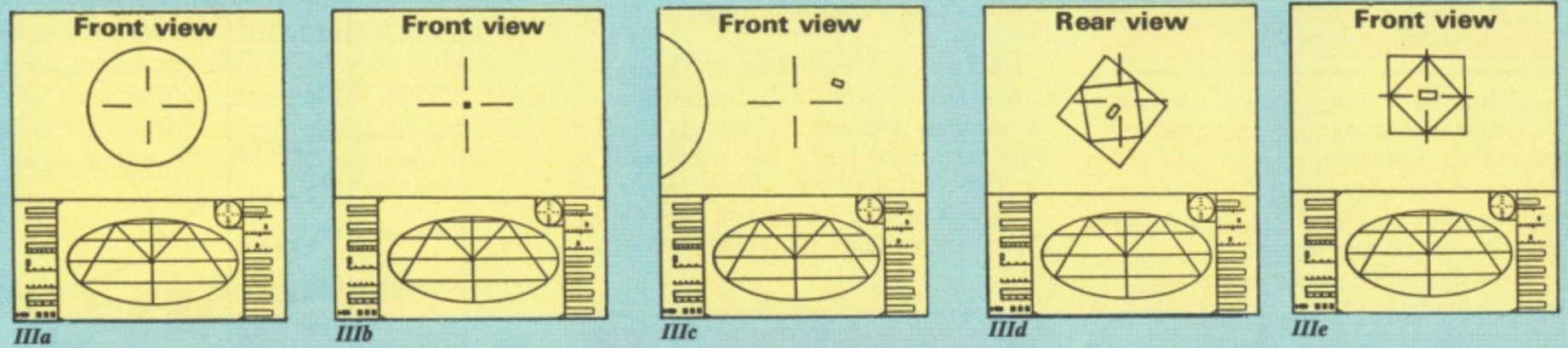
After a moment the jump drive will stall with a loud bleep. Now check the scanner. If there is a ship in front of you don't worry – it is a trader and will not shoot at you. Just make sure you don't crash into it by climbing a little, and you are safe.

If on the other hand the scanner shows ships on either side of you, you are in serious trouble and the only thing to do if you are not used to combat is to die gracefully.

If the scanner is clear of pirates then continue to fly straight at the planet as before. When you get close to the planet safety zone S will appear.

Now use the compass again and manoeuvre so that the large bright dot is at the centre of the compass. After a short time a stationary dot will appear on your screen – this is the space station. It will look something like Figure IIIb.

Now manoeuvre again so that the space station is on the right of your picture and the planet on your left (Figure IIIc). Accelerate to full speed and switch to the right view (f3).



IIIa IIIb IIIc IIId IIIe

Figure III: Locating and docking with the space station

In a short time the station will drift by. When you are square on to it stop. The screen will resemble Figure IIId. Switch back to the front view (f0) and rotate until you are facing the station. Carefully line up the centre of the slot of the station with the centre of the sights in your screen – see Figure IIIe.

Now speed up just a fraction, and wait. You will glide straight into the station – you have docked, and the whole of the galaxy is open before you.

If you didn't dock you need more accuracy when lining up on the slot, so try again.

Strategy . . .

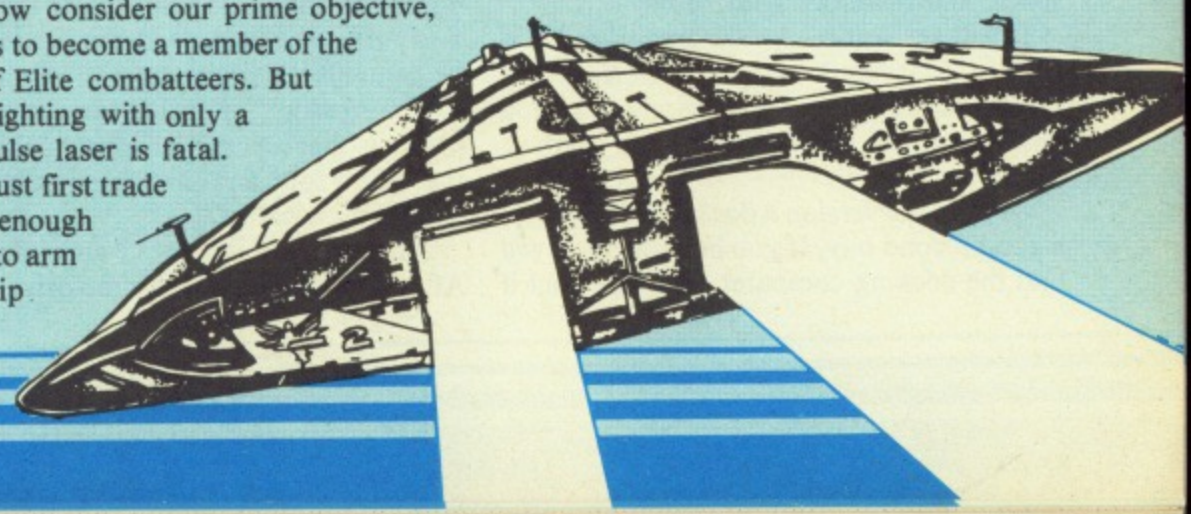
Having covered the fundamentals, we must now consider our prime objective, which is to become a member of the order of Elite combatteers. But to go fighting with only a front pulse laser is fatal. You must first trade to earn enough credits to arm your ship to the back teeth.

You start the game with 100 credits, the Galactic currency, on the planet Lave. This is a rich agricultural planet, and this means that farm produce is cheap but machinery is expensive.

It pays to buy wine here, so for the first time buy 4 tonnes (f1 for buy cargo) for about 100 credits.

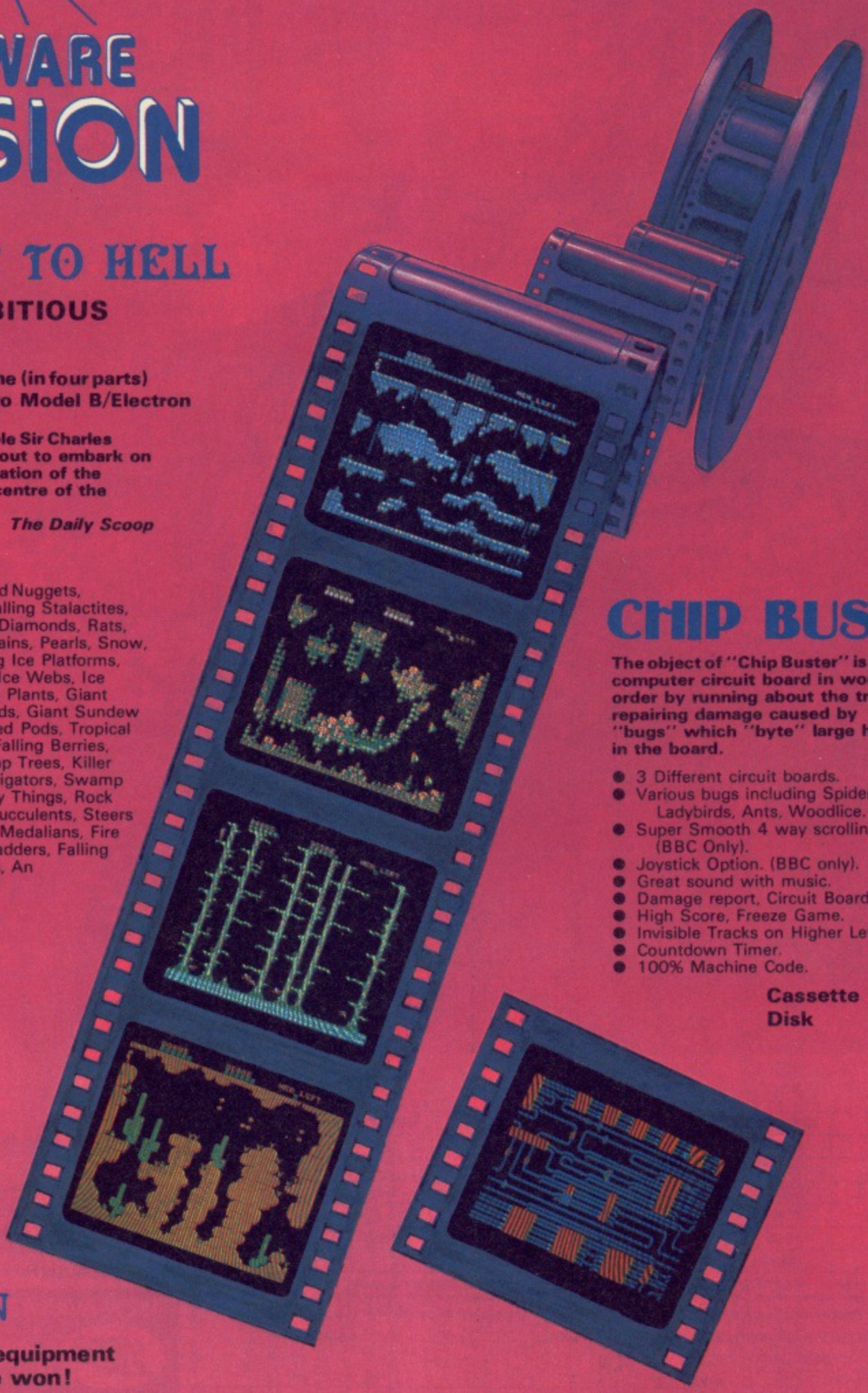
Leesti is a poor industrial planet, which means that machinery is cheap, but farm produce is expensive. So you hyperspace to Leesti to sell your wine (f2). You will get about 160 credits for your 4 tonnes – now you are a trader.

Now buy two computers, because they are cheap, and fly them back to Lave. Sell them at a high price and buy more wine, fly the wine to Leesti and so on. This is very boring after a while, but it really is worth doing for as long as you can stand it.



SOFTWARE INVASION

A GREAT NEW DOUBLE BILL



STAIRWAY TO HELL

UR MOST AMBITIOUS AME YET!

K of machine code game (in four parts) a standard BBC Micro Model B/Electron

..1895 and the indomitable Sir Charles bisher O.S. D.F.S. is about to embark on most dangerous exploration of the tury. A journey to the centre of the th . . ."

The Daily Scoop

ATURING

ing Trollies, Rock Falls, Gold Nuggets, ders, Pistons, Crushers, Falling Stalactites, agmites, Magic Squares, Diamonds, Rats, Bridges, Buckets and Chains, Pearls, Snow, Trees, Ice Ladders, Moving Ice Platforms, wballs, Frozen Waterfall, Ice Webs, Ice ws, Water Drops, Growing Plants, Giant terflies, Mushrooms, Gourds, Giant Sundew nts with Deadly Flying Seed Pods, Tropical les, Tropical Vegetation, Falling Berries, d "Oscars" Snakes, Swamp Trees, Killer squitoes, Swamp Fruit, Alligators, Swamp rs, Funny Little Red Fruity Things, Rock mations, Growing Cacti, Succulents, Steers ds, Falling Rock, Voodoo Medalians, Fire Leaping Flames, Rock Ladders, Falling a, Gold Crosses, Fire Balls, An lence with The DEVIL!

TAIRWAY TO HELL"
vailable on

ssette	**£12.95**
k	**£15.95**

prices are inclusive AT and Post & Packing.

se note that disks are able by mail order only and ordering, please state h DFS you use and whether require 40 or 80 track.)

CHIP BUSTER

The object of "Chip Buster" is to keep a computer circuit board in working order by running about the tracks repairing damage caused by "bugs" which "byte" large holes in the board.

- 3 Different circuit boards.
- Various bugs including Spiders, Ladybirds, Ants, Woodlice.
- Super Smooth 4 way scrolling. (BBC Only).
- Joystick Option. (BBC only).
- Great sound with music.
- Damage report, Circuit Board Explosion.
- High Score, Freeze Game.
- Invisible Tracks on Higher Levels.
- Countdown Timer.
- 100% Machine Code.

Cassette	**£7.95**
Disk	**£10.95**

OMPETITION

,500 of computer equipment your choice to be won!

Prize worth £750
Prize worth £500
Prize worth £250

ils in every "Stairway to Hell" pack!
petition ends 30th April 1986

For Mail Order please write to:
SOFTWARE INVASION, P.O. BOX 68, LONDON SW19 4TX Tel: 01-947 8876

	AMSTRAD	BBC/B	CBM 64	EINSTEIN	SPECTRUM	QL
CLUEDO	JAN 8	JAN 86	*		*	FEB 86
MONOPOLY	JAN 8	*	*	*	*	FEB 86
SCALEXTRIC	FEB 86		* †		JAN 22	
SCRABBLE	*	*	*	*		*
RRP cass	9.95	12.95	12.95		9.95	14.95 (cart)
disk	14.95	14.95	14.95	15.95		

* *Available Now!* † *CBM 64 Scalextric, £9.95 (cassette)* *Dates are approximate.*

MAIL ORDER: *Please send cheque or Postal order to: LEISURE GENIUS, 3 Montagu Row, London W1H 1AB.*

Please send me the following items as marked, for the .....computer.

	CASS	DISK
CLUEDO	☐	☐
MONOPOLY	☐	☐
SCALEXTRIC	☐	☐
SCRABBLE	☐	☐

(please tick)

*NAME*_____

*ADDRESS*_____

_____

_____ *POST CODE*_____

MU

Software by...

Leisure Genius®

3 Montagu Row, London W1H 1AB.

NOW AVAILABLE FROM SELECTED

Boots & WHSMITH STORES

AND AT OTHER GOOD STORES.

CLUEDO® trade mark and copyright licensed by Waddingtons Games Ltd. MONOPOLY® is produced under license from Parker Brothers and Waddingtons Games Ltd. SCALEXTRIC® is a registered trade mark of Hornby Hobbies Ltd. SCRABBLE® trade mark and copyright licensed by J W Spear & Sons PLC. All copyrights reserved LEISURE GENIUS® is a registered trade mark of Winchester Holdings Ltd.

TO USE

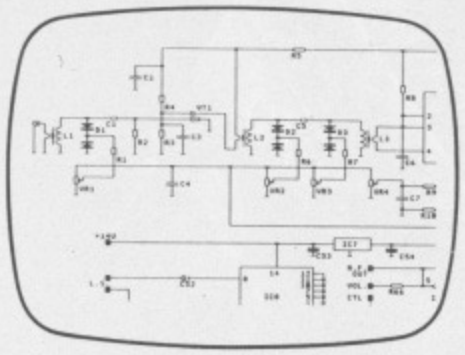
Available from most Computer dealers or direct from Gratsales Ltd.

ENQUIRIES WELCOMED

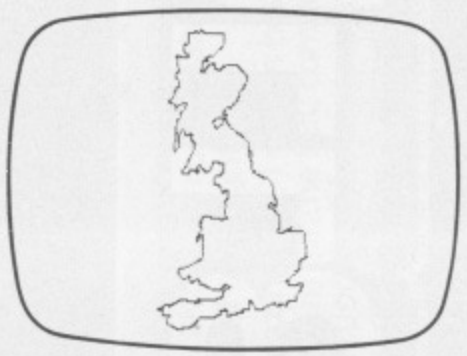
MU

HIGH-RES GRAPHICS AT LOW-RES PRICE

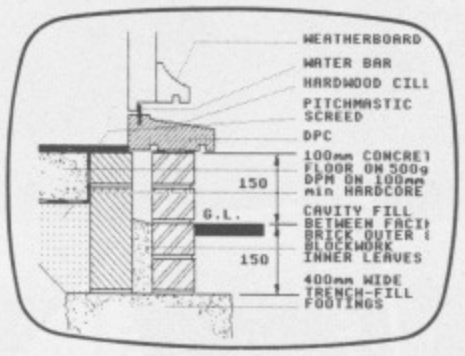
FREE-HAND DRAWING
ICON SOFTWARE



ELECTRONIC CIRCUIT
DESIGN WITH CIRKWIK



USING GRAFPAD
FOR TRACING



ARCHITECTURAL DESIGN
WITH DDX SOFTWARE

GRAFPAD II–

THE ULTIMATE IN GRAPHIC INPUT DEVICES

FOR THE BBC, COMMODORE AND AMSTRAD MICROS

The first low-cost graphic tablet to offer the performance and durability required for business, industrial, home and educational applications. It's small, accurate and reliable. Needs no adjustment or preventive maintenance. **GRAFPAD II** is a unique product that brings the power of modern technology under the control of the user.

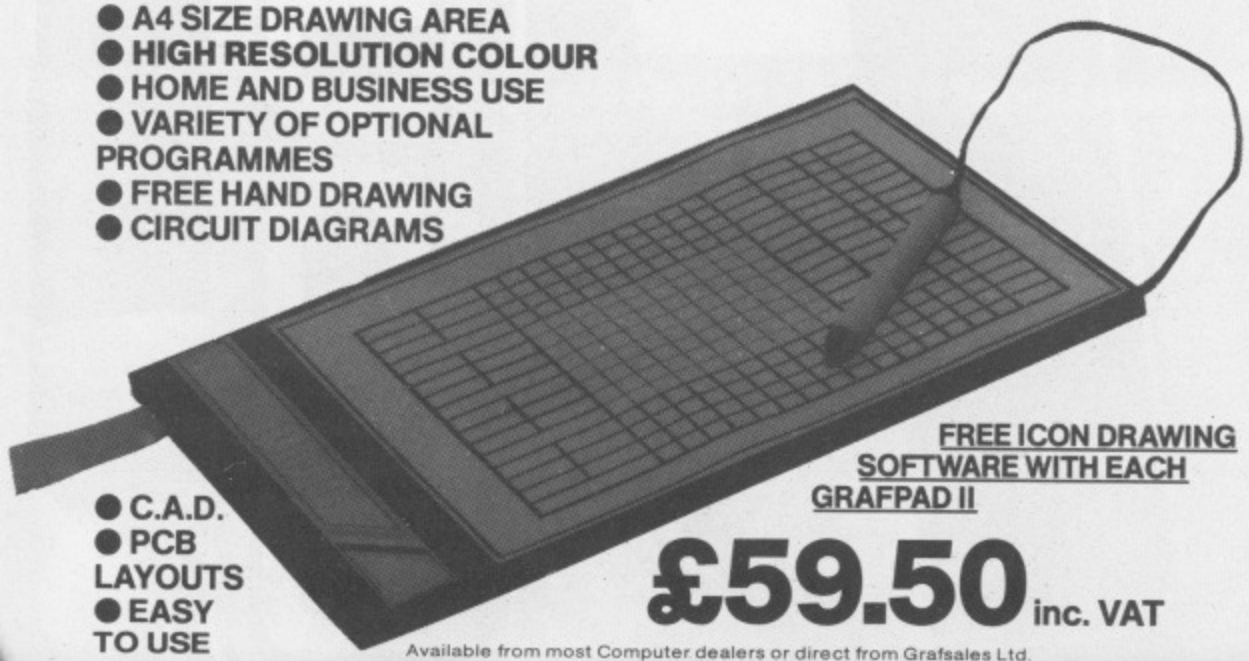
GRAFPAD II:

- A brilliant British invention manufactured in Gt. Britain, unequalled in the world of graphics input.
- Ferranti's space age technology makes the Grafpad II unique in its digitising technique.
- The culmination of 3 years of advanced research to create a final graphical solution for the world computer market.

IT COMBINES IN ONE DEVICE ALL THE FACILITIES OF PREVIOUS ATTEMPTS AT INPUT DEVICES. THE APPLICATIONS ARE AS NUMEROUS AS THAT OTHER COMMONLY HELD DEVICE–A PEN!–AND INCLUDE:

● Option Selection ● Form Input ● Data Collection ● Logic Design ● Circuit Design ● Picture creation ● Picture storage ● Picture retrieval ● Construction design ● C.A.D. ● Text Illustration ● Games ● Pattern Design ● Education ● PCB Design

- **A4 SIZE DRAWING AREA**
- **HIGH RESOLUTION COLOUR**
- **HOME AND BUSINESS USE**
- **VARIETY OF OPTIONAL PROGRAMMES**
- **FREE HAND DRAWING**
- **CIRCUIT DIAGRAMS**



- **C.A.D.**
- **PCB LAYOUTS**
- **EASY TO USE**

FREE ICON DRAWING SOFTWARE WITH EACH GRAFPAD II

£59.50 inc. VAT

Available from most Computer dealers or direct from Grafsales Ltd.

SPECIFICATION

Resolution:
1280 x 1024 pixels

Repeatability:
1 pixel

Output rate:
2000 co-ordinate pairs per sec.

Interface:
parallel

Origin:
LH corner or selectable

Dimensions:
350 x 260 x 12 mms.

EXPORT AND DEALER ENQUIRIES WELCOMED

TO: GRAFSALES LTD.
Unit 8, Derby Works, Carey Place, Watford, Herts, WD1 2LR. Tel: (0923) 43942

Please supply ____ GRAFPAD(S) II for* ____ MICRO
at £59.50 plus £2.50 p&p
or plus £8.00 Courier Insured Delivery.
*Please indicate for which machine.

NAME: ____

ADDRESS: ____

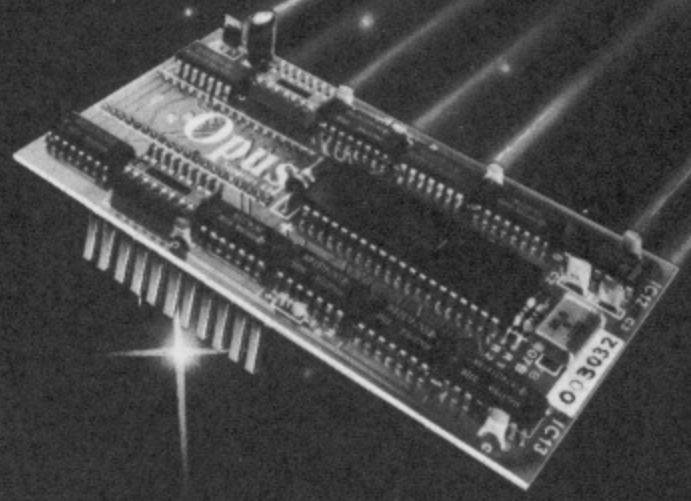
Cheque enclosed value £ ____

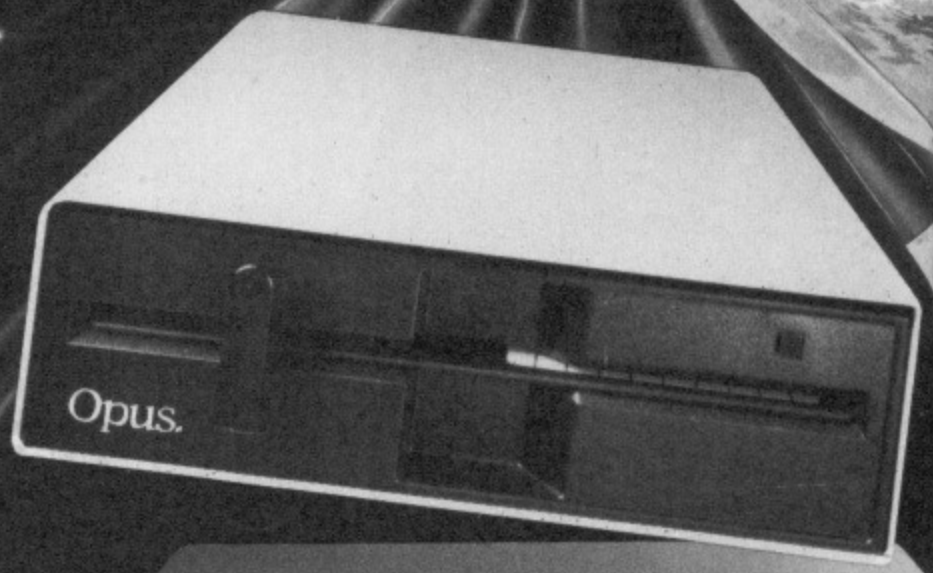
You can pay by credit card or telephone your order

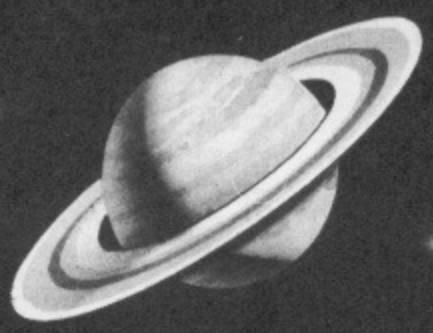
Visa			
Access			

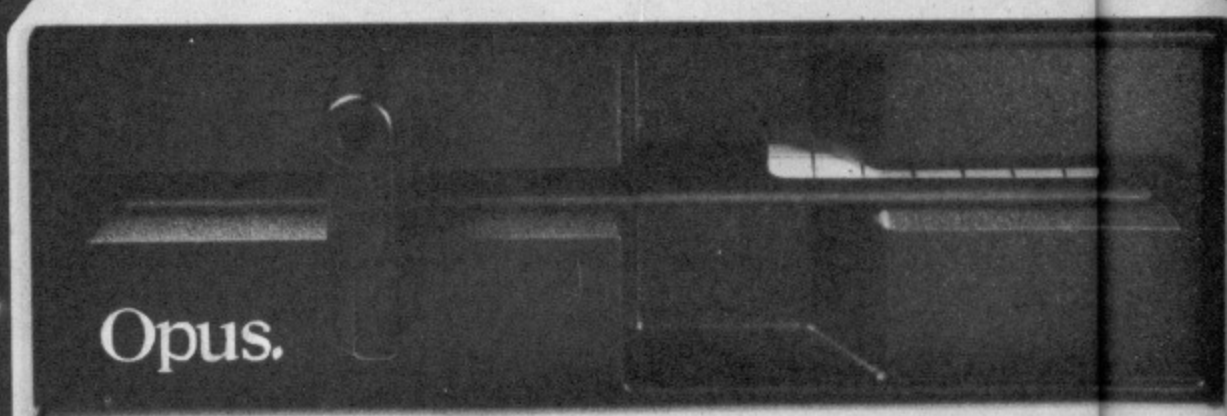
MU2

CHALLENGER 1

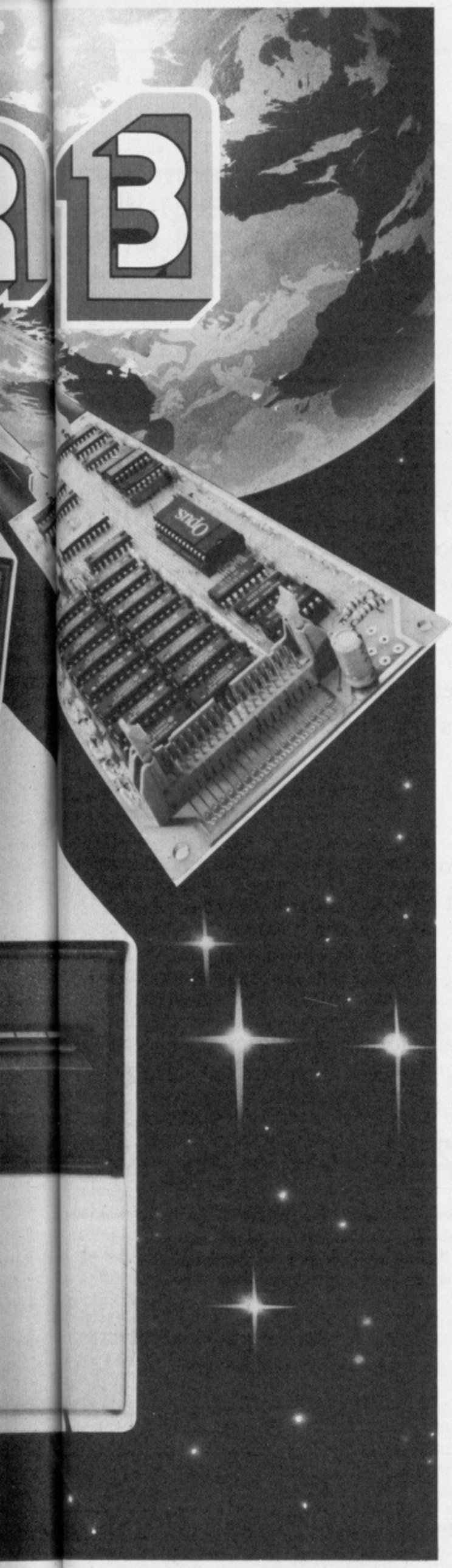








CHALLENGER 3



Simply light years ahead of the opposition

Opus announce the biggest disc drive breakthrough for years – CHALLENGER. It could make every other disc system for the BBC micro outdated overnight.

An amazing 3-in-1 design has produced Britain's first complete plug-in disc system for the BBC computer. No more complicated interface connections, soldering or track cutting, Challenger is an all-in-one disc system ready to plug straight into your computer. It's the simplest disc link-up ever and a winning combination that no other system can match.

5¼" DOUBLE-SIDED 40/80 TRACK DISC DRIVE

DOUBLE DENSITY DISC INTERFACE

SUPER FAST SOLID STATE RAM DISC – Up to 20 times faster than disc drive and providing a massive 256 K of RAM

ALL THIS IN A SINGLE UNIT FOR AN AMAZING £249.95

And just look at the storage capacity of this remarkable stand-alone system.

Our 5¼" disc drive and built in double-density disc interface – an extended version of the highly praised Opus DDOS, voted fastest system by 'Acorn User' and favourite choice of 'A & B Computing' – combine to give you a powerful 1 Megabyte system. But Challenger has a third dimension, a super fast Solid State RAM DISC for instant access to an additional 256 K of RAM. Effectively a lightning fast second disc drive which can be upgraded to ½ Megabyte capacity for only £49.95. It makes Challenger superior to a dual disc drive, giving faster access and less wear and tear on your drive.

Challenger uses the same disc controller chip as the new BBC B+ computer making it compatible with all leading software titles. Call us for our full compatibility listing.

We've provided a selection of utilities on ROM and Challenger's disc drive is 40/80 track switchable. The extended DDOS takes no User RAM, PAGE, the position at which BASIC programs load, is left unchanged, normally staying at &OEOO, and Challenger dynamically moves files on the disc to overcome the 'can't extend' problem.

Challenger's price of £249.95 includes our unbeatable two year warranty, a full operating manual, VAT and free delivery. Call us now on 0737-65080 for details of our nationwide dealer network or simply post the coupon below.

OPUS SUPPLIES THE DRIVE

The Opus disc drive range has few rivals for quality, reliability, and sheer value for money. We've taken the best in Japanese disc drive technology and backed it with Britain's longest guarantee – an amazing two years. For full details of our extensive range of half-height 5¼" disc drives together with information on your nearest stockist, 'phone 0737-65080.

OPUS – BRITAIN'S LEADERS IN DISC DRIVE INNOVATION

To: Opus Supplies Limited, 55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.
Please rush me the following: (PRICES INCLUDE VAT AND CARRIAGE)

_____ **Challenger Unit(s) £249.95 each**

_____ **RAM DISC upgrade(s) to 512K at £49.95 each**

I enclose a cheque for £_____ or please debit my credit card account with the amount of £_____

My Access ☐ **Barclaycard** ☐ **no. is:** ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

NAME _____

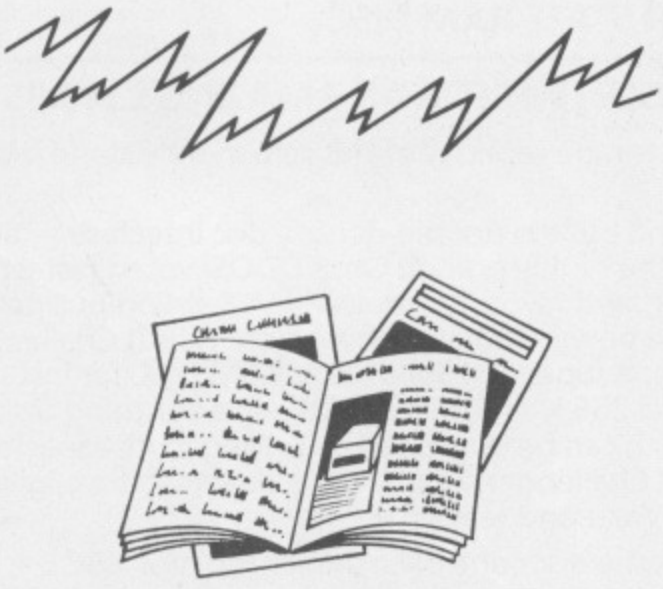
ADDRESS _____

_____

TELEPHONE _____ **MU1**

Opus.
Opus Supplies Ltd

Your key to communications!



FREE Electronic Mail . . . International Telex . . . 10 National Chatlines (Interactive Bulletin Boards) . . . 70,000 users across the UK . . . Teleshopping . . . Multi-User Interactive Strategy Games

Instant computer news . . . Hardware and software reviews . . . Technical features . . . Hints and tips

FREE and discounted quality software to download direct to your micro – **24 hours a day**

PRESTEL

300,000 pages of information on the huge Prestel database

for just 20p a day

Micronet 800 – The ultimate peripheral

Micronet 800
8 Herbal Hill, London EC1R 5EJ
Telephone: 01-278 3143

To: Micronet 800, 8 Herbal Hill, London EC1
Please send me a brochure on Micronet 800

Name_____

Address_____

_____

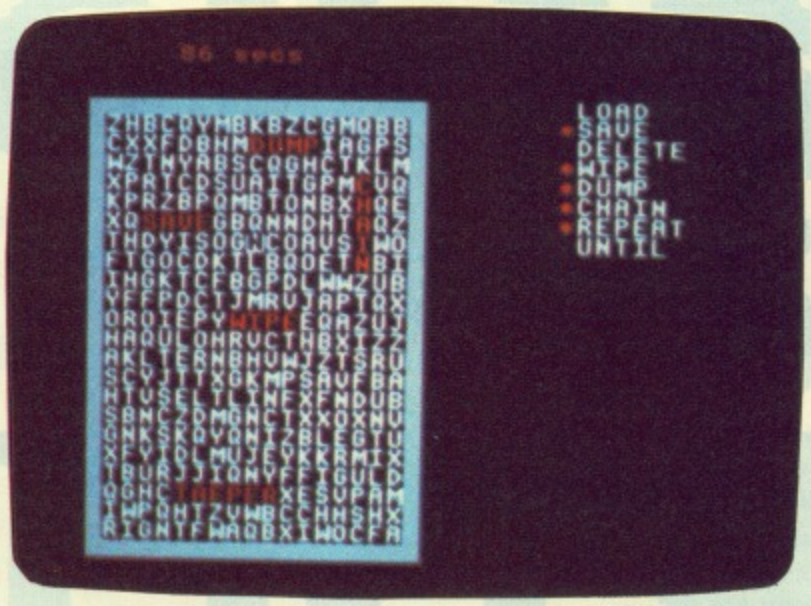
_____ Telephone No_____

Age_____ Micro_____

MU JAN '86

WORD SQUARE SOLVER

Last month KEVIN EDWARDS showed how to write a program to design word puzzles. Now he's come up with an aid to help solve them



MY old headmaster used to say: "It's easy enough to ask questions, the trick's answering them . . ."

Well, last month we gave you a word square creator. This month we've come up with the answer – or rather an aid for you to find the answers – a program to help you solve previously created puzzles.

The file created by last month's program contained the final word square along with the hidden words. This month's program allows you to solve the word square contained in that data file.

Before you can use the solver, however, you must add the data to Program I. This is done simply by *EXECing the word square file on to the end of the program in the following way:

```
*EXEC S.WORDS
```

Press Escape when all of the file has been appended – this is because the AUTO command is used to tag the data to the program.

The data filename S.WORDS is the default name used by the word square creator. If you're a disc user you will have no doubt renamed your files so that several squares can be saved on the same disc. If that's the case use the new name instead of S.WORDS.

Once the data has been added to the program you can RUN it. You will then be asked if you wish to print out the wordsquare. If your reply is Y it is sent to the printer.

Next a box containing the wordsquare will be displayed at the left side of the screen. A list of the words hidden in the square is also shown to the right of the screen.

At the top left of the box is a solid block. This is the cursor which you move using the corresponding cursor arrow keys.

All you do now is move the cursor to the start letter of the word which you have found and press the Return key. A block will be printed in the top left corner of the screen acknowledging the start position.

Next move the cursor in the direction you think the word is in. For example, move down one row if the word is down the screen.

When a valid position has been selected the word list is searched. If a match is found an asterisk is placed by the word at the right hand side of the screen indicating that it has been located correctly.

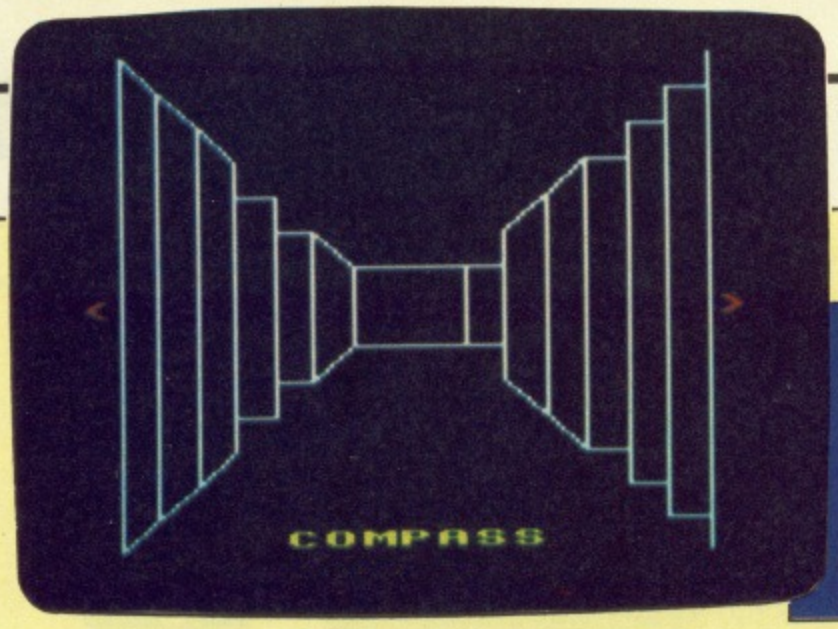
The word in the box is also highlighted by printing it in red. If the word isn't found a beep will sound.

When a correct word is found the elapsed time is also printed at the top of the screen. This is useful if you decide to have competitions with friends.

When all the words have been found you will again be asked if you want a print output. The printout can be marked with the solution for later reference.

And that's about it. Enjoy yourself puzzling.

Full listing starts on Page 189



CLAUSTROPHOBIA

It's bad enough on Earth – but in ROBIN NIXON's game you're on a distant planet and those claustrophobic effects can be deadly

YOU are exploring the ruins of an ancient settlement on a planet not far from Alpha Centauri when a large maze-like structure suddenly grows around you.

Before you know it you are trapped, with all your possessions and various treasures scattered around in different places. You are not content with simply escaping, but need to recover as much of the treasure as you can.

You can move about the maze, turning left and right and going in the direction you are facing. Objects can be picked up and dropped. If you find the PEN and PAPER, you can drop up to five notes as place markers.

Your combined physical energy and power pack runs to 2000 units. If your energy gets too low you can eat or drink any FOOD or WATER you find, though this results in loss of credits upon escape.

In return for a favour you did for a Denebian telepath you have been given the ability to teleport your mind out of your body for short periods, thus enabling you to look down at a plan view of the maze.

However you find this extremely tiring and lose large amounts of energy. If your energy starts to run out you can always try leaving the maze to re-charge and go back for another attempt.

The cursor arrow keys turn you left and right and move you forwards. The other control keys are:

G	= Get object.
D	= Drop object.
E	= Eat.
Q	= Drink.
I	= Inventory.
W	= Write note and drop it.
T	= Teleport.
K	= Look at Help page.

PROCEDURES

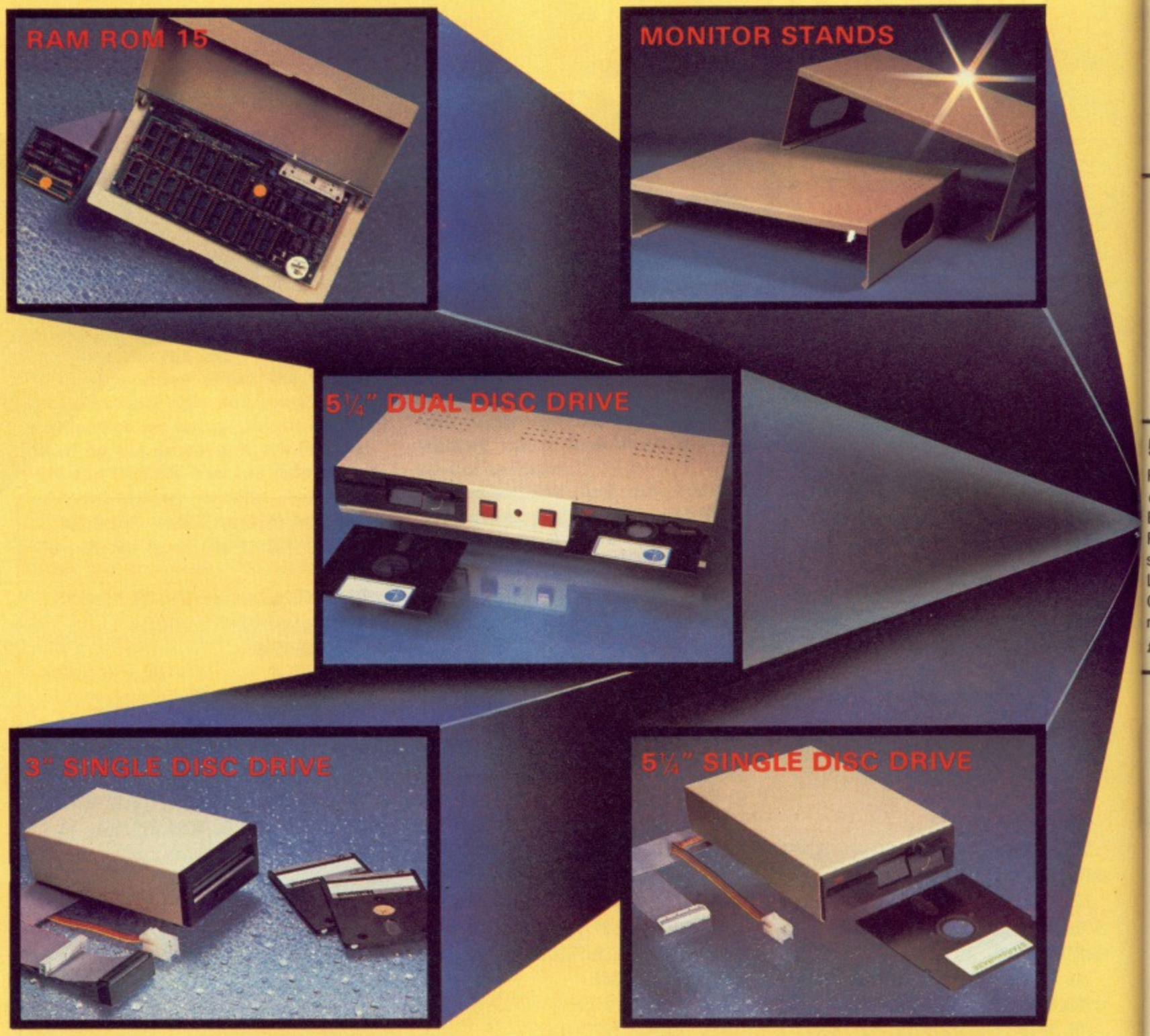
maze	Creates the maze, shows its construction on the screen, and calls PROCinst to display the instructions.
shuffle	Used by PROCmaze to choose a random direction in which to create the next section of corridor.
push	Pushes the last coordinate of the maze that was visited onto a stack.
pull	Pulls coordinates off the stack when there are no free positions in which to move.
tel	Displays the maze in a plan view.
direction	Called by PROCmaze after having called PROCshuffle, to set up variables to point in the randomly chosen direction.
look	Shows a three dimensional representation of the maze in the direction the player is looking.
passleft	Called by PROClook if there is a passage off to the left.
passright	Called by PROClook if there is a passage off to the right.
door	Displays a door when the exit is visible.
get	Called when an object is to be picked up.
invent	Shows all the objects the player is presently carrying.
gram	Decides whether to print the word SOME or A depending on whether an object is pronounced with a plural or not.
see	Tells you if you are standing next to an object.
space	Displays "Press the Space Bar" and waits for it to be pressed.
drop	Called when an object is to be dropped.
comp	If the player has picked up the compass, the direction he is facing in is displayed.
wand	If the player has the wand, his present coordinates are displayed.
key	Checks whether or not the player has the key when he or she wants to leave the maze.
gameover	Displays the results at the end of a game.
eat	Called when a player tries to eat any food.
quaff	Called when a player tries to drink some water.
energy	Displays the amount of energy the player has left every 100 moves.
write	Writes up to five notes and drops them if the player has both the pen and paper.
checkwr	Displays a note on the screen when one is in view.
inst	Displays the instructions.
keys	Shows which keys do what.
gaps	After the maze has been created, there is only one possible way from one point to any other. PROCgaps puts in a few gaps at random positions to allow for more flexible movement through the maze.

Claustrophobia

```
100 REM ************************
110 REM *                      *
120 REM *   Claustrophobia     *
130 REM *                      *
140 REM *     By R.Nixon       *
150 REM * (c) The Micro User   *
160 REM *                      *
170 REM ************************
180 REM
190 DIMA%(20,20),B%(5),P%(400),Q%(4
00),O$(15),I%(15),WR1%(5),WR2%(5)
200 *FX4,1
210 *FX11
220 FORG%=1TO5:B%(G%)=G%:NEXT:FORG%
=1TO15:READO$(G%):NEXT:SC%=0
230 X%=10:Y%=10:PT%=0:N%=0:H1%=68:V
1%=56:D%=1:I%=0:FD%=1:WT%=1:WR%=0:IS%
=0:RE%=0:I%=0
240 FORZ%=1TO15:I%(Z%)=0:NEXT:FORZ%
=1TO5:WR1%(Z%)=0:WR2%(Z%)=0:NEXT
250 MODE4:VDU23;8202;0;0;0;:MOVEX%*
20+439,Y%*16:PROCmaze
260 FORZ%=&10TO&F0STEP&10
270 R1%=RND(20):R2%=RND(20).
280 IFA%(R1%,R2%)>15 GOTO270
290 A%(R1%,R2%)=A%(R1%,R2%)ORZ%
300 NEXT:PROCgaps:X%=RND(20):Y%=RND
(20)
310 E6%=2100:I%=0:FORZ%=1TO15:IFI%
(Z%)=0 GOTO340
320 R1%=RND(20):R2%=RND(20):IFA%(R1
%,R2%)>15 GOTO320
330 A%(R1%,R2%)=A%(R1%,R2%)OR(ZZ%*1
6):I%(ZZ%)=0
340 NEXT
350 MODE4:VDU23;8202;0;0;0;29,0;-11
2;:PROCtel:MODE5:VDU23;8202;0;0;0;29,
0;-112;
360 PROCenergy:PROClook:PROCsee:PRO
Ccomp:PROCwand
370 *FX15,1
380 G%=GET:IFG%<>71 AND G%<>73 AND
G%<>68 AND G%<>75 AND G%<>84 AND G%<>
87 AND G%<>69 AND G%<>81 AND G%<136 O
R G%>139 GOTO380
390 IFG%=71 PROCget:GOTO360
400 IFG%=84 AND E6%>1 MODE4:VDU23;8
202;0;0;0;29,0;-112;:PROCtel:MODE5:VD
U23;8202;0;0;0;29,0;-112;:GOTO360
410 IFG%=73 CLS:PROCinvent:COLOUR3:
PROCspace:GOTO360
420 IFG%=68 PROCdrop:GOTO360
430 IFG%=69 PROCeat:GOTO360
440 IFG%=75 MODE4:VDU23;8202;0;0;0;
:PROCkeys:REPEATUNTILGET=32:MODE5:VDU
23;8202;0;0;0;29,0;-112;:GOTO360
450 IFG%=81 PROCquaff:GOTO360
460 IFG%=87 PROCwrite:GOTO360
470 ON G%-135 GOTO480,500,380,520
480 D%=D%-1:IFD%=0 D%=4
490 GOTO360
500 D%=D%+1:IFD%=5 D%=1
510 GOTO360
520 PROCdirection:IFX%=10 AND Y%=20
 AND D%=1 PROCkey:IFRE%=1 RE%=0:GOTO3
10 ELSE IFX%=10 AND Y%=20 AND D%=1 GO
TO360
530 PROCdirection:IFA%(X%,Y%)ANDT%:
X%=X%+X1%:Y%=Y%+Y1%:GOTO360
540 GOTO380
550 DEFPROCmaze:PRINTSPC13"CLAUSTRO
PHOBIA":VDU28,0,20,39,2:PROCinst
560 REPEATIN%=INKEY(0):IFIN%=32 AND
 IS%<5 PROCinst ELSE IF IN%=13 AND IS
%=5 IS%=0:PROCinst
570 G%=0:H%=0:PROCshuffle:REPEAT:G%
=G%+1:ON B%(G%) GOTO580,620,660,700,7
40
580 IFY%<2 GOTO740
590 IFA%(X%,Y%-1)>0 GOTO740
600 PROCpush:A%(X%,Y%)=A%(X%,Y%)OR1
:Y%=Y%-1:A%(X%,Y%)=A%(X%,Y%)OR4
610 H%=1:GOTO740
620 IFX%>19 GOTO740
630 IFA%(X%+1,Y%)>0 GOTO740
640 PROCpush:A%(X%,Y%)=A%(X%,Y%)OR2
:X%=X%+1:A%(X%,Y%)=A%(X%,Y%)OR8
650 H%=1:GOTO740
660 IFY%>19 GOTO740
670 IFA%(X%,Y%+1)>0 GOTO740
680 PROCpush:A%(X%,Y%)=A%(X%,Y%)OR4
:Y%=Y%+1:A%(X%,Y%)=A%(X%,Y%)OR1
690 H%=1:GOTO740
```

Turn to Page 181

BBC ? -


RAM ROM 15
MONITOR STANDS
5¼" DUAL DISC DRIVE
3" SINGLE DISC DRIVE
5¼" SINGLE DISC DRIVE

GCC !

5 WAYS TO IMPROVE YOUR BBC. . . . .

3" SINGLE DISC DRIVE

One of the most compact disc drives available today, the 3" Drive features the ingenious dual-sided cartridge style protected disc. The twin sided discs, 100K both sides, are physically protected at all times. The whole unit is very quiet and fast in operation and comes complete with all necessary cables, manual and formatting disc. In its sturdy, BBC colour coded metal case this drive is ideal for many varied uses especially within the educational field.
£86.00 + VAT = £98.90 inc. P. & P.

5¼" SINGLE DISC DRIVE

This highly reliable, high performance half height single 5¼" disc drive is fully BBC compatible 400K 40/80 Track switchable drive. The drives come complete with all necessary cables, formatting disc and disc drive manual, one year warranty and are supplied in a BBC colour coded metal case. Equally at home alongside or on top of your BBC Micro at £167.85 + VAT = £193.03 inc. P. & P.

5¼" DUAL DISC DRIVE

Finished in a metal case the same colour as the BBC, this slim compact dual disc drive, fully BBC compatible, is at home on top of the BBC Micro and is angled to allow easy access to the drive doors. Featuring twin 400K 80 Track drives the unit is also 40/80 Track switchable, the switch being mounted on the front of the unit with LED illumination.
Complete with all necessary cables, formatting disc and disc drive manual and a one year warranty, the complete unit is available at £358.00 + VAT = £411.70 inc. P. & P.

RAM ROM 15

". . . . . for those who want an expansion board (RAM/ROM) of the highest specification the RAM ROM 15 will not disappoint". (Acorn User April 1985). The RAM ROM 15 is an external board which allows the use of a maximum 16 sideways ROM sockets plus the necessary hardware for up to 16K of battery backed sideways RAM. With "No Solder" installation, the fully buffered RAM ROM 15 can be optionally powered by an external PSU, thereby virtually eliminating power drain and overheating problems.
RAM ROM 15 is "of the highest specification" but ONLY £89.99 + VAT = £100.79 inc. P. & P.

MONITOR STANDS

These robust metal monitor stands are finished in the same colour as the BBC Micro. They are available in two heights:
The High Stand: Which enables the stand to be used in conjunction with the BBC Micro and disc drive.
The Low Stand: Fits neatly over the BBC Micro on its own.
To tidy up your BBC, Disc Drives and Monitor, these drives are available at:
High Stand £18.00 + VAT = £20.70 inc. P. & P.
Low Stand £16.00 + VAT = £18.40 inc. P. & P.

ALSO AVAILABLE:

ROMEX 13
STARdataBASE
THE CRACKER
COMPONENTS
COMING SOON - NEW PRINTER SHARER/ BUFFER

FOR FURTHER TECHNICAL SPECIFICATIONS RING GCC ON

GCC (Cambridge) Ltd

BBC PRODUCTS AND COMPATIBLE PERIPHERALS

BBC MICROCOMPUTER SYSTEM

BBC MODEL B PLUS	£409.13 + VAT = £469.00
BBC DISC INTERFACE KIT	£82.61 + VAT = £95.00
BBC DISC INTERFACE KIT 1.2 ROM	£91.30 + VAT = £105.00
BBC A TO B UPGRADE KIT	£60.87 + VAT = £70.00
BBC MEMORY UPGRADE KIT (8 x 4816-100NS)	£17.39 + VAT = £20.00

MONOCHROME MONITORS

KAGA AMBER SCREEN	£119.00 + VAT = £136.85
KAGA GREEN SCREEN	£109.00 + VAT = £125.35
B.M.C. GREEN SCREEN	£109.00 + VAT = £125.35

COLOUR MONITORS

KAGA VISION 2 HIGH RESOLUTION	£285.00 + VAT = £327.65
KAGA VISION 3 SUPER HIGH RESOLUTION	£399.00 + VAT = £458.85

DAISY WHEEL PRINTERS

JUKI 6100	
JUKI 6300	

DOT MATRIX PRINTERS

EPSON LX80	£220.00 + VAT = £253.00
EPSON FX80	P.O.A.
EPSON FX100	P.O.A.
EPSON LQ1500	£890.00 + VAT = £1,023.50
KAGA KP10 (NLQ)	£245.00 + VAT = £281.75
KAGA KP910 (NLQ)	£375.00 + VAT = £431.25
STAR SG10	£240.00 + VAT = £276.00
STAR SD10	£326.00 + VAT = £374.90
STAR SG15	£326.00 + VAT = £374.90
STAR SD15	£411.00 + VAT = £472.65
STAR SR15	£495.00 + VAT = £569.25
STAR SG10C	£190.00 + VAT = £218.50
CITIZEN MSP10	£355.50 + VAT = £408.83
CITIZEN MSP15	£450.00 + VAT = £517.50
CITIZEN MSP20	£499.50 + VAT = £574.43
CITIZEN MSP25	£630.00 + VAT = £724.50

BBC FIRMWARE

GRAPHICS ROM	£29.00 + VAT = £33.35
DISC DOCTOR	£29.00 + VAT = £33.35
GREMLIN	£29.00 + VAT = £33.35
TERMI	£29.00 + VAT = £33.35
PRINT MASTER	£29.00 + VAT = £33.35
PASCAL	£59.00 + VAT = £67.85
FORTH	£34.72 + VAT = £39.93
VIEW	£52.00 + VAT = £59.80
WORDWISE PLUS	£49.00 + VAT = £56.35
BEEBASE	£35.00 + VAT = £40.25

BBC ACCESSORIES

STARDATABASE	£65.22 + VAT = £75.00
CRACKER	£62.50 + VAT = £71.88

SINGLE 400K 5¼" DISK DRIVE 40/80T SWITCHABLE	£170.00 + VAT = £195.50
DUAL 800K 5¼" DISC DRIVE 40/80T SWITCHABLE + P.S.U.	£350.00 + VAT = £402.50
SINGLE 3" DISC DRIVE	£55.00 + VAT = £63.25
LOW MONITOR STAND	£14.00 + VAT = £16.10
HIGH MONITOR STAND	£16.00 + VAT = £18.40
6116 (2K)	P.O.A.
6264 (8K)	P.O.A.
TEXTOOL	£6.00 + VAT = £6.90
G.C.C. NIF	£4.00 + VAT = £4.60
ULTRACALC	£69.13 + VAT = £79.50
R.G.B. MONITOR LEADS	£6.04 + VAT = £6.95
MONO MONITOR LEADS	£3.48 + VAT = £4.00
BBC PRINTER CABLES	£8.33 + VAT = £9.57
BOX LISTING PAPER	£16.00 + VAT = £18.40
ALL IC'S AVAILABLE FOR BBC	P.O.A.

Access

TRADE ENQUIRIES WELCOME

VISA

GCC (Cambridge) Limited
66 High Street, Sawston,
Cambridge CB2 4BG
Telex: 81594 SAWCOM

0223-835330/834641

Take part in our wide-ranging Reader Survey, help to decide the kind of features you'll be reading in future issues of ***The Micro User,*** *and . . .*

10 SUPERB PRIZES worth over £500!

Win yourself the ultimate ROM/RAM board

ONE of the reasons for the outstanding success of *The Micro User* has been our determination to reflect, as far as we possibly can, the interests of our readers. We do this by careful study of the letters that pour into our editorial office every day, and by talking to the many thousands of readers who visit us at the shows.

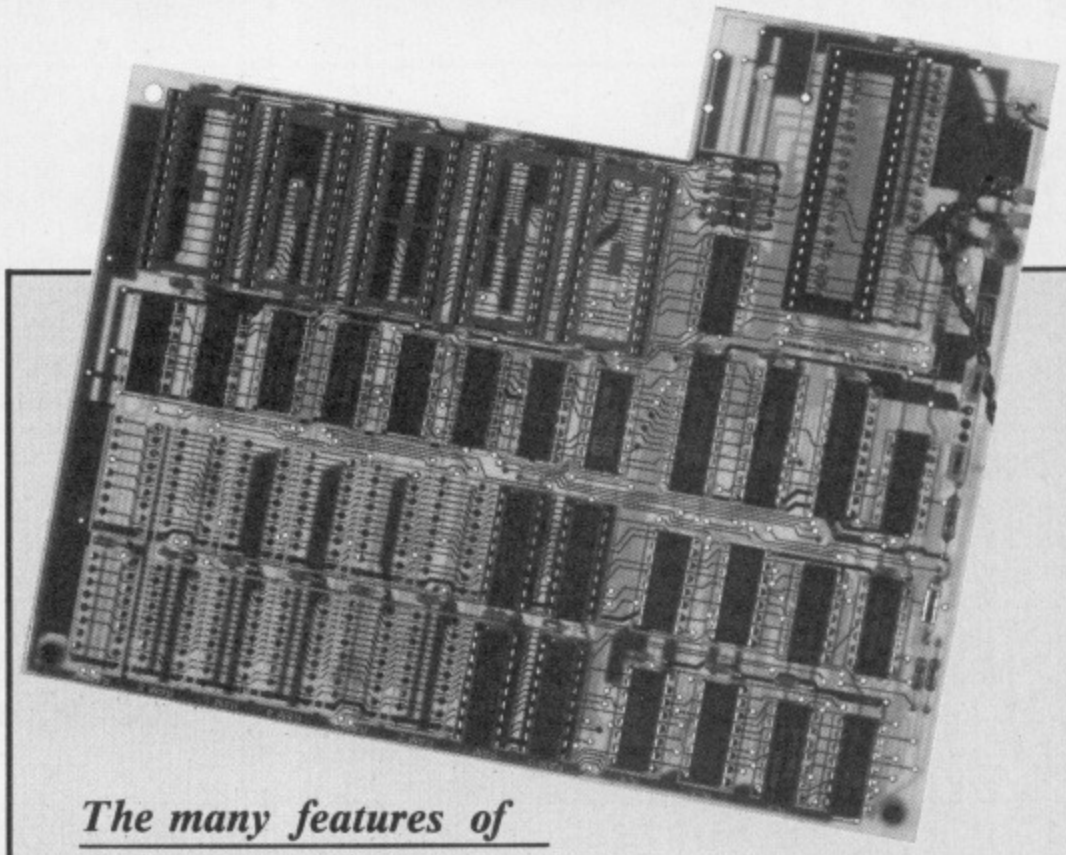
Now, as we plan the features that will entertain, amuse and intrigue you during the rest of 1986 – and hopefully stimulate to make even more use of your ever-expanding BBC Micro – we feel we need to take the pulse of the whole of our readership. To find out the kind of equipment you use now, and are considering buying in the future. To discover where your interests lie – and the subjects you would most like to read about in the pages of *The Micro User*.

What YOU say when you fill in our reader survey on the opposite page could play a vital part in determining the kind of features you'll be reading in *The Micro User* in months to come. So we're asking for the cooperation of every one of you in making it a success.

To encourage you, we've an outstanding gift for ten of you – the latest product from Watford Electronics that marks the second generation of sideways ROM/RAM technology for the BBC Micro.

As you can see from the panel on this page, the Watford ROM/RAM card marks the coming of age of sideways boards. And you've got ten chances to win one.

Help us give you the magazine you want by filling in our Reader Survey form and ten of you, chosen at random from the completed forms, will be the winners.



The many features of Watford's new ROM/RAM board include:

- ★ *32k of dynamic sideways RAM – easily upgraded to a massive 128k.*
- ★ *a comprehensive RAM filing system that turns the sideways RAM into a silicon disc.*
- ★ *software controlled write protection.*
- ★ *up to eight sideways ROMs on your micro.*
- ★ *software packed utilities disc.*

These are just a few of the powerful aspects of this versatile system.

You can, if you wish, use the sideways RAM as a printer buffer, or to perform a fast *BACKUP. And there's potential for upgrading with dynamic as well as static, battery-backed RAM.

Of course, as you'd expect from such a sophisticated product, there's no soldering required to fit it – it simply plugs into your BBC Micro.

And naturally, it's fully buffered.

If you wish your survey form to be included in the draw for the ROM/RAM cards, please return it by January 31, 1986.

THE MICRO USER READER SURVEY

I wish to enter the draw for a Watford ROM/RAM board.

Name (Mr,Mrs,Ms) .....

Address .....

.....

.....

Age group:
☐ Under 15 ☐ 20-30 ☐ 40-50
☐ 15-20 ☐ 30-40 ☐ Over 50

How long have you been reading the Micro User?
☐ 0-3 months ☐ 3-6 months
☐ 6 months-1 yr ☐ 1-2 yrs
☐ over 2 yrs

Do you:
☐ subscribe
☐ have a regular order
☐ buy occasionally

If you buy occasionally, do you purchase
☐ 1 in 2
☐ 1 in 3
☐ less regularly

Do you own:
☐ BBC Model B ☐ BBC Model A
☐ BBC B+ ☐ BBC 128K
☐ Electron

What do you use your micro for?
☐ playing games
☐ educational software
☐ writing your own programs
☐ business use

Please tick which of the following ROMs you have fitted:
☐ View ☐ Wordwise
☐ Viewsheet ☐ Wordwise+
☐ Viewstore ☐ Intersheet
☐ Commstar ☐ Disc Doctor
☐ Termi ☐ Slave
Please list any others you may have

.....

.....

Do you have a ROM/RAM board? If so:
Is it ☐ Internal ☐ External

Do you have sideways RAM fitted?
☐ Yes ☐ No
Please state the manufacturer and model

.....

Do you have any of the shadow RAM boards fitted?
☐ Aries ☐ Watford ☐ Raven

When you play games, which of the following types do you enjoy most?
☐ arcade
☐ strategy (eg. chess, draughts)
☐ adventure
☐ simulators (eg. Revs, Aviator)

Which DFS is fitted to your micro, if any? Manufacturer and version number, please.

.....

Is it
☐ single density ☐ double density

If you have disc drives, are they
☐ 40 track ☐ 80 track
☐ single sided ☐ double sided
☐ single drive ☐ twin drive
☐ 3 inch ☐ 5¼ inch
☐ other ☐ 40/80 Switchable
Please state manufacturer and model

.....

If you own a printer is it
☐ dot matrix ☐ daisy wheel
☐ thermal ☐ other
Please state manufacturer

.....

Which, if any, of the following modems do you own?
☐ Le Modem
☐ Nightingale
☐ Minor Miracles WS2000
☐ Prism
☐ Demon
☐ Other
If other, please give details.

.....

Is your modem:
☐ 1200/75 only ☐ Multiple baud rate

Which, if any, on-line database do you subscribe to?
☐ MicroLink ☐ Micronet
☐ Viewfax ☐ One-to-One
☐ EasyLink
Please give details of any other you subscribe to:

.....

If you have a monitor is it
☐ colour ☐ black/white
☐ monitor/TV
Please state the manufacturer and model

.....

What is the next piece of software you are likely to buy?

.....

If you have a second processor is it:
☐ Acorn Z80 ☐ Acorn 6502
☐ Other
If other, please give details

.....

Which of the following graphics add-ons do you use?
☐ lightpen ☐ mouse
☐ plotter ☐ trackball

What pieces of hardware are you likely to buy over the next 6 months?
☐ printer ☐ second processor
☐ disc drive ☐ digitiser
☐ monitor ☐ plotter
☐ ROMboard ☐ joysticks
☐ modem

Which of the above do you intend to add eventually to your system?

.....

How do you purchase products for your micro?
☐ mail order
☐ high-street shop
☐ exhibitions/shows
☐ The Micro User special offers

How many exhibitions/shows do you attend a year?
☐ none ☐ one ☐ two
☐ three or more

Is your main interest in attending exhibitions:
☐ new product launches
☐ bargain prices
☐ purchasing a particular product
☐ the wide range of products on view

Which article, or series of articles, would you like The Micro User to contain in forthcoming issues?

.....

Have you any general comments to make on the magazine contents?

.....

.....

.....

.....

.....

Finally, by circling one number in each line, could you indicate your level of interest in the following Micro User articles (0 lowest – 9 highest):

News	0	1	2	3	4	5	6	7	8	9
Beginner's Basic	0	1	2	3	4	5	6	7	8	9
Beginner's M/code	0	1	2	3	4	5	6	7	8	9
Games listings	0	1	2	3	4	5	6	7	8	9
Utilities listings	0	1	2	3	4	5	6	7	8	9
Adventures	0	1	2	3	4	5	6	7	8	9
Software Scene	0	1	2	3	4	5	6	7	8	9
Hardware Scene	0	1	2	3	4	5	6	7	8	9
ROM Roundup	0	1	2	3	4	5	6	7	8	9
Body Building	0	1	2	3	4	5	6	7	8	9
Problem Page	0	1	2	3	4	5	6	7	8	9
Book Reviews	0	1	2	3	4	5	6	7	8	9
Barry Wood	0	1	2	3	4	5	6	7	8	9
Bob 'n' Trev	0	1	2	3	4	5	6	7	8	9
Micromail	0	1	2	3	4	5	6	7	8	9

Post to:
Reader Survey,
The Micro User,
Europa House,
68 Chester Road,
Hazel Grove,
Stockport
SK7 5NY.

21st. Software (ELECTRON VERSIONS AVAILABLE)

PRESENTS A SELECTION OF HARDWARE, UTILITIES & SOFTWARE FOR THE BBC MICRO

ACORNSOFT'S
VIEW ROM
OUR PRICE **£52.80**
VIEWSHEET ROM
OUR PRICE **£52.80**

SLOGGER SOFTWARE ROMS

	R.R.P.	OUR PRICE
STARWORD	**£34.50**	**£31.50**
BEEBMAN	**£17.50**	**£16.00**
STARMON	**£24.95**	**£22.50**

SUPERIOR SOFTWARE
SUPER 3 PACK (BBC)
3 CASSETTES
MOON MISSION
BMX ON THE MOON
SPITFIRE COMMAND
GREAT VALUE ALL 3 FOR **JUST £6.95**

VINE MICROS ROM SOFTWARE
ADDCOM
R.R.P. **£28.00** OUR PRICE **26.00**
REPLAY
R.R.P. **£35.00** OUR PRICE **£31.50**

NEW SOFTWARE INVASION

	R.R.P.	OUR PRICE
CHIPBUSTER	**£7.95**	**£6.95**
STAIRWAY TO HELL	**£12.95**	**£11.65**

Disc versions add £3.00

NEW AT LONG LAST! US GOLD'S/IMAGINE

	R.R.P.	OUR PRICE
BRUCE LEE (Cass.)	**£9.95**	**£8.95**
YIE AR KUNG FU (Cass.)	**£9.95**	**£8.95**

NEW ACORNSOFT'S REVS 4 TRACKS

	R.R.P.	OUR PRICE
Cassette	**£9.95**	**£8.95**
Disc	**£12.95**	**£11.65**

(Remember you need the original REVS!)

NEW SUPERIOR SOFTWARE'S

	R.R.P.	
CITADEL	**9.95**	**8.95**
SPEECH	**9.95**	**8.95**

Disc versions add £2.00

	R.R.P.	OUR PRICE
AARDVAAK SOFTWARE		
Zalaga	7.95	6.95
Frak	8.95	7.95
ACORNSOFT		
Elite (cas.)	14.95	12.95
Elite (disc)	17.95	15.75
Revs (cas.)	14.95	12.95
Revs (disc)	17.95	15.85
Majic Mushrooms (cas.)	12.95	11.65
Majic Mushrooms (disc)	14.95	13.45
Aviator (cas.)	14.95	13.25
Aviator (disc)	17.65	15.25
Maze (cas.)	9.95	8.95
Maze (disc)	11.50	10.45
Acheton (disc)	17.65	15.95
Chess (cas.)	9.95	8.95
Firebug (cas.)	9.95	8.95
Firebug (disc)	11.50	10.45
Snooker (cas.)	9.95	8.95
Snooker (disc)	11.50	10.50
Labyrinth (cas.)	9.95	8.95
Labyrinth (disc)	11.50	10.45
Workshop (cas.)	9.95	8.95
Workshop (disc)	11.50	10.45
ACORNSOFT/BES		
Happy Letters	8.95	7.95
Timeman One	8.95	7.95
Happy Numbers	8.95	7.95
Wordhang	8.95	7.95
Osprey	9.95	8.95
ACORN/LINKWORD		
German	14.95	12.95
French	14.95	12.95
Italian	14.95	12.95
Spanish	14.95	12.95
ADDICTIVE GAMES		
Football Manager	8.95	7.95
Boffin	9.95	8.95
ADVENTURE INT:		
Gremlins	7.95	6.95
The Hulk	7.95	6.95
Spiderman	7.95	6.95
Adventureland	7.95	6.95
The Count	7.95	6.95
Mystery Funhouse	7.95	6.95
Robin of Sherwood	7.95	6.95
ALLIGATA		
Sun of Blagga	7.95	6.95
Contract Bridge	9.95	8.95
Guardian	7.95	6.95
Nightworld	7.95	6.95
Fistful of Fun (cas.)	9.95	8.95
Fistful of Fun (disc)	11.95	10.95
ANIROG (Discs 40T add £2)		
Jup Jet	9.95	8.95
ATARISOFT		
Pole Position	9.95	8.95
BUG BYTE		
Twin Kingdom Valley	9.50	8.50
C.D.S.		
Birdie Barrage	7.95	6.95
Steve Davis Snooker	7.95	6.95
C.R.L.		
Test Match	7.95	6.95
CLARES		
Profile disc)	12.00	11.00
Fontwise (disc)	12.00	11.00
Brom ROM	34.50	31.50
Brom (disc)	27.50	25.00

	R.R.P.	OUR PRICE
COMSOFT		
Serpents Lair	4.95	3.95
Playbox	4.95	3.95
S.A.S. Commando	4.95	3.95
DR. SOFT		
747 Flight Sim.	7.95	6.95
Gorf	7.95	6.95
Phanton Combat	9.95	8.95
D.A.C.C.		
Flight Sim 747 (DACC)	9.95	8.95
Bobby Charlton Soccer	11.95	10.95
DATABASE (Discs add £2)		
Red Arrows	9.95	8.95
DURELL MARTECH		
Mineshaft	6.95	5.95
Brian Jacks Superstars	7.95	6.95
Combat Lynx	8.95	7.95
Eddie Kidd Jump	7.95	6.95
Gisburne's Castle	7.95	6.95
Geoff Capes	8.95	7.95
EBURY SOFTWARE		
Mr T meets his Match (5-8 yrs)	9.95	8.95
Mr T's Money Box (3-6 yrs)	9.95	8.95
Mr T Tells the Time (3-6 yrs)	9.95	8.95
Mr T's Simple Sums (5-8 yrs)	9.95	8.95
EDGE COMPUTERS		
Microgo	9.95	8.95
EPIC SOFTWARE (Disc versions add £2)		
The Wheel of Fortune cas.	9.95	8.45
Castle Frankenstein cas.	7.95	6.55
The Quest of the Holy Grail cas.	7.95	6.55
Kingdom of Klein cas.	7.95	6.55
GLOBAL		
Op. Caretaker (Cleaning kit cas.)	10.95	9.95
GOLEM LTD (For disc version add £2)		
Education I	8.00	7.00
Education II	8.00	7.00
Fun with Words	8.00	7.00
Fun with Numbers	8.00	7.00
Jigsaw	8.00	7.00
HEWSON		
Heathrow A.T.C.	7.95	6.95
Fantasia Diamond	7.95	6.95
HOLLY COMPUTERS		
Gamemaker Mode 2	12.99	10.65
Gamemaker Mode 5	12.99	10.65
Jukit ROM	25.00	22.00
ROM H	15.00	13.00
HONEYFOLD		
Basic Programming	10.50	9.50
Advanced Programming	14.95	12.95
Assembly Language	12.50	11.50
ICON SOFTWARE		
Caveman Capers	7.95	6.95
Drain Mania	7.95	6.95
Bug Eyes	7.95	6.95
Frankenstein 2000	7.95	6.95
Contraption	8.95	7.95
Flip	7.95	6.95
IMAGINE		
Wizardore	7.95	6.95
KOSMOS SOFTWARE (Disc version add £1)		
French Mistress A or B*	8.95	7.95
German Master A or B*	8.95	7.95
Spanish Tutor A or B*	8.95	7.95
Answer Back Jun. or Sen.	9.95	8.95
Answer Back Sport	9.95	8.95
Identify Europe	7.95	6.95

	R.R.P.	OUR PRICE
L.C.L. (Disc version same price)		
Micro Maths (24 progs 'O' Level)	24.50	21.50
Micro English (24 progs 'O' Level)	24.50	21.50
Mega Maths ('A' Level)	24.50	21.50
LONGMAN'S SOFTWARE		
First Moves (Chess 8+)	9.95	8.95
Master Key (Typing Tutor)	9.95	8.95
LEISURE GENIUS		
Scrabble	12.95	11.65
Kensington	12.95	11.65
Cluedo	12.95	11.65
Monopoly	12.95	11.65
LEVEL 9		
Adventure Quest	9.95	8.95
Colossal Adventure	9.95	8.95
Dungeon Adventure	9.95	8.95
Emerald Isle	6.95	5.95
Lords of Time	9.95	8.95
Return to Edan	9.95	8.95
Snowball	9.95	8.95
The Worm of Paradise	9.95	8.95
Red Moon	6.95	5.95
MACSEN SOFT		
Block Busters	7.95	6.95
MELBOURNE HOUSE		
Classic Adventure	6.95	5.95
Hampstead	6.95	5.95
Terromolinos	6.95	5.95
Hobbit (cas.)	14.95	13.45
Hobbit (disc)	17.95	16.25
MP SOFTWARE		
Sadim Castle	7.50	6.50
Valley of the Kings	7.50	6.50
Firien Wood	7.50	6.50
Woodland Terror	7.50	6.50
Blue Dragon	7.50	6.50
Survivor	7.50	6.50
MICROPOWER (Disc version add £2)		
Dr Who/Terror Mines	18.95	17.25
Castle Quest	12.95	11.65
Ghouls	7.95	6.95
Swag	6.95	5.95
Chess	7.95	6.95
Killer Gorilla	7.95	6.95
U.X.B.	7.95	6.95
Felix in Factory	7.95	6.95
Galactic Commander	7.95	6.95
Cybertron	7.95	6.95
Stock Car	6.95	5.95
MIRRORSOFT (Disc version add £3)		
Count with Oliver	7.95	6.95
Look Sharp	7.95	6.95
First Steps	8.95	7.95
Here/There with Mr Men	7.95	6.95
Quick Thinking –	6.95	5.95
Starseeker	9.95	8.95
Harrier Strike Force	9.95	8.95
M.C. LOTHLORIEN		
Redcats	6.95	5.95
Paras	6.95	5.95
Johnny Reb	6.95	5.95
Special Operations	6.95	5.95
Battlezone	6.95	5.95
Waterloo	9.95	8.95
MICROBYTE		
Er*Bert	4.95	3.95
Draughts + Reversi	4.95	3.95
Pinball	4.95	3.95

	R.R.P.	OUR PRICE
MOSAIC		
Erik the Viking	7.95	6.95
Secret Diary of Adrian Mole	9.95	8.95
OASIS		
Aces High	14.95	12.95
OCEAN		
Match Day	9.95	8.95
Mr Wimpy	6.90	5.90
QUALSOFT (Disc versions add £3)		
Mexico '86	9.95	8.95
Div. I	9.95	8.95
REDSHIFT		
English Civil War	9.95	8.95
ROBICO SOFTWARE (Disc version add £2)		
Banjax	9.95	8.95
Beeline	7.95	6.95
Enthar 7 (disc)	17.95	16.45
Island of Xaan	9.95	8.95
Rick Hanson	9.95	8.95
SILVERSOFT		
Bored of the Rings	6.95	5.95
SHARDS (* Disc version add £3)		
Empire	6.95	5.95
Pettigrews Diary	7.95	6.95
Mystery of Java Star	7.95	6.95
Galilee	6.95	5.95
Whoopsy	6.95	5.95
Woodbury End*	9.95	8.95
SHIELD		
O Level Maths Ex.	9.95	8.95
O Level Chemistry Ex.	9.95	8.95
O Level Physics Ex.	9.95	8.95
SOFTWARE INVASION (* Disc add £3)		
3D Bomb Alley	7.95	6.95
Gunsmoke	7.95	6.95
Blitzkreig*	7.95	6.95
Super Pool	7.95	6.95
Votex	7.95	6.95
Jet Boat	7.95	6.95
3D Grand Prix*	9.95	8.95
Eagles Wing	7.95	6.95
SOFTWARE PROJECTS		
Manic Miner	7.95	6.95
SQUIRRELSOFT		
Lode Runner	9.95	8.95
Supergolf	7.50	6.50
Trafalgar	8.00	7.00
Polar Perils	7.95	6.95
SUPERIOR SOFTWARE (*Disc version add £2)		
Mr Wiz	7.95	6.95
Smash and Grab	7.95	6.95
Overdrive	7.95	6.95
Battletank	7.95	6.95
Wallaby	7.95	6.95
Space Pilot	7.95	6.95
Tempest*	9.95	8.95
Repton*	9.95	8.95
Death Star*	9.95	8.95
Repton 2*	9.95	8.95
U.S. GOLD		
Beach Head	£9.95	£8.95
ULTIMATE		
Atic Atac	7.95	6.95
Alien 8	9.95	8.95
Knightlore	9.95	8.95
Jetpac	7.95	6.95
Sabre Wulf	9.95	8.95
VIRGIN		
Sinbad	7.95	6.95

ALL PRICES ARE INCLUSIVE OF VAT AND CARRIAGE

OVERSEAS ORDERS PLEASE ADD £1.00 THEN 50p FOR 2ND and 3RD ITEMS EACH

We guarantee all titles are originals. We offer a quick and reliable service. Most Electron and BBC titles are available on request with the guarantee of at least £1.00 off the R.R.P.

Please send me: Cas. ☐ Disc ☐ 40T ☐ 80T ☐

	Cost
1. _____	£ _____
2. _____	£ _____
3. _____	£ _____
4. _____	£ _____
TOTAL	£ _____

Please make cheques payable to:
21st Software.

Send orders to:

21st SOFTWARE, Dept. MU
20 Woodside Drive
High Lane, Stockport SK6 8HU
Tel: Disley (06632) 3160

Name .....

Address .....

.....

.....

Post Code .....

Tel. No. .....

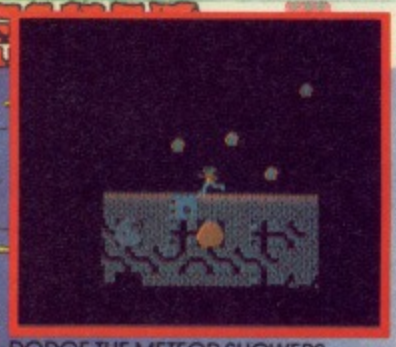
MORE THAN JUST A SEQUEL. A NEW EXPERIENCE

REPTON 2

COLLECT THE PUZZLE PIECES

THE PUZZLE PIECES IN POSITION

CLOSE-UP OF A MONSTER



DODGE THE METEOR SHOWERS

WATCH OUT FOR THE BLIND SPIRITS

ACORN ELECTRON VERSION

REPTON 2

REPTON met with unanimous acclaim from games players and reviewers alike. Now, totally redesigned and rewritten, we bring you a new experience... REPTON 2 — a challenge even for hardened REPTON addicts! Not only must you collect all the diamonds (more than a thousand in total), you must also find the 42 jigsaw puzzle pieces which have been strewn throughout the 16 levels. The levels of play, each 16 times the size of the TV screen, are connected by a series of transporters which propel you backwards and forwards between the different scenarios – but each transporter can only be used once. Each level has its own characteristics: brave the meteor storms at the planetary surface; entice the haunting spirits into their cages by strategically positioning the boulders; avoid the eerie skulls of past explorers; unlock the safes with hidden keys; and crush the fearsome monsters which hatch from giant eggs. Can **you** complete REPTON 2?

ACORN ELECTRON
BBC MICRO

MORE PRIZES!

Complete REPTON 2 and enter our competition. The first 100 winning entrants will each receive a beautifully designed "I'VE COMPLETED REPTON 2" cotton T-shirt; all correct entries received before 31st March 1986 will be eligible for the cash prize of **£200**

CASSETTE VERSION — £9.95

BBC DISC VERSION — £11.95

WE PAY UP TO 20% ROYALTIES FOR HIGH QUALITY BBC & ELECTRON PROGRAMS

SUPERIOR SOFTWARE LTD.
Dept. MU12, Regent House,
Skinner Lane, Leeds 7.
Tel: 0532 459453.

Access

VISA

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

FIVES is an adaptation of a commercial board game. It is similar to noughts and crosses save that it is played on a grid of 10 × 10 and it is necessary, as its name suggests, to place five pegs in a row rather than the usual three.

The game can be played between two players in the usual way or against the computer. After each game you have the choice of a new game with the further choice of a change of players.

Until there is a change of players the running total scores are displayed after each game.

Although the computer always plays yellow the order of play is offered at the start of each game. As is normal with similar type games there is an advantage in playing first – the computer i particular does better if given th opportunity.

In order to avoid repetitive games an to give the computer a degree unpredictability one or two rando features are built into the manner which it plays.

It would be possible to include extr

PROCEDURES

chars Defines counters/holes.
intro Opening screen title.
rules Explains rules/keys.
players Ascertains choice of game type and names of players.
init Initialises variables.
grid Draws playing grid.
update Shows last move/pegs left.
blank Clears text area for messages.
go Obtains player(s) moves and places them on grid. At same time updates grid array.
check Checks for winning line.
assess, horiz, vert, diag1, diag2, totals These calculate a move for the computer when applicable. They are called in a random order to avoid a pattern of play.
comp Makes computer's move either by using position from PROCassess or by checking grid for best position.
placepeg Positions peg on playing grid.
result Declares winner and shows score.
newgame Invites change of players.

VARIABLES

B(x,y) Array containing values of counters: 1s fo player 1, 6s for player 2/computer.
winner Ends game loop when greater than zero.
hole$, peg$ Strings containing characters that comprise holes and pegs.
score1,score2 Running score totals.
computer Set at 1 if playing computer.
N1$,N2$ Players' names.
player Controls who is to play and so on.
x,y Grid coordinates for placing pegs in array and
X,Y printing pieces on board.
t Total of any group of five. If *t*=6 or *t*=30, sets *winner* to greater than zero.
tot Total of six holes for ascertaining some moves.
col,row, C,R Used to fix position that computer will play its move.
merit Controls worth of various positions.
move Keeps check of number of moves made.
position, loop Start of loop for placing peg in line of five.
value,best Used when computer looking for move with merit set at zero.
mixer% Random number to add variety to the order that computer chooses its move.

```
10REM * FIVES By John Lambert *
20REM *  (c) The Micro User   *
30DIM B(11,11)
40PROCchars
50MODE5
60VDU23;8202;0;0;0;
70PROCintro
80MODE7
90VDU23;8202;0;0;0;
100PROCrules
110PROCplayers
120MODE5
130VDU23;8202;0;0;0;
140ON ERROR GOTO2910
150PROCinit
160PROCgrid
170REPEAT
180PROCgo
190PROCcheck
200PROCassess
210UNTIL winner>0
220PROCresult
230MOVE256,64:GCOL0,2:PRINT;"Press
 SPACE":MOVE256,32:PRINT;"for new gam
e"
 240reply$=GET$
 250IF reply$<>" " CLS:GOTO280
 260MODE7
 270PROCnewgame:GOTO120
 280END
 290DEF PROCchars
 300VDU23,224,255,255,231,195,195,12
9,129,129
 310VDU23,225,129,129,129,195,195,23
1,255,255
 320VDU23,226,0,0,24,60,60,126,126,1
26
 330VDU23,227,126,126,126,60,60,24,0
,0
 340hole$=CHR$224+CHR$8+CHR$10+CHR$2
25
 350peg$=CHR$226+CHR$8+CHR$10+CHR$22
7
 360ENDPROC
 370DEFPROCintro
 380DIMletter$(5)
 390VDU19,0,4,0,0,0,19,3,0,0,0,0
 400GCOL0,3:MOVE64,64:DRAW1216,64:DR
AW1216,960:DRAW64,960:DRAW64,64
 410FOR letter=1TO5
 420READ letter$(letter)
 430NEXT
 440across=6:title=1
 450REPEAT
 460FOR down=2TO14:COLOUR1
 470PRINTTAB(across,down);peg$
 480SOUND1,-15,52,1:zz=INKEY(15)
 490COLOUR0:PRINTTAB(across,down);pe
g$
 500NEXT
 510COLOUR1:PRINTTAB(across,down);pe
g$
 520COLOUR2:PRINTTAB(across,down+3);
letter$(title)
 530across=across+2:title=title+1
 540UNTIL across=16
 550delay=INKEY(300)
 560VDU20
 570ENDPROC
```

routines to make it more difficult to beat the computer, but this detracts from the enjoyment of playing against the machine. All too often with computer games the micro wins, which is particularly off-putting for younger players.

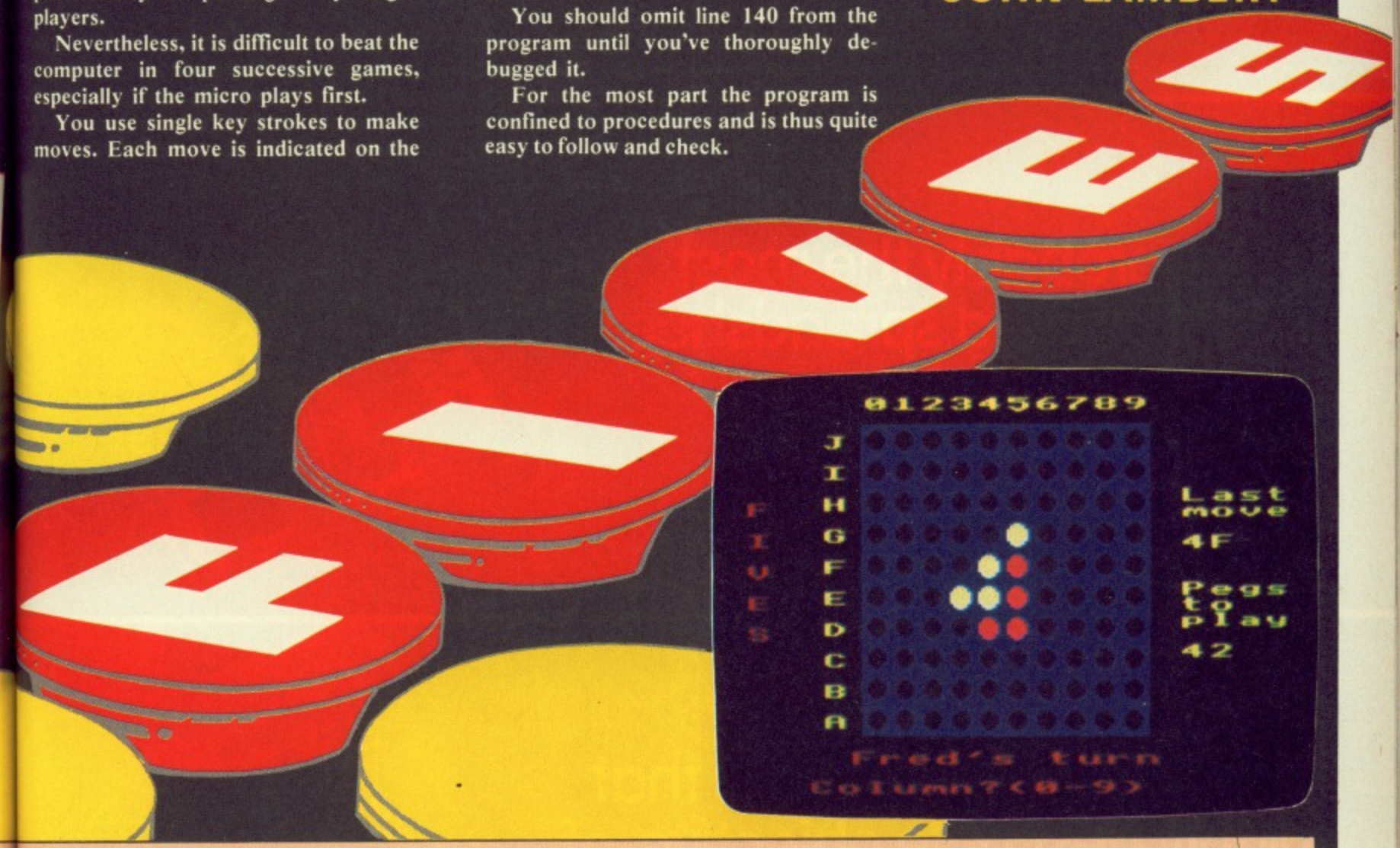
Nevertheless, it is difficult to beat the computer in four successive games, especially if the micro plays first.

You use single key strokes to make moves. Each move is indicated on the grid before the peg is committed and there is the chance of changing the play. Pressing the Escape key prematurely terminates the game in play and offers a new game without affecting the running score totals.

You should omit line 140 from the program until you've thoroughly de-bugged it.

For the most part the program is confined to procedures and is thus quite easy to follow and check.

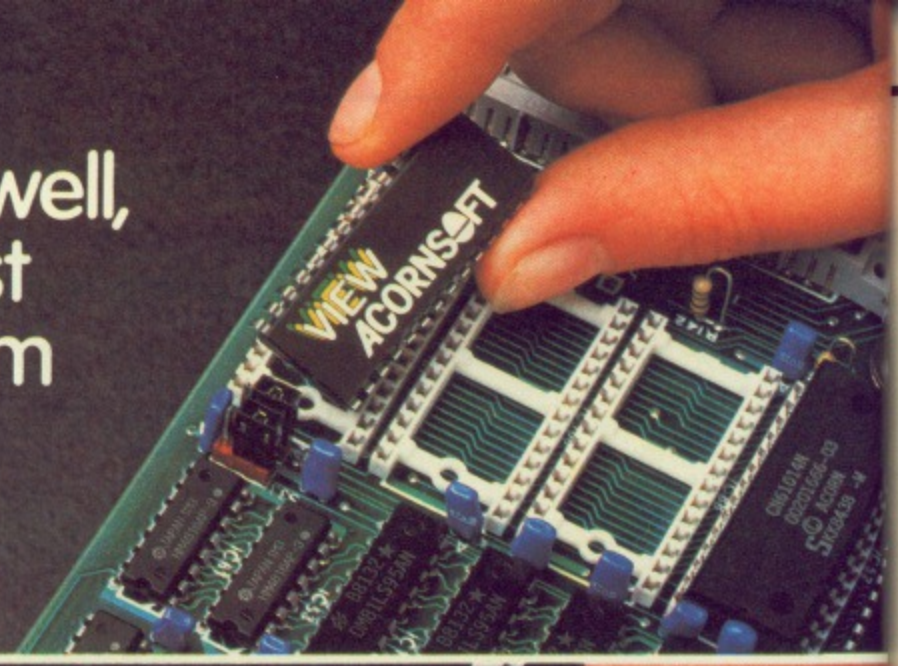
A traditional board game adapted for your micro by JOHN LAMBERT



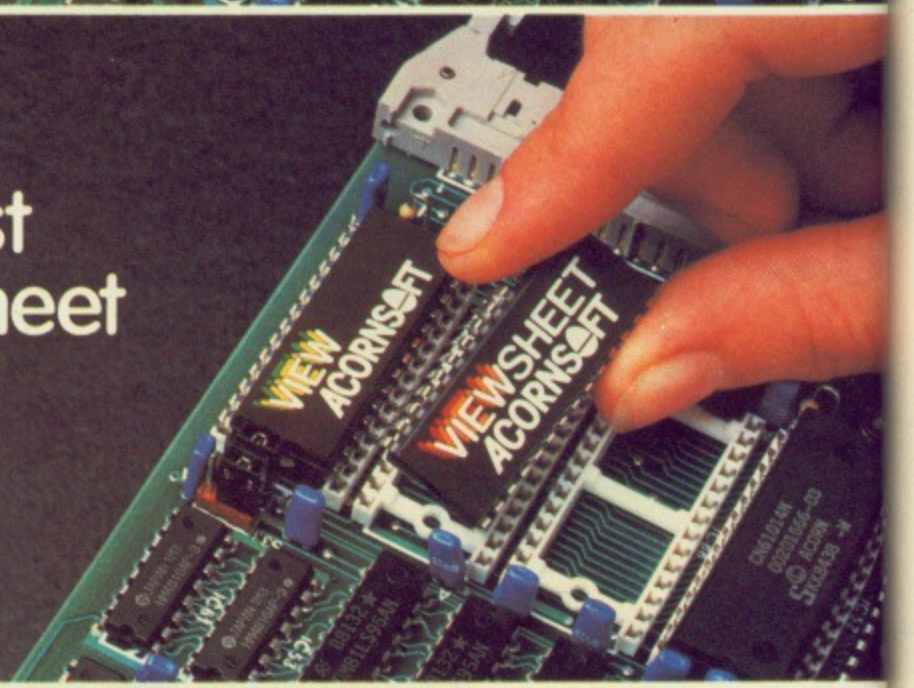

```
  580DEFPROCrules
  590space$=CHR$135+CHR$157+CHR$141+C
HR$129+"     Press SPACE to continue
      "+CHR$135+CHR$157+CHR$141+CHR$
129+"     Press SPACE to continue"
  600PRINT':FOR I=1TO2:PRINT;CHR$132;
CHR$157;CHR$141;CHR$131;SPC(13);"FIVE
S":NEXT
  610PRINT':PRINT;CHR$134;"The object
 of the game is to be the"'CHR$134;"f
irst player to place five pegs in a"'
CHR$134;"row in any direction similar
 to as in"'CHR$134;"noughts and cross
es."
  620PRINT':PRINT;CHR$130;"You may ch
oose to play the computer or "CHR$130
;"against any other player."
  630PRINT';CHR$134;"Players take it
in turns to place their"CHR$134;"pegs
 anywhere on the board. Each player"C
HR$134;"is limited to 25 pegs followi
ng which a"CHR$134;"draw is declared
in the event of there "CHR$134;"being
no winner."
  640PRINT';space$
  650VDU28,0,20,39,6:space=GET:CLS:VD
U26
  660PRINTTAB(0,6);CHR$131;"Pegs are
placed by giving the grid"'CHR$131;"c
o-ordinates - number then letter."'CH
R$131;"It is not necessary to press '
RETURN'"'CHR$131;"- single keystrokes
 are sufficient."
  670PRINT';CHR$134;"A player has the
 option of confirming"'CHR$134;"a mov
e or of changing it."'CHR$134;"Press
the SPACEBAR to confirm a play"
  680PRINT;CHR$134;"or any other key
to change the move."
  690PRINT';CHR$134;"Press ESCAPE if
you wish to start a new"CHR$134;"game
 before the present game is over."
  700VDU28,0,24,39,6:space=GET:CLS:VD
U26
  710ENDPROC
  720DEF PROCplayers
  730score1=0:score2=0
  740PRINTTAB(0,6);CHR$134;"After eac
h game the running score is"'CHR$134;
"displayed and the option of another"
'CHR$134;"game is given. At this time
 there is"'CHR$134;"an opportunity to
 change players."
  750PRINTTAB(0,12);CHR$134;"Do you w
ant to play the Computer? Y/N"
  760REPEAT
  770comp$=GET$
  780UNTIL comp$="Y" OR comp$="y" OR
comp$="N" OR comp$="n"
  790IF comp$="Y" OR comp$="y" comput
er=1 ELSE computer=0
  800IF computer=0 GOTO 840
  810REPEAT
  820PRINTTAB(0,15);CHR$(134);"You pl
ay";CHR$129;"Red";CHR$134;"and I will
 play";CHR$131;"Yellow"''CHR$134"Plea
se enter your name"'CHR$134"in 8 or 1
```

Turn to Page 184

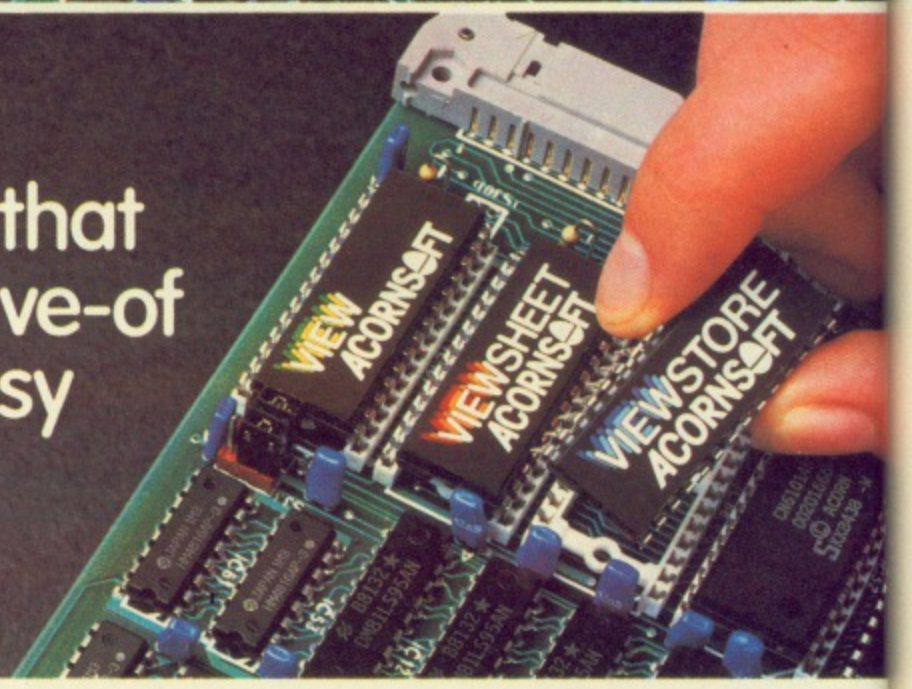
"VIEW handles very well, and is certainly the best word-processing system of its size..." Practical Computing.



"……probably the most sophisticated spreadsheet yet developed on a home micro..." Accountancy Age.



"ViewStore achieves that highly desirable objective-of being powerful and easy to use..." A & B Computing.



Why everyone's so happy to express their point of view.

The View range is the largest range of software available for the BBC Micro. And the most sophisticated.

Hardly surprising, since the View range comes from Acornsoft, and is designed to use the capabilities of the BBC Micro rather more fully than any other software package. Indeed, VIEW was awarded the 1984 British Microcomputing Award for home software.

The View range also includes ViewIndex, ViewSpell, ViewPlot and a Printer Driver Generator, all of them powerful, sophisticated and, above all, friendly to use.

Why not fill in the coupon (or call us on 0223 214411) for more details? And then you'll be able to form your own point of view.

Please send me information on the View range.

Name

Address

Post Code

Send to: Acornsoft Limited Cambridge Technopark
645 Newmarket Road
Cambridge CB5 8PD.

ACORNSOFT

BB186

NEW SERIES

Inside the 8271 – how your DFS really functions

KEVIN EDWARDS shows you how to make the most of your floppy disc controller

IN this short series we'll be looking at the 8271 Floppy Disc Controller (FDC) and learning how to program it using OSWORD &7F.

The standard disc interface for the BBC Micro uses a rather old disc controller which is only capable of operating in single density – the 8271.

This floppy disc controller is responsible for interfacing a disc drive to the BBC Micro. Without it a disc drive is as much use as a chocolate kettle.

More recently disc interfaces have become available which use double density FDCs, such as the Western Digital 1770 used by the Watford DDFS, the Electron Plus 3 and the BBC B+.

The advantage of using FDCs such as the 1770, as opposed to the 8271, are greater speed and a larger disc capacity.

As the name suggests, double density FDCs can store twice as much information on a disc as a single density FDC.

Since speed and storage capacity are the two most important factors when using discs, double density systems are becoming more and more popular. Their popularity is also increased by the fact that the 8271 is becoming very scarce and expensive.

Nearly all double density FDCs can operate in single density mode. This means that both single and double density discs can be read by the FDC as long as the Disc Filing System (DFS) in the micro can handle both formats.

However, before you rush out and sell your 8271 to buy a double density disc interface, you must be aware of the latter's main disadvantages.

One possible problem is software compatibility – or rather, incompatibility. You see, discs are protected by changing their format so that all *BACKUP type commands fail to do what they're supposed to. This is usually done by changing a few tracks on the discs so that DFS commands, which load data from disc, fail to work.

These "faulty" tracks are checked for using the OSWORD &7F call which examines specific information about the disc's format and protection.

This means that the double density FDC must be capable of executing OSWORD &7F calls correctly to satisfy the protection used on the disc. The problem is that the command bytes sent to an 8271 FDC are different from the commands sent to a double density FDC.

Fortunately, many of the new double density disc systems have included an emulator, a clever piece of software which translates 8271 commands into the relevant commands for their FDC.

Even so, emulating certain 8271 commands can be very tricky if not impossible. This is when the emulator will fail and protected discs will become redundant.

So, if you've got a large collection of protected discs and you're thinking of upgrading your disc system to double density, there's always the chance that some of your discs won't work. Your best bet is to find out which discs work on the disc system you are interested in before you buy it.

Now we'll take a look at the command which is at the heart of the problem, OSWORD &7F.

The operating system – OS – only recognises OSWORD calls 0 to 13 and passes any unrecognised calls to each paged ROM in turn. If one of these is a DFS, then OSWORD &7F is intercepted and executed.

Like all other OSWORD calls information is passed using a control block, a section of memory reserved for holding data.

This block is pointed to by the X and Y registers of the 6502 – X contains the least significant byte of the block address and Y contains the most significant byte of the block address. The data in the block contains the command and parameters which are to be sent to the 8271 FDC.

While it's easier to use OSWORD from machine code, Basic can be used as well.

A typical OSWORD &7F control block is shown in Figure I. This shows the data needed to read one sector starting from track 0 sector 2.

The drive number indicates which drive is being used. This should be between 0 and 3. A negative drive number would indicate that the

base+0	0	Drive number
base+1	0	Buffer address
base+2	&11	
base+3	&FF	
base+4	&FF	
base+5	3	Number of parameters n
base+6	&53	The command type
base+7	0	Parameter 1
base+8	2	Parameter 2
base+9	&21	Parameter 3
base+n+7	?	Result

Figure I: OSWORD &7F control block

From Page 117

previously selected drive should be used – this may not apply to certain DFSs. The block in Figure I selects drive 0.

The buffer address corresponds to a section of memory where data to be read/written from/to the disc is to be stored/found. In the example the address &FFFF1100 is used as a buffer. The leading &FFFF indicates that the data is to be loaded into the BBC's memory and not the second processor's memory, should one be present.

The number of parameters specifies how many extra bytes are needed to complete the command – see Figure III. In the example, three extra parameters are needed.

The command byte is the command number written to the FDC. This can be a command to read from the disc, write to it, verify the disc, format the disc and so on. Next month we'll look more closely at the commands available. Our example command byte is &53, which means *read multi-sized sectors*.

Error number in hex	Error meaning
08	Clock error
0A	Late DMA
0C	ID CRC
0E	Data CRC
10	Drive not ready
12	Disc write protected
14	Track 0 not found
16	Write fault
18	Sector not found

Figure II: 8271 disc errors

The next bytes are the additional parameters needed to complete the command. These usually correspond to the track address, sector start and number/size of the sectors being accessed.

In Figure I the first and second of these correspond to the track and sector address of the first sector to be read. The final parameter indicates the number of sectors being read and the sector size.

The final byte of the control block indicates the result of the OSWORD call – this is only used once the command has been executed. Any number other than zero indicates an error. This number is the one printed after "Disc fault" error message.

Figure II lists the possible errors that can occur. You should also note that the error numbers generated by double density FDCs differ from those given by the 8271, but most 8271 emulators will automatically change the error numbers into their 8271 equivalents.

There are many different 8271 commands available. Figure III lists them with their corresponding command numbers for the control block.

When OSWORD &7F is executed the DFS extracts data from the control block and processes it accordingly. Here's a general outline of the procedure used:

- Turn the selected drive on.
- Copy an interrupt routine into page

Frustrated by BASIC limitations?
Fed up with "insert source disc . . ."?
Database in a twist?

Then . . . . SLIP IN A *Slick!*

A new concept in utility discs. **SLICK!** is packed full of well written, useful utilities, many never previously seen. Disc utilities, filing utilities, programming aids, timesavers and more . . . . .

How have you managed without: ***STAR** Enables your BASIC programs to 'run' like machine code and behave like existing ROM utilities. A complete **INDEXED SEQUENTIAL FILING SYSTEM.** A comprehensive **DISC EDITOR.** A versatile and interactive **ENVELOPE EDITOR. *PCODE** sets up any facility on your printer quickly and easily. **DCOPY & DTXFR** are a powerful pair of copy facilities to make life bearable for single disc users! ***LOOK** gives instant access to any data file (obscure and unknown formats – no problem!). ***M** is an easy and effective disc menuiser. And more . . . .

Other Highlights include:
***ADDPROG *BIN *BAD *CRC *COMPARE *FKEY *GET *PRINT *SDUMP *SLOW *STAT *SAVEROM *KILLROM *VARS *VFIND *HSLICK** and more . . . . .

All this at the super SLICK introductory price of **£7.95,** inclusive of VAT & P&P. (Please state 40 or 80 track).

BJ COMPUTING, P.O. BOX 4, Sheffield, S1 1DU.

ANNOUNCEMENT

Fairhurst Instruments of Wilmslow, Cheshire are pleased to announce the acquisition of the Stockport based National Micro Centres.

Both companies will now be located at the Fairhurst Instruments premises in Dean Court, Woodford Road, Wilmslow.

Fairhurst Instruments see the acquisition as a major step in the supply of computers throughout the North West, particularly to schools, colleges and universities.

National Micro Centres has over recent years built up an excellent reputation with many schools.

The addition of NMC staff gives the company a large service and repair department, technical support and advisory staff and the product range of IBM, Apple, BBC, Apricot, Amstrad, Atari ST and others. It also provides customers with a complete computer service from two sources.

The move ensures continued growth for Fairhurst Instruments. With the additional services and facilities, customers can be confident of getting long term support, repairs and back-up.

National Micro Centres and Fairhurst Instruments will continue to offer an excellent service from their premises in Dean Court, Woodford Road, Wilmslow.

FAIRHURST INSTRUMENTS
DEAN COURT, WOODFORD ROAD,
WILMSLOW, CHESHIRE SK9 2LT.
Telephone: 0625 525694/533741/527146

Command/number of parameters		Effect
Initialisation:		
1 then 0(0)		Reset 8271
&75	(4)	Initialise 8271
Various:		
&69	(1)	Seek head
&5C	(0)	Read drive status
&7D	(1)	Read special register
&7A	(2)	Write special register
&63	(5)	Format track
&5B	(3)	Read ID fields
Single 128 byte sector:		
&52	(2)	Read data
&56	(2)	Read data & deleted
&4A	(2)	Write data
&4E	(2)	Write deleted data
&5E	(2)	Verify data & deleted
Variable length/Multi-sector:		
&53	(3)	Read data
&57	(3)	Read data & deleted
&4B	(3)	Write data
&4F	(3)	Write deleted data
&5F	(3)	Verify data & deleted

Figure III: The 8271 commands

&D – the routine depends on the command being executed.

- Wait until command register is ready to accept a new command. When it's ready write the command byte into location &FE80.
- Wait until the parameter register is empty. Now write the parameter byte into location &FE81 and repeat until all of the parameters have been sent.
- Wait until the completion flag is set.
- Read result register and store the result at the end of the OSWORD control block.
- Exit.

The data transfer, if there is any, occurs under interrupts. In fact the interrupt is a Non Maskable Interrupt (NMI). In other words, you can't stop it occurring.

When the 8271 has been asked to read or write data it must inform the 6502 microprocessor when it is ready to so – timing is critical. This is done by issuing an NMI.

When the 6502 receives this interrupt, it makes a note of what it's been doing and jumps indirectly through location &FFFA. This causes a "jump" to location &D00. Now the routine, previously copied into page &D by the DFS, reads/writes data from/to the 8271.

If data is being read from the disc the byte must be read from the 8271 (which acts as the middle man between the disc and memory). This is done by peeking location &FE84. The byte can now be stored in RAM.

If data is being written to the disc the reverse happens. That is, a byte is read from RAM and is poked into location &FE84.

The 8271 is also capable of transferring data using Direct Memory Access (DMA). This means that data transfer occurs automatically without the need of an NMI for each byte sent/read to/from the 8271.

In short, once the command has been sent to the 8271 the memory is accessed directly by another chip when information is to be interchanged. This is much better because the 6502 is not tied up executing interrupt routines and can therefore carry out any other tasks in hand.

Unfortunately, DMAing has not been implemented on the BBC Micro – a DMA controller is needed – and so all transfer must occur under interrupts.

Figure IV shows the various SHEILA – page &FE – locations associated with the 8271 registers. There are more internal registers in the 8271 but these can only be accessed using the read/write special register commands.

Here's a brief description of each register. You'll probably never need to use them, but it's interesting to see what they do.

- &FE80, when reading, gives the 8271 status. The bit meanings are:

bit 0,1	Unused – always 0.
bit 2	Non DMA data request. 1 = DMA interrupt. 0 = No DMA interrupt.
bit 3	8271 interrupt flag. 1 = 8271 interrupt. 0 = Not an 8271 interrupt.
bit 4	Result register full. 1 = true. 0 = false.
bit 5	Parameter register full. 1 = true. 0 = false.
bit 6	Command register full. 1 = true. 0 = false.
bit 7	Command busy flag. 1 = true. 0 = false.

- &FE80, when writing, sends a command byte to the 8271. Note that the command busy flag should be clear before writing to this location.
- &FE81, when reading, gives the result of the last operation. This is only valid when the command busy flag is clear and the result register full bit in &FE80 is set. Bits 1 to 4 combine to give the error type – see Figure II. The bit meanings are:

bit 0	Unused – always 0.
bit 1,2	Completion code.
bit 3,4	Completion type.
bit 5	Deleted data found. 1 = true. 0 = false.
bit 6,7	Unused – always 0.

- &FE81, when writing, sends a parameter byte to the 8271. Note that the parameter full bit in &FE80 should be clear before writing to this location.
- &FE82 – write only. Sending a 1 followed by a 0 to this register resets the 8271. There should be at least 10 clock cycles between writing the 1 and 0.
- &FE84, when reading, returns a byte from the disc. This can only be done after a read command has been issued to the 8271 and bit 2 in &FE80 is set to 1 – indicating that the 8271 has a data byte in &FE84 from the disc.
- &FE84, when writing, sends a byte to the disc. This can only be done after a write command has been issued to the 8271 and bit 2 in &FE80 is set to 1 – indicating that the 8271 is ready to accept a byte.
- *Next month we'll be looking more closely at various 8271 commands and error messages.*

Read Location	Function
&FE80	Status register
&FE81	Result register
&FE84	Read byte from disc
Write Location	**Function**
&FE80	Command register
&FE81	Parameter register
&FE82	Reset register
&FE84	Send byte to disc

Figure IV: SHEILA addresses

Electronequip

(Authorised BBC Micro Dealer, and Econet service centre)

SOFTWARE SALE

most **ACORNSOFT** **£2.99** inc VAT
most **OTHERS** **£1.99** inc VAT
Catalogue available

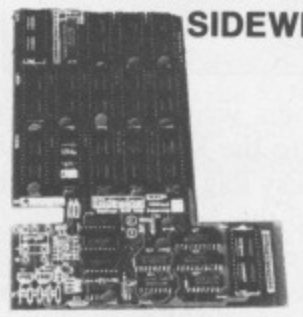
NORDMENDE

14" TV/Monitor
£199.00 inc VAT

Remote version **£229.95** inc VAT
Offer includes RGB/BBC cable
12" GREEN SCREEN **£69.00** inc VAT

Buy this superb TV/Monitor from the original distributors (since Sept '82)

SIDEWISE



ATPL

SIDEWISE FITTED

ATPL

"SIDEWAYS" rom board for BBC Micro.
No soldering required **£39.33** inc VAT

BBC MICRO SPARES

Keyboard	49.95	Keystrip	1.99	Speaker	2.99
Power Supply	49.95	Case	19.99	Keyswitch	2.30

All inc VAT

NEW

40/80 TRACK DRIVE SWITCH

Plugs into disc interface, converts most 80 track drives into 40/80 track units. No more disc errors for wrong discs.
Introductory price ..... **19.95** inc VAT

100% BBC COMPATIBLE

HIGH QUALITY, HALF-HEIGHT DISK DRIVES

Double sided 800k (2 x 400k)
40/80 track switchable ..... **£329** inc
Double sided 400k (single)
40/80 track switchable ..... **£149** inc
Single sided 100k (40 track) ..... **£99** inc
1 Box DS/DD 96 TPI ..... **£23.69** inc
1 Box SS/SD 48 TPI ..... **£18.63** inc
5¼" Disc Cleaning Kit ..... **£5.99** inc

BRANCHES

MAIL ORDER: 36-38 WEST STREET
FAREHAM, HANTS. (0329) 230670
SHOP/TECHNICAL: 59 WEST STREET
FAREHAM, HANTS. (0329) 230671
KINGS LYNN: 17 TENNYSON AVE. (0553) 3782

VOLTMACE JOYSTICKS

✱10% off list prices

		Discounted price inc VAT
BJVOLT 14	Voltmace Delta 14B Joysticks	13.46
BJVOLTAD	Voltmace 14B/1 Adaptor Box	13.36
BJVOLT3T	Voltmace Delta 3B Twin Joysticks	17.99
BJVOLT3S	Voltmace Delta 3B Single Joystick	11.95

DISC BOXES
30 Disc Box..... 6.90
40 Disc Box... 13.80

DUST COVERS
RX80 F/T 5.24
FX80..... 5.29
KP810..... 4.60
BBC Micro... 4.14
Microvitec ... 6.10
PW 1080A ... 4.60

EPROMS
2764..... 2.49
27128 ..... 3.85

LISTING PAPER
11 x 9.5" with micro perf's 7.50 per 1000

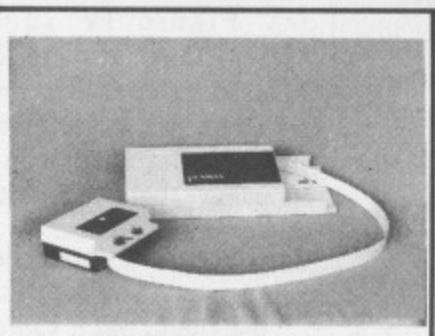
PRINTERS

KAGA KP810
£289.00 inc VAT

EPSON FX 80 **377.20** inc
BROTHER HR-15 **399.00** inc
SEIKOSHA SP-1000 **249.00** inc

Printer price **includes** paper and BBC interface cable.
Screen dump rom available for **£11.50** inc VAT

Just a selection. Phone for full details of full range



3 COLOUR PLOTTER
with
utilities **£299.50**

AMX
MOUSE
89.99

ALL PRICES INCLUSIVE OF VAT.
Prices subject to variation without prior notification
All Offers subject to availability
TRADE, EDUCATIONAL & HMG ORDERS
(Phone for discounts)
Large Stocks – 24 Hour Despatch
Securicor £4.90 (per parcel) inc VAT.
Postage 46p (per item) inc VAT.

Phone for comprehensive catalogue

MAIL ORDER ENQUIRIES TO BELOW OFFICE

ACORN COMPUTER

Electronequip

36-38 West Street, Fareham, Hants (0329) 230670

TORCH
BBC

What it offers the BBC Micro user...

Give your micro mainframe power

With MicroLink your micro becomes a terminal linked directly to the Telecom Gold mainframe computer, and able to tap its tremendous power and versatility. Right away you'll be able to use giant number-crunching programs that can only run on a mainframe. You can set up your own computerised filing systems, store and update statistics and other information, cross-reference material between files, selectively extract the information you want, perform massive calculations and design reports to display information from any of the files and in any format you choose.

The biggest bulletin board of them all

The number of bulletin boards is growing rapidly. New ones are springing up in all parts of Britain and all over the world, with people of like minds chatting to each other on all manner of subjects. The only snag is that the vast majority are single-user boards – which means lots of other people are also trying to make contact and all too often all you get is the engaged tone. But with the MicroLink bulletin board there is no limit to the number of people using it at the same time. And no limit to the number of categories that can be displayed on the board.

We're only a local phone call away

More than 96 per cent of MicoLink subscribers can connect to our mainframe computer in London by making a local phone call. This is possible because they use British Telecom's PSS system, which has access points all over Britain. A local phone call is all you need, too, for access to the international Dialcom system through MicroLink.

Telemessages – at a third of the cost

The modern equivalent of the telegram is the telemessage, which if sent before 8pm is delivered by first post the following day (except Sunday). Originally designed for people to phone their message via the operator, the service costs £3.50 for 50 words. Now it's available via MicroLink – and costs only £1.25 for up to 350 words!

Send and receive telex messages

With MicroLink you can turn your micro into a telex machine, and can send and receive telex messages of any length. You will be able to communicate directly to 96,000 telex subscribers in the UK, 1½ million worldwide – and even with ships at sea via the telex satellite network. Business people can now send and receive telexes after office hours, from home or when travelling. You can key in a telex during the day and instruct MicroLink not to transmit it until after 8pm – and save 10 per cent off the cost!

The mailbox that is always open

MicroLink is in operation 24 hours a day, every day. That means you can access your mailbox whenever you want, and from wherever you are ... home, office, airport – even a hotel bedroom or golf club! No-one needs to know where you are when you send your message.

What does it all cost?

Considering all the services you have on tap, MicroLink is remarkably inexpensive. You pay a once-only registration fee of £5, and then a standing charge of just £3 a month. On-line costs are 3.5p a minute (between 7pm and 8am) or 10.5p a minute during office hours. There is an additional 2p a minute PSS charge if you are calling from outside the 01- London call area. Charges for telex, tele-messages and storage of files are given on the next page.

How much it costs to use MicroLink

Initial registration fee: £5.

Standing charge: £3 per calendar month or part.

Connect charge: 3.5p per minute or part – cheap rate; 10.5p per minute or part – standard rate.
Applicable for duration of connection to the Service. Minimum charge: 1 minute.
Cheap rate is from 7pm to 8am, Monday to Friday, all day Saturday and Sunday and public holidays; Standard rate is from 8am to 7pm, Monday to Friday, excluding public holidays.

Filing charge: 20p per unit of 2,048 characters per month.
Applicable for storage of information, such a telex, short codes and mail files. The number of units used is an average calculated by reference to a daily sample.

Information Databases: Various charges.
Any charges that may be applicable are shown to you before you obtain access to the database.

MicroLink PSS service: 2p per minute or part (300 baud); 2.5p per minute or part (1200/75 baud).
Only applies to users outside the 01- London call area.

Telex registration: £10.

Outgoing telex: 5.5p per 100 characters (UK); 11p per 100 (Europe); 16.5p per 100 (N. America); £1.15 per 400 (Rest of world); £2.75 per 400 (Ships at sea).
Deferred messages sent on the night service are subject to a 10 per cent discount.

Incoming telex: 50p for each correctly addressed telex delivered to your mailbox. Obtaining a mailbox reference from the sender incurs a further charge of 50p.
It is not possible to deliver a telex without a mailbox reference. If a telex is received without a mailbox reference the sender will be advised of non-delivery and asked to provide a mailbox address.
Each user validated for telex and using the facility will incur a charge of 6 storage units a month. Further storage charges could be incurred depending on the amount of telex storage and the use made of short code and message file facilities.

Telemessages: £1.25 for up to 350 words.

Radiopaging: No charge.
If you have a BT Radiopager you can be paged automatically whenever a message is waiting in your mailbox.

International Mail: For the first 2,048 characters – 20p to Germany and Denmark; 30p to USA, Australia, Canada, Singapore, Hong Kong and Israel. For additional 1,024 characters – 10p; 15p.
These charges relate to the transmission of information by the Dialcom service to other Dialcom services outside the UK and the Isle of Man. Multiple copies to addresses on the same system host incur only one transmission charge.

Billing and Payment: All charges quoted are exclusive of VAT. Currently all bills are rendered monthly.

Software over the telephone

MicroLink is setting up a central store of software programs which you'll be able to download directly into your micro. The range will include games, utilities, educational and business programs, and will cover all the most popular makes of micros.

Talk to the world – by satellite

MicroLink is part of the international Dialcom network. In the USA, Australia and a growing number of other countries there are many thousands of users with electronic mailboxes just like yours. You can contact them just as easily as you do users in Britain – the only difference is that the messages from your keyboard go speeding around the world via satellite.

What you need to access MicroLink

You must have three things in order to use MicroLink: a computer (it can be any make of micro, hand-held device or even an electronic typewriter provided it has communications facilities), a modem (it can be a simple Prestel type using 1200/75 baud, or a more sophisticated one operating at 300/300 or 1200/1200 baud), and appropriate communications software.

MicroLink

in association with

TELECOM GOLD *

Application Form

AU12

I/We hereby apply to join MicroLink

(✓) ☐ I enclose my cheque for £5 payable to Database Publications as registration fee to MicroLink.

(✓) ☐ I also wish to use Telex. I authorise you to charge an additional £10 to my initial bill for validation.

☐ I confirm that I am over 18 years of age.

Signature _____

Date _____

I intend to use the following computer _____

FOR OFFICE USE ONLY:

Mailbox assigned _____

Start date _____

Password _____

SEND TO:
MicroLink
Database Publications
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

* *Telecom Gold is a trademark of British Telecommunications plc.*

Name ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Position ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Company ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Address ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Postcode ☐☐☐☐☐☐☐☐ Daytime telephone ☐☐☐☐☐☐☐☐☐☐

Commencement of Service
Please indicate month of commencement ☐☐ 19 ☐☐
Allow 10 days for validation of mailbox

Payment
Whilst Database Publications Ltd is the supplier of all the services to you, the commission and billing thereof will be handled by Telecom Gold as agents for Database Publications Ltd.
Date of first payment to be on 15th of month following commencement.
Please complete billing authorisation form A, B or C below:

A. Direct Debiting Mandate *(Enter full postal address of Bank Branch)*
To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

I/We authorise you until further notice in writing to charge to my/our account with you on or immediately after 15th day of each month unspecified amounts which may be debited thereto at the instance of British Telecommunications plc – TELECOM GOLD by Direct Debit. Bills are issued 10 days before debit is processed.

Name of Account to be debited ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Account Number ☐☐☐☐☐☐☐☐

B. Please debit my/our Access/Visa/*American Express account number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

* *Overseas subscribers only*

I/We authorise you until further notice in writing to charge to my/our account with you on or immediately after 15th day of each month unspecified amounts which may be debited thereto at the instance of British Telecommunications plc – TELECOM GOLD. Bills are issued 10 days before charge is applied to your account.

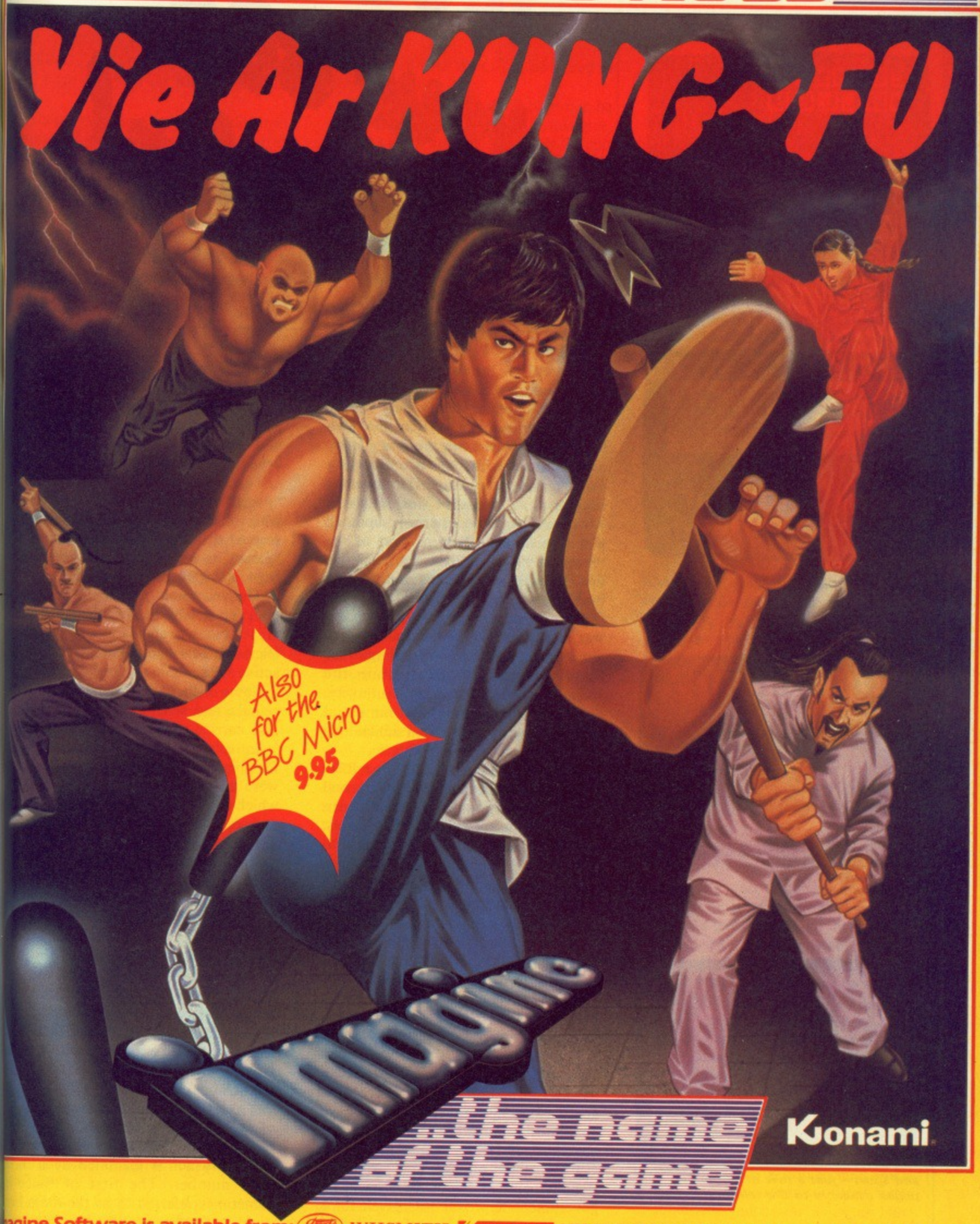
Signature _____ Date _____

C. Please invoice the company/authority.

(✓) ☐ If you select this option, which is ONLY AVAILABLE to government establishments and Public Limited Companies, you will be sent an authorisation form for completion which will require an official order number to accept unspecified amounts.

AMSTRAD £8·95
ZX SPECTRUM £7·95
COMMODORE 64 £8·95

Yie Ar KUNG~FU



Imagine Software is available from: Boots, WHSMITH, John Menzies, WOOLWORTH, LASKYS, Rumbelows, Greens, Spectrum Shops and all good dealers.

Imagine Software (1984) Limited • 6 Central Street • Manchester M2 5NS • Tel: 061 834 3939 • Telex: 669977

It's what your BBC Micro's for!

TONY LEAH charts the history of the revolutionary project that included plans for a new micro . . .

Information . . .

banking . . .

advertisements . . .

and sport – just a few of the many pages available to the teletext viewer

IT was 1970 – the year Edward Heath moved into No 10, Charles de Gaulle died and London streets were full of uncollected garbage – that the idea behind teletext first saw the light of day.

An internal British Broadcasting Corporation memo dated December 14 suggested a "magazine" of 30 pages which would be continuously updated and transmitted either as part of the television signal or over the telephone line, thus to some extent anticipating both teletext and viewdata.

Over the next two years this proposal was refined and the embryonic system was name Ceefax – meaning "see facts". About the same time the Independent Broadcasting Authority, controller of Britain's commercial television, was working on a similar idea which came to be called Oracle.

In March and April 1973 the BBC began testing after the end of normal evening broadcasting using spare capacity in the normal television signals.

Around the middle of that year both broadcasting organisations began regular meetings with representatives of industry to agree a common standard.

Toward the end of the year the BBC transmitted the first 32 page magazine.

During these early years progress was very slow because the service was largely experimental and television receivers with teletext decoders built into them were very expensive.

However even at this stage it was clear that teletext had much to offer in the way of instant news, sports results and weather and travel information, so an editorial unit was set up at the beginning of 1974.

From then on the unit expanded steadily, and in September that year government approval was given for a two year trial period for teletext broadcasting.

At the end of this time the government, broadcasters and industry agreed that the trial had been a success and teletext became an established broadcasting service.

Teletext information is displayed as "pages" on the viewers' television set with one page occupying the entire screen, either replacing the picture or "mixed" over it. A page is made up of 24 rows of 40 characters.

The television picture in Britain is made up of 625 lines of which about 25 are left blank to allow for field flyback in television sets before the start of each active field.

Some of these unused lines carry test signals, and since the 1970s they have also carried teletext data.

Initially two lines per field were used for this purpose. Later a further pair were added. The total number of lines which could eventually be used depends on possible interference and also on advances in receiver design – but 10 or 12 lines seems the likely maximum.

The UK teletext system uses a synchronous fixed format structure. This means that one row of 40 characters is transmitted on each data line in the blanking interval.

It also means that the control and row address codes have a fixed relationship to the horizontal synchronising pulse.

Together these ensure that the signal capacity is used effectively and that the teletext signal itself is as robust as possible.

To make things easier for both the viewer and the broadcaster pages are organised into magazines of 100 pages each of which is identified by a three digit number. The first of these is sometimes referred to as the magazine number. Ceefax has 100 page numbers

on BBC1 – 100 to 199 – and there are 100 page numbers on BBC2 – 200 to 299.

These magazines are sub-divided into groups or blocks of pages devoted to particular areas such as news, sport, travel and others. The number of pages in a block depends on circumstances, but in the case of Ceefax, news, sport and weather and travel are all allocated 20 pages while finance and television listings occupy 10 each.

It is usual to start each block with an index to its contents and important index pages are listed on the first page of the magazine.

It is theoretically possible to put up to eight magazines on a network so BBC1 could carry pages 100 to 899. In practice, however, each teletext page has to be broadcast in turn and the waiting time to get through 800 pages would be unacceptable as far as the viewer is concerned.

All teletext pages which are to be broadcast on a network are held in a computer and each is transmitted in turn. In the example of BBC1 the pages go out as 100, 101, 102 and so on until the computer reaches 199, when it starts again at 100.

When four lines are being used the total cycle time of the magazine is about 15 seconds and therefore average waiting time for a particular page is seven and a half seconds.

The fact that BBC1 carries 100 page numbers does not mean that it is restricted to carrying a total of 100 pages.

Any one page number can be used to carry a number of cycling pages, each of which are transmitted in turn.

For example page 103 could be two sub or cycling pages conventionally identified as 103s1 and 103s2.

On its first pass through the cycle the computer might broadcast 102, 103s1, 104 and on the second 102, 103s2, 104. This technique has the advantage of allowing an increased number of pages without increasing access time.

The drawbacks are that the viewer has no control over which one of a set of cycling pages appears first and has no way of skipping over unwanted sub-pages to reach the one required.

It is theoretically possible to use up 99 sub-pages but in practice the limit is much lower.

In addition to the three digit method of identifying pages a time code or sub-code of four digits can be added to further identify them.

By this means every sub-page can be uniquely identified and, for instance, 103s1 can be recognised by the teletext system as 103 0001, the other sub-page being 103 0002.

It is also possible to use the four digit number to represent time and by this means a silent alarm clock page can be broadcast.

Creating the pages to fill the various blocks is a mammoth task. As most are updated daily – if not more often – and all pages are in full colour, Ceefax and Oracle present a large editorial task.

Where information is already held on computer the work of page creating is greatly simplified. For instance, during a general election results are flashed to the election computer system which, as well as providing various services to the commentators, passes the results to a minicomputer which turns them into pages for immediate broadcast.

The same approach can be adopted with an external supplier of information. Five times a day Ceefax links up with the London Stock Exchange and receives by computer around 200 updated share prices.

Apart from a quick visual check the process is entirely automatic, thus making a considerable saving in staff.

Again, much of the travel information on Ceefax comes from direct links with videotex databases. Airline information is taken from SkyGuide on British Telecom's Prestel service and train information comes from a videotex system run by British Rail.

Following the success of some early experiments, Ceefax and Oracle joined forces with Brighton Polytechnic to explore the idea of using teletext to carry computer programs, written in Basic, which could be downloaded automatically by specially adapted television receivers.

Nine secondary schools in England and Scotland were provided with special TV sets which had been designed and built by Mullard.

Regular broadcasts began in September 1981 with two main aims. First to show that the technology worked and computer programs could be broadcast, downloaded and run successfully. Second to try and discover in broad terms whether there was any educational value in such a service.

The pilot project proved that this was a viable method of distributing software and there was interest in its educational applications.

In January 1982 BBC Television launched its computer literacy project aimed primarily at encouraging adult viewers to get direct experience of microcomputing.

The project included two TV series, together with a number of books and courses, and – most significantly – a micro produced by Acorn Computers under licence from the BBC.

This machine – the now famous BBC Micro – was designed to be a powerful and flexible computer to which a wide range of peripherals could be added.

Among these was a teletext adapter which enabled the user both to receive ordinary teletext pages from any of the UK's four television channels and free telesoftware from the BBC.

In September 1983, only a decade after the start of teletext, the BBC launched the world's first regular service of broadcast telesoftware.

To date the language used has been Basic, but there is no reason why others could not be used in the future.

Among early transmissions was software which supported BBC programmes, particularly those which were educational.

Later telesoftware began its own educating with a set of programs teaching good programming techniques by offering procedures which could be built into the user's own programs.

An interesting example of what telesoftware is uniquely able to do is a program called Dinner written at Brighton Polytechnic. It is intended to be used in domestic science teaching to encourage pupils to put together a well balanced meal within a given budget.

What is particularly significant is that the software is downloaded through the telesoftware adapter in the normal way and the program then uses the adapter to get the very latest food price information from Ceefax pages.

This means that although the pupil may choose the same ingredients each time the program is used, the result will be different if the price has changed.

It is this sort of innovative technology that has impressed other countries to the extent that the UK teletext system has become known as World System and is in use in most European countries, parts of America, and as far away as New Zealand.

Exploit the full potential of teletext

ROBIN NIXON reviews the Volex teletext adapter which keeps you in touch with this exciting field

YOU'VE probably got to grips with the use of Mode 7 teletext graphics by now. Double height, multi-coloured headers are almost certainly a feature of many of your title pages.

And I'm sure many of you will have experimented with the graphics facilities, limited though they may be, to obtain special effects.

In addition, nearly everyone has had experience with viewdata-type databases such as Prestel and the various Mode 7 carousel systems.

But, I wonder, how many of us have used Mode 7 for the purpose for which it was designed, teletext?

When tenders were being sought by the BBC from potential designers and producers of the BBC Micro, there were three features which the BBC insisted on. These were a strong structured Basic, expandability and teletext compatibility.

Teletext, in the main, seems to be the most under-exploited of these, which is a pity as a micro equipped with a teletext receiver is a far more flexible system than a standard teletext TV.

And there's no denying that there's a vast wealth of untapped information being disseminated by the BBC and ITV. In fact the amount of data on Oracle and Ceefax combined is far greater than that in your daily newspaper.

"Great", I hear you say, "but how can I cheaply and easily access this database?". Obviously many people have teletext adapters for their TV sets. But even so it has been estimated that this facility is only used for less than 10 minutes per day per person – and usually to see the horoscopes and what's on TV.

Perhaps one of the main drawbacks of teletext is the fact that you often have to wait for between 20 and 60 seconds before a selected page appears on screen. Wouldn't it be nice if you could have instant access to teletext? Well, the Volex TTX2000B teletext adapter

could be your answer, although you have to cheat a bit.

It comes in a sleek black 15cm × 22cm × 3cm case. With it you get an external power supply and an eprom.

Fitting the TTX2000B to your BBC Micro is a simple matter. All you do is insert the eprom in an unused ROM socket, connect the TTX to the 1MHz bus, plug in an aerial lead, power up and type:

```
*TELETEXT
```

You may also need to adjust the preset tuners to the wavelengths of your local TV transmitter, but again, this is a simple operation.

Once the system is up and running you are presented with the familiar title page of whichever teletext service you are tuned in to.

From there on you have all the facilities of a standard teletext television. All the commands are available by pressing one of the function keys or equivalent letter keys. Table I summarises these. They are fairly self explanatory except for the R key.

Some Prestel frames have information that's not revealed until you send a certain signal. This is a feature designed for quizzes and puzzles. Pressing R will alternate between revealing and concealing the answers.

However, as I've hinted, the combination of micro plus adapter can do far more than merely mimic your TV. For a start, you can download software for your micro.

At the moment the BBC transmits a number of free programs plus a set of program notes to go with the latest

Function key	Alpha	Effect
f0	P	Select page.
f1	C1	Channel 1.
f2	C2	Channel 2.
f3	C3	Channel 3.
f4	C4	Channel 4.
f5	M	MOS call (allows star commands to be entered).
f6	Z	Dump screen to printer.
f7	S	Save page to tape or disc.
f8	H	Hold page.
f9	T	Download telesoftware.
–	R	Reveal/conceal.

Table I: Control keys

***CH1 or *BBC1**	Select Channel 1.
***CH2 or *BBC2**	Select Channel 2.
***CH3 or *ITV1**	Select Channel 3.
***CH4 or *ITV2**	Select Channel 4.
***PAGE**	Select page number.
***TRANSFER**	Translates the buffer into displayable form and transfers it into RAM at a specified address.
***DATE**	Prints the date.
***TIME**	Prints the time.
***HON**	Permanently displays the rolling header on a Mode 7 screen (even while a program is running).
***HOFF**	Turns the header off.
***DISPLAY**	Displays the contents of a page of memory at a specified address.

Table II: The applications mode star commands

Micro Live program. These can be downloaded easily in teletext mode by pressing f9 or T. You then enter the page in which the program you wish to download resides and sit back.

Downloading is fully automatic. Data is loaded in blocks and any errors that occur force the program to reload a block until all the blocks have been downloaded.

Channel 4 have also just started transmitting telesoftware, but this is at present only for the Spectrum. However they will soon be transmitting telesoftware for the BBC Micro too.

Volex has also included an applications mode which allows you to incorporate teletext in your own Basic or assembler programs via a set of additional star commands (see Table II). These can be brought into use by typing:

```
*APPLICATIONS
```

If you want to access these applications from assembly language

programs you use OSWORD with &7A. The way to do this is clearly documented in the manual.

Listing I gives an example of the power of these applications.

It switches to BBC1, displays the scrolling header, and waits until page 720 is transmitted. At the time of writing page 720 on Ceefax is the menu of a group of pages about Halley's comet.

Line 160 translates the buffer into displayable form and saves it at &3000. Then line 170 displays it on screen.

I mentioned earlier that the Volex adapter would enable you to have instant access to teletext pages.

The way to do this would be to write a program which will wait for all the pages you are interested in. Save them to tape or disc and then load them back in at your own convenience. This would mean constructing your own mini teletext database. Listing II does just that.

All right, perhaps it isn't exactly instant, but once you've captured your pages you can flip through them. Listing III, when tacked on to the end of Listing II, will do that.

The uses of these captured pages are legion, particularly in education. One idea the editor came up with is to load the weather map page every day as part

of a geography project. These pages displayed in sequence would give a good pictorial example of how weather changes.

Statisticians could load the stocks and shares pages and so on. The possibilities are only limited by your imagination and the amount of information available on teletext which, fortunately, is constantly increasing.

Teletext has in fact been planned in five stages. We are in the middle of stage one. Eventually, in stage five, the BBC and ITV hope to be able to transmit photographic quality teletext.

However, as it is now, teletext is a very large database of free information and software which is expanding all the time. In 1973 Ceefax had only 30 pages, now it has over 100, and many of these pages have up to 10 subpages.

Anyone interested in taking advantage of this rapidly expanding

project would be well advised to take a look at the Volex 2000B.

With its implementation of the standard teletext features, plus those available in applications mode, it is the ideal product to keep you in touch with this exciting and ever-developing field.

```
 10 REM Listing I
100 MODE7
110 *APPLICATIONS
120 *HON
130 *BBC1
140 *PAGE 720
150 *HOFF
160 *TRANSFER 3000
170 *DISPLAY 3000
180 *DISC
190 *OPT 1,0
200 *SAVE PAGE720 7C00 7FFF
210 END
```

Listing I

```
 10 REM Listing II
100 MODE 7
110 DIM A%(30)
120 P%=0
130 INPUT "Enter channel number",CH%
140 REPEAT
150 INPUT "Enter page number",A%(P%)
160 P%=P%+1
170 UNTIL A%(P%-1)=0 OR P%=30
180 MODE 7
190 *APPLICATIONS
200 OSCLI ("CH"+STR$(CH%))
210 *HON
220 FOR Z%=0 TO P%-2
230 VDU 31,2,0:PRINTSTR$(A%(Z%))
240 OSCLI ("PAGE"+STR$(A%(Z%)))
250 *HOFF
260 *TRANSFER 3000
270 *DISPLAY 3000
280 *DISC
290 *OPT 1,0
300 OSCLI ("SAVE PAGE"+STR$(A%(Z%))+
" 7C00 7FFF")
310 *APPLICATIONS
320 *HON
330 NEXT
340 END
```

Listing II

```
350 REM Listing III
360 MODE 7
370 *OPT 1,0
380 FOR Z%=0 TO P%-2
390 OSCLI ("LOAD PAGE"+STR$(A%(Z%))+
" 7C00 7FFF")
400 REPEAT UNTIL GET=32
410 NEXT
420 GOTO 380
```

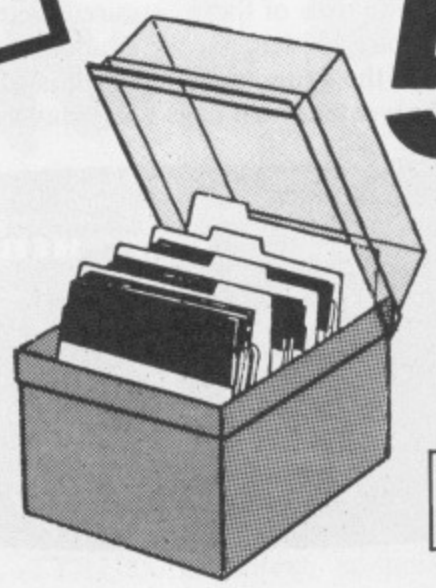
Listing III

IDS

A VERY! Special Offer!

LIMITED SUPPLIES!

STOCK CLEARANCE! £29.95*



50 DISKS SS/DD

PLUS

STORAGE BOX

- Full Specification Control Data StorageMaster!
- Lifetime Guarantee!
- 48 tpi, Single Sided!
- Bulk packed disks identical to branded product but without manufacturers label!
- Complete with labels and w/p tabs!
- Individually certified by CDC to 30% above ANSI Specification!

Telephone Orders accepted with VISA/BARCLAYCARD

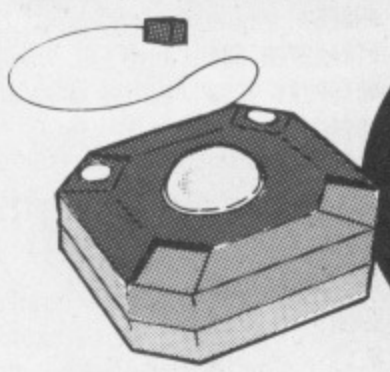
* excl. delivery and VAT

Send cheque for £36.74 (includes £2.00 delivery and VAT) to IDS Computer Supplies Dept SBC2

Ring for complete list. 0908 569655

■ Unit 15 Darin Court ■ Crownhill ■ Milton Keynes ■ MK8 0AD ■

STACK 100 PRODUCTS



NEW £19.95 inclusive

FOR BBC MODEL B (OS 1.2)

- TRACKER BALL
- BALLPOINT COLOUR DRAWING SOFTWARE
- FREE X-WORD GAME
- FITS ANALOGUE PORT

A Full Colour potentiometric TRACKER BALL system with picture saving and loading. Box, Circle, Triangle, Line, Fill, Airbrush, Etc. – ACCURATE AND EASY TO USE. Challenging X-Word Game included. Cassette based – transferable to disk.

ALSO AVAILABLE

★ COLOUR LIGHTPEN + 10 games + LITEWRITER DRAW SOFTWARE **£28.00** Inclusive

★ GRAPHIX-ED Keyboard driven graphics generator program **£5.75** Inclusive

NOTE: LIGHTPEN and TRACKER BALL can use each others pictures

SPECIAL OFFER

40T DISKS VERBATIM – suit BBC **£11·93** PER 10 inclusive

Available from good computer stores or direct from

MEEDMORE (DISTRIBUTION) LIMITED

28 Farriers Way Industrial Estate, Netherton, Merseyside L30 4XL

Tel: 051-521 2202

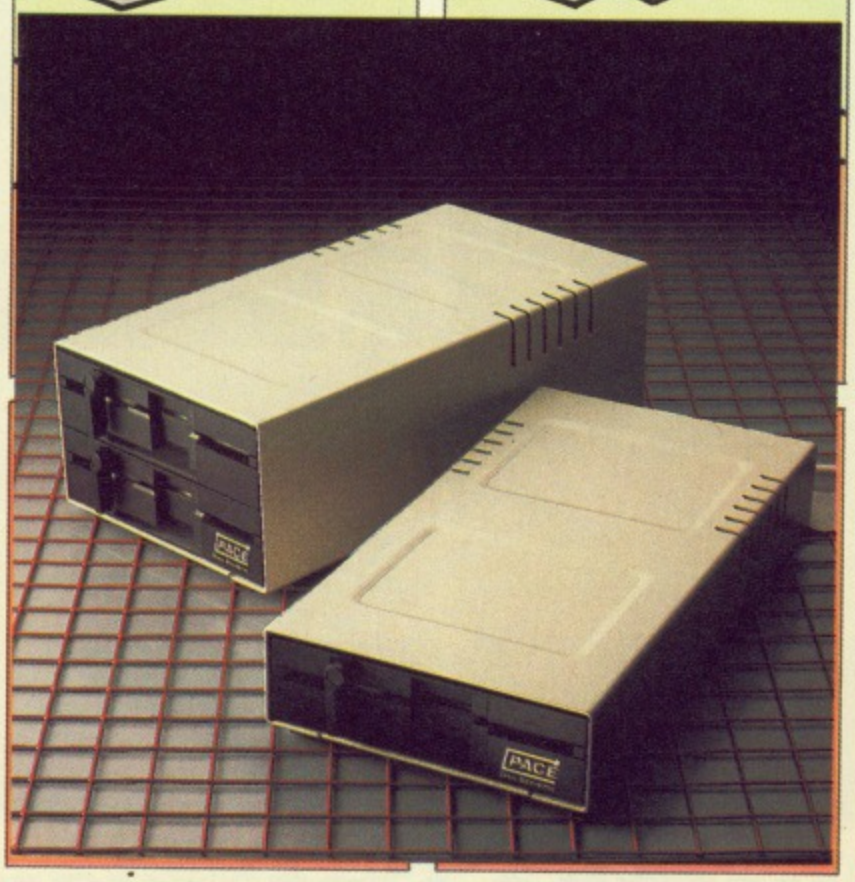
★ P&P FREE

Access VISA

Cheques: Meedmore

PACE
Micro Technology

PEAK OF PERFECTION



When you give your BBC computer a Pace disc drive, you give yourself much more.

More time, More confidence, More flexibility, and more importantly, Peace of mind.

A quality disc drive from Pace will give you the freedom to use your BBC the way you want to use it. Why be dictated to by the speed of a "Data Recorder" when all your programs and data can be loaded and saved in less than a tenth of the time with discs. You will very quickly become dependent on your drive.

At Pace Microtechnology we realise just how important your drives will become so we build them to last. Each unit has a die-cast alloy chassis for rigidity and long-term stability. They use direct drive brushless DC motors for accurate speed control and LSI technology for high reliability with low power consumption. The heads are long-life ceramic.

But the quality doesn't stop with the mechanism. The cases are functional yet attractive enamelled aluminium. Only the highest quality data cables are used and each drive is individually tested before and after building. Our after-sales service is second-to-none.

Quite simply, what more could you want?

For further information call us on 0274 729306 or write to the address below.

NEW Self-powered Pace drives

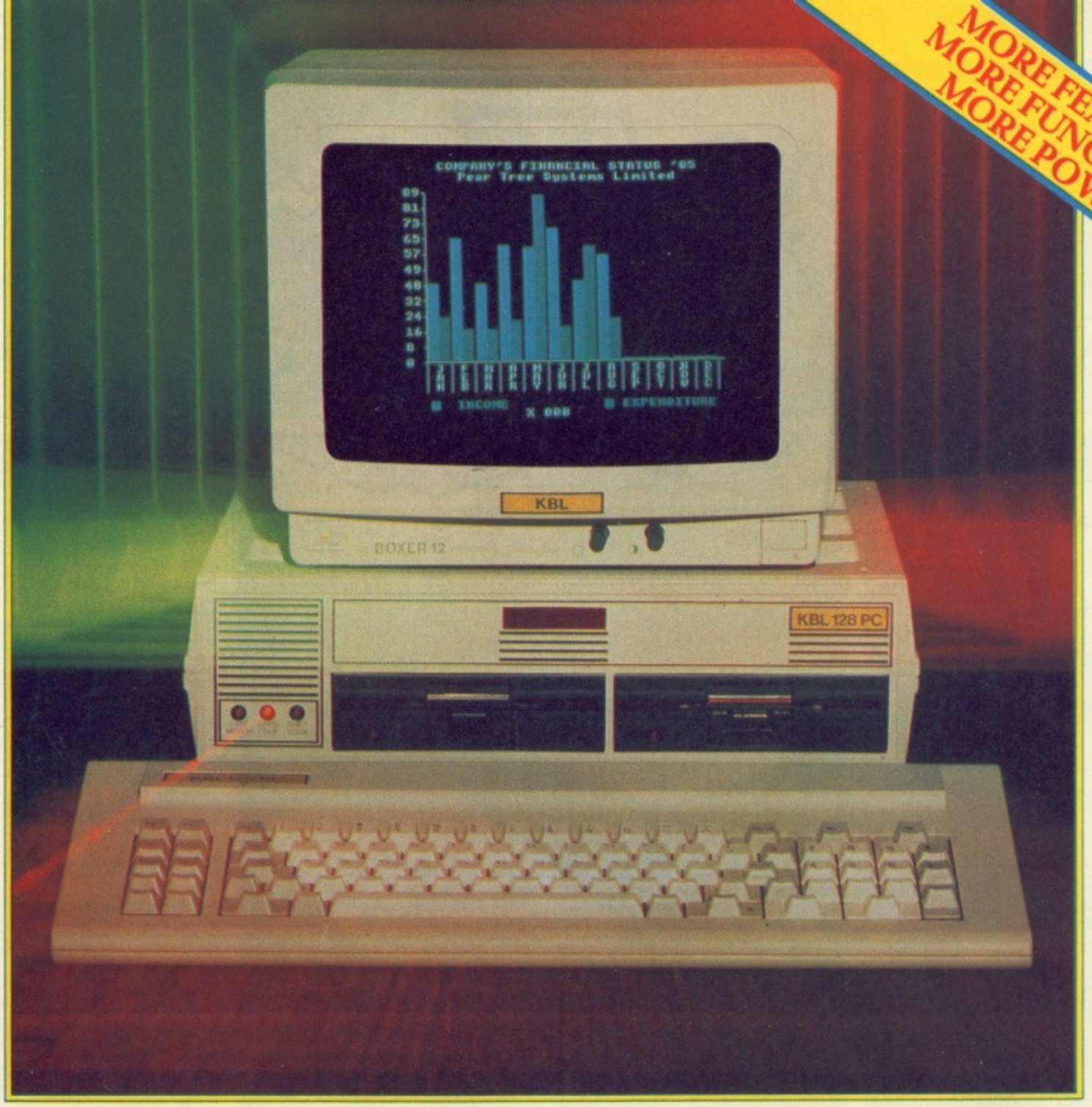
With the addition to our range of self-powered drives, we now have the largest range of drives available for the BBC.

Single drives. Dual drives. Single drives in dual cases (for simple upgrading). Drives with power supplies. Drives which use the BBC auxiliary power socket. 40/80 track switchable drives.

For further details contact:

Pace Micro Technology
Juniper View
Allerton Road
Bradford BD15 7AG
Telephone 0274 488211
Telex 51564
International tel. no.
+44 274 4488211

Pace Micro Technology, a division of
Pace Software Supplies Ltd.



Buy the Software and the computer comes FREE!

The KBL 128 PC is a remarkable new small business system with a powerful 128K RAM.

Complete with Hi-Res Monochrome Monitor, twin 1.4 MByte Data Storage Disk Drives, a choice of English/French/Greek/Arabic operating systems, PLUS a staggering range of Business Software Programs worth £1170 – the complete package costs only £1170 ex VAT.

The KBL 128 PC is fully compatible with all Acornsoft, giving access to thousands of additional programs.

THE HARDWARE

* 128K RAM COMPUTER
* ACORN ADFS FITTED STANDARD
* 1.4 MByte DISK DRIVES
* 80mm COOLING FAN FITTED
* HI-RES MONOCHROME MONITOR (COLOUR OPTION AVAILABLE)

PEARTREE COMPUTERS LIMITED

PEAR TREE MEADOW
ELLINGTON THORPE
HUNTINGDON
CAMBS PE18 0AW
TELEPHONE 0480 50595

THE SOFTWARE

- WORD PROCESSOR
- STOCK CONTROL
- CUSTOMER DATA BASE
- PURCHASE LEDGER
- SALES LEDGER
- NOMINAL LEDGER
- INVOICING/CREDIT NOTES
- PROFORMA QUOTATIONS
- BANK A/C CONTROL
- PETTY CASH CONTROL

TO PEAR TREE COMPUTERS
ELLINGTON THORPE
HUNTINGDON CAMBS PE18 0AW

PLEASE RUSH ME DETAILS OF
YOUR AMAZING LAUNCH OFFER

NAME _____

ADDRESS _____

TELEPHONE _____

CLARES Nº1 IN UTILITY SOFTWARE!

BROM £34.50 40 80 3" £27.50

THE NUMBER ONE TOOLKIT ROM FROM CLARES

*EDIT is a FULL SCREEN EDITOR, which means that you can scroll your program up and down just like WORDWISE does with text, do not confuse this powerful editor with the line editor used in other toolkit ROMs. The EDITOR allows insertion and deletion of lines and insert and overwrite within a line. This is the editor that the BBC micro should have had.

*ERROR ON will trap errors in a program and enter the EDITOR at the statement generating the error, no more wading through multi statement lines trying to identify the error.

Commands pioneered by BROM are:
*ROMON & ROMOFF which enable you to turn on/off sideways ROMs so that they stay off even after CTRL/BREAK. This also allows the DFS to be swtiched off and PAGE reverts to &E00 automatically.
*CASE which forces input into upper or lower case irrespective of caps/shift lock.
*FLIST which lists a program one statement to a line but more importantly it will even list 'BAD PROGRAMS'.
*ONEKEY is a single key entry option but you can also define your own strings to any ASCII key, just like an extra 48 function keys.
*FIND, *CHANGE & *SCHANGE provide selective or global SEARCH and REPLACE facilities. These commands work with strings and keywords or a mixture of both e.g. *FIND PROChelp T', will list the full line containing PROChelp, the 'T' simply tokenizes any keywords.

Yet another group of commands allow lines to be moved or copied to a new location.
The other commands provide function key editor, 'BAD PROGRAM' cure, variable lister, integer variable flush, program compacter etc.
This is a genuine useful ROM that no user should be without. Be warned, once used you will not be able to live without it!
"This is the best BASIC screen editor I have so far used." MICRO USER August 85.
"...this is the best On-Screen BASIC Editor I have ever used; it is far superior to BEEBUGSOFTS TOOLKIT." Viewfax Tubelink

FONTWISE £12.00 40 80 3"

Now you can have PROPORTIONAL and JUSTIFIED text by using FONTWISE. Not only that but you can have it in 10 differrent fonts, all in the same document if required.

*PROPORTIONAL
*JUSTIFIED
*10 FONTS
*CONDENSED or NORMAL
*PAGINATION
*USES WORDWISE OR ASCII TEXT
*Plus many more features

Ask for a sample printout and you will be amazed at the quality that your printer can produce. Compatible with most printers that have a bit image mode yet it is as fast as NLQ when printing. You have got to see this to believe it.
Send for your sample printout today or just give us a ring.

FUN HOUSE £10.00 40 80 3"

FUN HOUSE is a highly original suite of educational programs suitable for ages 3 to 13. The program is designed to encourage children to spell words which relate to objects found around the home. Animation and music are used to good effect and some highly original ideas are incorporated. Each room exercise is terminated with a warning item e.g. the lounge finishes with 'FIRE' which goes on to engulf the whole lounge. Tests with a newly hired 4 year old resulted in us having to prise him away from the keyboard after 2 hours. In that time he had gone from never having used a keyboard to finding the location of all the keys very quickly and entering the correct answer. He had thus started on the path to learning spelling and familiarised himself with the keyboard including the use of DELETE to correct his mistakes. Can you afford not to give your children the same start?
"there is nothing of the quality of this suite of programs" EDUCATIONAL COMPUTING

New! PROFILE 40 80 3" £12.00

A PROCEDURE LIBRARY MANAGEMENT SYSTEM

Now you can start the procedure library that you always promised yourself. PROFILE allows you to store, list, merge and grab procedures without any of the headaches. Automatic alteration of LINE NUMBERS and resident variables such as TOP, LOMEM etc. release you from the tedious chore of setting and resetting, checking and rechecking. PROFILE leaves you free to create your programs without disturbing your chain of thoughts.

*100 Procedures can be stored on each disc (disc space allowing)
*NO LIMIT to the number of procedure discs used
*MERGE Procedures into your programs easily
*LIST Procedures from disc to check suitability etc.
*RENAME Procedures on disc
*GRAB new Procedures from existing programs
*NESTED Procedures can also be grabbed automatically

A Procedure can be a FUNCTION, a BASIC program or part of it or a PROCEDURE.

With PROFILE you will quickly amass a wealth of procedures which will enable you to write programs quickly and easily. Simply write the controlling program containing the procedure calls and PROFILE will merge the procedure for you.

PROFILE in effect provides you with a MACRO BASIC in which you only have to define the procedure once and it can be re-used automatically thereafter.

Make life easier for yourself and order PROFILE today.

40 80 3" _____ DISC
40 _____ 40 TRACK
80 _____ 80 TRACK
3 _____ 3" DISC - ADD £3
_____ EPROM

Send for detailed newsletter
All prices inclusive of VAT & Carriage - NO EXTRAS! Please state 40 or 80 track disc and state D F S you use

clares
MICRO SUPPLIES

**98 Middlewich Rd.,
Northwich, Cheshire CW9 7DA.
Tel: 0606 48511
Open 9—5pm Monday—Friday
LUNCH 12.30—1.30**

Compiled Basic – within limits

Accelerator
Computer Concepts

BASIC compilers – standard features on large computer systems – convert their Basic into machine code so that it will run much faster.

The speed increase can be very dramatic as the Basic in these machines is often very slow.

BBC Basic is renowned for being fast already, so that it is obviously more difficult to increase the speed further.

Still, some people are never satisfied, and Computer Concepts have attempted to cater for the speed merchants. It's taken a while though: There was talk of a Basic compiler by this company about two years ago. Now it has arrived I must admit it's not quite what I had expected.

The software is supplied on two eproms to be plugged into paged ROM sockets: An 8k compiler and a 16k eprom marked "Accelerator G-code".

Accelerator, as the compiler is known, will convert Basic programs either into an intermediate code – which they call G-code – or true machine code.

Unfortunately programs which have already been written may need to be altered as there are some restrictions in use.

Not all the Basic keywords are supported. Pseudo variables such as LOMEM, PAGE and TOP are missing, as is the EVAL statement.

Integers are only 16 bit long (–32,768 to 32,767), a retrograde step. This also affects the ! function which now only returns a two byte number.

You'll also need to alter your FN functions: A $ must be added if a string result is required and a % for an integer. There is no TRACE facility in G-code which makes it important to be able to fully debug a program in Basic. This becomes a problem if the syntax needs to be changed.

The assembler is not supported, so machine code should be compiled separately.

You'll need to remember that some of the normally free zero page locations &70-&85, may be used by the G-code

When a Basic program is in suitable form, compilation can tak place in memory or from disc b *ACCELERATOR.

The compiler goes through th program three times, displaying th current line number as it goes. If th program is in memory this is very quick Compiling from disc takes longer bu not as long as you'd expect if you'v used other micro compilers.

Once converted, the G-code epro needs to be in place to run the program

These programs are said to run up t five times faster than their Basi equivalent, though in practice I foun that many of mine were two to thre

Beebman still has a bug problem

Beebman
Slogger Software

BEEBMAN from Slogger Software, is yet another utility chip with sideways ROM managing facilities for the BBC Micro. So, what does this one have to offer which may make it stand out among its competitors?

Well, it has a number of memory viewing and checking facilities for both sideways ROM and sideways RAM memory as you'll see from Figure I.

Among these there's a very comprehensive set of facilities for moving blocks of memory between normal user memory, the sideways ROM area, sideways RAM and filestore.

These performed extremely well. Screen presentation was very simple in black and white and could easily be diverted to a printer. Probably the only useful information missing after executing *PROMS was the language or service entry labels.

However, Beebman's most important feature is the ability to switch off and switch out unwanted ROMs under software control and that this 'removal' even survives a Ctrl+Break.

This facility is quite important when ROM commands clash or when autobooting disc software which is incompatible with certain ROMs.

I also find this necessary when using Pace's autodial utility for communications. I was certainly looking forward to having this capability permanentl within my micro.

The two relevant commands wer *OFFROM and *KILLROM. Fo these to operate on all ROMs it i important that Beebman is placed in high priority socket, preferably 15 When certain ROMs were present in th machine, however, these commands di not seem to work correctly – they onl temporarily switched off ROMs an this did not survive a Break, never min a Ctrl+Break.

However if *BEEBMAN is typed i before using these functions it "fights the offending ROMs for workspace an performs as described. Recent versio

times faster.

Nor is it easy to predict the length of the resulting code. Sometimes it is shorter and sometimes longer than the original.

Once a Basic program has been compiled to G-code, this code can then be converted to machine code by a program supplied on disc.

In addition to the restrictions at G-code level, no real numbers or real number functions such as SQR, PI, SIN and COS are implemented. In addition the Escape key is not automatically trapped.

Depending on which keywords you want to use, one of three libraries of routines is added to the code.

Level 1 routines – the simplest – are 3k long but do not support strings, filing system commands or procedures.

Level 2 routines are 4.5k long. They include all level 1 routines plus filing commands and some string functions.

Level 3 routines are 6k long. These include levels 1 + 2 and procedures and functions.

These libraries are designed to work at specific addresses. Those supplied on the disc locate at &1900, &800 for second processor users, &E00 to produce code that can be run on a tape system, and &8100 for developing sideways ROMs. If another location is required the LIBGEN program will do this.

Converting G-code into machine code results in further speed improvement, up to three times faster.

I would have preferred options in the compiler to allow for double precision integers – as is normal in BBC Basic. Also some sort of trace facility would have been nice – even if it meant maintaining an extra trace file on disc – as well as the ability to have real arithmetic in machine code.

Documentation was very good. All aspects of the software are covered including theory and how to implement differences.

There are extensive lists with all the BBC Basic keywords listed and whether it was possible to use them and at what level.

To sum up, if you expect that a compiler should be able to convert any Basic program you have, you'll be disappointed.

You really need to plan new programs in view of the limitations to get the best out of this system.

Conversion to G-code requires the least alteration to a Basic program, while still producing a worthwhile increase in speed as well as protecting the program from being listed.

Jim Notman

PROBLEM

I HAVE a keyboard problem. At times, when I am programming or playing games, the keyboard stops responding in which case I have to press Break which ruins the program.

Even pressing Break has no effect – it just escapes the program or game. I've tried everything, including Break, Ctrl+Break, and I've switched the machine off. Sometimes the problem solves instantly, sometimes it takes hours, days, and even weeks for the typing to come back. – Austin Maguire, Irvinestown, Co. Fermanagh.

SOLVED

This sounds like a loose keyboard connector. You can take the lid off and push home the ribbon cable that connects the keyboard to the main board.

Mike Cook

*Command	Function	*Command	Function
PROMS	*Displays status of all or selected sideways ROMs.*	RLOAD	*Loads file into sideways RAM.*
RSIZE	*Displays length of ROM code.*	ROMMEM	*Transfers ROM contents into user memory.*
RAMCLR	*Clears memory in sideways RAM.*	MEMROM	*Transfers data from user memory to sideways RAM.*
OFFROM	*Disables specified ROM star commands even through a Ctrl+Break.*	PEEK	*Displays contents of any sideways memory in hex and Ascii.*
ONROM	*Re-enables a disabled ROM.*	POKE	*Writes to memory or sideways RAM.*
KILLROM	*Equivalent to removing a ROM from the computer.*	ILIST	*Disassemble user or sideways memory to 6502 mnemonics.*
CRCSUM	*Performs a checksum on a specified area of memory.*	PKEY	*Displays contents of function keys.*
RSAVE	*Saves ROM contents to file.*	KLIST	*Lists user status of function keys.*

Figure I: Beebman commands

of Beebman certainly seem to be able to switch off every ROM I have tried.

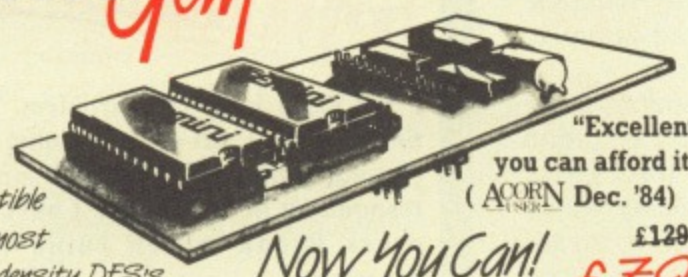
Unfortunately the presence of the chip also interferes with the DNFS workspace, for example *DUMP no longer works at all. This is disappointing, particularly as I have tested four different "versions" of this chip over a period of a few months, having communicated the bugs back to the manufacturers.

Therefore despite the apparently reasonable memory viewing and handling features of Beebman, I can only recommend the chip when this problem has been sorted – yet another case of incompletely debugged software being sent off for review. **Mike Mahon**

Gemini ROMS

DATAGem

The Definitive Random Access, 24K ROM based Database Management System for the BBC B and BBC B+.



Now compatible with most double density DFS's

"Excellent if you can afford it..." (ACORN USER Dec. '84)

Now You Can! ~~£129.95~~ £79.95

DATAGEM

Long hailed as the most comprehensive and powerful database for the BBC, and now becoming a legend in its own right, DataGem has been significantly reduced in price now that development costs have been recovered by Gemini. Whether you have a single 40 track drive or a Winchester hard disk, this system will make use of ALL your disk space, treating up to 4 drive surfaces as ONE CONTINUOUS FILE. Much has been made and exploited of DataGem's superb selective searching capability, and together with its unmatched mathematical powers, the system provides a really professional database for use in the home, office or school that will harness the full power and potential of the BBC micro.

AMATEURS & PROFESSIONALS

For newcomers to databases as well as seasoned users, DataGem represents an ideal starting point. Structuring your file and layout couldn't be simpler using DataGem's on-screen 'painting' format. You can have up to 62 fields or data items wherever you want them on a scrolling 120 x 120 card. Colours are all definable, and field data and field titles may be separated if required. Data entered may be stored in up to 8 tiers or 'levels', as well as within the whole database file. Scan one level or the whole database for records that match your search parameters, and place them in another data level for later manipulation. DataGem also boasts limited facilities for producing data merged letters, and may be configured as a 62 cell spreadsheet.

TECHNICALLY SPEAKING

The System Comprises:-

1. 2 EPROMs mounted on carrier board containing 24K of 6502 optimised machine language. Carrier board may be inserted in either of two positions under keyboard or in sideways ROM board.
2. Demonstration applications disk in both 80 and 40 track format with documented examples of DataGem files. Disk contains no DataGem program code.
3. Full colour packaging consisting of A5 ring binder with professional documentation, user registration card and quick reference card.
4. Utility program named 'Trans' also supplied to allow transference of data files from all other Gemini databases.

The System Features:-

- Permits just ONE file to exist over FOUR floppy disk drive surfaces with a maximum file size of at least 10 Megabytes.
- Allows up to 5100 User Definable Records.
- Maximum number of 62 fields per record, which may be any combination of the following types:-
  STRING – Up to 120 characters long
  DATE – Either two or four digit year dates may be selected.
  TEXT – A field with no data, allowing background text to be placed anywhere on the record. This may then be altered/moved/deleted, even after the database is in use. Up to 3000 characters of background text may be placed on the record in this way, enough for limited word processing and mail-merge.
  NUMERIC
- Allows searches on any field or COMBINATION of fields to ANY depth.
- Up to 9 subsets of data INSTANTLY available and saved to disk automatically.
- Sorts alphabetical or numeric on any field, ascending or descending with NO LIMIT on the depth of sort.
- Interfaces with 'VIEW' and 'WORDWISE'.
- Includes a free format report generator for a completely flexible printing format.
- Allows the user to extend the file or add fields after having started to enter data.
- Offers a free format painted screen which scrolls 120 x 120, and supports extensive mathematics.
- Provides User defined field relational variables and multiple and single character wildcards.
- Exists self contained on ROM, and does not require additional utilities on disk.
- Finds the occurrence of a string or partial string in ANY field in the database with just one command.
- Mathematical Operators
  +, −, ★, /, multilevel parentheses (up to 50 levels), unary negation.
- Logical Operators
  >, <, >=, <=, <>, =, ★(AND), +(OR).

WHAT OTHERS SAY

DataGem provides many of the Spreadsheet facilities of an item like Lotus 1-2-3... Combined with a Word Processor, it forms the basis of a very competent small business system.
Personal Computer News – July 1984.

DataGem stands out in terms of both price and performance. Excellent if you can afford it.
Acorn User – December 1984.

NEW DATAGEM GUIDE

Available separately to existing owners of DataGem (see below), this new and comprehensive manual has just been completely re-written by Simon Williams, a veteran press reviewer and writer. The new guide takes you step by step through all the facilities of the program with worked examples, and without any requirement for a previous knowledge of databases. It contains over 40,000 words and is fully indexed.

MONEY-BACK GUARANTEE

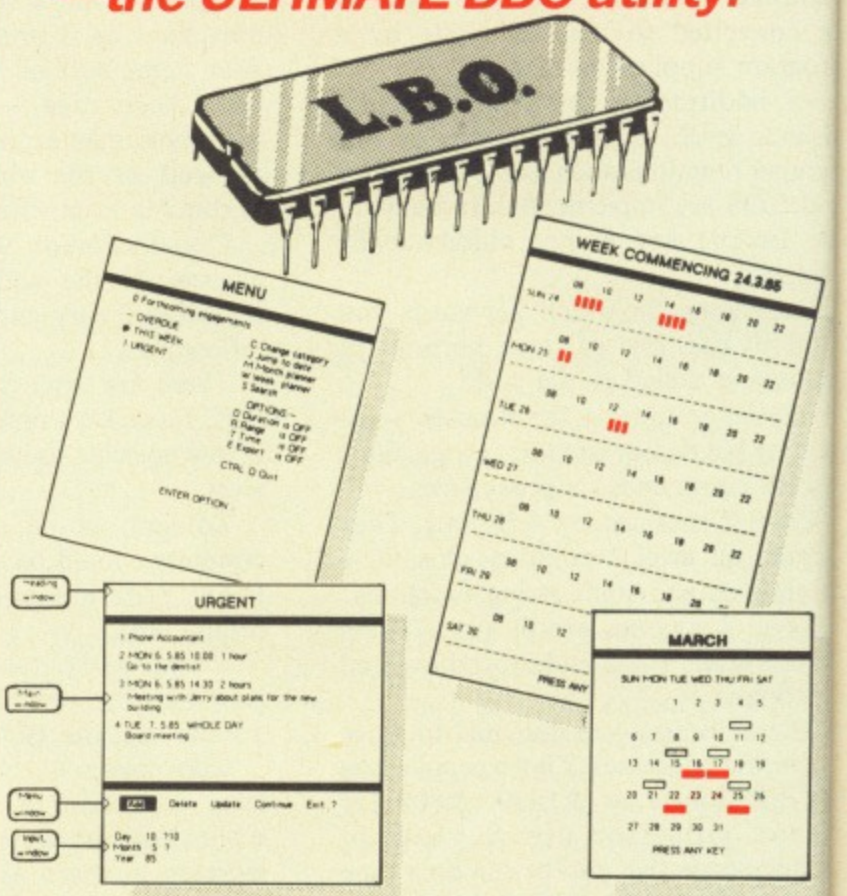
The power and facilities of DataGem are just too great to detail in this advertisement. As the product is protected against unauthorised copying, we are able to offer our no-quibble money-back guarantee to customers purchasing DataGem direct from Gemini. If you don't agree that it's worth the price, send it back to us undamaged within 7 days of purchase for ANY reason and we'll refund your money – immediately.

STOP PRESS!!

New DataGem owner's manual (see above), available separately at **£12.95** inclusive
Price refundable against purchase!

L.B.O. LIFE & BUSINESS ORGANISER

– the ULTIMATE BBC utility!



A NEW & EXCITING ROM RELEASE FROM GEMINI

This is a comprehensive life and business organiser package in 100% machine code which has been very carefully designed to provide a wide range of useful facilities for the busy person at home or in the office, and is simplicity itself to use. Once you start using LBO, you'll ALWAYS use it – not like one of those ROMs you only occasionally call on. LBO will put an end to forgetfulness and ensure that your time is organised, you know what you have to do and when, you don't forget bills or birthdays, and you are reminded constantly of urgent matters.

LBO was written by two graduates in Computer Science from Exeter University in consultation with a lecturer in Cognitive Psychology. It has been very cleverly researched and programmed and is confidently recommended by Gemini as a very superior program for the very superior BBC micro.

Features include:-

- Automatic reminder of entries overdue for attention
- One week's advance notice of forthcoming events
- Urgent notice board
- Creation of categories of entries; e.g. bills, birthdays, letters to be written, notepad etc.
- Sorting of appointments by date and time of day
- Month AND week's summary at a glance, indicating time booked and free
- Single entry of a RANGE of events and updating of regular happenings
- Super search facility to call any event by any related word or part word
- Month by month preview of all forthcoming events
- Built-in intelligent calendar
- All data saved to disk
- Full printer support
- Easy to follow documentation

Use LBO to organise your life from today until 1999! It can handle literally hundreds of multi-line messages, as many as you are every likely to need. Despite the very wide range of facilities offered, this professional program is VERY easy to use and requires absolutely NO knowledge of computers. A vital aid to your everyday life, LBO is GREAT FUN TO USE!

L.B.O. only **£19.95**

Also available on DISK for those with a cluttered ROM board – £19.95.
QL version also available now, MS-DOS version early 1986.

Gemini ⟹ DISK SOFTWARE ⟹

DDD Suite

THE REVOLUTIONARY 'TRIPLE-D' BBC DISK INTEGRATED SOFTWARE SYSTEM

Of great significance to businessmen, educationalists and hobbyists alike, these programs are certainly the most powerful and sophisticated of their breed, and may be used 'stand-alone' or together as a suite. Gemini have probably the most experience in writing serious software for the BBC micro, with classics such as BEEBCALC and BEEBPLOT achieving sales of tens of thousands of units. We have drawn on almost four years of experience and user feedback to produce what we are confident will be hailed as the ultimate in functional software for the BBC micro: the ***'TRIPLE-D'*** Integrated Suite. We've also brought it in at a price that should make it accessible to more of you, and most importantly, we're giving you REAL value for money.

The modules, which are formatted for both 40 and 80 track systems, are available separately, or as an economical combination pack. Each module is clearly documented with a comprehensive, indexed manual, with training sections that refer to demonstration applications provided with each disk. Remember, ***'TRIPLE-D'*** uses proper random-access files that will take advantage of your true disk capacity, even over TWO drive surfaces. Have you ever heard of a true disk-based spreadsheet before? Well it's here now in the form of the ***'TRIPLE-D'*** suite and can handle up to 52,000 FILLED cells! If you already have our 'DataGem' ROM database, you'll be pleased to know we've even included some special utilities for you!

I confidently recommend the ***'TRIPLE-D'*** suite to you. If you purchase the product from us and don't share my enthusiasm, return it to us in new condition within seven days of purchase and we'll refund your money – immediately and without quibble.

Dale Hubbard
Chairman & Managing Director
Gemini Marketing Limited

DDD-BASE £29.95

- Up to 2000 records, 1 search level subset, 26 fields/record, 2 drives, 79 chars/field
- Scrolling screen, 79 x 26. Interrupt driven real-time clock
- Layout painted on-screen to your design, including background text/graphics
- Fully menu driven, with powerful line editor and access to *OS commands
- Default entry capability, no need for tedious re-typing of repetitive data
- Lightning search using advanced 'hashing' techniques
- Powerful maths, allowing all BASIC functions, on any field
- 10 user-defined variables to simplify complex calculations
- Multiple level 'intelligent' sort – program only sorts 'out-of-order' data
- Printed reports in record or summary format. Data spool option for transfer to other files
- FULL DATA COMPATIBILITY WITH 'DDD-CALC' AND 'DDD-PLOT'

DDD-CALC £29.95

- True disk-based spreadsheet, 2000 rows, 26 columns, 52000 cells. Powerful line editor
- Fast, smooth machine code screen scroll with pop-down menu
- Individually adjustable column widths with text overflow
- Full relative and absolute replication
- Find and move to a row by name
- User defined variables, delete/insert rows, SORT rows with 'DDD-Base'
- Send data from all or part of sheet to printer, or just print cell formulae
- Data over 1 or 2 drive surfaces
- Fast recalculation, even over large files
- All BASIC functions allowed, plus 'SUM', 'MAX', and 'MIN'. *OS calls, and real time clock
- Data spool option for merging with other files
- FULL DATA COMPATIBILITY WITH 'DDD-BASE' AND 'DDD-PLOT'

DDD-PLOT £29.95

- Stunning menu driven colour graphics using the BBC's capability to the full
- Pie charts, histograms, scatter graphs, line graphs and function plotting
- Disk save of screen for instant recall within your own programs
- Superb data entry editor with up to 255 plottable data entries for text and x/y coordinates
- Automatic scaling with user override
- Screen customisation allowable after plotting for background text etc., with up to 64 columns in Mode 1
- Disk save of ALL data
- Statistics facilities include mean, max, min, standard deviation, line of best fit, correlation coefficient etc.
- Colours re-definable for any plot
- Epson m/c fully SHADED screen dump with interface for other dumps on request
- FULL DATA COMPATIBILITY WITH 'DDD-BASE' AND 'DDD-CALC'

Combo Pack – All 3 modules £69.95

NEW!

MONEY MANAGEMENT

This program is designed for disk users. It allows individual transactions to be stored and retrieved in respect of up to 5 separate Bank/Building Society/Investment accounts AND up to 5 Credit card/loan/Mortage accounts.

The transactions are also analysed – and may be (screen) listed – under 3 separate Income and 15 separate Expenditure headings.

Each transaction consists of:

(1) Date
(2) Description – up to 16 characters
(3) Amount
(4) Last 4 digits of cheque no. or a credit card transaction reference. (Payments only)

Account and income/expenditure headings may be personalised.

Budget amounts can be stored for each of the 15 expenditure heads and a report shows how expenditure to date compares with the budget. It also shows the balance remaining. This report is also produced in percentage terms and a third report forecasts annual expenditure based on expenditure to date at any particular time.

A further report gives balances for each Bank/Loan account at the beginning of the year, balances for each income/expenditure account to date and the resultant Bank/loan account balances. This report represents, therefore, the changes in liquid assets and liabilities over the period, both in terms of totals and of distribution between accounts.

The main menu contains a print option for this report.

Lists of outstanding cheques or credit transactions may be produced for each account and when statements are received, input of the cheque reference no. (last 4 digits) and the amount causes verification to occur (on screen), whereafter these cheques are removed from the cheque no. file, the remaining list of unpresented cheques allowing simple reconciliation of each Bank a/c. Similar reconciliation of credit card a/cs can be achieved.

The program caters for transfers between accounts (e.g. from Bank to Building Society a/c or from Bank to Credit card a/c etc) the relevant details being input only once.

The program also allows for standing orders to be set up on any single account or between any two accounts. These are paid simply by inputting a date up to which the payment of all orders should be recorded. The necessary debits and credits are then created and the date of each order is reset. Orders can be for any multiple of calendar months.

The program is fully menu driven and all areas of input are 'range protected'. As much guidance as possible is included in all screen displays and the user is always given the opportunity to abort a transaction.

Full amendment and deletion routines are provided; for individual transactions, for Standing orders and for budgets.

The main file can hold between 800 (all full length descriptions) and 1800 (no descriptions) transactions. The former should be sufficient for most people for at least one year and the index file size is set on this basis. A warning is flashed on the main menu when the main file reaches 750 transactions. Account balances may be carried forward to a new set of accounts.

All you will ever need in a home finance package and beautifully [illegible]ted.

ONLY £12.95
Highly Recommended

Gemini VALUE!

With over four years experience of providing practical software solutions for business and home applications, Gemini have put together a selected range of famous titles for the BBC and BBC Plus in TWO special packs, at VERY SPECIAL prices. These super value packs contain all the serious application software you're ever likely to need for your BBC, from spreadsheet and database management to a complete professional business accounting system. Gemini's 'OFFICE MATE' and 'OFFICE MASTER' packs are here – put that computer to WORK!

• DATABASE • BEEBCALC SPREADSHEET • BEEBPLOT GRAPHICS • WORD PROCESSOR • FULL DOCUMENTATION

DATABASE

Use this program for storing all types of information just the way YOU want to store it. You set up a computerised 'card index' system and add records and data to the file in the format that you choose.

Advanced features include sorting and searching for specific records, mathematical calculations, printer routines, data summaries etc. If you don't have a database, you certainly should!

BEEBCALC SPREADSHEET

Perhaps the most commercially successful item of business software yet written, the Gemini Spread Sheet processor offers a very wide range of invaluable calculation and editing features.

Consider, for example, a Cash Flow forecast containing rows and columns of figures, combined with text and numbers. If say, the cash receipts for January need to be changed, it would normally be necessary to delete and recalculate several figures for each successive month.

With BEEBCALC, however, an 'on screen' amendment to the January figure is made, and the corrected figures for each successive month automatically appear upon touching the 're-calculate' key.

Formulae cells in the table may be specified which relate to each other and then copied RELATIVELY or ABSOLUTELY to other parts of the program, which in itself is modular, and directly linkable to other Gemini programs. BEEBCALC has a complete range of inbuilt data entry and formatting techniques, and the structure of the table may be amended at any stage. Of course, full printer facilities are included which allow for either the table to be printed or just the data and formulae relating to the table. Another important feature, any valid BBC BASIC formula is acceptable as data entry making the system immensely powerful and versatile. BEEBCALC's sister program, BEEBPLOT will take data from disk or tape files created by BEEBCALC to provide data portrayal in graph, histogram or pie chart format.

BEEBPLOT Graphics

Written specially for use with the BBC micro, this program makes full use of the high resolution colour graphics to provide an easily assimilated visual representation of numerical data.

For example monthly sales statistics comparing two year's results may be instantly converted into two side by side pie charts, histograms or graphs ... for easier visual comparison and assimilation.

BEEBPLOT also incorporates a built-in machine code screen dump, enabling a high resolution printed image to be produced using an Epson or similar bit image compatible printer. It also interfaces with other Gemini programs such as Beebcalc and Cash Book and is particularly recommended where any kind of mathematical plotting facility is required.

WORD PROCESSOR

This program provides many routines found in large and more expensive packages. With a typical word length of 5-6 letters it allows for up to 1000 words in memory at one time and is ideal for the user who wishes to write any kind of business letter on a home computer.

Features include: block delete, block insert, search and replace, edit text, display text, and many more.

Step up to Office Mate and save money!
(Price if purchased individually - £79.80 – save £67.80 with this pack)
Electron version available,
pack contains Database, Beebplot, Beebcalc, Home Accounts,
Cassette only.

OFFICE MATE
£12
Cassette or Disk

• CASH BOOK • FINAL ACCOUNTS • MAILIST • EASILEDGER • INVOICES & STATEMENTS • STOCK CONTROL • FULL DOCUMENTATION

CASH BOOK

Gemini's CASHBOOK is a complete 'stand-alone' accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cash book system and will provide you with a computerised system complete to trial balance.

Simple to use, this program will replace your manual cash and bank records and provide vital management information at any time. It will take you from sheaves of invoices and cheque book stubs to trial balance, and may, if desired, be used in conjunction with the Final Account program.

Typical information from CASHBOOK is as follows: **1.** Summary of VAT information to enable completion of VAT returns. **2.** Cumulative receipts and payments report analysed over the standard profit and loss and balance sheet headings. **3.** Option for departmental analysis of sales and purchases. **4.** Printout of all transactions, nominal account balances etc. **5.** Journal routine for entering transfers between accounts and year end adjustment for debtors, creditors, etc. **6.** Trial balance. **7.** Full audit trail facility.

This program is recommended not only for businessmen, but also for practising Accountants for use in the preparation of Accounts from incomplete records; a printer is essential.

FINAL ACCOUNTS

Requires Gemini 'CASHBOOK' module (except Commodore 64 version)

This program will take data prepared by your Gemini Cashbook module and produce a complete set of accounts for you in the following format: **1.** Trial Balance with inbuilt rounding routine. **2.** Notes to the Accounts. **3.** VAT summary. **4.** Profit and Loss Account with comparatives facility. **5.** Balance Sheet with comparatives.

All reports may be produced at any time interval comparing actual to budget if required.

MAIL LIST

Gemini's Mailist program will enable you to keep a record of names and addresses and then print, examine, sort and find themn, all with special selection techniques. All our mailists contain our exclusive 'SEARCHKEY' system, giving you the option of creating your own dedicated coding system for each name on file. For example, on most mailing list systems, you are only given the standard heading such as name, street, town, country, postcode etc. With the Gemini searchkey system, you could find, say, all names on the file that are companies having a turnover in excess of '50,000' or all names that are subscribers who are behind in their subscriptions or all names that are eligible for a Christmas card this year!

A full and useful range of routines is included in the menu, and the program allows you to set up your own format for printing labels, i.e. the tab settings you require and spaces between labels, etc. Multiple copies can also be printed.

EASILEDGER

Contains routines to enable the small business man to keep a record of one of the most important aspects of his business – cash flow.

EASILEDGER is essentially a debit/credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information. Its flexibility lies in its ability to produce account balances instantly for debtors and creditors, together with a record of all transactions, dates and references. A year-to-date summary of sales, purchases, receipts and payments over the twelve month period is also provided, as is a complete INTERACTIVE bank account database.

EASILEDGER is a management aid software tool and is designed to run alongside an existing accounting system. If you operate a cash based business and require a complete accounting package to produce the accounts to trial balance and beyond then we recommend you consider using both Easiledger and Cashbook programs together.

INVOICES & STATEMENTS

The Gemini INVSTAT program greatly reduces the time and cost of preparing Invoices and Statements by storing essential information such as customer names, addresses and account numbers, VAT routines and footer messages such as 'Please remit by return', 'Overdue and outstanding', etc.

Not only are Invoices and Statements produced more quickly and accurately, but pre-printed forms for them are eliminated since the INVSTAT program produces professionally formatted documents using your own printer.

STOCK CONTROL

You have a stock of products. With the Gemini program you may enter details of each product on to a record card on the computer with details of your own existing part number (if any), a description of the product, the unit quantity (i.e. one, a gross, a pair, etc.), the cost price per unit, the selling price per unit, a specified minimum satisfactory stock level, units in stock ordering quantity and supplier details.

The program will allow you to enter stock received, stock out, and will also give you a summary of stock items and current holding, together with details of total cost of stock, total sales value of stock, current gross margin on stock, cost of bringing stock up to minimum level, understocked items, etc.

Each stock item has its own computerised record and you may browse through the file as a whole, or just a specified number of records. An extremely powerful program, highly recommended for inventory control in small and medium sized businesses.

OFFICE MASTER
£25
Cassette or Disk

Gemini INTEGRATED ACCOUNTS & HARDWARE

WHY INTEGRATED ACCOUNTING?

Because it will retrieve information stored in one program for use by another, and store data in one program which has been generated by another.

This means that the scope for human transposition error is virtually eliminated ... for example, when typing an invoice manually, the typist could type £14.25 instead of £41.25, and undercharge the customer. Such an error cannot occur with integrated, computerised invoice generation, since only the part number needs to be entered and the price (and product description), are taken AUTOMATICALLY from the Stock Control program, and printed AUTOMATICALLY onto the Invoice.

Likewise a Stock Controller, operating a manual system, could transpose the quantity sold, when posting from a copy invoice, and deduct 93 pcs from the Stock card, instead of 39. This would understate the book stock by 54 pcs, and possibly cause the product to be re-ordered, and consequently overstocked. Again, this could not happen with an integrated system, since the quantity invoiced is AUTOMATICALLY deducted from stock, due to integration of the Invoicing and Stock Control programs.

WHY THE BBC MICRO?

Because, although originally designed as an educational computer, it has the facilities needed for serious business use. In particular, speed of operation ... although only an 8 bit machine, it has a faster operating speed than many 16 bit micros. By gearing a suite of Integrated Accounting programs to the BBC Micro, Gemini have produced a combination of excellence which will eclipse any other computerised business system in its price bracket ... and many other systems in much higher price ranges.

WHY GEMINI?

Because our business software for the BBC Micro is based upon the solid foundation of experience.

We have successfully written business software for the BBC Micro since it was first launched.

Your choice of software for a computerised business system is critical ... badly written programs could bring your business nearer to ruin, more quickly than almost any other investment. The fine reputation of Gemini, evidenced by the Independent press comments listed below, are your guarantee of confidence in the professional experience which back this major investment in the efficiency of your business.

INDEPENDENT PRESS COMMENTS

John Vogler reporting in December 1984 edition of 'A & B Computing' said of Gemini Integrated Accounting when comparing to Peartree, Micro Aid, Software for All, Acornsoft Mirle and Sage:–

"This is the newest and most exciting. To have achieved a substantial degree of integration, very rapid file access and respectably large file sizes, without the use of a second processor, is a fine achievement. As one would expect from GEMINI, the individual modules are eminently professional and for the first time present the single processor BBC as a viable small business computer ... GEMINI have produced a superb product ... superb exarnples of the programmer's art."

INVOICING & SALES LEDGER

The Gemini Sales Ledger and Invoicing program will produce invoices and statements for customers and enable a tight control over credit procedures to be maintained by producing aged debtors reports, and by keeping current information concerning customer accounts.

The module can be used independently or interfaced with the Gemini Nominal Ledger and Stock Control modules, and offers the following advantages: • Maintains open-item sales ledger. • Comprehensive customer Master File maintained in memory. • Choice of fixed and free format invoices. • Integrates with Gemini Nominal Ledger and Stock Control modules. • Prints invoices, invoice copies, statements and credit notes. • Reports include: Aged Debtors, Sales Daybook Sales analysis by user defined code, VAT analysis, Audit trail giving copy details of all transactions. • Automatic updating of sales ledger. • Comprehensive accounting controls including period end close down routines and full audit trail for all transactions. • Examine customer status by file enquiry to screen or printer showing year to date activity. • Trade and settlement discount terms definable for each customer. • Caters for up to 5 rates of VAT. • Can hold up to 135 customers on 40 track disk system and up to 610 customers on a 80 track disc per Sales Ledger file. • Comprehensive analysis of invoices over unlimited, user definable sales codes.

Price £69.95.

PURCHASE LEDGER

Used independently or interfaced with the Gemini Nominal Ledger, the program maintains a complete file for each supplier, records amounts outstanding at any time, helps to determine which invoices are payable, and payment dates for the claiming of discounts. Among this module's many features are the following: • Automatic posting of suppliers' invoices to Purchase Ledger. • Comprehensive analysis of invoices over unlimited, user definable expense headings. • Comprehensive accounting controls including period end close down routines with posting reports, and full audit trail facilities at appropriate stages of processing. • Full integration with Gemini Nominal Ledger module. • Purchase invoices and credit notes easily processed. • Supplier file held in memory, with full details of each supplier. • Maintains open item purchase Ledger. • Management of invoices due for payment within cash restraints. • Maximum number of suppliers on 40 track disk system of 135 and maximum of 610 suppliers on 80 track disk system per Purchase Ledger file.

Price £69.96

NOMINAL LEDGER

This is the central module of the Integrated Accounting system and may also be used independently as a Cash Book or interfaced with the Sales and Purchase Ledgers and payroll programs. It includes the following main features: • 143 Nominal accounts all of which are user-definable. • Posting of transactions from Sales and Purchase Ledgers and Payroll modules. • Full Cash Book facilities. • Print out of full Trading and Profit and Loss Account and Balance Sheet together with notes to the accounts. • Full accounts may be produced for whatever period chosen by the user. • Comprehensive accounting controls including period end close down routines and complete audit trail for all transactions. • Journal feature for adjustments between accounts and correction of book-keeping errors. • Reports include: Account Master File showing complete code listing. Cash Book entry details. Journal printouts. Trial Balance. Trading and Profit and Loss Account with notes. Balance Sheet with notes. Audit Trail Enquiry for all accounts. • Account enquiry showing movements over the period under review including opening balance, period end adjustments and closing balance. • Account posting masks allow conversion of analysis codes set up in other modules into selected user-defined Nominal Ledger codes.

Price £69.95

PAYROLL

This program provides a full range of controls over the different aspects of Payroll Accounting icluding tax and other deductions. It can be used independently, or interfaced with the Gemini Nominal Ledger, and offers the following facilities: • Employee file maintained in memory, containig: Name, address, sex, marital status, National Insurance Number and contribution type, date of birth, personnel number, department, date employment commenced, all applicable tax codes, whether week 1 or month 1 applicable, hourly or salaried, pay cycle, payment type (cash, cheque or direct transfer), PAYE reference number, previous name, bank details. • Supports weekly, fortnightly, four weekly or monthly employees. • Company master file containing: Name, address, bank account number and name, bank name and branch, PAYE reference. • Produces cash analysis of note and coinage to suit requirements. • Employee pay details include: Gross pay and tax paid to date both current and previous employer. National Insurance contribution for employer and employee. Five rates of overtime per employee. Up to 12 standard and 5 non-standard pay elements per employee. Basic pay. Hourly rate. • Reports include: Payroll reconciliation, Payslips, Coinage analysis, Cheque and bank giro list, Payroll masterfile, Departmental analysis. • Relevant data to complete Inland Revenue forms including: P11, P35, P45, P14/P60. • Maximum 98 employees on 40 track disk system and 198 employees on 80 track system per Payroll file.

Price £69.95

STOCK CONTROL

A program providing full control over every aspect of stockholding operations which can be interfaced with the Gemini Sales Ledger and Invoicing program, this module includes the following features and routines: • Inventory Master File holding details of part number, selling and cost price, sales and product code, current stock, location of stock, allocated items, re-order level, quantity on order, current period activity and supplier code. • Permits four types of transactions – sales, returns, receipts and adjustments. • Part enquiry routines for any stock item. • Reports include: Part catalogue, giving stock sales and cost values. Re-order report. Evaluation stocks list, giving stock sales and cost values. Dormant parts report. Delete parts report. Stock usage report. Stocktaking sheet. Stock audit report sorted into part sequence and transaction type and date. • Screen prompt when item falls below the minimum re-order level. • Directly interfaces with Sales Ledger to enable automatic generation of product details for invoice production and adjustment of stock records. • Maximum 980 part numbers on 40 track disk and 1980 on 80 track disk per stock file.

Price £69.96

Gemini's Office Mate and Office Master, sole distributors to the trade

CentreSoft Ltd

Unit 10, The Parkway Industrial Centre, Heneage Street, Birmingham, B7 4LY. Tel: 021 359 3020. (Mail order to Gemini).

INTRODUCTION

Designed for the small to medium sized business user, where speed and efficiency are vital, Gemini Integrated programs are suitable for sole traders, partnerships, or limited companies. All require a BBC B 32K microcomputer, and an 80 column printer. A double disk drive with an Acorn compatible DFS is required for integrated accounting purposes. A single disk drive may be sufficient where modules are used independently, although this is not recommended for the Sales Ledger and Invoicing module. The manuals indicate the system capacities for various disk drive combinations.

The programs have been devised by H.C.C.S Ltd in the light of substantial mainframe computing experience, and share many of the features normally found only in very large installations. Used in a typical business environment where invoicing, sales ledger posting, stock control adjustment and nominal ledger posting is simultaneously made, the software will convert the BBC micro into a business computer of enormous power, directly comparable with hardware/software combinations costing many times its price.

Each program is supported by a comprehensive, easily followed manual, and 'user friendly' screen prompts with errer trapping routines, which make a specialised knowledge of accountancy unnecessary for the average user. All the programs, however, have many sophisticated features which make the programs revolutionary for the home micro market.

Gemini Marketing Limited confidently recommend the programs to serious commercial owners of the BBC B micro as software capable of making an enormous contribution to business efficiency and profitability at minimal cost, since it requires no expensive second processor in order to achieve the advantages of integrated accounting.

NEW LOW PRICE

Price £69.95 per Module

Includes 1 year software support

Special Hardware/Software OFFERS

Having arranged bulk hardware purchasing discounts, Gemini is now able to offer complete systems of hardware and software offering unequalled value for money. We offer a choice of hardware only or hardware with software as follows:–

DEAL 1

BBC SYSTEM comprising:–
- BBC 32K with DFS
- 40/80 switchable 800K double disk drive
- 80 column printer
- 12" screen monitor (for colour add £150 to system price)
- All connecting cables

OUR PRICE INC. VAT £999.95

MS-DOS version soon.

DEAL 2

Please enquire by telephone for prices of individual hardware items.

DEAL 1 with the addition of the following:–
- 'DDD' Integrated database, spreadsheet and graphics
- DataGem database ROM
- Integrated Accounts – ALL 5 MODULES
- Mail Merge utility for Integrated Accounts
- 'Video Classroom' programming educational video (VHS only)
- 'Life & Business Organiser' ROM
- 'Office Master' software pack
- 1 pack each pre-printed stationery; payslips, statements, remittance advice, invoices for use with integrated suite, plus one box 2000 sheets listing paper.

USUAL PRICE £1650 – OUR PRICE INC. VAT £1395

If not ordering by telephone, please use this order form to order any item on this page, or three preceeding pages. Please state your requirements clearly, and whether you require 40 or 80 track format when ordering disks.

Please allow 7 days for delivery.

24 hour **CREDIT CARD HOTLINE** – AMEX/ACCESS only – **0395-265165**

All stated prices include VAT and post/packing.

To: Gemini Marketing Ltd., Gemini House, EXMOUTH EX8 4RS

Please supply _____

Name _____

Address _____

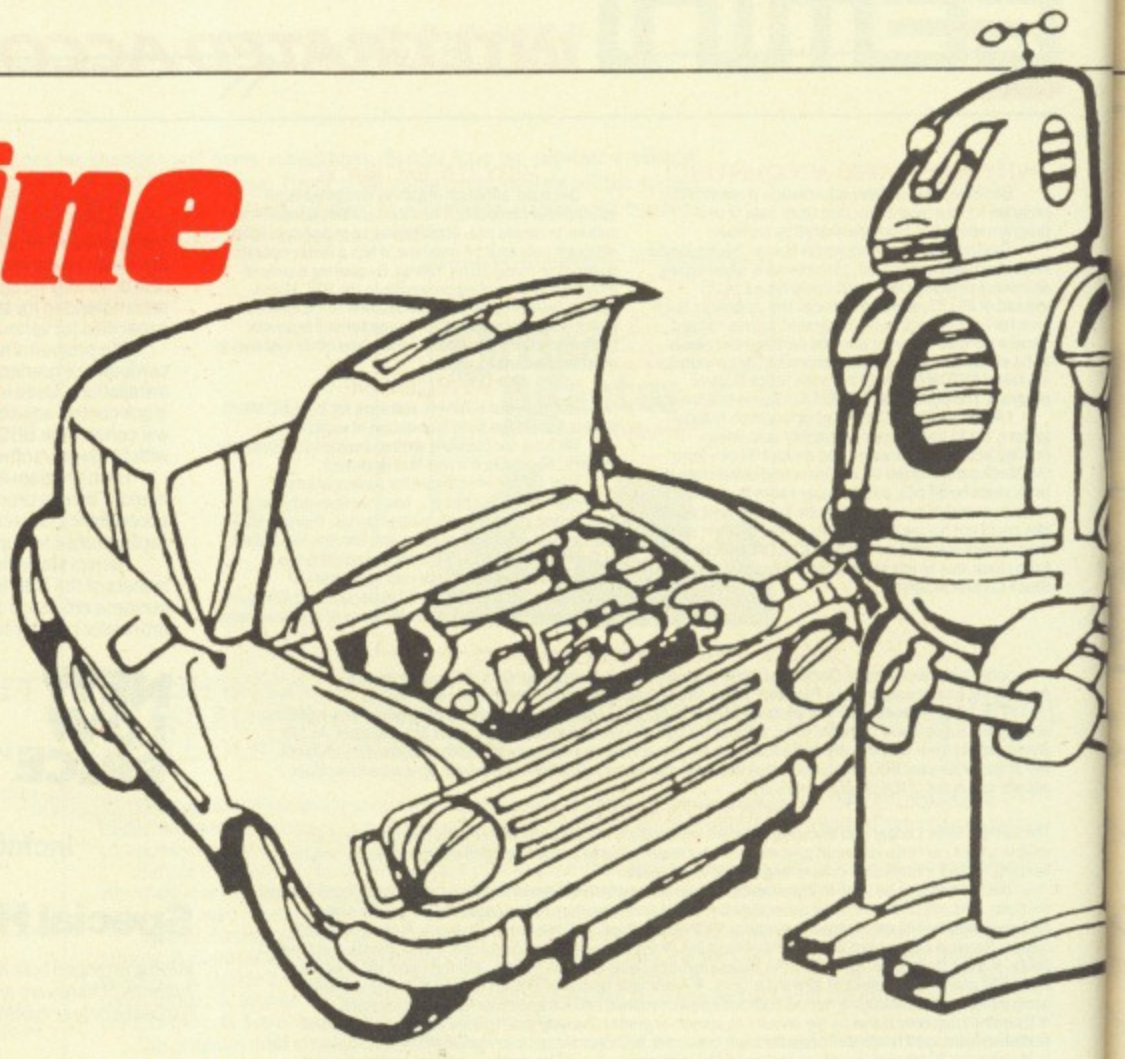
_____

Cheque/POs value £_____ enclosed, or please debit my Access/Amex no._____

Signature _____

Export/Trade enquiries and Local Authority POs welcome.

Machine Code? It's all done by numbers...



MIKE BIBBY helps make sense of machine code

I THINK the question I get asked most often by micro enthusiasts is: "What exactly is machine code? I just can't make sense of all this LDA# &AD and BNE business. I bought a book, but that didn't help".

Well, this series of articles is an attempt to answer that question. You may not be an accomplished machine code programmer at the end of it, but you will certainly know what machine code is, and be able to write your own simple programs.

Better than that, you'll be in a position to take advantage of the many excellent books on 6502 machine code currently on the market, and see how they fit in with your BBC Micro. From then on you'll be able to teach yourself, and that's always the best way.

So what IS a machine code program?

Let me dodge the question by telling you that all programs are machine code, eventually, and we'll get round to exactly what that means in a minute.

First of all, tradition decrees that I tell you that the microprocessor at the heart of the BBC Micro is the 6502, complete with 8 bit registers and a 16 bit address bus. I should then go on to discuss its arithmetic logical unit, its internal data bus and so on, referring you to an incomprehensible diagram showing its "architecture".

To heck with all that. Let's talk about it from the consumer's point of view – yours. You see, I'm not one of those "you can drive a car better if you know what's under the bonnet" freaks. I have it on good authority that gynaecologists do not make the best lovers.

So what is machine code all about? The fact is, it's all about numbers – lots of them. More precisely, it's about lots of numbers, each of which is between 0 and 255 in value.

Show me a machine code program and I'll show you a load of such numbers. Forget about LDA and BNE for the moment. Believe me, it's all done by numbers.

Let me explain. We're used to talking about a micro having memory, aren't we? Well a micro's memory is composed of lots of individual memory cells, as is our own brain. And, just like our memory cells, a micro's memory cell can only remember so much.

In the case of the 6502, the cell can

Switch	7	6	5	4	3	2	1	0
Value	128	64	32	16	8	4	2	1

Table I: Values associated with each switch

Switch	7	6	5	4	3	2	1	0
Value	128	64	32	16	8	4	2	1
State	off	off	on	off	off	off	on	off

gives → 32 + 2 = 34

Figure I: Encoding 34 with switches

remember only one byte at a time – and a byte, you won't be surprised to learn, happens to be a number in the range 0 to 255.

An upper limit of 255 might seem a little arbitrary, but there's an excellent reason for it. It's all to do with the wiring. (Okay, we'll lift the bonnet just a little!)

Each memory cell, or location as it's more properly termed, consists of a set of eight switches, each of which can be either ON or OFF. Now by arranging the switches in various patterns of on and off, we can encode things – a sort of electrical semaphore. And what we code is – yes, you've guessed it – numbers!

Have a look at Table I. What it does is to link each switch with a number. We've labelled our switches switch 0, then switch 1 and so on up to switch 7. Notice that, yet again, computers start counting at 0. Even though we only go up to switch 7, there are eight switches in all.

Now below each switch in the table is the number linked to it (don't worry why we picked these particular numbers for the moment). Switch 0 is worth 1, switch 1 is worth 2, switch 2 is worth 4 and so on.

Notice how the value of each switch doubles as you go along. Given these values we can code numbers. For example, if switch 4 were ON, and all the others off, we'd be "hiding" the number 16. Similarly, if just switch 7 were on, we'd be coding 128.

Even better, by having more than one switch on at a time we can code other numbers than just the eight we've linked so far – we just add the values of all the switches that are ON, to arrive at the new number. For instance, if switch 5 and switch 1 were on simultaneously, and all the others were off, the number we've got is 34. Figure I shows why.

If you think about it for a moment, you'll see that the smallest number we can encode is 0 (all the switches OFF) and the largest number we can encode is 255 (all the switches on).

The really nice thing about the way we've chosen our numbers though, is that every number between 0 and 255 has its own unique pattern of switches, so there's never any confusion about the number you've coded, or stored – to use computerese – in the byte.

But, and it's a big but, writing 34 as **off off on off off off on off** is incredibly cumbersome. However mathematicians decided that since there were only two states for each switch (ON and OFF), they'd use the number 1 for ON and 0 for OFF. Using 1 and 0 in this way gives us what are called binary numbers. In this scheme of things 106 becomes %01101010. Figure II shows how.

hi byte	bit	15	14	13	12	11	10	9	8
	value	32768	16384	8192	4096	2048	1024	512	256
lo byte	bit	7	6	5	4	3	2	1	0
	value	128	64	32	16	8	4	2	1

Table II: 16 bits explained – compare with Table I

Switch	7	6	5	4	3	2	1	0
Value	128	64	32	16	8	4	2	1
State	off	on	on	off	on	off	on	off
binary	0	1	1	0	1	0	1	0

Giving → 64 + 32 + 8 + 2 = 106 decimal
→ %01101010 binary

Figure II: The binary representation of 106

You may be wondering why we've put the "%" in front of the 01101010. The reason is that otherwise we might mistake it for an incredibly large ordinary number. So if you see a % in front of a number it's coded in our binary way. Incidentally, each switch is known as a bit, and since a byte consists of eight such switches, we can say that there are eight bits in a byte. Bits and Bytes in the April 1983 edition of *The Micro User* goes into it in more detail.

Now these eight bits in a memory byte allow us to store any number from 0 to 255 – 256 different numbers, if you remember to count 0. But if we're going to have a computer of any power we don't want to stop counting at 255. After all, if we were using binary to count the number of bytes in a micro's memory, we'd be limited to 256 (counting from 0 to 255) – not a very big computer.

So what the micro does is to have 65536 different memory locations, numbered from 0 to 65535 to store its data in. Why 65536? Well, in order to keep track of its memory bytes, the computer has to do some more wiring.

We've already seen that having eight wires would only allow us to keep tabs on 256 locations. What the 6502 does is to double up the number of wires to 16 – which then gives it 65535 as its largest number. Look at Table II if you don't believe me!

As you can see, it's like the old Table I with an extra eight switches or bits added on top – that is, another byte.

To get the value of these extra bits we just keep on doubling. 128 was the last one, so it goes 256, 512 and so on up to 32768. The top (higher valued) set of eight bits is called the high byte of the address – hi byte for short. The bottom (lower valued) set of eight is called the low byte of the address – lo byte for short.

If all the switches are on – that is, if all the bits were set at 1 – the number these two bytes would code is:

```
  %1111111111111111
= 32768 ┐+
  16384 │
   8192 │
   4096 │
   2048 ├      hi byte values
   1024 │
    512 │
    256 ┘
    128 ┐
     64 │
     32 │
     16 ├      lo byte values
      8 │
      4 │
      2 │
      1 ┘
  ------
  65535
```

Now do you believe me? The reason we've gone into so much detail is because, as I've said, machine code is all about numbers stored in the micro's memory. In fact machine code is mostly about moving those numbers (and hence the information encoded in them) around the memory of the computer – that is, from one memory location to another.

For example, there's a large machine code program that actually runs your BBC Micro. It's called the Operating System (OS for short). One of its jobs is to print that familiar "BBC Computer"

ALL SOFTWARE AVAILABLE ON 3'' DISKS

CHALICE

SOFTWARE/HARDWARE

ASK ABOUT B+ COMPATABILITY

■ VECTOR 1 ♦

TAPE TO DISK UTILITY

Features

+ Once only purchase
+ Can save to any disk
+ Very user friendly, help pages on disk
+ 40/80 Format
+ No awkward ROMs, can be used on any machine
+ Can load to all available RAM &400–&7FFF
= Simply the best tape to disk utility available

Vector 1 versions compatible with Acorn, Opus, UDM, Cumana, BBC+ &.Watford (Not 1-42, 1-43) DFS's.

■ VECTOR 2 ♦

DISK UTILITY

Features:

+ 40/80 Format
+ User friendly, menu driven
+ Contains powerful features such as a disk sector editor, Disk Compare, format, verify and track repair
= The most powerful disk utility available

Prices: £12.00 each for Vector 1 or Vector 2 £23 for both.

MUST NOT BE USED TO INFRINGE COPYRIGHT

Please specify DFS when ordering

Slide Master: Specialised database for the photographer tailored for perfect cataloguing of a photographic collection. Comes complete with comprehensive manual. (Disk Only)
(Please specify 40/80 tracks) **£16.00**

EPROMS

2764	(250 ns)	Each	**£2.80**
27128	(250 ns)	Each	**£4.15**

NEW ★ RELEASE ★

MEGA-ROM

The latest release from Chalice software, over 60 commands on a 16K ROM. The range of commands available means that there is something for every BBC user. For the disc user the ROM provides a skewed formatter to speed up disc access, a disc sector editor, disc search, verify and repair utilities, a useful free space command, plus many other handy commands. For the BASIC programmer, commands include search and replace on a global or selective basis, list active variable values, append BASIC program, move and copy lines, bad program repair, a highly effective routine to shrink BASIC programs down to a far smaller size etc. Other commands include disassembly, memory edit, graphics compilation, comprehensive file transfer utility, function key lister, envelope lister, rom lister, rom save, full rom status, switches roms off through <CTRL><BREAK>, send commands straight to a ROM, KEEP command, inverse video command, a command to send codes direct to your printer, memory search, base conversion, display character definitions, close open files and many others. All commands have been chosen on the basis that they are useful and not as space fillers.

Introductory price £34.95

OVER 60 COMMANDS

the SCYTHE

The Scythe toolkit contains a version of the VECTOR 1 tape to disc system, which will transfer most protected tapes, but we have not stopped there. The Scythe has been packed with a host of other commands: MDIS, SDIS, MEDIT, KLIST, BASE, ROMLIST, ROMSAVE, NROM, FLUSH, FORMAT, VERIFY, FREE, SFIND, BFIND XLIST, BAD, MRELOC, SLOW, TDISK, VECTOR, ROFF, RON, SECTLOAD, SECTSAVE, MSHIFT & MSWAP. These commands cover everthing from ROM management, utilities for the disc user, aid for the machine code or BASIC programmer, and a set of general utilities of use to all BBC users. The commands will accept input in HEX, DECIMAL, BINARY and the resident INTEGER variables making the Scythe very easy to use. The Scythe comes complete with a comprehensive manual and a free utilities disk.

PRICE £24 INCLUSIVE

ROM MASTER

ROM Master is a budget utility ROM designed for people with several ROMs on their BBC computer. ROM master has several utilities to help prevent the interference which can occur between different ROMs, any ROMs that cause problems can be switched off even through <CTRL> <BREAK>. Using ROM master has been designed to be as easy as possible. Most commands will accept lists, so you can, for example, switch off several ROMs with just one command. ROMs can be specified by their socket numbers or their title or even abbreviations of the title. 20 commands are available, please send for full details.

As a bonus feature for anyone who has files they want to keep from prying eyes, ROM master contains the commands SCRAMBLE & UNSCRAMBLE which will encrypt or de-encrypt a file based on an entered password. The encryption used is highly sophisticated so unless you know the correct password the files cannot be read.

PRICE £14.95

Orders to:
CHALICE SOFTWARE, Dept.MU
3 Merlin Way,
Covingham,
Swindon SN3 5AN.

Access

All Enquiries Please Ring:
0793-615026
Dealer Enquiries are Welcome

All prices shown include VAT and p&p. Please add £3.00 per disk if you require 3'' disks and specify when ordering.

From Page 139

message on the screen when you first turn on the machine.

What happens is that the message is stored away in the micro's memory. When you switch on it copies the message from those locations into the memory reserved for the screen so you can see it. That is, the OS machine code program moves the numbers that encode the message from one location to another.

This same sort of transfer of data occurs when you press a key. The OS transfers the value of the key pressed from the location that remembers which key it was to the memory set aside for the screen.

When you save a Basic program the OS's own machine code program moves the contents of the memory where the Basic program is stored out to the cassette port.

It's all about moving bytes of data around. More formally, most of machine code is concerned with moving bytes of information from one memory location to another. If you're a realist, you'll probably have guessed that there's a lot more to it than that. But have faith, most of what I'm telling you is true.

To investigate this movement of bytes further we need an analogy – in other words a meaningful lie. Suppose we have a tiny micro with only three memory locations. Figure III shows the sort of thing.

It's fairly easy to wire them up so that the numbers can move from one location to another – just join each location to every other location (in the figure, by the way, I've only shown one of the eight wires for clarity).

If you stretch your imagination you'll see that it looks a lot like a simple railway.

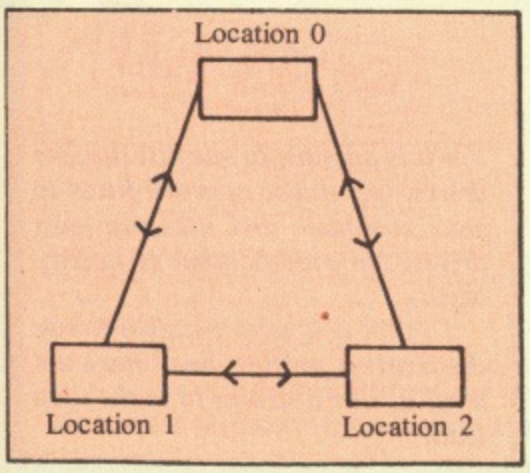


Figure III: Linking three memory locations

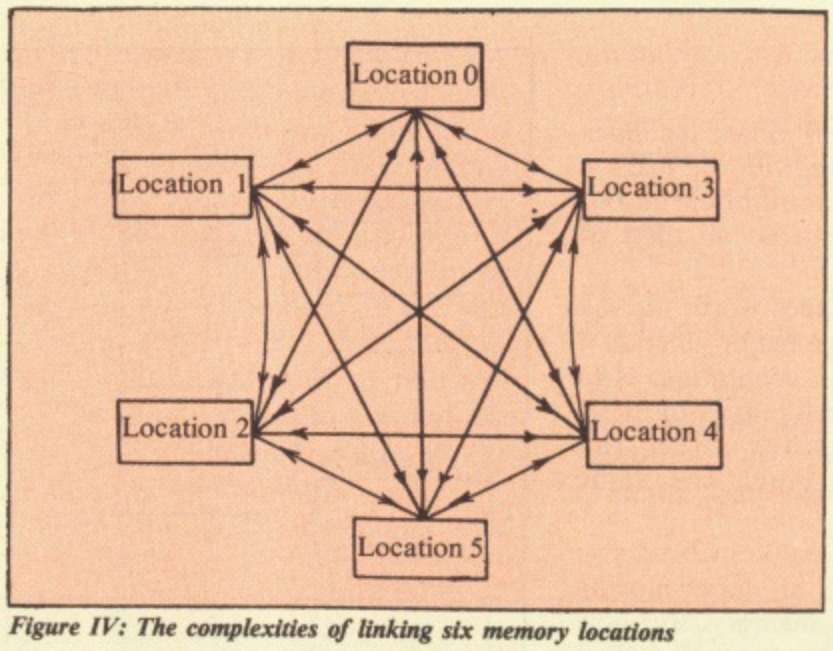


Figure IV: The complexities of linking six memory locations

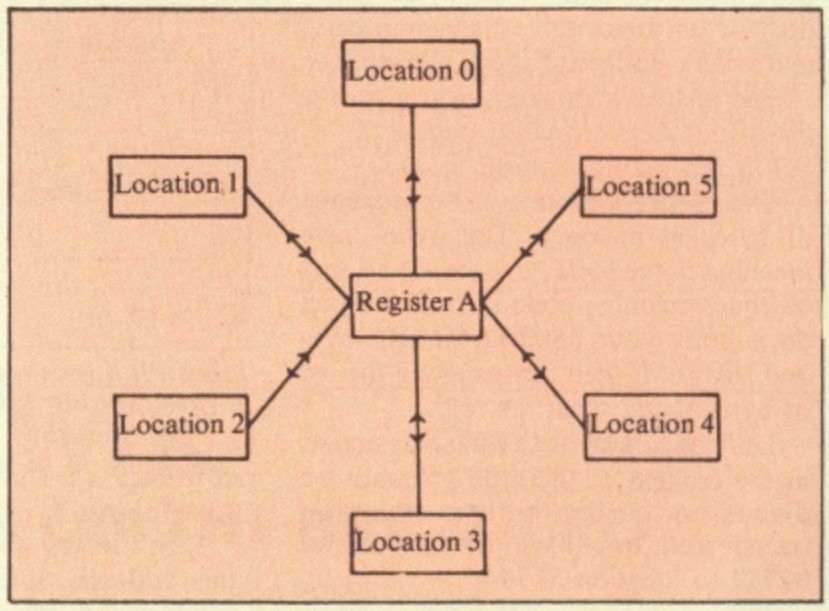


Figure V: Memory locations linked by Register A

But suppose there were more locations, as in Figure IV. You can see the layout's getting complicated. And when you consider that the 6502 addresses tens of thousands of such locations, you can see that we've got problems – the wiring's far too complex.

Of course the answer is to stop giving each memory location its own direct lines to each and every other location. We'll do what railways do, and have junctions and branch lines.

Figure V shows such a layout. Our six locations are all connected via the major junction A. Everything passes through here. In fact there is such a memory location as A – a major junction through which traffic passes. It's deep in the heart of the 6502 and can hold one byte numbers. In computing jargon we call such a junction a register and the A register in particular is known as the Accumulator.

Now suppose you wanted to move a byte of information from memory location 32777 to memory location 31744. You would have to go via the Accumulator, that is, register or junction A.

You would do this by giving the machine two instructions:

1. *Load the Accumulator with the number contained in memory location 32777.*
2. *Store the contents of the Accumulator in memory location 31744.*

It's a sort of microelectronic pass the parcel. The data goes from location 32777 to A, then from A to 31744. It's always a two-stage journey. All traffic passes through the Accumulator.

In practice the actual layout is more like Figure VI, but there's still no direct traffic. Everything goes to A first and then back out.

To stretch our analogy a little further, a major rail junction like A would have

From Page 141

lots of facilities that other junctions haven't. It's the same with the 6502 – once you've got a number in the Accumulator you can do all sorts of things with it!

Also no rail designer worth his salt would depend on one major junction – there'd be too much congestion. He'd have other junctions. Similarly the 6502 has registers other than the Accumulator for much the same reasons.

By now I think I've convinced you that machine code's all about moving numbers around in memory. But how does the micro know what to do? How do you tell it to move these numbers, and where you want them putting?

The answer's simple – you give it a list of numbers stored in memory!

I'm not joking, honest.

The program itself is just a sequence of bytes in memory. The bytes have meaning to the 6502, you see – it's a sort of code, machine code in fact. All you do is point your 6502 at the first byte and say go. It then moves along the list of bytes doing what it's told.

Let's have a look at what this means in the context of the little program we discussed earlier – the one that transferred one byte from location 32777 to location 31744.

The actual string of bytes we need is:

173 9 128 141 0 124 96

I've written the numbers in decimal, as that's what we're used to – of course the micro reads them in binary. Figure VII explains what it's all about. When we point the 6502 at the location of the first byte of our program and tell it to go it knows that first byte is going to tell it to do something. The fancy name for this sort of "command" byte is an opcode – short for operation code.

Now 173 is an opcode that tells the 6502 to load the Accumulator with the contents of a particular location in memory. From the opcode itself, the 6502 knows that the address of this memory location will be contained in the two bytes directly following the opcode (remember you need two bytes to specify addresses).

So having understood the meaning of the opcode, the 6502 moves its attention along to these two bytes and works out the address they refer to (in this case, location 32777). It then copies the contents of that address into the Accumulator.

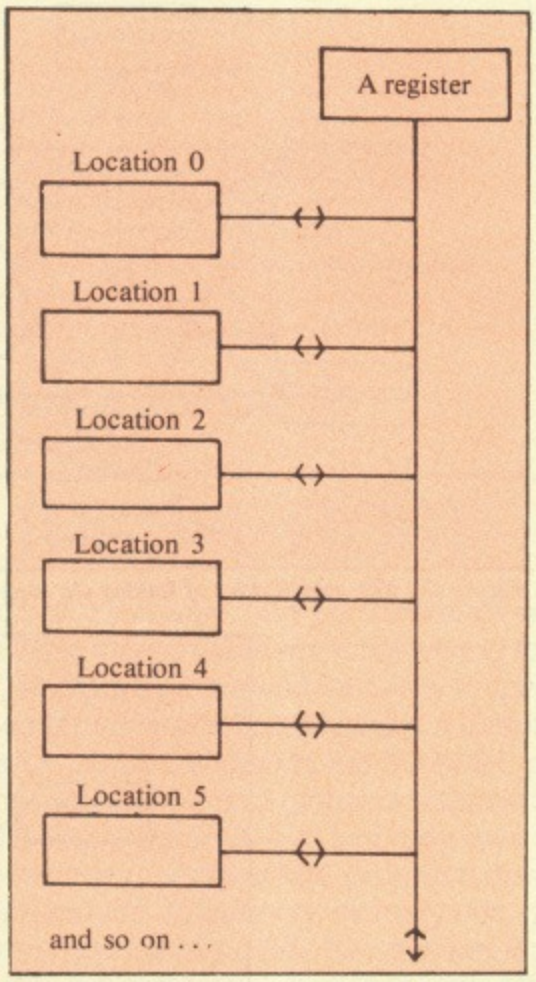


Figure VI: A more realistic representation of memory/register linkage

Don't worry about how it works out this address. Suffice it to say for the moment that it's stored in two bytes – we'll go into more detail next month.

The 6502 has finished with the first three bytes and has done all the first opcode instructed it to. It now turns its attention to the fourth byte, which it knows must be an opcode since it has finished its previous task.

This time the byte is 141, which tells the micro to store the contents of the Accumulator in the memory location specified in the next two bytes. (In a sense, this is the mirror image of the last opcode. That loaded the Accumulator from a memory location. This opcode stores the Accumulator in a memory location.)

So having worked out what the opcode contained in the fourth byte wants it to do, the 6502 turns its attention to the next two bytes along, works out the address they store and copies the Accumulator into that location.

Having finished that instruction, which used the fourth, fifth and sixth bytes, the 6502 then moves on to the seventh and last byte to find its next opcode.

The seventh byte contains 96, the opcode for return – which tells the 6502 to go back to where it was before it started or, as the jargon has it, called this progam.

This works in much the same way as RETURN does in a subroutine, causing the micro to rejoin the main flow of the program.

Notice that you don't need any extra bytes after this opcode to tell it where to return to. When this routine was called the 6502 carefully stored where it was up to for future reference – as does a Basic program when it meets a GOSUB.

Let's have another look at the machine code program we've developed. I'm going to split each instruction – that is each opcode and its data bytes – onto a separate line.

173 9 128
141 0 124
96

PROBLEM

I HAVE a BBC Micro with Acorn DFS. I also have a TRS-80 48k with expansion interface and twin disc drives. The disc drives are Micropolis Model 1022I, 100k, 40 track single sided single density.

Would you please advise me of what modifications and parts would be required in order to be able to interface the discs to use with the BBC Micro?

The disc drives have their own power supplies.

Could you also tell me if the Brother EP22 typewriter/printer will work with the BBC Micro? – G. Bromehead, Rotherham.

SOLVED

Yes it is possible to use just the disc drives. Get a disc upgrade fitted to your computer and use your own drives. No modification is necessary.

I think it is also possible to use the Brother printer, but I have not tried it. Get a dealer to make up a lead.

Mike Cook

Doesn't make immediate sense, does it? Our brain is much more adept at making sense of words than numbers. Have a look at the program in a new form, that uses "words":

```
LDA 32777  173 9 128
STA 31744  141 0 124
RTS        96
```

The symbols on the lefthand side are mnemonics. LD stands for LoaD, ST for Store and RTS for ReTurnS.

The translation is as follows:

LDA 32777 *LoaD the Accumulator with the contents of memory location 32777.*

STA 31744 *STore the contents of the Accumulator in memory location 31744.*

RTS *ReTurnS to the program that called the machine code in the first place.*

There are special program called assemblers that let you type in your routines in these more meaningful mnemonics and then translate them into machine code. In fact your BBC Micro has one built in, which we'll be learning to use.

Well that's all for now. I hope you've now got a better understanding of what machine code is.

● *Next month we'll be looking at hexadecimal and running your own machine code programs. Until then, practice your binary – you'll be needing it!*

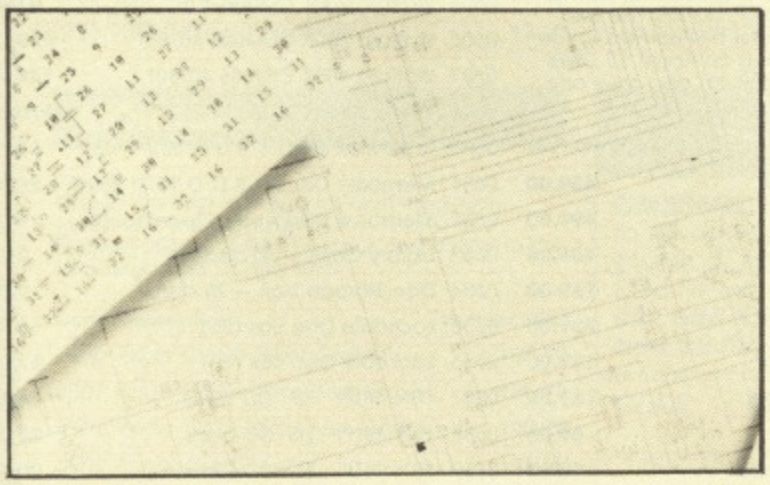
Contents of memory location	173	9	128	141	0	124	96
Meanings of above bytes	Load Accumulator with contents of the address that follows	These two bytes specify the address needed by previous opcode		Store the Accumulator in the address specified by the next two bytes	These two bytes specify the address referred to by the previous opcode		Return from whence you came

Figure VII: A simple machine code program explained

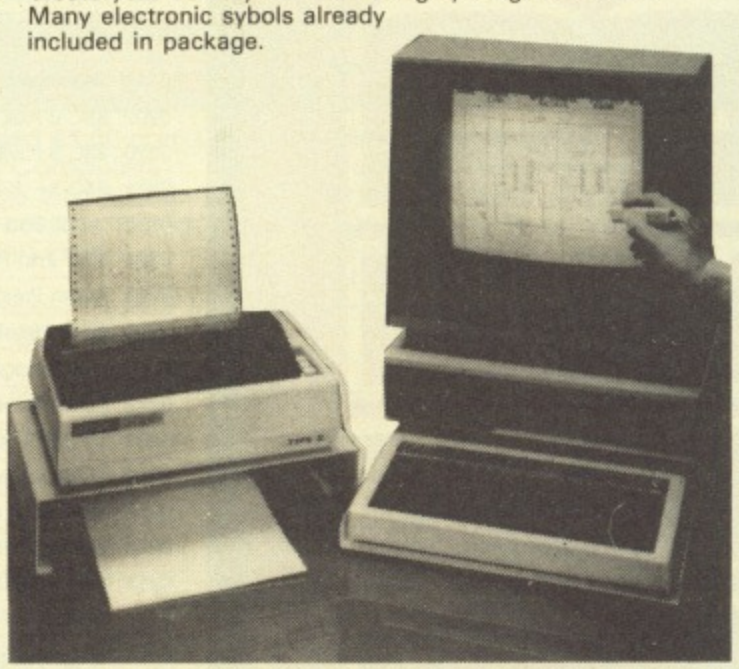
Datapen **CIRKWIK** Datapen

SCHEMATIC DRAWING ON THE BBC MICRO

A CAD package orientated to the production of schematic drawings, such as circuit diagrams, flow charts, pipework diagrams, fluid logic diagrams and many similar professional and engineering applications.



- ★ Lightpen or trackerball driven.
- ★ Virtual screen 8 x the BBC's mode 4.
- ★ Uses standard dot matrix printer in dual-density graphics mode to produce excellent quality diagrams.
- ★ Automatic parts list generation.
- ★ Up to 640 different symbols may be in use in any one diagram.
- ★ Total symbol library unlimited in size.
- ★ Create your own symbols on a highly magnified scale.
- ★ Many electronic sybols already included in package.



CIRKWIK Version for lightpen only **£19.95**
CIRKWIK Version for trackerball or lightpen **£24.95**
CIRKWIK Version for grafpad or lightpen **£24.95**
HARDWARE:
DATAPEN Lightpen (introductory programs included) **£25.00**
MARCONI Trackerball with icon based program included **£69.50**
ATARI Trak-Ball c/w with user port interface **£33.00**
User port/Atari Track-Ball interface only **£13.00**
Our prices already include VAT
Postage: Trackerball £2.50, Interface or software £1.00, max. £2.50
S.A.E. for details of lightpen, CIRKWIK and other programs.

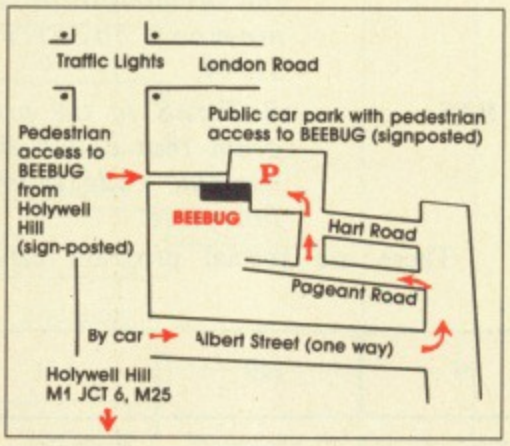
DATAPEN MICROTECHNOLOGY LTD. Dept ED, Kingsclere Road, Overton, Hants RG25 3JB Telephone: (0256) 770488

BEEBUG SHOWROOM AND MAIL ORDER

The products in this price list are available in our showroom in St.Albans and by mail order. Telephone your order on 0727 40303 or send the order form to the address below. Alternatively come along and see us. We are open 9 - 5.30 Mon - Sat, and there is ample parking at the rear of our premises.

We take both Access and Visa credit cards. Simply telephone us on our multi-line telephone number 0727 40303 quoting: Cardholder's Name, Cardholders Address, Cardholder's Telephone number, Credit Card number, expiry date, order details.

PLEASE NOTE: that the mail order despatch address must be the same as the cardholder's address.



BEEBUG MAIL ORDER
Dolphin Place, Hollywell Hill,
St.Albans, Herts. AL1 3YS
Tel: 0727 40303 — Multi-lines

- Computers
- Printers
- Monitors
- Disc Drives
- Budget Discs
- Software

COMPUTERS

BBC B Plus
There are now two versions of this machine, the standard 64K with shadow screen memory at £459, and a 128K model at £489 with a special Basic and 64K user ram available for programs!

ADFS/1770 Interface
The Advanced Disc Filing System is now available at £29, offering a 60% increase in storage space and a large number of files per disc.

The 1770 Interface at £49 gives increased speed over the 8271 interface and has inbuilt format and verify routines.

Second Processors
At £189 the 6502 second processor remains the best way of adding memory; invaluable for word processing and spreadsheet users.

Disc Interface Offer
As the B Plus has a disc interface fitted as standard it seems that support for tape users may dwindle in future. To overcome this Beebug Mail Order is offering the Acorn 1.2 DNFS Disc Interface Kit at £89 until January 1st. The 1.2 DNFS is not part of the usual DFS upgrade and so this offer is only available while stocks last. We are also offering a Starter Pack for newcomers to the Disc Filing System comprising an Acorn 1.2 DNFS upgrade kit, Cumana CSX100 40T disc drive and a box of 10 Beebug Discs, all for £179.

Code	Description	Price inc. VAT
0202	BBC B Plus Computer	459.00
0220	BBC B+ with Econet	499.00
0221	BBC B+ 128K	489.00
0203	'6502' 2nd Processor	189.00
0204	'Z80' 2nd Processor	389.00
0205	Acorn Prestel Adaptor	129.00
0206	Acorn Teletext Adaptor	139.00
0210	A to B Upgrade Kit	69.00
0212	Acorn Speech Upgrade	46.00
0209	1.2 DNFS Rom	19.50
0217	1770 Disc Interface Upgrade Kit	49.00
0218	ADFS Rom for 1770 DFS	29.00
0213	Watford DFS Rom and Manual	26.50
0214	Watford DDFS Rom + Manual	98.00
0216	Watford DFS Manual	6.95
0219	Watford DFS Kit	85.00
0223	Acorn 1.2 DNFS upgrade	89.00
0222	Disc Starter Pack	179.00

DISC DRIVES

Cumana drives are used widely in the Beebug offices and seem particularly robust.

The 80 track drives are all switchable to 40 track and the 800k CD800S will satisfy most data storage requirements.

Our BEEBUG Discs all come in free plastic storage boxes — worth up to £9.00 for 25 or 50 Discs.

Code	Description	Price inc. VAT
0600	Cumana 100K CSX100 40T	97.00
0610	Cumana 100K CS100 40T	127.00
0601	Cumana 200K CDX200 40T	187.00
0602	Cumana 400K CSX400 40/80T	113.00
0603	Cumana 400K CS400 40/80T	133.00
0604	Cumana 800K CD800S 40/80T	252.00
0605	Watford 200K CLS200 40T	97.00
0606	Watford 400K CLS400S 40/80T	133.00
0607	Watford 400K CS400S 40/80T	149.99
0608	Watford 800K CD800S 40/80T	270.00
0650	Memorex Discs S/S D/D 48TPI 3481	15.50
0651	Memorex Discs D/S D/D 96TPI 3501	25.50
0652	Memorex Disc Head Cleaning Kit	9.65
0653	Library Case — 10 discs	2.25
0654	Disc Storage box — 25 discs	9.00
0655	Lockable Disc Box (35)	13.80
0656	Lockable Disc Box (80)	17.25
0657	10× 48TPI SS DD Discs	14.40
0658	10× 48TPI DS DD Discs	20.00
0659	10× 96TPI SS DD Discs	20.00
0660	10× 96TPI DS DD Discs	21.40
0661	25× 48TPI SS DD Discs	33.90
0662	25× 48TPI DS DD Discs	45.19
0663	25× 96TPI SS DD Discs	45.19
0664	25× 96TPI DS DD Discs	48.90
0665	50× 48TPI SS DD Discs	58.30
0666	50× 48TPI DS DD Discs	81.40
0667	50× 96TPI SS DD Discs	81.40
0668	50× 96TPI DS DD Discs	92.49

OTHER HARDWARE

Roms and Rams
The 2764 8K eprom is only £2.30 and the 27128 16K eprom now £3.45. The Aries B32 Ram board is good value at £91.

Modem Mania
Other price reductions are the Nightingale Modem at £120, and the accompanying Commstar for £33.

Joysticks
We can fully recommend the Voltmace 3B joysticks at £12 and £19.95 for single and twin models repectively. Just the thing to make the best of our new software!

Code	Description	Price inc. VAT
0700	Aries B20 RAM Card	86.50
0701	Aries B32 RAM Card	91.00
0702	Watford 32K RAM Card	69.00
0703	AMX Mouse	79.95
0704	ATPL Sidewise ROM Board	39.00
0705	2764 8K eprom	2.30
0706	27128 16K eprom	3.45
0707	6264 8K ram	7.50
0708	Eprom Extractor	5.00
0709	Eprom Eraser	32.20
0710	Softlife Eprom Blower	75.90
0711	Nightingale Modem	120.00
0712	Pace Commstar	33.00
0713	Phone 2 into 1 adaptor	6.32
0714	BBkey Function Key Labels	2.00
0717	Watford Sideways ZIF	17.25
0718	Voltmace Delta 3B Single Joystick	11.99
0719	Voltmace Delta 3B Twin Joystick	19.95
0720	Voltmace Delta 14B Joystick	14.95
0721	Voltmace Delta 14B/1 Interface	14.85
0722	13 amp 4-way plug block Extension	10.35
0723	Pocket Screwdriver	0.26
0724	Antex CN17 Soldering Iron	6.79
0725	13 amp plugs	0.86
0726	8 way DIP switch	0.98
0727	RS423 domino plug	0.46
0728	RGB 6 pin DIN plug	0.46
0729	Cassette 7 pin DIN plug	0.30
0730	3-core 6 amp Mains Cable (per m)	0.35
0731	4-core RS423 Cable (per m)	0.20
0732	6-core RGB or Cassette Cable (per m)	0.25
0733	Safebloc Test Connector	11.50
0734	BBC Replacement Keyboard	46.00
0735	ATPL Battery Backup kit	17.00

SOFTWARE

We have expanded our range of software to include major titles such as Elite, Revs, White Knight Mk 12 and Aviator.

ISO Pascal at £69 continues to be the best structured alternative to Basic.

The Basic Editor is selling well at £29, as is the Graphics Extension Rom (GXR) at £29 (please specify B or B+).

Code	Description	Price inc. VAT
1000	Acornsoft View	53.00
1001	Acornsoft View Sheet	53.00
1002	Acornsoft Hi-View	55.00
1003	Acornsoft Lisp Rom	49.00
1004	Acornsoft BCPL	56.00
1005	Acornsoft Comal	49.00
1006	Acornsoft Logo	69.00
1007	Acornsoft ISO Pascal	69.00
1008	Acornsoft Basic Editor	29.00
1009	AMX Desk	21.95
1010	AMX Utilities	13.45
1011	BBCsoft UltraCalc 2	75.00
1012	Acornsoft Elite Disc Version	17.00
1013	View Printer Driver Cassette	9.90
1014	View Printer Driver Disc	11.50
1015	Revs Disc	17.00
1016	Aviator Disc	17.00
1100	Wordwise Plus	52.90
1112	Hi Wordwise Plus Disc	6.50
1102	Wordwise	35.00
1106	Accelerator	58.90
1109	Disc Doctor	28.00
1103	C.C.Graphics ROM	28.00
1110	Intersheet	51.35
1111	Hi Intersheet Disc	6.50
1104	Printmaster (Epson)	28.00
1105	Printmaster (Star)	28.00
1107	Speech ROM	30.00
1108	Acorn Speech Processor	10.00
1118	White Knight Mk 12 Disc	19.00
1119	White Knight Mk 12 Cassette	9.50
1017	GXR B	29.00
1018	GXR B+	29.00
1114	Interchart	29.00

PRINTERS

Daisywheel Offer
Beebug Mail Order are offering the Juki 6100 Daisywheel which provides true letter quality print at only £359. This low price is unlikely to be repeated or maintained!

New Epson Offer
The new Epson LX80 printer is proving very popular and so we offer a combined package of the LX80 with its tractor feed unit for only £274.

Printer Accessories
Due to the costs of sending our Printer Paper through the post we must now charge a carriage of £2 per box, in addition to normal carriage charges. The price of £14.50 is for single boxes and, as with all our goods, we would be pleased to quote to schools and industry for larger quantities.

Platten Cleaner Kit
A specially designed pad allows you to remove all traces of ink and other dirt from your printer platten using the special solvent supplied.

Code	Description	Price inc. VAT
0300	Brother HR 15 Daisywheel	373.75
0301	Canon PW1080A 10"	340.00
0302	Canon PW1156A 15"	405.00
0303	Canon PJ1080A colour	460.00
0304	Epson LX 80	270.00
0305	Epson RX 100	392.00
0306	Epson FX 80	362.00
0307	Epson FX 100	490.00
0308	Epson JX 80 colour	569.00
0309	IBICO LTR1 Letter Quality	138.50
0310	Juki 6100 Daisywheel	359.00
0311	Kaga KP 810	263.35
0312	Linear Graphics Plotmate	333.50
0313	LX80 Tractor Feed Unit	23.00
0314	LX80T Offer Package	274.00
0400	2m Printer Lead	10.00
0401	Platen Cleaner Kit	6.00
0402	Epson FX80/RX80 Ribbon	5.00
0403	Epson FX100/RX100 Ribbon	10.00
0404	Juki 6100 Daisywheel (Wheel)	20.50
0405	Brother HR-15 Daisywheel (Wheel)	20.50
0406	11"×9.5" P/Paper (2000)	14.50
0407	3.5"×1.44" Labels (1000)	5.00
0408	Canon PW/Kaga Taxan Ribbon	6.79
0411	HR-15 Correctable Ribbon	4.30
0412	HR-15 Nylon Ribbon	4.30
0413	LX 80 Replacement Ribbon	5.50
0414	Ibico Ink Roller	4.60
0415	Epson JX80 Ribbon	14.95

MONITORS

Colour
One of the best monitors for high resolution graphics is the Sanyo 3115. It is used in the Beebug offices and is a serious competitor to the Microvitec 1451 at only £449.

Code	Description	Price inc. VAT
0500	Kaga 1201 G Hi-res Green	103.50
0501	Kaga 1202G Ultra Hi-res Green	120.75
0502	Kaga 1203A Ultra Hi-res Amber	120.75
0503	Zenith 123 12" Green	75.90
0530	Microvitec 1431 Med-res Monitor	218.50
0531	Microvitec 1451 Hi-res Monitor	276.00
0532	Philips CT2007 14" TV Monitor	225.00
0533	Sanyo Very Hi-res 14" Monitor 3115	449.00
0550	1.0m Monitor Lead RGB	5.75
0551	1.0m Monitor Lead BNC Zenith/Kaga	3.45
0552	Single Plinth for Monitor	12.65
0553	Double Plinth for Monitor	21.85
0554	Memorex TV and VDU Cleaning Kit	4.51

ORDER FORM

CARRIAGE. Please **add £1.00** carriage to all orders except Computers, Monitors, and Printers **add £7.00.** Disc Drives, 2nd Processors, Modems etc. **add £5.00.** Listing Paper **add £2.00.**

BEEBUG MAIL ORDER
Dolphin Place, Holywell Hill, St.Albans, Herts. AL1 1EX
(Dolphin Place is opposite 18 Holywell Hill in the centre of St.Albans).

CODE	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL

NAME:

ADDRESS:

POSTCODE:

SUB TOTAL £

CARRIAGE £

TOTAL £

ACCESS/BARCLAYCARD NO:

In accordance with our competitive pricing structure prices are subject to alteration at any time.

New From CUMANA Super Value Disk Drive Starter Pack

If you're a BBC or Electron* user, you can now upgrade your micro with Cumana's Super Value Disk Drive Starter Pack.

For only £179.95 we'll supply you with a single disk drive, double density disk interface, diskettes, user manual and the right accessories for your micro. In fact, everything you need to increase the speed, efficiency and performance of your micro.

Look for the special price at your local dealer today.

Send off your coupon or visit your local dealer today.

Trade enquiries welcome.

CUMANA DISTRIBUTORS

CEM Micro Computer Services (Belfast) 0232 24411, Telebank Commercial Services (Bolton) 0204 29411, Thompson Cook (Birmingham) 0527 25000, J.S. Simnett (Kingston-upon-Thames) 01-541 1495, Microworld (Edinburgh) 031-557-4196, Hugh Symonds (Bournemouth) 0202 26535, Eltec (Bradford) 0274 722512.

*Electron needs the plus one expansion unit.

ORDER FORM (DISK DRIVE STARTER PACK OFFER) MICRO USER JANUARY

To: CUMANA LIMITED, THE PINES TRADING ESTATE, BROAD STREET, GUILDFORD, SURREY GU3 3BH Tel: 0483 503121

Please rush me: ..... (Qty) Super Value Disk Drive Starter Pack(s) at £179.95 for BBC/Electron* *delete as appropriate

I enclose cheque/PO* for ..... or debit my access/visa* card no. ..... *Delete as applicable

NAME .....

ADDRESS .....

.....

Tel: .....

CUMANA® The best name in memory

VISA ACCESS — SPEEDYSOFT — EUROCARD MASTERCARD

01-846 9353 (24 HRS)

WE ALWAYS TRY TO SEND YOUR PROGRAMS ON THE SAME DAY WE GET YOUR ORDER, THAT'S WHY IT'S CALLED SPEEDYSOFT! All programs normally in stock before we advertise them! FOREIGN ORDERS WELCOME, satisfied customers in 64 countries over 3 years. UK prices include VAT: export prices are the same, plus p&p because of the extra work involved. Pay by sterling cheque, bank draft or postal order. All orders must be prepaid: we send your programs as soon as we get your money!. It's fastest to order by phone from any country with your VISA, EUROCARD, MASTERCARD or ACCESS. Call 01-846 9353, 24 hrs, 7 days a week. BIG FREE ILLUSTRATED CATALOGUE WITH EVERY ORDER WITH DETAILED REVIEWS, LOAD TIMES, SCREEN SHOTS, ETC. Includes lots of classic serious software, too. Send £1.00 cash (refunded with first order) for catalogue only. TWO FREE BLANK TAPES OR ONE FREE 5.25 INCH DISK IF YOUR ORDER FROM THIS AD COMES TO £30 OR MORE, excluding p&p. State choice on order form.

"... A SERVICE THAT IS AS RELIABLE AS YOUR PROGRAMS"
(J. Noppen, Belgium)

WATERLOO

The first new wargame from Lothlorien for a long time is great. You are Napoleon. Can you win at Waterloo and change the course of history? Your 6 Corps commanders are intelligent; they may use their own initiative, they may get confused. Can you use them to defeat Wellington? 3 skill levels. Full-screen graphics. 19 command keys and helpful victory hints in the manual. Your computer opponent depends, like you, on strength,, morale, terrain and a bit of luck. No Stick. (Lothlorien) **Cassette £9.95 Disk (40/80 Track OK) £12.95.**

DR WHO

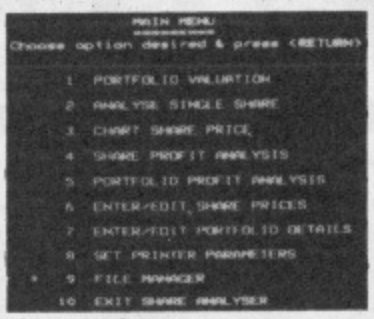
'Dr WHO and the mines of terror' comes from the authors of **'Castle Quest'.** There can't be a much better recommendation. It is three times as big as CQ and has 18K of graphics out of 40K of program, partly on ROM! The mines you explore measure 1000 feet wide to scale. There are interwoven mental puzzles and reactive tests. It's a real challenge. (MicroPower) NOT for BBC+ **Cassette plus ROM £18.95 Disk plus ROM £19.95**

HARRIER

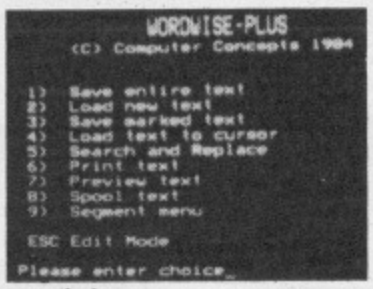
'Strike Force Harrier' is a full flight and battle simulation for a Vertical and Short Take-off and landing aircraft. Your objective is to bomb the enemy HQ while defending yourself and your ground sites from enemy aircraft and ground forces. Choose either Practice or Combat with 3 skill levels. 30 command keys. 5 on-screen windows. Flight chart to map your sorties. 28-page manual. Learn your different attack methods, from high-speed yoyo to the Immelman! No Stick. (Mirrorsoft) **Cassette £9.95 Disk (40/80 Track OK) £12.95**

THE REAL YOU

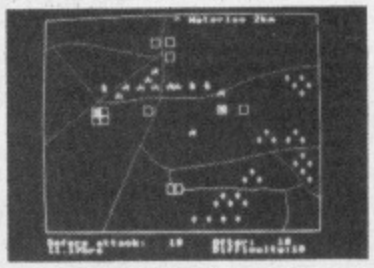
16 tests to try on yourself, your family, your friends. Are you a good lover? A latent radical? A good manager? Satisfied with your job? How do others rate you? Compare your sexual experience with the average. Measure your own IQ. How honest are you? Tests can also be taken by couples to measure compatability. Manual tells you how to change what you don't like about yourself. Fascinating. Sticks OK. (CollinsSoft) **Cassette 14.95 Disk(40/80 Track OK) £16.95**



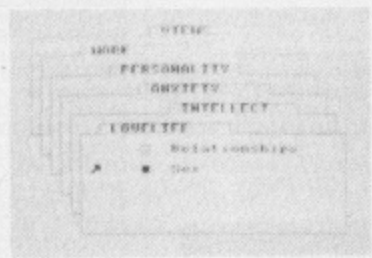
Share Analyser



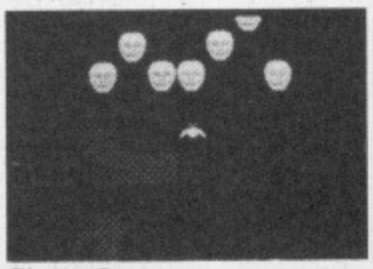
Wordwise +



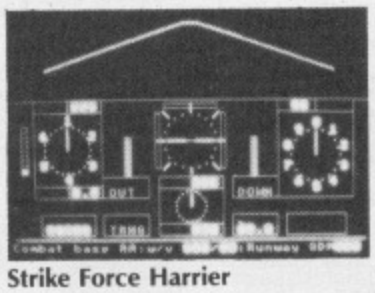
Waterloo



The Real You



Repton 2



Strike Force Harrier

RED ARROWS

"One of the best flight simulators to be released in a long time." (Home Computing Weekly) "Where it scores is in the relatively gentle introductory stages and the final aim of a performance of aerobatics. The graphics are very good ... highly recommended." (ZX Computing) Written in co-operation with the actual pilots, this is a faithful simulation of the Red Arrows breathtaking aerobatics. Sticks OK. (Database) **Cassette £8.95 Disk (40/80 Track OK) £11.95**

REPTON 2

"This brilliant new game ... for my money the best arcade game for the Beeb ... Colour, sound, super scrolling, some excellent humour." (Acorn User) That review was of the original Repton. Now there is Repton 2, which Acorn User says is *'even better than Repton.'* We agree. It even talks to you! It's bigger, more colourful, has more puzzles and better graphics and sound. You must collect over 1,000 diamonds and find the 42 jigsaw pieces strewn over 16 levels. Could keep you busy for months! Great fun. No Stick. (Superior) **Cassette £9.95 Disk (40/80 Track OK) £11.95**

FLOPPYWISE+

"Provides backup copies of protected disks quickly and simply ... I have yet to find a disk that it has not copied. I cannot stress strongly enough that to copy for any other purpose than personal backup is illegal." (Micro User) This FloppyWise+ ROM contains 39 other very useful routines apart from the 'CLONE' routine reviewed above. An invaluable addition to your ROMS. (Software Services) **BBC ROM £29.95**

ADRIAN MOLE

"Looks really great. All the old characters are there ... even if you've read all the books and stuff, there are still plenty of new situations you can get into." (Your Computer) Pete Austin, of Level 9 fame, has brought you the chance to be Adrian Mole in a split-screen text/graphics adventure which loads in 4 parts and will keep you amused for a very long time. No Sticks. (Level9/Mosaic) **Cassette 9.95 Disk (80 Track only) £12.95**

INTER CHART/SHEET

"Inter Chart is remarkably good value, capable of really serious work ... Inter Sheet is quicker, has more features and is cheaper than either of its competitors." (A&B Computing) Two ROMS: a spreadsheet and a charting ROM. Buy them separately if you wish. But they also work together to swap data. Details are in our catalogue: but these ROMS are some of our most popular items and you save pounds on each of them! (Computer Concepts) **INTER CHART £33.00 INTER SHEET £50.00** (Recommended price over £93.00 the pair!)

"EXCELLENT CATALOGUE AND EXTREMELY FAST SERVICE
(A. Ammundsen, New Zealand)

WORD PROCESSING

The most useful feature of any micro. For the Beeb, you can't beat the **WORDWISE+ ROM.** Compatible with 6502 2nd processor. Our price £50.00 saves you £6.35. The new **WORDEASE** Disk adds lots of useful commands to your Wordwise+, plus powerful label printing and mailmerge routines. Disk only (40/80 Track OK) £21.00. And, if you really use your Wordwise, you will need the **SPELLCHECK 2 ROM** from Beebugsoft. A dictionary disk with 6,000 words checks your spelling. Add to the disk (more than 17,000 words even on a 100K disk!) as you wish. 6502 compatible. As A&B Computing said it's *"the obvious choice"* Our price £32.00 saves you £2.00.

POST TO: SPEEDYSOFT (MU13)
37 CHURCH ROAD, LONDON SW13 9HQ, ENGLAND.
For CATALOGUE ONLY, send £1 cash. Refunded with your first order.
I own a ..... I enclose a cheque/PO payable to Speedysoft OR charge my VISA/ACCESS/EUROCARD/MASTERCARD

No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Signature: ..... Expiry Date .....
Please write clearly. If we can't read it, you won't get it.
Name: .....
Address: .....
.....
..... Postcode: .....
PHONE NO: if any, in case of query .....

Program Name	Cass/Disk	Price
Postage & Packing	UK add 75p per order	
	Europe ADD £1.00 per program	
	Outside Europe ADD £1.50 per program	
	Total Order	

COMPUTER WAREHOUSE

1000's OF BARGAINS FOR CALLERS

THE "ALLADINS' CAVE OF COMPUTER AND ELECTRONIC EQUIPMENT

EX-STOCK INTEGRATED CIRCUITS

4164 200ns D RAMS 8 for **£14.95** **4116** 300 ns **£1.50**
2112 £10.00 **2114 £2.50** **2102 £2.00** **6116 £2.50**
EPROMS 2716 £4.50 **2732** £3.00 **2764** £4.95
27128 £5.50 **6800** £2.50 **6821** £1.00 **68A09** £8.00
6B09 £10.00 **8085** £5.50 **8086** £15.00 **8251** £7.00
8748 £15.00.
Thousands of IC's EX STOCK send SAE for list.

RECHARGEABLE BATTERIES

Dry Fit **MAINTENANCE FREE** by Sonnenschein & Yuasa
A300 07191315 12v 3ah as RS 591-770 **NEW £13.95**
A300 07191312 6v 3ah as RS 591-360 **NEW £9.95**
A300 07191202 6-0-5v 1.8ah as RS 591-382 Ex Equip **£5.99** 3.6v 100 mah PCB mount as RS 591-477 **NEW** £1.00

HOT LINE DATA BASE

DISTEL©

The **ORIGINAL FREE OF CHARGE** dial up data base. Buy, browse or place **YOUR OWN AD** for goods or services to sell. 1000's of stock items, spares and one off bargains. Updated daily.
ON LINE NOW. CCITT, 8 bit word, no parity.
For **300** baud modems call 01-679 1888
For **1200**-75 baud modems call 01-679 6183

PRINTER / TERMINAL SCOOP

A **MASSIVE** purchase of these attractive stand alone terminal units enables a **SUPER BARGAIN** offer. Made by the **US GENERAL ELECTRIC CORPORATION** the **GE MODEL 30** features a standard **QWERTY** 80 key electronic keyboard coupled to a quality built matrix printer with variable 3" to 9.5" forms tractor. The printer is capable of continuous duty printing, with up to 120 characters per line. Standard **RS232** interface accepts **ASCII** data at 110, 150 or 300 baud. Ideal for Terminals, Data loggers, local label printing, or just as a printer!! Sold **TESTED** with data **ONLY £95.00**. Also available with **TWIN MAGTAPE CASSETTE** unit for data capture, data preparation etc **£150.00** Carriage £10.00.

DISK DRIVES

Japanese Half height, 80 track double sided disk drives by **TEAC, TOSHIBA** etc. Sold as **NEW** with 90 day guarantee **ONLY £125.00.**
SUGART SA400 SS FH 35 TRK **£55.00**
SIEMANS FDD100 SS FH 40 TRK **£75.00** carriage on 5¼" drives **£5.50**
Brand **NEW** metal cases with internal PSU etc for above drives, below cost!!!
DSKC 1 for 2 HH or 1 FH 5¼" drive **£39.95** + pp £4.50 **DSKC 2** for 1 HH or 1 FH 5¼" drive **£29.95** + pp £4.50
8" Refurbished standard units.
SUGART 801 SS £175.00 + pp £8.50
SUGART 851 DS £250.00 + pp £8.50
DRE 7100 SS as seen £125.00
TWIN SUGART 851's in smart case, complete with PSU etc, £595.00
8" DRIVE PSU for 2 drive units £45.00
Hard Disk Drives
DRE/DIABLO Series 30 2.5 Mb front load, **£525.00**, Exchangeable version £295.00
ME3029 PSU for above £95.00
DIABLO 44/DRE4000A, B 5+5 Mb from £750.00
CDC HAWK 5+5 Mb £795.00
CDC 9762 80 Mb RM03 etc £2500.00
PERTEC D3422 5+5 Mb £495.00
RODIME 10MB ST506 Winchester NEW £299.00
BASF 6172 23Mb Winchesters, as seen £199.00
Carriage on other drives £10.00.
Unless stated all drives are refurbished with 90 day guarantee. Many other drives and spares in stock – call sales office for details.

MODEMS

Join the communications revolution with our super range of **DATA MODEMS**, prices and specifications to suit all applications and budgets...
BRAND NEW State of the art products.
DACOM DSL2123 Multi standard 300-300, 1200-75 Auto answer etc. **£268.00**
DACOM DSL2123AD Auto dial, smart modem with multi standard **AUTO SPEED** detect, and data buffer with flow control etc. **£365.00**
DACOM DSL2123GT The **CREAM** of the intelligent modems, auto dial, auto call, index, buffer etc etc. **£498.00**
STEEBECK SB1212 V22 1200 baud **FULL DUPLEX**, sync or async, optional auto dial, **£465.00**
TRANSDATA 307A Acoustic coupler **300** baud full duplex, originate only, **RS232** **£49.00**

Ex **BRITISH TELECOM** full spec, CCITT, ruggedised, bargain offers. Sold **TESTED** with data. Will work on any **MICRO** or system with **RS232** interface.
DATEL 2B 300 Baud Modem see **SPECIAL OFFER.**
MODEM 13A 300 baud unit, only 2" high fits under phone. **CALL** mode only £45.00
MODEM 20-1. 75-1200 baud. Compact unit for use as subscriber end to PRESTEL TELECOM GOLD, **MICRONET** etc. **£39.95** + pp £6.50
MODEM 20-2 1200-75 baud. Same as 20-1 but for computer end, **£65.00** + pp £6.50
DATEL 2412 Made by SE labs for BT this two part unit is for **synchronious** data links at 1200 or 2400 baud using **2780/3780** protocol etc. Many features include 2 or 4 wire working, self test, auto answer etc.
COST OVER £800 Our price **ONLY £199** + pp £8.00
DATEL 4800, RACAL MPS4800 baud modem, EX BT good working order, **ONLY £295.00** + pp £8.00

SUMMER OFFER
MODEM TG2393. Ex BT, Up to 1200 baud, full duplex over 4 wire or half duplex over 2 wire line. **ONLY £85.00 PER PAIR** + pp £10.00

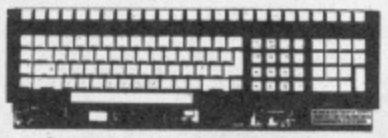
For more information
CONTACT OUR SALES OFFICE

COOLING FANS

Keep your hot parts **COOL** and **RELIABLE** with our range of **COOLING FANS**
ETRI 126LF21 240v 5 blade equipment fan Dim. 80 x 80 x 38mm **£9.95**
ETRI 88XUOI Dim. 92 x 92 x 25mm 240v equipment fan, complete with finger guard **NEW £9.95**
GOULD JB-3AR Dim. 3" x 3" x 2.5" compact very quiet running 240v operation. **NEW £6.95.**
BUHLER 69.11.22 8-16v DC micro miniature reversible fan. Uses a brushless servo motor for extremely high air flow, also silent running and guaranteed 10,000 hr life. Measures only 62 x 62 x 22mm. Current cost £32.00. OUR PRICE **ONLY £12.95** complete with data.
MUFFIN-CENTAUR standard 4" x 4" x 1.25" fans 110v OR 240v **NEW** at **£10.50** or tested EX EQUIPMENT 240v £6.25 or 110v £4.95.
1000's of other fans **Ex Stock.**
Call for Details. Post & Packing on all fans £2.00.

QWERTY KEYBOARDS

Manufacturer's **BRAND NEW** surplus.
ALPHAMERIC 7204/60 Full travel **ASCII**, 60 key with parallel output and strobe. £39.95
DEC LA34 Uncoded keyboard with 67 quality gold plated switches on X-Y matrix – ideal micro conversions etc. **£24.95**
AMKEY MPNK-114 Superb word processor chassis keyboard on single **PCB** with 116 keys. Many features such as On board Micro, Single 5v rail, full **ASCII** coded character set with 31 function keys, Numeric keypad, cursor pad and **9600** baud **SERIAL TTL ASCII OUTPUT!! ONLY £69.00** with data.



Carriage on all Keyboards £3.50

PLESSEY VUTEL

Manufactured by **PLESSEY** Ltd this compact unit, only slightly larger than a telephone, features an all in one **TELEPHONE**, 24 x 40 character CRT screen, **VIEWDATA – PRESTEL** modem, Keypad and electronics to run as a fully fledged **PRESTEL** terminal or telephone. Ready to plug direct into a BT 600 type jack socket and instantly connect you to **PRESTEL** etc. Many other features include Memory dialling, Recall button, Off line screen data storage, Picture expand, Standard Mullard LUCY chip set, Integral 5" JVC crt monitor, etc etc. Designed to sell to the **EXECUTIVE** at over £600!! But from **DISPLAY, BRAND NEW AND BOXED** at only £99.00 for **DTMF** tone dial or **£140.00** for standard **DIAL PULSE** version.
Carr. £8.00.

COLOUR AND MONOCHROME MONITOR SPECIALS

'SYSTEM ALPHA' 14" COLOUR MULTI INPUT MONITOR made in the UK by the famous **REDIFFUSION Co.** for their own professional computer system this monitor has all the features to suit your immediate and future monitor requirements. Two video inputs: **RGB** and **PAL** Composite Video, allow direct connection to the **BBC** and most other makes of micro computers and **VCR's**. An internal speaker and audio amplifier may be connected to your systems output or direct to a VCR machine, giving superior sound quality. Many other features included PIL tube, Matching **BBC** case colour, Major controls on front panel, Separate Contrast and Brightness – even in **RGB** mode, Two types of audio input, Separate Colour and audio controls for Composite Video input, **BNC** plug for composite input, 15 way 'D' plug for **RGB** input, modular construction etc etc.

This Must be **ONE OF THE YEAR'S BEST BUYS**
Supplied **BRAND NEW** and **BOXED**, complete with DATA and 90 day guarantee.
SUPPLIED BELOW ACTUAL COST – ONLY £149.00

DECCA 80 16" COLOUR monitor. **RGB** input.
Little or hardly used manufacturer's surplus enables us to offer this special converted **DECCA RGB** Colour Video TV Monitor at a super low price of only **£99.00**, a price for a colour monitor as yet unheard of!! Our own interface, safety modification and special 16" high definition **PIL** tube, coupled with the tried and tested **DECCA 80** series TV chassis gives 80 column definition and picture quality found only on monitors costing **3 TIMES OUR PRICE**. In fact, **WE GUARANTEE** you will be delighted with this product, the quality for the price, has to be seen to be believed. Supplied complete and ready to plug direct to a **BBC MICRO** computer or any other system with a **TTL RGB** output. Other features are: internal speaker, Modular construction, auto degaussing circuit, Attractive **TEAK CASE**, compact dimensions only 52cm W x 34 H x 24 D, 90 day guarantee. Although used, units are supplied in **EXCELLENT** condition, **ONLY £99.00** + Carr.
DECCA 80, 16" COLOUR monitor. Compositve video input. Same as above model but fitted with Composite Video input and audio amp for **COMPUTER**, VCR or **AUDIO VISUAL** use. **ONLY £99.00** + Carr.
REDIFFUSION MARK 3, 20" Colour monitor. Fitted with standard 75 ohm composite video input and sound amp. This large screen colour display is ideal for shops, schools, clubs and other **AUDIO VISUAL** applications. Supplied in AS NEW or little used condition **ONLY £145.00** + Carr.

BUDGET RANGE EX EQUIPMENT MONOCHROME video monitors.
All units are fully cased and set for 240v standard working with composite video inputs. Units are pre tested and set up for **80** column use on **BBC** micro etc. Even when MINOR screen burns exist – normal data displays are unaffected.
12" KGM 320-1 B/W high bandwidth input, will display up to 132 x 25 lines. **£32.95**
12" GREEN SCREEN version of **KGM 320-1** Only **£39.95**
9" KGM 324 GREEN SCREEN fully cased very compact unit Only **£55.00**
9" HITACHI VM-906E/K Black and White screen **£49.95**
Carriage and insurance on all monitors **£10.00**

D.C. POWER SUPPLY SPECIALS

GOULD OF443 enclosed, compact switch mode supply with DC regulated outputs of +5v @ 5.5a, +12v @ 0.5a, –12v @ 0.1a and –23v @ 0.02a. Dim 18 x 11 x 6 cm. 110 or 240v input. **BRAND NEW** only **£14.95**
GOULD G6-40A 5v 40 amp switch mode supply NEW £130.00
GREENDALE 19A-BOE Switch mode 60 watt open PCB with a fully regulated DC output of 5v @ 6 amps, and three semi regulated outputs of +12V, –12V +15V @ upto 1 amp. Dim only 11 cm x 20 cm x 5.5 cm. Similar to RS 591-994. 110 or 240v AC input. **TESTED** ex equipment. **Only £24.95**
AC-DC Linear **PSU** for **DISK** drive and **SYSTEM** applications. Constructed on a rugged ALLOY chassis to continuously supply fully regulated DC outputs of +5V @ 3 amps, –5V @ 0.6 amps and +24v @ 5 amps. Short circuit and overvoltage protected. 110 or 240 V AC input. Dim 28 x 12.5 x 7 cm **NEW £49.95.**
Carriage on PSU's £3.00

SPECIAL 300 BAUD MODEM OFFER

Another **GIGANTIC** purchase of these **EX BRITISH TELECOM, BRAND NEW** or little used 2B data modems allows US to make the **FINAL REDUCTION**, and for **YOU** to join the exciting world of data communications at an **UNHEARD OF PRICE OF ONLY £29.95**. Made to the highest **POST OFFICE APPROVED** spec at a cost of hundreds of pounds each, the 2B has all the standard requirements for data base, business or hobby communications. All this and more!!

- 300 baud full duplex
- Full remote control
- CCITT tone standards
- Supplied with full data
- Modular construction
- Direct isolated connection
- CALL, ANSWER and AUTO modes
- Standard RS232 serial interface
- Built in test switching
- 240v Mains operation
- 1 year full guarantee
- Just 2 wires to comms. line

NOW ONLY £29.95

BT 600 Jack plug and cable £2.25 Carriage and Ins. £10.00

VDU TERMINALS

Standard VDU data entry terminals at give away prices!!
QUME QVT108. Current product, state of the art terminal with detachable keyboard, 12" green screen, 2 page RAM, **TVI 925** emulation, 25 x 80, Clock, Swivel and tilt base, Printer port, Function keys etc. **BRAND NEW** and BOXED AT ALMOST **HALF PRICE** Only **£425.00**
AJ510 – EX RENTAL, Z80 controlled, 15" green screen 24 x 80 display, graphics, cursor addressing, printer port etc. Very good condition **TESTED** complete with manual only £225.00.
ADDS 520 – Dumb terminal, used, 12" b/w screen RS232 interface and printer port. **TESTED. ONLY £125.00**
Carriage on terminals £10.00
100's of other terminals in stock, **CALL** for more details.

DISPLAY -ELECTRONICS-

All prices quoted are for U.K. Mainland, paid cash with order in Pounds Sterling PLUS VAT. Minimum order value ***£2.00***. Minimum Credit Card order ***£10.00***. Minimum BONA FIDE account orders from Government Depts., Schools, Universities and established companies ***£20.00***. Where post and packing not indicated please ADD £1.00 + VAT. Warehouse open Mon-Fri 9.30-5.30. Sat 10.30-5.30. We reserve the right to change prices and specifications without notice. Trade, Bulk and Export

32 Biggin Way, Upper Norwood, London SE19 3XF
Telephone 01-679 4414 Telex 894502 Data 01-679 1888

Classic V Combat

Alice invites you to take your pick

A WHILE back I mentioned that I had, with extensive use of the hint sheets, "solved" most of Level 9's games. A few days later Jon Thackray, co-author of Acornsoft's gigantic Acheton adventure, rang to ask me why I had not solved his game.

The main reason is that Acheton is so big that it is only available on disc and I had only been able to play it intermittently on a borrowed machine.

"Never mind", says Jon, "I'll send you a full solution", which duly landed, with a thump, on my desk soon afterwards. A quick scan through and test rattled both my brains and the disc drive.

Essentially it's Colossal Cave*3, that is it's about that much bigger (54 treasures for example) and consequently about 10 times longer and harder to sort out.

Even with this full solution, plus all the hints, it will take weeks to battle your way through to opening the safe and completing the master section.

In the process you will still have to recognise and solve dozens of puzzles – the Tower of Hanoi is one example – plus contending with some rather obscure jokes and references – a thing I deplore because, when humour is involved, "people usually mean what they say but rarely say what they mean".

'Adventures can just as easily be written that take place above ground'

For example, and apart from the solution, Jon also sent a listing of his Auto Adventure System which, like The Quill, is intended to take the spadework out of writing such programs.

He and co-author David Seal call it Shovel (Structured Handling of Versatile Exploration Language) with the comment that adventures "can just as easily be written that take place above ground" – see what I mean about humour?

On the subject of obscure jokes I long ago appreciated that the bird in Colossal Cave was a Norwegian blue parrot (pining for the fjords) but had failed to see that birds, cages, snakes and killing dragons with your bare hands was largely taken from Mozart's "The Magic Flute".

I passed this useful information on to Pete Austin because there have been complaints (not from me) that he ruined the dragon joke in his Level 9 version.

As you may know, Level 9 has moved to Avon country, but this has not stopped the company turning out three or four top quality games per year and taking note of my comment that GET EVERYTHING did not always work.

They have re-written, yet again, their analyser and text compressor and the result (called SHOVEL 9?) is believed to be 100 per cent right.

This attention to detail partly explains Level 9's success, but I think the main reason is they are always experimenting with new ideas – take their latest D&D innovation for example.

"Dekko Chand Lal Hai" is Hindi for "Look it's the Red Moon". I recall this from the Eagle comic in 1952 when Dan

→

Solution

THE Knapsack problem (August) has a maximum total value of 24. There are a number of ways to do this, for example a size 8 (value 11) plus a size 9 (value 13).

The main interest of the puzzle is its very practical, commercial applications. One reader, Jonathan Hurwitz, of Leeds, sent in a complex Basic program which recursively solved the Knapsack puzzle for up to 1300 items, each with different volumes and values.

He also added that, if it was useful, could I "please sell it and send me 20 per cent of the profits".

Unfortunately it's not that simple because, in the real world, objects tend to have rather more than just two simple properties. They are usually awkward, knobbly three-dimensional shapes of differing fragility/durability and often require a priority in packing.

For example, the British Army wants to load equipment – tanks, guns, food, ammunition and so on – into a Hercules air transport. The type of emergency decides the required load but tanks can only be loaded into specially strengthened parts of the cargo bay and certain other equipment is delicate or required immediately and is therefore stowed last and on top.

The number of restrictions and requirements make the real Knapsack problem virtually unsolvable in real life, and so far computer programs, usually written in artificial intelligence languages that attempt to simulate "properties" of objects, such as Lisp and Prolog, have failed to compare with the "pattern packing" abilities of experienced humans.

Nevertheless, it is a fascinating problem and maybe the property handling features of adventure shell programs – Jon Thackray's Shovel can handle 256 per object – might help to improve the computer's efforts.

From Page 149

Dare destroyed the original with a chlorophyl lamp.

Level 9 claim the name as copyright, which shows that Peter Austin hasn't read everything.

Nevertheless he always tells a good story and this is no exception – interesting plot, bags of atmospheric text and plenty to try at the start, so it must appeal to both novice and expert.

Briefly you have to find the Red Moon Crystal which (due to Dan?) has been recreated with magik and hidden in a tower on Baskalos island.

The game has over 200 rooms as usual, and the new wrinkle is that you can cast spells (10 of them).

But there is more than magik abroad in the air – you need some of the spells to survive combat with creatures who don't just chuck the odd axe or sharp knife.

I was just getting into the swing of things (and marvelling that mushrooms can shrink chain mail) when Bob Redrup wrote that he had solved it,

'No wonder the British excel at solving puzzles. – it's the climate'

albeit with only half the maximum points, in five rainy days.

No wonder the British excel at solving puzzles – it's the climate.

Slightly piqued, after all I'M the expert, I asked Bob if he would like to write a review so he did. If you think I ramble obscurely try his offering in the panel above.

I am often asked to recommend games, something I usually avoid because, like Bob, I am a confirmed reactionary with a preference for classics with lots of text (=atmosphere), puzzles and plays on words.

What I will say is that if you have a disc drive then Acheton will keep you quiet – and the drive rattling – for months.

If you've no disc then you won't go far wrong if you buy ANY Level 9 game before it's written, let alone reviewed!

Alice

The task: Find the Crysta..

"I FOUND Krellf the human slumped over, dying of thirst. A moment's thought and I remembered where I'd seen a bottle, so off I went on my errand of mercy. Umpteen moves later, battered and glad of medical help to restore my failing strength, I returned with a bottle of water. Gratefully, Krellf told me something I already knew. I killed the Wally".

That's typical of the involvement one should feel with a good adventure.

With Red Moon, Level 9 has introduced some new features – a smaller box to house the tape, info on the insert and the concept of combat – is this a pandering to the bloodthirsty younger generation?

The task: Find the Crystal. The equipment: Your wits.

The Crystal is hidden in the depths of Castle Cakabol. I found three ways of entering, but make sure you explore all the open-air "rooms" before venturing inside. There are the usual chain-type puzzles to link and deft touches of wry humour. Hardest, as a dog lover, was the canine conundrum.

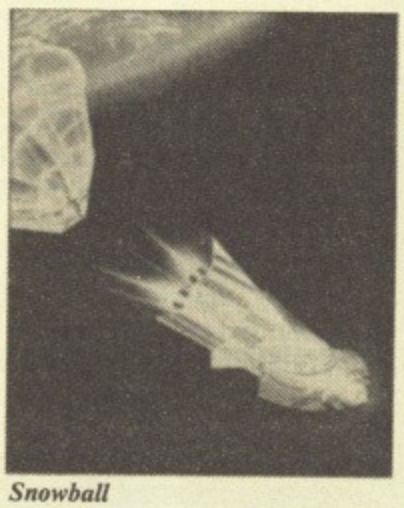
Funniest, for me anyway, was the crossing the line ceremony – or lack of it. There's also a maze – but at least it's logical and you don't need to drop objects to solve it. Actually a

A look in my postbag

I RARELY reproduce letters, believing that how to do X in game Y is of little interest to most readers. Paradoxically I also advise people who regularly get stuck to browse through other magazines for just such clues and refuse to answer multiple questions without an SAE – I'm also contrary, so:

Dear Alice,

During my holidays I played several adventures at the same time, but am now back at school from 9 to 5 so little time. Can you help me with a few problems – particularly Level 9's:



Snowball

Snowball: *I have completed this (1000 out of 1000) but the booklet says that everything has a purpose. I didn't use the debt card, the bomb and the gun. What is the use of these items?*

What bomb? The other two are alternative ways of getting the lance and moving in space.

Return to Eden: *I had a quick sniff at this but am stuck at the river. You can't feed the leviathan and once you're on the tiny island you can't leave. What am I missing?*

You CAN feed the leviathan.

Emerald Isle: *How on earth do you stop the cars? I have taken everything to the city, but nothing happens. It must have something to do with the signpost, but you can't turn, burn, break or take it.*

Only when you type in LIGHT MATCH do the cars disappear, but that must be a bug in the program because they reappear when you type

sta.. Equipment: Your wits

rewarding exercise.

Of the characters encountered, some you slay, some you don't. Likewise some things are "magik" (see the insert for helpful hints) but it always costs, success or no, one hit point.

The same penalty pertains when you SAVE, which I found an irritation – after all this is the time-honoured way to explore many dangers.

However I liked the one-way exits (like trap doors you can't always go back), the fact that you can't drown and – I think – I like things that go bump in the night.

Biggest moan is for the combat damage system, I don't mind a bit of D&D, but the random factor doesn't really appeal.

I finished without a clue sheet but only half points – I never found the fan, for example.

On the whole this is an ideal introduction to proper adventures. It is nicely beyond the idiots' fare that too many software houses offer and provides plenty of fun for any level of player.

An enjoyable romp and great value for money, even if I didn't scratch my head quite as much as I am with Acheton – though I was bald before I started.

Bob Redrup

Return to Eden

LOOK.

And where is the lever for the plaque? Speaking of bugs (September, Micro User) *you can push the ceiling in the mine without holding the fencepost.*

Another two bugs for Pete Austin? The irony is that the fence post is the lever for the plaque. Insert it and the traffic stops.

Adventure Quest: *Thanks to you I have completed Colossal Cave, but am now stuck in the sequel. I cannot pass the djinn, the Sphinx or the orcs and the snowman cannot help me. Please tell me just the hint I need to go on.*

"Just the hint" is as follows. You need the Bag of Wind to blow the djinn away, you need the sandworm to swallow the Sphinx and you need the snowman to push the rocks on to the first group of orcs (there are four groups altogether).

Je suis très désolé que je ne peut pas payer d'un coupon-réponse. – **Marcel Langezaal, 2313 KC Leiden, Holland.**

Actually the above is only about half the letter, all in excellent English. I have visited Holland and can only remember "Kopecken Kaput?" – which means "Broken carburettor?" The Dutch simply don't let the English learn how to say even "Good morning". Incidentally, Marcel has solved so much on his holidays I must presume Holland also shared our English summer.

Adventure Quest

Puzzle this one out

A NUMBER of computerate readers spotted that line 10 of Lac Dracula was incorrect. They correctly deduced that:

10 ON ERROR GOTO 140

was intended to trap division by zero (at the middle of the lake) and suck you down into the Black Hole.

Intrigued that some people called programmers can read a program as easily as a musician reads music, I now present a similar problem in that all you have to do is read the program, deduce the question and then find the answer (which is hidden in it) by applying the Sherlock Holmes technique of ignoring everything that cannot be relevant, therefore that which remains MUST be the answer.

The program was written by Peter Derlien, of Sheffield, who thinks it is much simpler than my average puzzle, but I seriously doubt whether more than 1 in 999 of our computerate readers can correctly confound me with their mental ability. The editor disagrees. Who's right? Answers on a postcard please.

DERLIEN'S PUZZLE

```
 10 DIM U(9)
 20 REPEAT
 30 FOR J=1 TO 9:U(J)=0:NEXT J
 40 INPUT " A ",A
 50 INPUT " B ",B
 60 N$=STR$(A)+STR$(B)
 70 OK=1:L=LEN(N$)
 80 FOR J=1 TO L
 90 N=VAL(MID$(N$,J,1))
100 IF U(N)<>0 OR N=0 THEN OK=0:
J=L
110 U(N)=1
120 NEXT J
130 IF B=0 THEN PASS=0 ELSE PASS
=(OK=1 AND L=9 AND B=A*INT(PI))
140 UNTIL PASS
150 PRINT"These confound me and
I confirm your":PRINT"mental
abilities"
```

MIRRORSOFT

FLEET STREET Editor

CITY OF LONDON EC4

Welcome to the world of personal publishing on your BBC Micro!

FLEET STREET EDITOR gives you everything you need to produce professional-looking printed materials – in one package!

The different stages in newspaper and other types of print production processes are represented by the six different 'departments' in the program. By following these stages through the program and comprehensive manual, you can blend text and graphics to produce printed materials for a wide range of applications.

Whatever information you want to communicate, FLEET STREET EDITOR will make your task easier and more enjoyable... and save you money!

That's right – FLEET STREET EDITOR not only provides you with a complete publishing package. As part of the package, you also receive valuable money-off coupons for Cumana disk drives and Touch-Pads and for Mannesmann-Tally dot-matrix printers.

All this for just £39.95 including VAT!

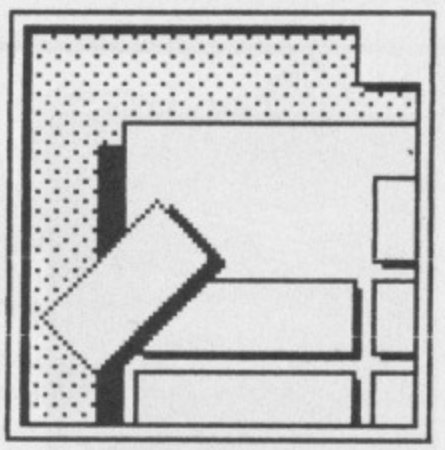
A QUICK TOUR ROUND THE DEPARTMENTS

Each Fleet Street Editor page is constructed as a series of panels, with up to 8 panels per A4 page. Here's where you construct those panels:

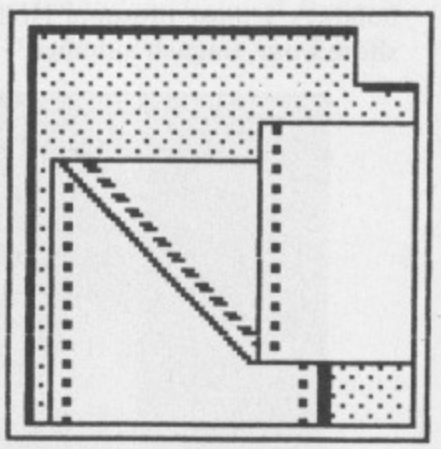
GRAPHICS LIBRARY
200K (about 600 pieces) of ready-to-use art – illustrations, symbols, and display typefaces which can be incorporated into your own work.

STUDIO
Where you modify existing art from the Library or your own collection, or create your own. All the graphics in the Library were created here.

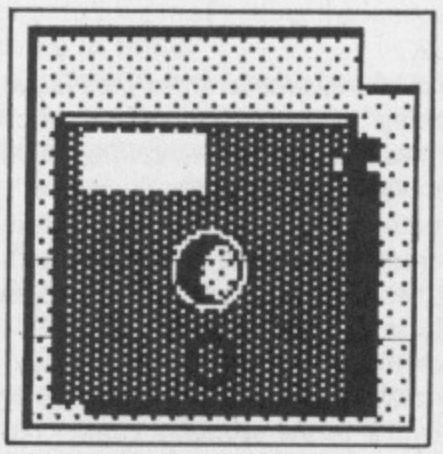
COPYDESK
Input your text here, using either the program's word processor or existing View or Wordwise files, and watch it wrap automatically round your graphics. Use different fonts, too.



PAGE MAKE-UP
Define the format for your page and construct it from the catalogue of panels you've built up. Some panels are provided ready-made for you to experiment with.



PREVIEW AND PRINT
Preview a reduced representation of your completed page on screen, approve it, and send it to your printer using one of the built-in printer-drivers – you can write your own, too.



ADMINISTRATION
Set up the program to suit your system configuration, format disks, integrate graphics from any Mode 4 program, and further manipulate Fleet Street Editor files.

THE FIRST EDITION

Publication: January 23rd 1986

The minimum equipment you need to become a FLEET STREET EDITOR is:

- ✻ BBC Model B with disk interface
- ✻ 40 track single-sided disk drive
- ✻ Dot matrix printer capable of 640 dot bit image mode and true descenders
- ✻ Monochrome monitor or TV

You can configure the program to any type of drive combination via the Administration department.

FLEET STREET EDITOR is supplied on two disks – one containing the program and one containing the graphics library. These are formulated in different ways for different drive configurations, so take care when ordering or buying FLEET STREET EDITOR that it matches your current system. Upgrades are available.

The registration card supplied in the back of the manual, when completed and returned to us, will ensure you receive details of new software designed to enhance your FLEET STREET EDITOR.

Complete the coupon and return it to us for a detailed brochure or to place a firm order. FLEET STREET EDITOR should also be available from good software stockists everywhere.

ORDERS Please tick

I would like to order FLEET STREET EDITOR. ☐
My disk system is as follows:

_____

_____

I enclose my cheque No. _____ for £39.95 OR
Please debit my Access/Visa account no.

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature _____

Please allow 21 days for delivery

INFORMATION Please tick

Please send your detailed brochure on FLEET STREET EDITOR ☐

Name _____

Address _____

_____

_____ Post code _____

MIRRORSOFT LTD, FREEPOST BS4382, Paulton, Bristol BS18 5BR

MIRRORSOFT LTD FREEPOST BS4382, Paulton, Bristol BS18 5BR (no stamp needed)

N-N-NOW YOU CAN MAKE A SOUND SAMPLER

M-M-MIKE COOK presents a way to capture sounds and turn them into exciting electronic effects

AS a New Year is upon us it's time to sit back, letting the turkey sandwiches digest, and contemplating the past year. No doubt the TV will show reviews of the last year's events and I dare say that the hit songs will receive a final airing.

One of them represented a first in pop music – Paul Hardcastle's "Nineteen". What made it unique was that it was the first electronically compiled song to top the charts.

I am sure that you know that Paul does not stutter, and that the "N... N... N... Nineteen" effect was achieved by the use of a sound sampler. So this month we will see how we can make a sound sampler for our computer.

A sound sampler has more uses than just producing a rhythmic stutter. Any sound can be captured and stored, then it can be modified, manipulated and generally mashed about before being replayed.

Treated sounds sometimes bear no relationship to the original.

Bearing in mind that the first commercial systems to manipulate sounds in this way cost much the same as an average house, our system will have to be more modest.

Nevertheless it is capable of all the effects available on full size systems, the major limitations being brought about by the computer's lack of memory.

Incidentally, I much prefer the cricketing spoof of "Nineteen" called "Nineteen not out", and that was done without any electronics at all!

We have covered the basic elements of a sound sampler in past Body Building articles. We first of all need a way to convert sounds from a microphone into a digital form.

We have to do this faster than 8000 times a second, so the computer's inbuilt analogue to digital (A/D) converter will not be fast enough.

We looked at a fast A/D converter in the March 1984 Body Building article. Next we need software to process the digital information.

Finally we need some way to turn it back into an audio signal such as the digital to analogue (D/A) converter described in the October 1984 Body Building article.

Unfortunately we can't use these past projects directly as they both plug into the user port. True, we could use the user port expansion board (August 1984) but that would be rather costly for those not already possessing one.

As we need some additional circuitry as well as the converters, a better solution is to start from scratch and build a board especially for the job.

We can also take advantage of the slightly better chips that have appeared on the market since the earlier projects were designed.

As well as sampling the signal with these converters we also need to filter it. On the output side the effect of sampling is to break up the signal at a high rate. If this is above the maximum frequency of hearing then we have no need to filter it.

However it is useful to vary the rate of sampling so we need to filter the signal to remove any high pitched whine produced by lower sampling rates.

Similarly, we need to filter the input signal to prevent aliassing. I have described aliassing several times before, so briefly it is the creation of artificial signals due to sampling the input signal at a rate slower than once every cycle.

In the September 1985 Body Building article I looked at a switched capacitor filter whose cut off frequency could be varied by the clock rate fed to it. We can use the same device for our two filters.

The last requirement of our sound sampling system is some form of input

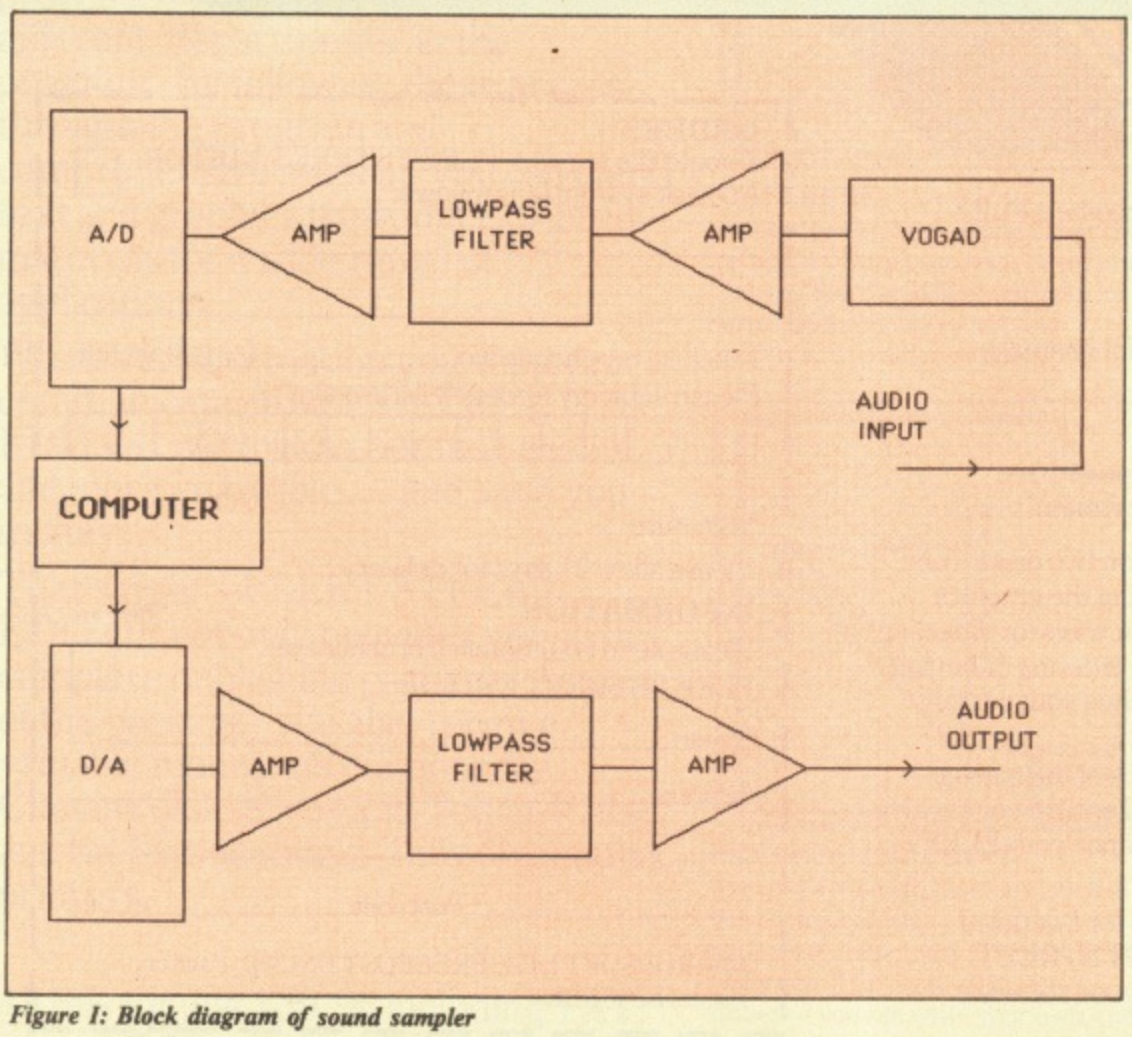


Figure 1: Block diagram of sound sampler

control. You see, we are going to sample our signal to 8 bits of resolution. In that way one sample will fit nicely into one byte.

This will produce an adequate quality if the signal is adjusted to cover all the values represented in one byte, but if the signal drops then not very many values in the byte are used so the signal sounds coarse and noisy.

So with only 8 bits to play with you have to be constantly twiddling with the input levels to optimise the quality.

What we need is a VOGAD – not some fugitive from the "Hitch Hikers Guide to the Galaxy", but a Voice Operated Gain Adjusting Device.

Basically it is an automatic level controller of the type found in most cassette recorders. It's the device that stops cassette recorders working properly with computers – they all have them. With a VOGAD you can always be sure of the correct level.

Having looked at the signal processing elements we need, all that has to be decided is how to connect it to the computer. There are several ways to do this and I had considerable difficulty deciding which to choose.

Finally I decided that the most cost effective solution would be direct connection of the converters to the 1MHz bus.

The block diagram of the sound sampler can be seen in Figure I. The signal first passes through a VOGAD and is amplified before being filtered. After filtering, the signal is amplified again to give a full scale reading on the A/D converter. Then it can be read into the computer.

After storage and/or processing in the computer it is passed to the D/A converter. This requires an op-amp to turn the current output into a voltage output.

The signal is then filtered before being passed to the final buffer amplifier.

You might think I could have used fewer amplifiers, and so I could. However there is no point, as inside each filter IC are two uncommitted op-amps, and it's those I am using.

That's the outline. Now down to the detail. Figure II shows the full circuit of our sound sampler. Let's go through it section by section and see how it relates to the block diagram.

The signal from a microphone or other sound source is first buffered with an emitter follower. This is because the VOGAD has a low input impedance and a microphone has a high output impedance, so transistor T1 acts as an impedance buffer.

The signal is passed into IC1, the VOGAD. This is a Plessey device, the internal structure of which is shown in Figure III.

As you can see, it consists of two amplifiers. The output from the pre-amp is coupled to the input of the main amp through an external capacitor.

The main amplifier's output is detected and rectified in the AGC (automatic gain control) detector and passed to the gain control of the first amplifier.

An external resistor and capacitor control the dynamic response of the gain control – that is, how fast the gain is turned up and down in response to signals.

With the components used, the gain gets turned down rapidly (20mS) in response to a large input signal. When the signal drops the gain is turned up in about two to three seconds.

After the signal has been made a constant amplitude by the VOGAD it is passed into the filter, IC2. The block diagram of this is shown in Figure IV. R5 and R6 make an inverting amplifier

→

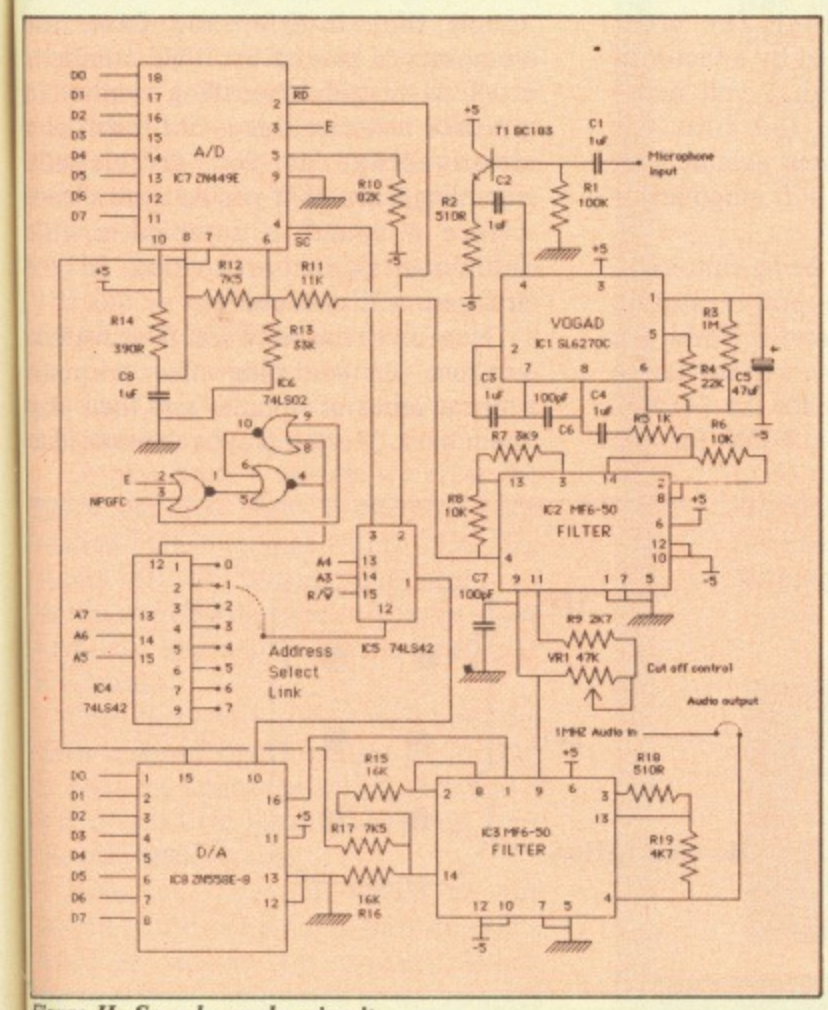


Figure II: Sound sampler circuit

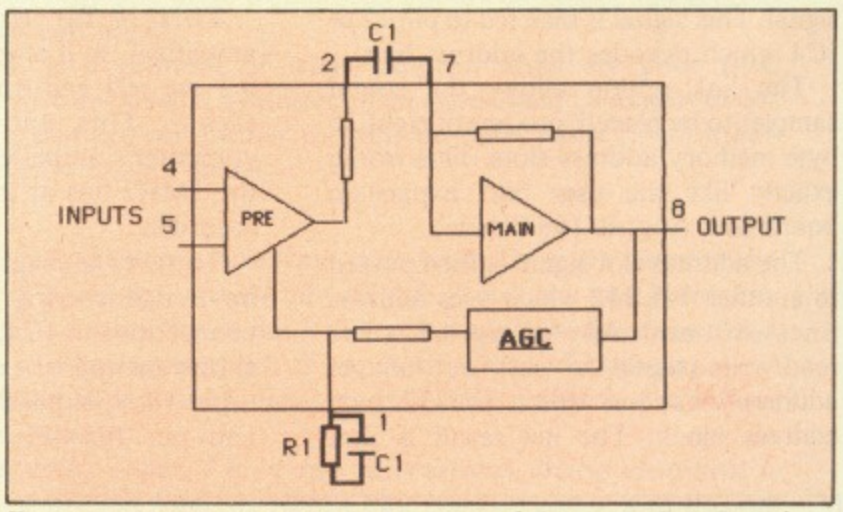


Figure III: SL6270C VOGAD (Voice Operated Automatic Gain Device)

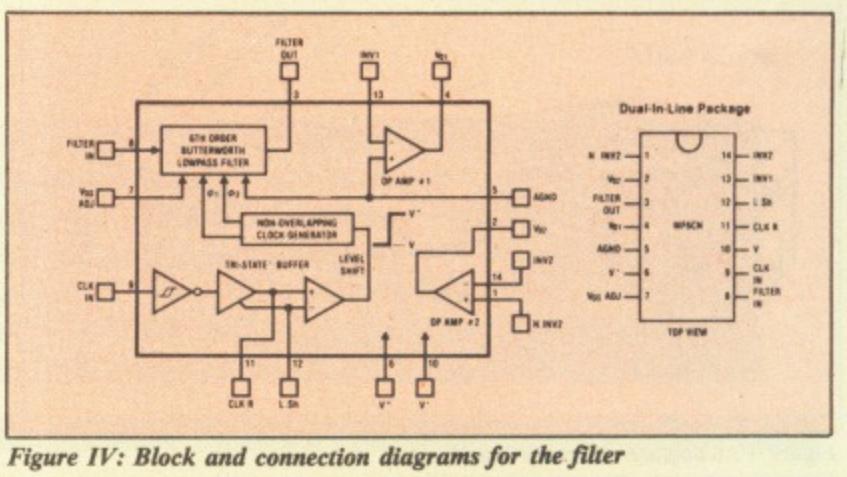


Figure IV: Block and connection diagrams for the filter

From Page 155

with a gain of 10 and pass the signal into pin 8 the input of the filter. The filtered signal on pin 3 is amplified again before being passed to the A/D converter.

The filter's cut-off frequency is set by an internal clock oscillator which is controlled by C7, R9 and VR1.

The range on the variable resistor will allow you to set the cut-off frequency from approximately 4KHz to 16KHz. You can adjust this for optimum results when you are using the sampler.

The A/D converter, IC7, is a Ferranti device and a successive approximation type similar to that used in the March 1984 Body Building article.

This one is slightly faster and has an internal clock oscillator which, however, we aren't using as it is fast enough to be clocked by the E signal on the 1MHz bus. This means that conversion will always be done in 9uS.

If necessary, we can relate this to the number of machine code instructions, since we instructed the device to start a conversion. The start conversion signal (SC) is derived from the address lines on the 1MHz bus as is the read (RD) signal.

The 1MHz bus interface consists of IC 4, 5 and 6. IC6 is a conventional clean-up circuit for the page enable signal. This signal is then fed to pin 12 of IC4 which decodes the address lines.

The link option allows the sound sampler to be placed into one of eight 32 byte memory address slots. This works exactly like the user port expansion board (see August 1984 issue).

The address slot signal is then passed to another 74LS42 which uses address lines A3 and A4, along with the read/write signal to sort out unique address locations within the 32 byte address block. The net result is that when reading the first address in the block you read the A/D converter, and when writing to that address you write to the D/A converter.

If you write to the middle address in the block – the first address + 8 – you will trigger the start convert signal on the A/D converter.

After processing, the samples are written to the D/A converter and filtered by IC3. This takes its clock input, and hence its cut-off frequency, from the input filter IC2.

The final stage is an amplifier, but this is one with a gain of less than one because the signal at this stage is a 10 volt peak to peak audio signal.

This is far too high for most amplifiers, so if amplified by a factor of 0.1 we will end up with 1 volt audio signal. This can be fed into the computer's amplifier input available on the 1MHz bus or to a hi-fi amplifier or recorder.

To save the diagram being cluttered I have not shown the power supply connections to IC4, 5 and 6. These are simply on opposite corners of the device – pin 16 +5V pin 8 0V for the 74LS42 and pin 14 +5V, pin 7 0V for the 74LS02. Also not shown are capacitors C9 to 12 which are 0.1uF supply decouplers.

The signals on the 1MHz bus are described in the Advanced User Guide but note that the author's view of the physical location of the pins uses a rather strange convention. If you want to know the location when looking at the underside of the connector you should invert the diagram shown there.

To connect the sound sampler to the bus you need a ribbon cable and connector. This should be made up as shown in Figure V. Also power is taken from the auxiliary power socket shown in Figure VI.

All the components have been gathered together, along with a high quality double-sided, plated through hole, printed circuit board as Body Building Pack 30. The order form can be found on Page 209. As with previous 1MHz bus packs, only one IDC connector is supplied.

Pack 16 is a cable and one connector. In this way if you already have a cable you can simply chain the new device on to it. If you don't you will need pack 16 as well as pack 30.

The sound sampler works quite well except when sampling silence. You see the VOGAD turns up the volume so much that interference from the computer is picked up. This manifests itself as a quite "werdling" noise. In practice however this is not much of a disadvantage as you are usually sampling a sound. If you do want silence before a sound is sampled a little judicious signal processing in the software will produce it.

Now on to the software. If we want to produce our stuttering effect we must store a series of samples and then play them back. During playback we need to

● ***Component list for Body Building Pack 30:*** **1 SL6270C VOGAD, 2 MF6-50 filters, 1 ZN449E A/D converter, 1 ZN558E-8 D/A converter, 1 74LS02, 2 74LS42, 19 resistors, 12 capacitors, 1 printed circuit board, 1 aux power supply connector and cable, 7 IC sockets, 1 BC183 transistor, 1 34 way IDC socket.**

Pack 16: **1 length of 34 way ribbon cable, 1 34 way IDC socket.**

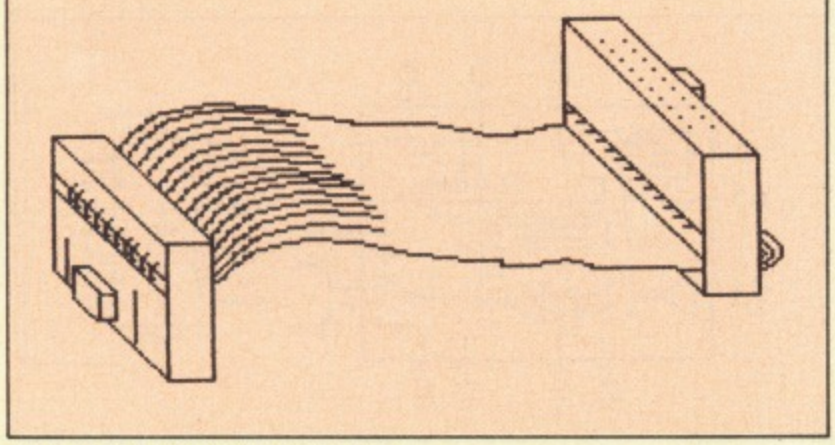


Figure V: Computer-to-board cable

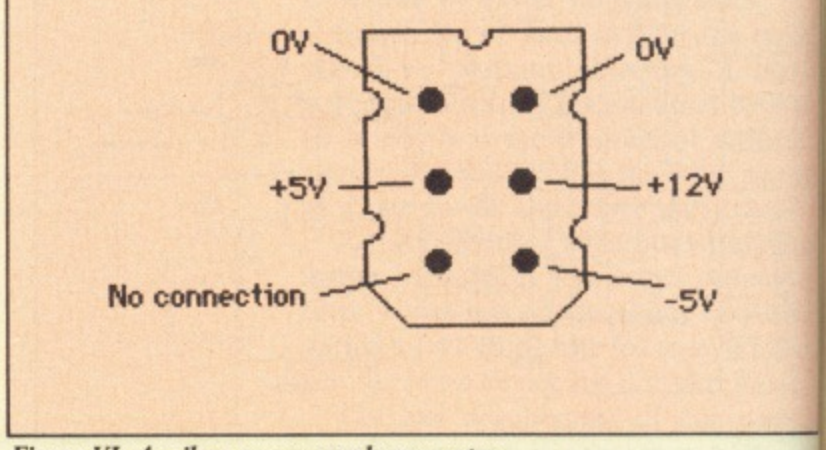


Figure VI: Auxilary power supply connector

be constantly looking for a key input. If we see one the samples need to be played back from the beginning again.

The program in Listing I will allow us to do just this. It uses nearly 20k of memory as the sample buffer. This is the same space as used by the high resolution screens, so by keeping the program in Mode 1 we can actually see the samples as we store them. We have to be careful, however, not to allow the screen to scroll, otherwise some of our samples will be lost.

The sample rate is controlled by timer 1 of the User VIA. The faster the rate (smaller number) the higher the quality of sound but the shorter the duration.

By placing a large value in the timer we can get longer times but lower quality. There is enough memory to get about three seconds of reasonable quality sound.

To get the sample into the computer a machine code routine is used. This is GIN, and is found between lines 230 to 440.

The first thing the program does is to call a subroutine to set up the timers. As we need exactly the same code when we replay a sample we place it in a subroutine. This disables the interrupts, as otherwise we would get a non-uniform rate of sample gathering resulting in crackling at the final audio output.

Lines 250 to 270 hold the program until timer 1 times out. Then it is time to read the A/D converter, line 290. We then start the converter working on the next sample (line 300) while we store this one.

The sample is stored by lines 310 to 370 and we use memory locations from &3000 to &7CFF. When this area is full the program winds down by stopping the timer, enabling the system interrupts and returning to Basic.

To play back a sample we press the space bar and enter a machine code routine SOUT at lines 450 to 750. This starts off by calling the start up subroutine and then looks directly at the keyboard and loops until the Space bar is released.

Then lines 610 to 630 wait until the timer times out, get a sample and output it. Then the Space bar is looked at and if it is pressed we branch back and start the playback again.

Note that line 530 would set the output to the mid point to prevent clicks when the sample was replayed. When we have finally outputted all the samples the program jumps back to the wind down code.

The Basic section of the program has to make sure the screen does not scroll. This would happen when you pressed Return with a conventional INPUT statement. To circumvent this, lines 980 to 1020 gather a number one key press at a time.

You can sample at one rate and play back at another, thus increasing or decreasing both the speed and pitch. To get the stuttering effect simply press the Space bar rapidly.

You could add extra features to this program quite simply, for example, saving and loading samples to disc.

This could be done with a *SAVE NAME 3000 7D00 from within the program, NAME being the name of the file you wanted to save it in. Make sure that you don't let the screen scroll, otherwise your samples will be spoilt.

Many other effects can be achieved using this system, but I have run out of space.

● *Next month we will look at how to make the sampler alter the pitch of a sound without altering its length and thus play a tune composed of sampled sounds. Imagine that – Bach played in barks. We will also see how to achieve real time processing effects using the board.*

So I'll leave you by wishing you a happy n . . n . . New Year.

Full listing starts on Page 163

PROBLEM

I HAVE a BBC Micro with Basic II, OS 1.2, version 4 board, Beebug's toolkit, UDM DDFS version which has the 8271 emulated, a Shugart SA 410 200k 80 track disc drive which is powered by the BBC and a Smith-Corona printer.

At your May show in London, I was told that many problems were caused by overheating and to deal with this, remove the cover. As my disc drive is powered by the computer, I thought the PSU from another BBC to power my disc drive would help, but my computer still gets hot after one to two hours.

Enclosed, is a printout of what happens when my poor BBC overheats. Also enclosed is a printout of an experiment I was able to do.

Would it damage my printer to print on toilet paper? – Matthew Field, Kingston upon Thames.

SOLVED

I am not sure from your letter if you are running the computer with the lid off. If you are and it crashes when it gets hot it looks as though you have some bad memory chips. If so, these will need replacing.

The printout is not very helpful, as rubbish is rubbish, but it does point to the memory.

As to the toilet paper, I have two reservations. Being absorbent it might draw more ink from the ribbon than normal paper, and the soft fibres might clog up the print head more easily, requiring more frequent cleaning.

Mike Cook

If you have a technical query that you just can't solve, send it to: "Problems", Mike Cook, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Letters on other subjects should be sent, as usual, to Micromail.

BRING Twillstar

COMPUTERS

BBC Mod B Plus – 64K	£399.00
BBC Mod Plus with Econet	£410.00
BBC Mod B Plus with DFS and Econet	£465.00
BBC Mod B Plus – 64K with 64K Upgrade Kit	£449.00
BBC Mod B Plus – 128K	£449.00

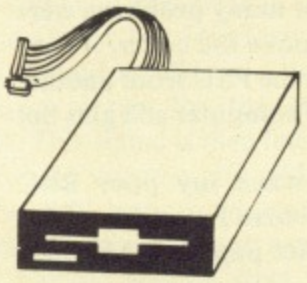
DISC DRIVES

CSX 100 (100K) 1 x 40 Track Single Sided Drive Excluding PSU	£95.00
CSX 400 (400K) 1 x 80 Track Double Sided Drive Excl. PSU	£110.00
CDX 800S (800K) 2 x 80 Track Double Sided Drive Excl. PSU	£185.00
CS 400 (400K) 1 x 80 Track Double Sided Drive Incl. PSU	£130.00
CD 800S (800K) 2 x 80 Track Double Sided Drive Incl. PSU	£229.00

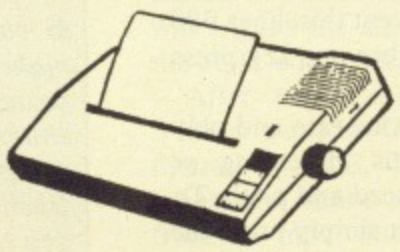
MITSUBISHI 400K Single Drives Cased 40/80 Track Switchable £99.00

THE BEST NAME IN MEMORY – SPECIAL PRICES

"CUMANA"



EPSON LX80 + NLQ for WORD PROCESSING



SPECIAL OFFER of the month £229.00

PRINTERS

DOT MATRIX PRINTERS

The new Centronics GLP Printer with 50 CPS and NLQ	£113.00
The new Seikosha Printer with 100 CPS and NLQ 1000A	£199.00
Just arrived Seikosha GP50 Graphics Printer. Seikosha GP50A (Parallel)	£69.00
Seikosha GP50S (Inc. Spectrum Printer Interface & Cables	£69.00
Kaga KP810 (NLQ)	£269.00
Kaga KP 910 (NLQ)	£379.00
Canon PW 1080A (NLQ)	£269.00
Canon PW 1156A	£379.00
Star SG 10	£249.00
Star SG 15	£389.00
Epson LX 80	£229.00
Epson FX 80	£365.00
Epson FX 100 F/T	£495.00
Brother EP 44	£228.00
Shinwa CP 80A	£189.00
MP 165	£240.00
Juki 5100	£269.00

BARGAIN BUY

The new Citizen 120D with 120 CPS and 25 CPS NLQ. Tractor and friction feed standard. IBM and Epson compatible with full Two Year Warranty.

Citizen 120D ~~£189.00~~ £175.00

DAISY WHEEL PRINTERS

Brother HR15	£349.00
Quendata DWP 1120	£199.00
Juki 6100	£319.00
Juki 2200	£275.00
Juki 6300	£799.00

COLOUR PRINTERS

Canon PJ1080A	£440.00

PLOTTERS

Penman Plotter (complete with utilities and cables)	£235.00

MONITORS

MONOCHROME MONITORS

Phillips BM7502 Green Screen	£79.00
Phillips BM7522 Amber Screen	£95.00
Kaga KX1201G Hi-Res Green	£103.00
Kaga KX1203A Ultra Hi-Res Amber	£120.00

COLOUR MONITORS

Microvitec 1431 Std Res	£212.00
Microvitec 1451 Med Res	£275.00
Microvitec 1441 High Res	£420.00
Microvitec 2030 CS20 Std Res	£435.00
Microvitec 1431AP Std Res	£228.75
Microvitec 1451 AP Med Res	£320.00
Kaga RGB Vision II12" High Res	£258.00
Kaga RGB Vision III 12" Ultra High Res	£365.00

NEW Phillips CM 8501 Std Res Monitor with grey glass screen RGB and audio input. Only £199.00

NEW Phillips CM 8533 Medium Res monitor with dark glass etched screen composite video input RGB and audio input £259.00

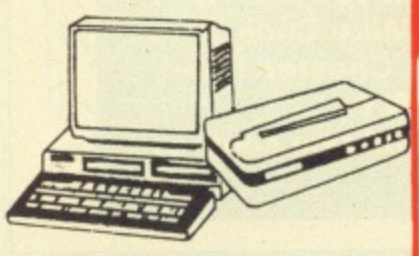
TV MONITORS

NEW Phillips 1114 Colour TV/Monitor with 14" tube offering 10 preselect channels. RF CVBS and RGB inputs. £209.00

TCL SPECIAL PACKAGE

The BBC Plus all in one Word Processing Package contains a 64K BBC Plus, View 3.0 WP, Hi-Res Green Screen Monitor, 800K Dual Drives, Quendata Printer, Box of Discs, and all the necessary leads and cables housed in a strongly constructed, high impact ABS unit colour matched to the BBC micro giving your BBC Micro System the professional PC look.

Special Offer £999.00



BBC UPGRADES

A-B Upgrade	£110.00
Acorn DFS Interface	£89.00
Econet Interface	£49.00
Speech Interface (Special Offer)	£25.00
64K Upgrade Kit	£39.95
17/70 Upgrade Kit	£49.95
ADFS ROM	£29.95

TCL SPECIAL WORKSTATIONS

Once again TCL has answered a special need of all BBC Computer, users with the new mushroom workstation – no more untidy wiring or pulled plugs. Transforms your system into a handsome console unit.

Features include:

- ★ **Advanced Cable Management Twin 400K Mitsubishi Slimline Drives switchable from 40 to 80 Track with Status Indicator LED's**
- ★ **On board regulated 4 Amp power supply with overload protection**
- ★ **Mains Input Filter for clean power supply.**
- ★ **Filtered power to the 3 Take-off sockets at rear for Micro, Monitor and Printer.**

MUSHROOM WORKSTATION

At a Special Price of **£349.00** inc. VAT

Those people already owning disc drives can have them fitted into the Workstation. Prices on request.

EXPANSION BOARDS

RAMAMP RA20+44

The RA20+44 board has 20K of RAM addressed from &3000 to &7FFF when switched on with *VIDEO. This will in effect give you back 20K of RAM if you are using say MODE 0. There is also 2 slots of sideways RAM from &8000 to &BFFF which can be used for ROM based software. There is a further 12K of RAM from &8000 to &AFFF which can not be used as sideways RAM. This is the situation in the BBC+ and it means in effect that this board will turn your BBC into a BBC+ as far as the VIDEO and the extra 12K RAM is concerned. One can read and write to this 12K RAM in the same way as the BBC+ does. We offer this RAM as a printer buffer.

RA20+44	£79.00
Write protect kit	£5.00

RAMAMP RA32N

The RAM/ROM board has 6 slots of ROM and 2*16K of sideways RAM that is addressed from &8000 to &BFFF. THIS EXTRA RAM IS NOT AN EXTENSION OF MEMORY FOR BASIC.

RA32N	£59.00
WPK/N	£5.00

RAMAMP RAM16

The 16K RAM BOARD (RAM16) is a sideways RAM board which plugs into any spare ROM slot. It is addressed from &8000 to &BFFF. THIS EXTRA RAM IS NOT AN EXTENSION OF MEMORY FOR BASIC. A write protect switch can be fitted. Any utility can be *LOADed into the RAM directly from Disc with the command *LOAD "FILENAM" 8000 RETURN. This can be done wherever the board is fitted, the slot need not be specified.

RAM16	£32.00
WPK/RAM16	£2.50

RAMAMP ROM6S

The ROM board has 6 slots of ROM (ROM6). Each slot can accommodate any 8K or 16K ROM. One can NOT fit RAM at a later date.
The board is fully buffered.
The board is compatible with all D.D.D. Controllers, RAVEN 20 and indeed our own RA20+44. It is compatible with the SOLIDISC 16/32K or 64K sideways ram board.

ROM6S	£32.00

RAMAMP RA32+

The RAM/ROM board has 4 slots of ROM and 2*16K of sideways RAM that is addressed from &8000 to &BFFF. THIS EXTRA RAM IS NOT AN EXTENSION OF MEMORY FOR BASIC.

RA32+	£58.00
WPS+	£5.00

The RAMAMP boards come complete with RAM inclusive in the price and are fully buffered. Fitting takes only a few minutes. No soldering required. No bits of the I/O port are used. All bits of the I/O port are yours. Free software is available. Write protect switch can be fitted if required.

RAVEN 20

The RAVEN 20 is a 20K RAM Expansion board for the BBC Micro Model B fitted with O.S. 1.2.
The RAVEN Board provides the user with an extra 20K of usable RAM in screen modes 0-3. This together with the aid of software makes the system completely transparent to both the user and the computer. £49.00

INTO YOUR HOME

ACCESSORIES

COMPUTER	
BBC Dust Cover Vinyl	£3.50
BBC Dust Cover Plastic	£6.95
Quickshot II Joystick + I/F	£19.90
Data Recorder complete with BBC Lead	£24.95
DISC STORAGE	
10 x 5¼ Library Case	£2.00
15 x 5¼ Flip-N-File	£5.95
70 x 5¼ Lockable	£9.95
PRINTER ACCESSORIES	
TRACTOR ADAPTORS	
FX80	£33.00
LX80	£23.00
Juki 6300	£129.00
Juki 6100	£129.00
Quendata DWP 1120	£114.00
Brother HR15	£95.00
SHEET FEEDERS	
Juki 6300	£183.00
Juki 6100	£183.00
Quendata DWP 1120	£165.00
Brother HR15	£212.00
Printer Leads from	£8.00
RIBBONS	
LX 80	£5.50
MX100/FX100	£11.50
MX/FX80	£5.50
GP80	£5.00
GP100	£5.70
GP250	£6.00
KAGA KP80	£6.50
1080	£6.50
Brother HR15 M/S	£4.50
Brother HR15 Carbon	£3.30
Juki 6100	£4.20
Oki 80/82	£2.35
Riteman	£6.50
GLP	£3.99
SERIAL INTERFACES	
Epson 8143	£34.00
Juki	£58.00
Canon	£91.00
Kaga	£85.00
Epson 8148 + 2K Buffer	£65.00
LISTING PAPER	
11" x 9½ 2000	£14.00
Epson 81118	£65.00
Teleprinter Roll	£4 .50
Teleprinter Roll Holder	£14.00
PRINTER LABELS	
1000 90x36mm 1 across	£5.70
1000 90x36mm 2 across	£6.70
1000 90x36mm 3 across	£7.70
MONITOR ACCESSORIES	
Monitor Stands Wooden plynth	£11.50
Double plynth	£21.00
BBC BOOKS	
The Advanced User Guide	£12.95
The Advanced BASIC ROM User Guide	£7.95
The BBC Micro ROM Book	£9.95
Guide To The BBC ROM	£9.95
Basic ROM User Guide	£9.95
Disk Drive Projects for Micros	£5.95
The Advanced Disk User Guide For The BBC Micro	£14.95
Get More From Your Epson Printer	£7.95
The Hackers Handbook	£4.95
The Epson FX/KAGA Printer Commands Revealed	£5.95
EPROMS	
2764	£2.20
27128	£3.95
RAMS	
62 64 LP15	£3.95

DISC
Double Sided Double Density 96 T.P.I. Uses 3m media. Guaranteed for life. Free Library Box included £20.00

SERVICES

Fast Repair Service for the BBC Computer average charge from	£23.00
Printer Repairs from	£20.00
Disc Drive repairs from	£15.00
BBC COMPUTER SPARE PARTS AND COMPONENTS	
PSU	£59.00
Keyswitch	£2.00
Complete Keyboard	£59.00
Keyboard Connector	£5.18
UHF Modulator	£5.18
Video ULA	£20.00
Serial ULA	£16.00
6522 VIA	£4.10
6502A 2 MHZ CPU	£7.50
UPD7002	£17.25
6845SP Crt Con	£7.50
SAA5050 Teletext	£10.35
LM324	£0.50
6522A 2 MHZ VIA	£6.33
8271	£52.00
74LS123	£0.46
74LS00	£0.28
74LS04	£0.28
74LS10	£0.28
7438	£0.46
74LS163	£0.86
74LS244	£0.92
74LS245	£1.27
74LS375	£1.04

DISC UTILITIES

View Index	£14.95
View Printer Driver Generator	£11.50
Hi-View	£59.00
Acornsoft Database	£15.00
Clares Betabase 40/80 Track	£23.00
Clares Graph Disc 40/80 Track	£12.95
Clares Replica II Disc Copier 40/80 Track	£11.95
Clares The Key 40/80 Track	£12.95
Microtext Disc	£59.85
Beebugsoft Design	£19.00
Beebugsoft Masterfile II	£19.00
Beebugsoft Teletext Disc	£12.00
Beebugsoft Sprites Disc	£12.00
Beebugsoft Discmaster	£19.00
Beebug Billboard Disc	£19.00
Beebug Quickcalc Disc	£15.00
Beebug "Hershey" Font Disc	£15.00
Beebug Paintbox II Disc	£12.00
Gemini DDD Base	£28.00
Gemini DDD Calc	£28.00
Gemini DDD Plot	£28.00

BBC FIRMWARE

FIRMWARE	
Acorn View Word Processor	£55.00
Acorn View Sheet	£55.00
Acorn Logo ROM	£69.00
Acorn ISO Pascal	£69.00
Acorn BCPL	£99.00
Comconcept:	
Wordwise Word Processor	£36.00
Wordwise Plus	£47.00
Intersheet	£56.00
Disc Doctor	£28.00
Printmaster (Epson)	£28.00
Printmaster (Star)	£28.00
Caretaker	£28.00
Graphics ROM	£28.00
Communicator	£60.00
Accelerator	£55.00
Gremlin Debug ROM	£28.00
Interchart	£34.00
Beebug:	
Toolkit ROM	£27.00
Sleuth ROM	£29.00
Help ROM	£25.00
Exmom II	£29.00
Spellcheck II	£31.00
Spellcheck Worldwise	£31.00
Spellcheck View	£31.00
Altra:	
Enigma Disc Imager	£45.00
Tube Editor	£45.00
Probe I	£35.00
Basic Editor 2	£35.00
Basic Editor I	£25.00
First Aid II	£19.00
Gemini:	
Datagem Database	£115.00
Pace	
Toolstar	£33.00
Commstar	£33.00
System ADE ROM	£60.00
System Spy ROM	£30.00
Edward User Pack	£44.00
Edward Teacher Pack	£25.00
BBC Ultracalc	£69.00
BBC Toolbox	£20.00
Clares B ROM	£32.00
AMX MOUSE and Software	
AMX Mouse	£79.00
AMX Pagemaker	£49.95
AMX 3D Zicon	£24.95
AMX Database	£24.95
AMX XAM	£24.95
The Original AMX Art plus Utilities	£14.95
AMX Paintpot	£14.95
AMX Desk	£24.95

OPEN
9AM - 6PM
MONDAY TO SATURDAY

MODEMS

NIGHTINGALE MODEM
Special Offer £130.00
Price includes Commstar ROM and comprehensive manual.
Auto Dial/Auto Answer Board £55.00
Auto Dial Utilities Disc £11.00
OBBS Bulletin Software £23.00

MINOR MIRACLE WS2000
BT approved, Optional Computer Control, Auto Dial Auto Answer. Options available.

WS 2000	£148.00
Lead (BBC-modem)	£7.50
Auto answer	£34.00
Auto dial	£34.00
Data beeb	£28.75

Communications ROM includes Full Prestel Facility and control of WS 200 Autodial Auto Answer 30 ARDS.

DEMON
With its devilishly clever features. Auto Dial, Auto Redial Auto Answer Full and Half Duplex European and USA standards complete with Power Supply Leads and Manuals Full Baud Rates

DEMON with BBC ROM	£81.00
DIAL DISC	£4.95

HOW TO ORDER

You may purchase any of the items listed by cheque made payable to TWILLSTAR COMPUTERS LIMITED.

All you have to do is to list your requirements on a sheet of paper, post it to us quoting ref and we will despatch your goods within 24 hours. Please add the following amounts for Postage and Packing:

Items below £10.00	add £1.50
Items Below £50.00	add £2.50
Items below £100.00	add £3.50
Items over £100.00	add £8.00

All prices include VAT at 15%
'No Hidden Extras'
Access/Visa Card Holders:
Call us on our new Special Line
01-571 5938

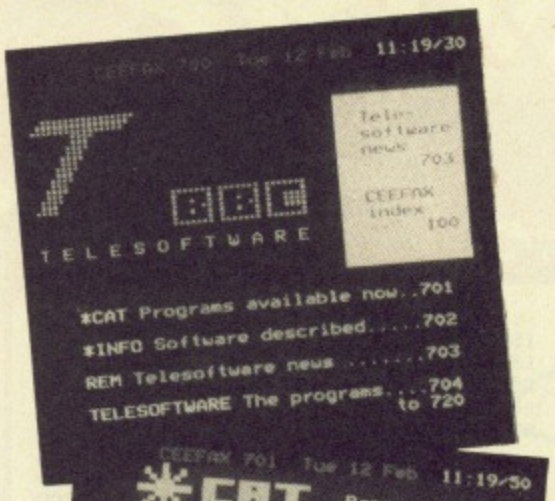
TCL

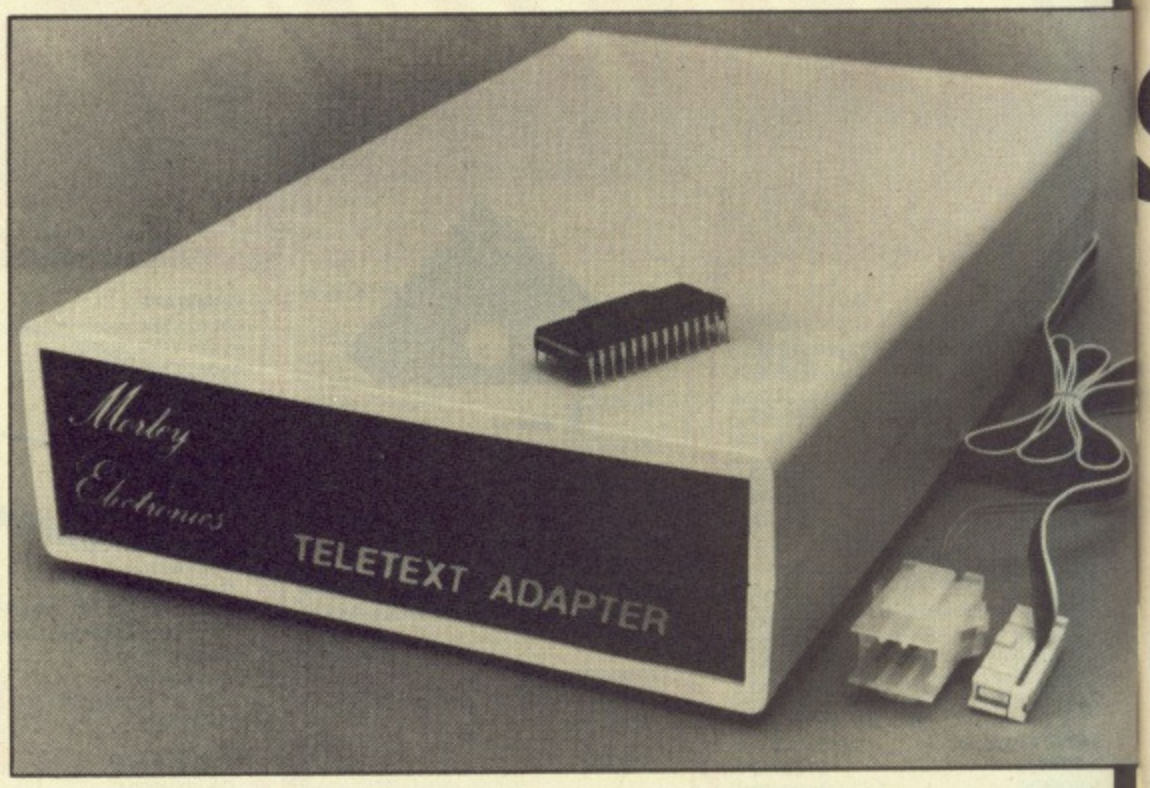
TELEPHONE ORDERS
(01) 574 5271
Telex Number 25247 attn TIL

Twillstar Computers Limited

17 Regina Road, Southall, MIDDLESEX, UB2 5PL

MORLEY ELECTRONICS





FEATURES

- Advanced design uses the latest technology will handle ANY future enhancements to the Teletext system eg: full field: 8 bit data transfer: 2k pages etc.
- Simply plugs into user port and power output.
- Low power consumption, less than 200ma. Optional power supply available.
- User friendly menu driven software including extended OSCLI and Osword commands for access from BASIC programs.
- No user-RAM required (PAGE remains at default value).
- FREE Telesoftware, no access charges. (at present updated weekly.)
- Save selected pages to disc/tape for later retrieval.
- Full access to all Teletext services and channels eg: CEEFAX, ORACLE, 4-TEL.
- Software available on ROM or sideways RAM format disc.
- Basic 1 & OS1.0 compatible.
- Gives you a real-time clock at your disposal (*TIME).
- Free software upgrades to allow for any enhancements to the teletext service. Eg: extra channels, full field data on cable & satellite systems etc.
- Easy to follow comprehensive user guide.
- No hardware limitations, it can for example receive virtually unlimited numbers of channels.
- Works with Solidisc SWR.
- Utils disc available including printer drivers allows pages to be selected and dumped direct to a printer (no more TV or Radio Times to buy).

ELECTRON TELETEXT ADAPTER

Electron adapter now available, including emulated Mode 7 allowing you to run long Adventure type programs. Please ring for Details.

M/B software DESIGN 7

Easily the best value Mode 7 screen designer on the market today.
Design any mode 7 screen, from simple MENU pages to full CEEFAX standard. This program is an invaluable aid. Designs can be saved to disc as automaticaly numbered files or the program will convert the screen into a BASIC Proc.

INTERFACES DIRECTLY WITH ADAPTER allowing CEEFAX-ORACLE pages to be selected and dropped into editor screen for altération, saving, or conversion to BASIC. Allows channel change from within program.

The Morley Teletext adapter introduces you to the world of Teletext at a price that wont break the bank. Inside it you will find the latest in second generation Teletext chip technology, which unlike our rivals who are still using chips designed more than eight years ago, will be fully compatible with any future advances in the Teletext system.
With the Morley adapter you will get a unit that automatically tunes itself in to the required station (no more messing around with screwdrivers in the back of the case), a user friendly menu driven program available on rom or disc, easy to follow instructions and a 12 month warranty. Add to this the free downloadable telesoftware and we are sure that you will agree that we are offering you one of the best bargains on the market today.

For technical details please ring Morley Electronics on Tyneside (091) 251 3883.

To order please fill in and send order form to: **MORLEY ELECTRONICS, 1 MORLEY PLACE, SHIREMOOR, TYNESIDE NE27 0QS.**

Please send me.

Qty. ☐	Morley Teletext adapters	@ £74.45 inc. VAT & P&P.
Qty. ☐	Teletext software on Rom	@ £24.95 inc. VAT & P&P.
Qty. ☐	Teletext software on Disc	@ £23.95 inc. VAT & P&P.
Qty. ☐	M/B DESIGN7 screen designer	@ £8.95 inc. VAT & P&P.
Qty. ☐	Teletext utilities on Disc	@ £5.95 inc. VAT & P&P.
Qty. ☐	Optional PSU	@ £9.95 inc VAT & P&P.

Please delete 40/80

Total £

Access

NAME _____ PHONE No. _____ CHEQUE No. _____

ADDRESS _____

_____ POSTCODE _____

CUMANA

Special Price Offers!

†Double density disk interface for Acorn Electron	£ 74.95
*CSX100M 1 x 40 track single sided 5¼" disk drive for BBC micro	£ 69.95
CS100M 1 x 40 track single sided 5¼" disk drive	£114.95
CD200M 2 x 40 track single sided 5¼"disk drive	£209.95
CS351 1 x 40 track single sided 3½" disk drive	£ 99.95
CD352 2 x 40 track single sided 3½" disk drive	£179.95
*CSX351 1 x 40 track single sided 3½" disk drive	£ 59.95
*CDX352 2 x 40 track single sided 3½" disk drive	£109.95
Beta double density disk controller for Sinclair Spectrum	£ 49.95
MCP40 four colour plotter printer (limited quantity)	£ 59.95
QFS double density disk interface for BBC-B	£ 49.95
Cumana Touch Pad	£ 49.95

*Excluding power supply (for BBC micro)
†Disk interface requires Acorn Plus 1 expansion unit
All prices include VAT + Delivery

ORDER FORM – MICRO USER JANUARY
Cumana Ltd, Pines Trading Estate, Broad Street, Guildford GU3 3BH.

QTY	PLEASE RUSH ME	PLEASE TICK
.....	Electron Interface(s) at £ 74.95	☐
.....	CSX100M disk drive(s) at £ 69.95	☐
.....	CS100M disk drive(s) at £114.95	☐
.....	CD200M disk drive(s) at £209.95	☐
.....	CS351 disk drive(s) at £ 99.95	☐
.....	CD352 disk drive(s) at £179.95	☐
.....	CSX351 disk drive(s) at £ 59.95	☐
.....	CDX352 disk drive(s) at £109.95	☐
.....	Beta d.d. controller(s) for Spectrum at £ 49.95	☐
.....	MCP40 4 colour plotter/printer at £ 59.95	☐
.....	QFS double density disk interface for BBC-B at £ 49.95	☐
.....	Cumana Touch Pad at £ 49.95	☐

I enclose cheque/P.O. for _____

or debit my Access/Visa Card No. _____

Name _____

Address _____

_____

Tel No. _____

CUMANA®
The best name in memory

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

p&h electronics Ltd

5 THE PARADE · YATELEY
HANTS
TEL: 0252 877222

22/24 GUILDFORD ROAD
BAGSHOT · SURREY
TEL: BAGSHOT 0276 73078

BBC MICRO CENTRES

TELEPHONE OR VISIT

ALL PRICES INCLUDE VAT
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

FAST PHONE/MAIL SERVICE – SAME DAY DESPATCH ON ITEMS IN STOCK
SUPPLIERS TO SCIENTIFIC AND EDUCATION AUTHORITIES

ACORN

BBC B Plus (64k)	£450.00
BBC B Plus (128k)	£475.00
Electron	£99.00
Z80 2nd Processor + Business Software	£399.00
6502 2nd Processor	£199.00
IEEE Interface	£325.00
Bit Stick (CAD High Res Joystick)	£375.00
Teletext Receiver	£149.00
Prestel Receiver	£139.00
Music Synthesiser -500	£195.00
Acorn DNFS Kit	£100.00
Data Cassette Recorder	£35.00
Electron Plus 1	£59.00
Electron Plus 3 (with Disc Drive)	£229.00

MONITORS

MONO

Philips BM7502 Green High Res	£79.00
Philips BM7522 Amber High Res	£85.00
Ferguson MM02 Green High Res	£79.00
Ferguson MM06 Amber High Res	£79.00

COLOUR

Microvitec 1431 Standard Res	£215.00
Microvitec 1451 Medium Res	£285.00
Microvitec 1441 High Res	£485.00
Sony KX 14CPI Multi-Standard (NEW)	£390.00

TELEVISION/MONITORS

Hitachi 1444 14in CTV + RGB	£199.00
Ferguson MC01 14in CTV + RGB	£215.00
Philips New Range of Monitors in stock	POA
Ferguson MC05 14in CTV + RGB (new)	£215.00
Philips 1114 14in CTV + RGB (new Super!)	£200.00

PRINTERS

DOT MATRIX

Tally MT80 + 100cps	£215.00
Tally MT85 with NLQ	£350.00
Epson P40	£58.00
Epson RX80FT+	£200.00
Epson NLQ Board for RX and FX+	£119.00
Epson LX80 with NLQ	£250.00
Epson LX80 Tractor Unit	£22.00
Epson LX80 Sheet Feeder	£55.00
Kaga Taxan 810 with NLQ	£270.00
Kaga Taxan 910 with NLQ	£439.00
Cannon PW1080A with NLQ	£270.00

DAISYWHEEL

Juki 6000	£215.00
Juki 2200 with Keyboard	£299.00
Juki 6100	£399.00
Brother HR15	£395.00

DISK DRIVES

CUMANA

CSX100M 100k S/S 40T	£89.00
CS100 100K S/S 40T with P.S.	£129.00
CSX400 400k D/S 40/80T	£114.00
CS400 400k D/S 40/80T with P.S.	£135.00
CD200M Dual 100k with P.S.	£209.00
CD800S Dual 400k with P.S.	£250.00

OPUS RANGE NOW IN STOCK

ACCESSORIES

Data Recorder	£29.00
Data Recorder – BBC Lead	£4.00
Full Proportional Joy Stick	£12.50
Full Proportional Joy Stick Pair	£20.00
Voltmace 14b Joystick	£14.50
AMX Mouse	£75.00
AMX Utilities Software	£13.50
AMX Desk	£22.00
AMX Paintbox	£13.50
AMX 3D Zicon	£22.00
AMX Page Maker	£47.00
AMX Data Base	£22.00
AMX Xam	£22.00
AMX Super Art	£47.00
Modem Nightingale with Commstar	£155.00
Modem Auto Answer Board + Software	£75.00
Sideways ROM Board	£45.00
RAM-ROM 15 Sideway ROM System	£110.00
Computer Desk Double Width	£69.00
Disc Storage Box (50)	£19.00
Disc Storage Box (80)	£23.00
Printer Lead Serial – BBC	£10.00
Printer Lead Parallel – BBC	£12.00
5¼in Discs 10 in Library Case DS/DD	£18.00
TV Aerial/Computer Switch	£2.50
BBC Key Function Key Mask	£2.00
Giant Reference Card for BBC	£2.50
Computer Covers Soft – State Type	£5.00
Computer Covers Hard – BBC and Electron	£10.00
Printer Covers – State Type	£5.50
Disc Drive Covers – State Type	£5.00

ACORNSOFT-VIEW

View – Wordprocessor ROM	£50.00
Hi-View – For 2nd 6502 Processor	£50.00
Viewsheet – Spreadsheet ROM	£50.00
View Index Disc	£15.00
View Store – Database ROM	£52.00
Printer Driver Generator – Cassette	£10.00
Printer Driver Generator – Disc	£11.50
View 3 inc. Printer Drivers	£79.00

ACORNSOFT BOOKS

Creative Graphics	£7.50
Graphs and Charts	£7.50
Lisp Manual	£7.50
Forth manual	£7.50
S. Pascal Manual	£7.50
Comal Manual	£11.50
BCPL Manual	£15.00
ISO Pascal Manual	£15.00

ACORNSOFT

Forth Cassette	£16.50
Forth Disc	£19.50
Forth ROM	£47.00
Lisp Cassette	£16.50
Lisp Disc	£19.50
Lisp ROM	£47.00
S-Pascal Cassette	£16.50
S-Pascal Disc	£19.50
ISO - Pascal ROM	£62.00
BCPL ROM	£95.00
Comal ROM	£47.00
Logo ROM	£65.00
Turtle Graphics Cassette	£16.50
Graphics Extension ROM	£28.00
Graphics Extension ROM for B Plus	£28.00
Microtext Cassette	£47.00
Microtext Disc	£55.00
Creative Graphics Cassette	£9.50
Graphs and Charts Cassette	£9.50
French for Electron Also	£14.50
Italian for Electron Also	£14.50
Spanish for Electron also	£14.50
German for Electron also	£14.50
Basic Editor	£28.00
Database Disc	£16.50
Micro Prolog (new)	£76.00
ISO Pascal Stand Alone Generator	£34.00

TOP GAMES

Doctor Who Cass+ROM	£17.00
Doctor Who Disc+ROM	£18.00
Elite	Cas. £13.50 Disc £16.50
Elite – Electron	Cas. £12.50
Elite II for 2nd 6502	Disc T.B.A.
Revs	Cas. £13.50 Disc £16.50
Revs II (4 Track)	T.B.A.
Aviator	Cas £13.50 Disc £16.50
Castle Quest	Cas. £11.00 Disc £13.00
Scrabble	Cas. £12.50 Disc £17.00
Whiteknight 12 Chess	Cas. £9.50 Disc £17.50
Snooker	Cas. £9.50 Disc £11.00
Acheton	Disc £16.50
Combat Lynx BBC and Electron	Cas. £8.50
Repton	Cas. £9.50 Disc £11.50
Repton II	Cas. £8.50 Disc £10.50
Monopoly	Cas. £12.50 Disc £17.00
Red Arrows	Cas. £8.00 Disc £10.50
Jump Jet	Cas. £9.00 Disc £10.50
Lord of the Rings Part I	£14.50

ROMS/UTILITIES

Wordwise Plus	Rom	£49.00
Intersheet	Rom	£50.00
Interchart	Rom	£34.00
Disc Doctor	Rom	£29.00
Printmaster	Rom	£29.00
Graphics	Rom	£29.00
Caretaker	Rom	£29.00
Accelerator	Rom	£60.00
Speech	Rom	£29.00
Termi II	Rom	£32.00
Communicator	Rom	£65.00
Toolkit	Rom	£26.00
Exmon II	Rom	£26.00
Murom (Music)	Rom	£28.00
Master File II	Disc	£18.00
Help II	Rom	£29.00
Sleuth	Rom	£28.00
Spellcheck III (View + W/W)	Rom	£33.00
Spellcheck (View)	Disc	£18.00
Spellcheck (Wordwise)	Disc	£18.00
Hershey Characters	Disc	£14.00
Hershey Characters	Cassette	£9.00
Advanced Disc Tookit	Rom	£33.00
ADE	Rom	£55.00
Logo (LCSI)	Rom	£59.00
BBC Ultracalc II	Rom	£69.00
Stardatabase	Rom	£69.00
Replica II 40/80	Disc	£12.00
Beta Base 40/80	Disc	£23.00
Vine Replay Disc Utility	Rom	£33.00
Vine Tape to Disc	Rom	£18.00
Island Logic Music	Cassette 1	£12.00
Island Logic Music	Cassette 2	£12.00
Island Logic Music	Disc	£24.00
Wordease	2 Roms	£27.00

COMPUTER BOOKS

BBC User Guide	£12.50
BBC User Guide Binder	£3.95
Advanced User Guide	£12.95
Advanced User Guide Binder	£3.95
Advanced Basic ROM BBC	£7.95
Advanced Graphics with the BBC	£9.95
Applied Assembly Language	£7.95
30 Hour Basic	£6.95
Basic ROM User Guide	£9.95
BBC Micro Disc Companion	£7.95
Disc Programming for the BBC	£7.95
The BBC Micro ROM Book	£9.95
Word Processing on the BBC Micro	£5.25
Complete Forth	£6.95
Logo Programming	£8.95
Basic for Business	£6.95
6502 Applications	£7.95
6502 Assembly Language Programming	£19.95
6502 Assembly Language Subroutines	£19.95
Z80 Applications	£14.50
Z80 Assembly Language Programming	£19.95
Z80 Assembly Language Subroutines	£19.95
Get More from Epson Printer	£7.95
Word Processing Book	£4.95
Word Star and CPM Made Easy	£6.95
Word Star Fast Reference Guide	£4.35
Word Star Made Easy	£16.95
Introduction CPM Z80 2nd Proc (new)	£9.95
Wordwise Plus (new)	£9.95

CHRISTMAS SPECIALS

Philips 1114 14in CTV/Monitor	£200.00
Cannon PW 1080A Printer	£270.00

GAMES SENT NO P&P CHARGE IN UK

MAIL ORDER COUPON

P&H ELECTRONICS LIMITED
22/24 GUILDFORD ROAD · BAGSHOT · SURREY GU19 5JN

Please send me: (or order by letter)

1 _____ 4 _____

2 _____ 5 _____

3 _____ 6 _____

I enclose cheque/PO for _____ P&P see above _____

Or please debit my Access/Barclaycard/Visa* *(delete as applicable)*

Card Number _____ Expiry Date _____ Telephone _____

FAST VAT FREE EXPORT SERVICE

CARRIAGE COSTS – Micros – Monitors – Disc Drives – Printers – Desks – 2nd Processors: £7
Cassette Decks: £3. – Books – Software – Leads £1. per item.
ACCESS/BARCLAYCARD/VISA ORDERS WELCOME
CREDIT FACILITIES Instant credit up to £1,000, deposit 10%
PLEASE STATE; DISK FORMAT 40 OR 80 TRACK

Name _____

Address _____

_____

_____

MU 1

From Page 157

```
10PRINT"BEEB BODY BUILDING COURSE"
20PRINT"SOUND SAMPLER"
30PRINT"By Mike Cook"
40PRINT
50LINK=1
60BA=&FC00+LINK*32
70SC=BA+8
80FOR PASS=0 TO 3 STEP 3
90P%=&A00
100[
110OPT PASS
120.SETUP \ INITIALISE
130SEI \ DISABLE INTERRUPTS
140STA SC
150LDA #&40
160LDY #0
170STA &FE6B \ ENABLE TIMER 1
180LDA #&C0
190STA &FE6E \ ENABLE INTERRUPT
200LDA #0
210STA &FE65 \ START IT OFF
220RTS
230.GIN \ GET SAMPLE INTO MEMORY
240JSR SETUP
250.HOLD
260LDA &FE6D \ GET INTERRUPT FLAG
270BPL HOLD \ LOOP UNTIL TIME OUT
280STA &FE6D \ CLEAR INTERRUPT
290LDA BA \ GET SAMPLE
300STA SC \ START GETTING NEXT ONE
310STA (&70),Y
320INY
330BNE HOLD \ GET ANOTHER
340INC &71 \ INCREASE MS POINTER
350LDA #&7D
360CMP &71 \ REACHED LIMIT ?
370BNE HOLD \ BRANCH IF NOT
380.FIN LDA #&40
390STA &FE6E \ DISABLE T1 INTERRUPT
400STA &FE6D \ CLEAR ANY INTERRUPTS
410CLI \ ENABLE SYSTEM INTERRUPTS
420LDA #&80
430STA BA \ LEAVE AT DC LEVEL ZERO
440RTS
450.SOUT \ PLAY A SAMPLE
460JSR SETUP
470LDA #&62
480STA &FE41 \ SPACE BAR LINE
490LDA #&03
500STA &FE40 \ KEYBOARD ENABLE
510.AGAIN
520LDA #&80
530STA BA \ SET DC LEVEL
540.PAUSE
550LDA &FE41 \ LOOK AT KEYBOARD
560BMI PAUSE \ WAIT TILL UNPRESSED
570LDA &72 \ TRANSFER START ADDRESS
580STA &70
590LDA &73
600STA &71
610.HOUT
620LDA &FE6D \ GET INTERRUPT FLAG
630BPL HOUT \ LOOP UNTIL TIME OUT
640STA &FE6D \ CLEAR INTERRUPT
650LDA (&70),Y \ GET A SAMPLE
660STA BA \ OUTPUT IT
670LDA &FE41
680BMI AGAIN \ BACK AGAIN IF SPACE
PRESSED
690INY
700BNE HOUT \ GET ANOTHER
710INC &71 \ INCREASE MS POINTER
720LDA #&7D
730CMP &71 \ REACHED LIMIT ?
740BNE HOUT \ BRANCH IF NOT
750JMP FIN
760]
770NEXT
780MODE1
790PROC_INSTRUCTIONS
800CD%=25
810?&FCC7=0
820?&FCC6=CD%
830?&70=&00
840?&72=&00
850?&71=&30
860?&73=&30
870REPEAT
880PRINTTAB(0,31);SPC(38);
890PRINTTAB(0,31);"(S sp R)";
900A$=GET$
910IF A$="S" THEN ?&70=00:?&71=&30:
CALL GIN
920IF A$=" " THEN ?&70=00:?&71=&30:
CALL SOUT
930IF A$="R" THEN PROC_RATE
940UNTIL FALSE
950DEF PROC_RATE
960PRINT"DELAY ";CD%;" INPUT NEW VA
LUE ";
970T$=""
980REPEAT
990A$=GET$
1000IF A$<> CHR$(13) THEN PRINTA$;
1010T$=T$+A$
1020UNTIL A$=CHR$(13)
1030CD%=VAL(T$)
1040?&FE66=CD%
1050ENDPROC
1060DEF PROC_INSTRUCTIONS
1070PRINT"BEEB BODY BUILDING COURSE"
1080PRINT"SOUND SAMPLER"
1090PRINT"JANUARY 1986"
1100PRINT"By Mike Cook"
1110PRINT
1120PRINT"Options are:-"
1130PRINT"S  - Sample input"
1140PRINT"sp - Play back sample"
1150PRINT"R  - Rate of digitising"
1160ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 223.

APEX Software *proudly presents*

GLIDER PILOT 2

Our successful flight simulator is now extensively machine coded for faster response and smoother action. Practice option, full solid colour, perspective view. Separate instruction booklet. Keyboard or potentiometer joystick.

August Micro User said of GLIDER PILOT:
'A good package and a good introduction to gliding.'

Now better than ever, still with Free Notebook Memo Pad Utility on Disc.

BBC B/B+ OS 1.2 Basic 1 or 2

Cassette £6.95 · Discs 5¼" £8.95, 3" £11.50

★★Upgrade★★ send old copy plus £2.00

APEX Software

Station Road, New Penshaw, Houghton-le-Spring, Tyne & Wear DH4 7PE

WITHOUT a Mouse

Now you can use the superb **AMX ART** software without the mouse or its ROM.
NORTHSOFT **MOUSETRAP** patches **AMX ART** to use either: (1) RB2 Tracker Ball (2) Joystick (3) Grafpad or (4) Keyboard.
NOTE: **AMX ART** plus **MOUSETRAP** runs **WITHOUT** the MOUSE driver ROM.
NORTHSOFT **MOUSETRAP** is available from:

Northside Computing
14 Cedarwood Road, Dublin 11, Ireland

Dual Format 40/80 Track Disk £6.95 incl. P&P

From Page 53

Listing I

```
  10 REM PLAY1
  20 REM =====
  30 REM (c) The Micro User
  40 MODE7:CLOSE#0
  50 PRINTCHR$134;"ABCDEFG ";CHR$129
;"X ";CHR$130;"&-N ";CHR$132;")< ";CH
R$133;"WHQBST ";CHR$131;".^"
  60 VDU28,0,24,39,2
  70 ENVELOPE 1,0,1,-1,0,1,1,255,12,
-2,-1,-15,126,50
  80 ENVELOPE 2,5,1,0,-1,1,0,1,128,-
4,0,-12,128,20
  90 ENVELOPE 3,2,4,0,0,0,0,0,110,-2
,-6,-8,126,0
 100 ENVELOPE 4,130,-1,1,0,1,1,8,-10
0,-1,-8,-9,120,120
 110 ENVELOPE 5,3,1,-1,1,1,1,1,7,-1,
-1,-1,80,126
 120 ENVELOPE 6,1,-1,0,1,1,4,1,-100,
-1,-8,-9,100,120
 130 ENVELOPE 7,1,1,-1,0,2,1,4,110,-
2,-6,-8,126,10
 140 ENVELOPE 8,129,0,-4,4,8,1,1,110
,-2,-6,-8,126,10
 150 ENVELOPE 9,1,-1,1,0,1,1,8,8,1,-
6,-1,120,126
 160 ENVELOPE15,4,4,-4,0,1,1,0,110,0
,-6,-8,126,0
 170 CHAIN"PLAY2"
```

Listing II

```
   5 REM (c) The Micro User
  10 CLS:CLEAR:mb%=60:mn%=480
  20 a$="ABCDEF&X$-N.)<^WHQ8ST"
  30 DIM n%(5,mn%),b$(2,mb%),p%(7),d
%(6)
  40 p%(1)=41:p%(2)=49:p%(3)=53:p%(4
)=61:p%(5)=69:p%(6)=73:p%(7)=81
  50 d%(1)=32:d%(2)=16:d%(3)=8:d%(4)
=4:d%(5)=2:d%(6)=1
  60 FOR A%=0 TO 2:FOR B%=0 TO mb%
  70 b$(A%,B%)=STRING$(40," "):b$(A%
,B%)="":NEXT:NEXT
  80 *CAT
  90 A%=0:R%=0:S%=0:T%=10:U%=0
 100 ONERRORGOTO200
 110 PROCread
 120 REPEAT:PRINT'CHR$134;"Copy-Edit
-New-Play-Save-Tempo-eXit?":x$=GET$
 130 IFx$="C" PROCcopy
 140 IFx$="E" PROCedit
 150 IFx$="N" PROCsave:RUN
 160 IFx$="P" PROCplay
 170 IFx$="S" PROCsave
 180 IFx$="T" PROCtempo
 190 UNTIL x$="X":PROCsave:END
 200 IF ERR=17 PRINT:GOTO120
 210 REPORT:PRINTERL:STOP
 220 ===
 230 DEF PROCchan1
 240 IF G%>TIME-J% ENDPROC
 250 IF X%=B% Q%=Q% OR 1:ENDPROC
 260 J%=TIME:X%=X%+1
 270 P%=n%(0,X%):G%=t%*n%(3,X%)
 280 IF P%>0 SOUND &11,E%,P%,G%
 290 IF P%<0 SOUND &11,15,ABS(P%),G%
 300 ENDPROC
 310 :
 320 DEF PROCchan2
 330 IF H%>TIME-K% ENDPROC
 340 IF Y%=C% Q%=Q% OR 2:ENDPROC
 350 K%=TIME:Y%=Y%+1
 360 P%=n%(1,Y%):H%=t%*n%(4,Y%)
 370 IF P%>0 SOUND &12,E%,P%,H%
 380 IF P%<0 SOUND &12,15,ABS(P%),H%
 390 ENDPROC
 400 :
 410 DEF PROCchan3
 420 IF I%>TIME-L% ENDPROC
 430 IF Z%=D% Q%=Q% OR 4:ENDPROC
 440 L%=TIME:Z%=Z%+1
 450 P%=n%(2,Z%):I%=t%*n%(5,Z%)
 460 IF P%>0 SOUND &13,E%,P%,I%
 470 IF P%<0 SOUND &13,15,ABS(P%),I%
 480 ENDPROC
 490 :
 500 DEF PROCcopy
 510 PRINTCHR$134;"Copy from bar?";C
HR$135;:INPUT""F%
 520 PRINTCHR$134;"        to bar?";C
HR$135;:INPUT""G%
 530 REPEAT:PRINT'CHR$133;"Bar ";F%;
" to bar ";G%;" :";:FOR A%=0 TO 2
 540 PRINTTAB(20)CHR$134;"Voice ";A%
+1;"?";CHR$135;
 550 REPEAT:z$=GET$:UNTILz$="Y" OR z
$="N":PRINTz$
 560 IF z$="Y" b$(A%,G%)=b$(A%,F%):S
%=0
 570 NEXT:F%=F%+1:G%=G%+1
 580 UNTIL F%>mb% OR G%>mb%:ENDPROC
 590 :
 600 DEF PROCedit
 610 REPEAT:PRINTCHR$134;"Start at b
ar?";CHR$135;:INPUT""R%:UNTIL R%<=mb%
:IF R%=0 R%=1
 620 R%=R%-1:REPEAT:R%=R%+1:PRINT
 630 FOR B%=0 TO 2:PRINTCHR$133;"Bar
 ";R%;" Voice ";B%+1'b$(B%,R%)'CHR$13
4;
 640 IF b$(B%,R%)="" PRINT"Insert?"
ELSE PRINT"Change to?"
 650 INPUTLINE""i$:IF i$<>"" b$(B%,R
%)=i$:S%=0
 660 IF i$=" " b$(B%,R%)=""
 670 NEXT:UNTILR%=mb%:ENDPROC
 680 :
 690 DEF PROCflat
 700 W%=4:W%=-1:FOR A%=1 TO K%
 710 W%=W%+3:IF W%>7 W%=W%-7
 720 p%(W%)=p%(W%)-4:NEXT:ENDPROC
 730 :
 740 DEF PROCgetkey
 750 REPEAT:PRINTCHR$134"Key (nS/nF)
?"CHR$135;:INPUT""k$
 760 UNTIL INSTR("1234567",LEFT$(k$,
1))>0 AND INSTR("FS",MID$(k$,2,1))>0
 770 IF k$="" k$="C "
 780 PROCkey:ENDPROC
 790 :
 800 DEF PROCkey
 810 IF k$="C " ENDPROC
 820 K%=VAL(LEFT$(k$,1)):z$=RIGHT$(k
$,1)
 830 IF z$="F" PROCflat ELSE PROCsha
rp
 840 ENDPROC
 850 :
 860 DEF PROCpitch
 870 IF A%=mn% M%=1:ENDPROC
 880 A%=A%+1:n%(C%,0)=A%:n%(C%+3,A%)
=D%
 890 IF X%=0 n%(C%,A%)=0 ELSE n%(C%,
A%)=p%(X%)+Q%
 900 ENDPROC
 910 :
 920 DEF PROCplay
 930 IF S%=0 PROCscan:S%=1
 940 PRINTCHR$134;"Envelope (1-9)?";
CHR$135;:REPEAT:E%=GET:UNTILE%>48 AND
 E%<58:E%=E%-48:PRINT;E%
 950 B%=n%(0,0):C%=n%(1,0):D%=n%(2,0
)
 960 G%=0:H%=0:I%=0:J%=0:K%=0:L%=0:Q
```

```
%=0
  970 X%=0:Y%=0:Z%=0:t%=21-T%:TIME=0
  980 REPEAT:PROCchan1:PROCchan2:PROC
chan3:UNTIL Q%=7:ENDPROC
  990 :
 1000 DEF PROCread
 1001 PRINTCHR$134"Load filename?"CHR
$135;:INPUT""f$:IF f$="" PROCgetkey:E
NDPROC
 1010 C%=OPENUPf$:U%=0
 1020 INPUT#C%,T%,k$:PROCkey:PRINTCHR
$133;"Tempo ";T%;"  Key "k$;
 1030 REPEAT:U%=U%+1:INPUT#C%,b$(0,U%
),b$(1,U%),b$(2,U%):UNTIL EOF#C%:CLOS
E#C%
 1040 IF U%<60 U%=U%-1
 1050 PRINT"  Bars ";U%:ENDPROC
 1060 :
 1070 DEF PROCsave
 1080 PRINTCHR$134;"Save filename?";C
HR$135;:INPUT""f$:IF f$="" ENDPROC
 1090 C%=OPENOUTf$:PRINT#C%,T%,k$:R%=
0
 1100 REPEAT:R%=R%+1:PRINT#C%,b$(0,R%
),b$(1,R%),b$(2,R%):UNTIL b$(0,R%)=""
 OR R%=mb%
 1110 CLOSE#C%:PRINT" OK":ENDPROC
 1120 :
 1130 DEF PROCscan
 1140 K%=0:M%=0:PRINTCHR$133;"Compili
ng...";:FOR C%=0 TO 2:A%=0:D%=8:O%=48
:FOR R%=1 TO mb%:PROCscbar(b$(C%,R%))
:NEXT:NEXT
 1150 IF M%>0 PRINTCHR$129;"Maximum n
otes used"
 1160 PRINTCHR$133;"Bars ";U%;"  Voic
es ";K%
 1170 ENDPROC
 1180 :
 1190 DEF PROCscbar(i$)
 1200 IF i$="" OR M%>0 ENDPROC
 1210 U%=R%:K%=C%+1:FOR B%=1 TO LENi$
:PROCseek(MID$(i$,B%,1)):NEXT:ENDPROC
 1220 :
 1230 DEF PROCseek(x$)
 1240 X%=INSTR(a$,x$):IF X%=0 ENDPROC
 1250 IF X%<9 PROCpitch:ENDPROC
 1260 IF X%>15 D%=d%(X%-15):ENDPROC
 1270 IF X%=13 O%=O%+48:ENDPROC
 1280 IF X%=14 O%=O%-48:ENDPROC
 1290 IF X%=9  n%(C%,A%)=n%(C%,A%)+4:
ENDPROC
 1300 IF X%=10 n%(C%,A%)=n%(C%,A%)-4:
ENDPROC
 1310 IF X%=11 n%(C%,A%)=n%(C%,A%)+N%
:ENDPROC
 1320 IF X%=12 n%(C%+3,A%)=n%(C%+3,A%
)*3 DIV 2:ENDPROC
 1330 n%(C%,A%)=-n%(C%,A%):ENDPROC
 1340 :
 1350 DEF PROCsharp
 1360 N%=-4:W%=9:FOR A%=1 TO K%
 1370 W%=W%-3:IF W%<1 W%=W%+7
 1380 p%(W%)=p%(W%)+4:NEXT:ENDPROC
 1390 :
 1400 DEF PROCtempo
 1410 PRINTCHR$133;"Tempo is ";T%:REP
EAT:PRINTCHR$134;"New tempo (1-20)?";
CHR$135;:INPUT""T%:UNTIL T%>0 AND T%<
21:PRINT" OK":ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 223.

AMSTRAD CPC 6128: £49.95 (disc)
CPC 6256: £49.95 (disc)

BBC 'B' £39.95 (cass) £49.95 (disc)
(also available for ECONET and E-net)

COMMODORE 64: £22.95 (cass) £49.95 (disc)
128: £59.95 (disc)

OXFORD PASCAL

AVAILABLE ON CASSETTE OR DISK

Oxford Pascal is a **FULL, STANDARD** implementation of **PASCAL** available for most micros. It is a well established product with thousands of users in the home, education and industry.

OXFORD PASCAL OFFERS:

● Friendly error reporting, ● Stand alone object code, ● Graphics and sound extensions, ● High speed object code, ● Interactive resident compiler PLUS full disc compiler, ● Linker, ● Tutorial and reference manual, ● Compact object code.

NEW THE OFFICIAL GUIDE TO OXFORD PASCAL

In addition to the full user manual supplied with Oxford Pascal, the product is now supported by two new books by Ian Sinclair in the Cassell Computing series.

The Official Guide To Oxford Pascal on the Commodore 64 **Price £7.95**
The Official Guide To Oxford Pascal on the BBC Micro **Price £7.95**

Here is what the press say about Oxford Pascal

If you're looking for a full implementation of Pascal, Oxford computer systems have done it, Congratulations!
The Channel 4 TV Database program

The code produced is very compact. Runs a good bit faster than BASIC ....
Acorn User

I can wholeheartedly recommend Oxford Pascal to Pascal novices and experts alike
Computing Today

A very attractive buy
RUN magazine

Oxford Computer Systems (Software) Ltd.
Hensington Road, Woodstock, Oxford OX7 1JR, England.
Telephone (0993) 812700

Please make cheques payable to OCSS Ltd.
My computer is Commodore 64 ☐ Commodore 128 ☐ BBC 'b' ☐
Amstrad CPC 6128 ☐ Amstrad CPC 6256 ☐

I enclose £..... (add £2 p&p)

Please debit by ACCESS A/C No.....

Please rush me my copy of Oxford Pascal

Name.....
Address.....
.....Postcode .....
Tel.....

Advanced Technology Products Limited

B.U.5.
Station Road, Clowne,
Chesterfield, S43 4AB.
(0246) 811585 (4 lines)

WE OFFER A DESIGN DEVELOPMENT AND MANUFACTURING SERVICE

SIDEWISE

SIDEWISE, ROM/RAM EXPANSION FOR THE BBC MICRO

- ★ Full Sideways ROM Expansion to a total of 16 ROMS.
- ★ 16K Battery Backed CMOS RAM Option - Ram is treated as ROM no 15 on read.
- ★ Software for Sideways ROMS may be down loaded and run in RAM under true Sideways environment. See below for details of software packages available.
- ★ An ideal tool for Sideways ROM program development with the addition of RAM.
- ★ Plug-in-and go construction mounts neatly inside the BBC.
- ★ No soldering required to fit Sidewise.
- ★ Full buffering of address and data busses - prevents data bus loading problems associated with unbuffered boards.

No.1 MARKET LEADER

Join the 10's of thousands of happy users.

£38.00 + £1.00 P&P + VAT

OPTIONS FOR SIDEWISE

Battery back up kit
£17.00 + 50p P&P + VAT

CMOS RAM 8K Bytes
£5.00 + 50p P&P + VAT

Buy 2 for £8.00 + 50p P&P + VAT

SIDEWISE PLUS

The Sideways ROM Board for the new BBC B+ Computer

- ★ Full Sideways expansion to a total of 10 x 16K ROMS.
- ★ Mounts neatly over the Sideways area inside BBC+ Micro.
- ★ No soldering required to fit Sidewise Plus.
- ★ Fully buffered board.

£29.95 + £1.00 P&P + VAT

SOFTWARE PACKAGES

A range of software specifically designed to enhance and extend the use of Sideways RAM on ATPL Sidewise and other products.

★ **SPOOLIT** Allows the Sideways RAM to be used as a 8K or 16K printer buffer.
£10.00 + 50p P&P + VAT

★ **DFS SHIFT** Moves the user RAM workspace required by the DFS into Sideways RAM. Allows memory recovery to & 0E00. Works with Acorn .9DFS only.
£10.00 + 50p P&P + VAT

★ **SIDESWIPE** Allows you to save Sideways ROM onto disc and load Sideways ROMS from disc into RAM.
£10.00 + 50p P&P + VAT

★ **TURBOPROM - 1** Uses a fast programming algorithm to greatly reduce programming time of EPROMS (14 mins = 2 mins), used in conjunction with Autoprom (BBC and other systems).
£10.00 + 50p P&P + VAT

★ **TURBOPROM - 2**
As TURBOPROM 1 but the program comes in a Sideways ROM.
£15.00 + 50p P&P + VAT

★ **DISC INDEX PROGRAM**
Allows you to generate a data base of disc directories stored on Sideways CMOS RAM (Compatable with Acorn DFS only).
£10.00 + 50p P&P + VAT

★ INDEX UTILITY ROM

Index Utility has been written to help utilize the ATPL SIDEWISE board to its fullest extent. Features supported include:

- ★ Paged ROM/RAM control.
- ★ Memory eraser.
- ★ Disc utilities.

plus many more, including features to make the use of a 6502 Second Processor less tiresome.

Command examples are:

- ★ Disc free space per drive.
- ★ Dump text window to printer.
- ★ Erase; Memory in specified area, ROM control switch and tube memory.
- ★ Display low memory areas.
- ★ Load menu.
- ★ Switch NFS off.
- ★ Manipulate read/write on ROM 15.
- ★ ROM display.
- ★ ROM switch on/off copy.
- ★ Search facilities.

As can be seen from just a few of the many commands this ROM is a useful addition to the SIDEWISE ROM board.

FOR ONLY £24.95 + 50p P&P + VAT

INSIDEOUT

INSIDEOUT is designed to make a sideways ROM socket available outside the BBC computer, to allow for easy exchange of sideways ROM's.

- ★ Can be used from BBC model B or expansion board sockets
- ★ Supplied with low insertion force socket for ease of use no costly cartridge packing.
- ★ EPROM plug in and go.
- ★ Not limited to one device.
- ★ Socket rated at 100's of insertions mounted outside the BBC. Easily removed and refitted.
- ★ Can be mounted in user defined location — not fitting in an illegal position.

ONLY £13.00 + 50p P&P + VAT

SYMPHONY

The Acorn Music 500 Compatable Electronic Keyboard. The Symphony Electronic Keyboard provides simulation of a wide range of musical instruments and sound effects through the BBC Micro or the Acorn Music 500.
£105.70 + £3.50 P&P + VAT

OPTIONAL EXTRAS

SYMKIT-Allows sound output from the BBC to be connected to an external amplifier.
£5.89 + 50p P&P + VAT

SYMAMP-Wooden cased amplifier with 6 Watt output suitable for use with the Symphony keyboard or Acorn Music 500.
£39.50 + £2.50 P&P + VAT

SYMSWITCH-Sustain foot switch for use with the Symphony keyboard.
£6.95 + £1.00 P&P + VAT

SYM 500-Software to allow music to be played through Acorn Music 500 via the Symphony keyboard - Now includes sequencing.
£14.95 + 50p P&P + VAT

Demonstrations of Symphony can now be seen at the following places
Technomatic, 15-17 Burnley Road, London NW10 1ED.
Electronequip, 59 West Street, Fareham, Hampshire CO16 0JW.
The Data Store, Chatterton Road, Bromley, Kent.
Cardiff Micro, 46 Charles Street, Cardiff CF1 1EE.

COLOUR-STICK

An advanced light pen package for the BBC Computer, with disc based art program, Icon driven.

- ★ Comprehensive manual and software including two games, Solitaire and Pontoon.
- ★ Drawing facilities include; Multi point rubber banding, 4 colour shapes for circles, squares, rectangles, elipses, arcs, and sectors at any angle and size.
- ★ Drag drawing, and air brush facilities with unique area washing.
- ★ Colour fill in any of 4 solid colours and a choice from 120 textured colours.
- ★ Screen printer dumps to Epson printer.
- ★ Utilities to provide users with light pen routines.
- ★ Fits to analogue port and needs 40 or 80 track disc drive.
- ★ Text can be entered in various sizes, fonts and colours.
- ★ Save and load screens to and from disc.
- ★ Please state 40 or 80 track disc.

£39.50 + £1.00 P&P + VAT

CAD SYSTEM

Robo systems professional CAD for Apple, BBC, and IBM computers

- ★ 10,000 users worldwide, rapidly becoming the standard CAD System at a realistic price.
- ★ Auto dimensioning adjustable curves, precision grids and angle locks, powerful zoom and pan, scale drawing and text, and graphics library index.
- ★ Supports a wide variety of plotters from A4 to A0.
- ★ Ideal tool for:- Electrical/electronic engineers, chemical engineers, planning engineers, architects, education establishments, and PCB design.

ATPL have been appointed distributors for Robo products. We are currently looking for dealers, very attractive discounts available, please apply.

CAD systems start at **£795.00**

Please contact sales office for demonstration or quotation.

BREAK LOCK

EVER HIT YOUR 'BREAK' KEY WHEN YOU DIDN'T MEAN TO?

FOR THE BBC MICRO

Fit ATPL 'BREAK LOCK' to your BBC Micro and avoid disaster where inadvertant use of 'BREAK' will cause loss of data and/or programmes.
ATPL 'BREAK LOCK' is a 2 position key-switch that will:

- ★ Prevent accidental or unauthorised use of the 'BREAK' key.
- ★ Act as a security device to prevent unauthorised use of your system more effectively and cheaper than security ROMs.
- ★ Easily and neatly fit in the 'Ash-tray'.
- ★ Render demonstration machine tamper-proof.

£8.53 + 50p P&P + VAT

AUTOPROM

Professional EPROM Programmer for the BBC computer and Acorn type Systems.

- ★ Capable of programming all 27 series EPROMS up to 27256 and most 25 series EPROMS.
- ★ Tape or disc based software, including fast program algorithm (27128 in 2 mins) and comprehensive manual.
- ★ Unique facility to run users own basic or machine code program at Switch on or Reset.

£98.00 + £2.00 P&P + VAT

DEALERS ENQUIRIES WELCOME ON ALL OUR PRODUCTS –PLEASE CALL

CONDITIONS OF SALE & DELIVERY

Cheques made payable to Advanced Technology Products Ltd. please allow 28 days for delivery. Cost of carriage or postage refer to each section. Quantity orders and overseas carriage charged at cost. Condition of sales available on request.

ACCESS/VISA accepted. Carriage to be added to advertised price, then add VAT to the total. In accordance with our policy of progressive development we reserve the right to modify specifications without prior notice.

From Page 69

```
  190 FOR P=0 TO DIF%:NEXT P
  200 IF INKEY(-98)H%=H%-1
  210 IF INKEY(-67)H%=H%+1
  220 IF H%>13 H%=13
  230 IF H%<3 H%=3
  240 COLOUR1:VDU31,H%,28:CALL CRAFT%
  250 IF H%<6 AND N%=7 PROCcrash
  260 IF H%>=6 AND H%<=10 AND N1%=7 P
ROCcrash
  270 IF H%>10 AND N2%=7 PROCcrash
  280 GOTO 120
  290 REM Draws the universe
  300 DEFPROCstars
  310 FOR O%=-1 TO 1 STEP 2
  320 FOR STARS%=0 TO 30
  330 ANGL%=RND(180)
  340 IF ANGL%=90 GOTO 330
  350 K%=RND(5)+1
  360 C%=RND(8)+7
  370 TN=TAN(RAD(ANGL%))
  380 FOR X%=0 TO 22
  390 C%=C%+1:IF C%>15 C%=8
  400 GCOL0,C%:PLOT69,K%*TN+600,500-K
%*O%:K%=K%*5/4
  410 NEXT
  420 NEXT
  430 NEXT
  440 ENDPROC
  450 REM Moves the stars
  460 DEFPROCmove
  470 VDU19,X%,3;0;
  480 IF X%=8 VDU19,15,0;0; ELSE VDU1
9,X%-1,0;0;
  490 IF X%=15 X%=7
  500 X%=X%+1
  510 ENDPROC
  520 REM Machine code which prints t
he spaceship
  530 DEFPROCasmb
  540 FOR PASS=0 TO 2 STEP 2
  550 P%=CRAFT%
  560 [OPT PASS
  570 LDA#32:JSR&FFEE
  580 LDA#224:JSR&FFEE
  590 LDA#225:JSR&FFEE
  600 LDA#226:JSR&FFEE
  610 LDA#32:JSR&FFEE
  620 LDA#10:JSR&FFEE
  630 LDA#127:JSR&FFEE
  640 LDA#8:JSR&FFEE
  650 LDA#8:JSR&FFEE
  660 LDA#8:JSR&FFEE
  670 LDA#8:JSR&FFEE
  680 LDA#32:JSR&FFEE
  690 LDA#227:JSR&FFEE
  700 LDA#228:JSR&FFEE
  710 LDA#229:JSR&FFEE
  720 RTS
  730 ]
  740 NEXT
  750 ENDPROC
  760 REM Defines characters and enve
lopes
  770 DEFPROCchar
  780 ENVELOPE5,2,1,-1,1,2,4,2,120,-1
,-1,-1,120,110
  790 FOR P=224 TO 240
  800 READA,B,C,D,E,F,G,H
  810 VDU23,P,A,B,C,D,E,F,G,H
  820 NEXT P
  830 AS$=CHR$(235)+CHR$(8)+CHR$(10)+
CHR$(236)
  840 AL$=CHR$(237)+CHR$(238)+CHR$(8)
+CHR$(8)+CHR$(10)+CHR$(239)+CHR$(240)
  850 AST$(1)=CHR$(230)
  860 AST$(2)=CHR$(231)
  870 AST$(3)=CHR$(232)
  880 AST$(4)=CHR$(233)
  890 AST$(5)=CHR$(234)
  900 AST$(6)=AS$
  910 AST$(7)=AL$
  920 DATA0,0,0,0,0,0,1,2,0,24,24,60,
126,219,189,189,0,0,0,0,0,0,128,192,7
,31,126,254,255,0,0,0,126,66,189,231,
.219,219,102,60,224,248,126,127,255,0,
0,0
  930 DATA0,0,0,0,0,0,0,0,0,0,0,24,16
,0,0,0,0,0,0,8,24,24,8,0,0,0,0,12,26,28
,28,26,12,28,118,114,120,120,114,118,
28,0,0,0,0,0,28,118,114,123,249,249,249
,251,251,118,118,60
  940 DATA7,15,31,63,63,127,127,127,2
24,56,12,4,134,130,130,130,127,127,12
7,127,63,63,31,7,130,130,130,134,4,8,
56,224
  950 ENDPROC
  960 REM Prints asteroid on the left
  970 DEFPROCleft
  980 IF N%>N1% AND N%>N2% SOUND&10,-
(N%*2),7,30:SOUND&11,0,N%*10+150,1
  990 M1%=1:GCOL0,0:MOVE600-A%,500-B%
:PRINT AST$(N%)
 1000 IF N%=7 M1%=0:N%=1:B%=6:A%=5:SO
UND&10,-1,0,1:PROCscore:ENDPROC
 1010 B%=B%*2:A%=A%*2:N%=N%+1
 1020 GCOL0,7:MOVE600-A%,500-B%:PRINT
 AST$(N%)
 1030 ENDPROC
 1040 REM Prints asteroid in the cent
re
 1050 DEFPROCcentre
 1060 IF N1%>N% AND N1%>N2% SOUND&10,
-(N1%*2),7,30:SOUND&11,0,N1%*10+150,1
 1070 M2%=1:GCOL0,0:MOVE600,500-B1%:P
RINT AST$(N1%)
 1080 IF N1%=7 N1%=1:M2%=0:B1%=6:SOUN
D&10,-1,0,1:PROCscore:ENDPROC
 1090 B1%=B1%*2:N1%=N1%+1
 1100 GCOL0,7:MOVE600,500-B1%:PRINT A
ST$(N1%)
 1110 ENDPROC
 1120 REM Prints asteroid on the righ
t
 1130 DEFPROCright
 1140 IF N2%>N% AND N2%>N1% SOUND&10,
-(N2%*2),7,30:SOUND&11,0,N2%*10+150,1
 1150 M3%=1:GCOL0,0:MOVE600+A1%,500-B
2%:PRINTAST$(N2%)
 1160 IF N2%=7 N2%=1:M3%=0:B2%=6:A1%=
5:SOUND&10,-1,0,1:PROCscore:ENDPROC
 1170 A1%=A1%*2:B2%=B2%*2:N2%=N2%+1
 1180 GCOL0,7:MOVE600+A1%,500-B2%:PRI
NT AST$(N2%)
 1190 ENDPROC
 1200 REM Displays a crash when the c
raft has been hit
 1210 DEFPROCcrash
 1220 FOR P=0 TO 40
 1230 SOUND&11,0,250-(P*6),1:SOUND&10
,-15,7,2:VDU19,0,RND(15);0;
 1240 FOR X=0 TO 20:NEXTX
 1250 NEXT
 1260 VDU19,0,0;0;
 1270 LIVE=LIVE-1
 1280 IF LIVE=0 PROCend
 1290 ENDPROC
 1300 REM Defines initial value of va
riables
 1310 DEFPROCvariables
 1320 LIVE=3:S%=0:X%=8:M1%=0:N%=1:B%=
6:A%=4:M2%=0:N1%=1:B1%=6:M3%=0:N2%=1:
B2%=6:A1%=4
 1330 ENDPROC
 1340 REM Sets up initial actual colo
urs
 1350 DEFPROCsetup
 1360 FOR P=9 TO 15
 1370 VDU19,P,0;0;
 1380 NEXT
 1390 VDU19,8,7;0;
 1400 VDU19,6,11;0;
 1410 ENDPROC
 1420 REM Calculates and displays the
```

→

PINEAPPLE SOFTWARE

Programs for the BBC model 'B' with disc drive with FREE updating service on all software

ARE YOU GETTING THE MOST FROM YOUR DOT MATRIX PRINTER AND DISC DRIVE?

DIAGRAM is a new program which really exploits the full potential of the BBC micro and will enable you to obtain printouts of a size and quality previously unobtainable from your system.

Originally designed for producing large circuit diagrams, DIAGRAM has now been improved to the point where it is invaluable for anyone who wishes to produce large areas of mixed graphics and text, and has many of the features normally found only in very expensive text/graphics processors.
DIAGRAM utilises a unique method of storing information on disc which allows not only very large diagrams to be created, but also allows rapid 'scrolling' of the screen both horizontally and vertically over the full area of the diagram.
The hard copy printout options available with DIAGRAM are second to none, and use is again made of the unique disc storage techniques to produce both horizontal and vertical printouts in various sizes down to probably the smallest high definition printing you have ever seen from your printer – a full 3×6 (18 mode 0 screen) diagram printed in a single print run onto an A4 sheet!

FEATURES

- Diagrams may consist of up to 39 mode 0 screens, defined in any aspect ratio, e.g. 3 screens across by 13 screens down, 10 screens × 3 screens etc.
- Up to 128 Icons may be used by any one diagram, and may be predefined in full mode 0 definition with a maximum size of 32 × 24 pixels. An unlimited size library of Icons may be built up allowing rapid transfer of Icons from the library to a new diagram.
- Editing of diagrams can be achieved at any time during 'scrolling' around the screen, and edit features include:- Comprehensive horizontal and vertical line drawing routines with automatic 'perfect joins' at corners and T junctions. Entry of text characters and Icons at any time by a single key press. Also, any size rectangular area of the screen may be predefined, and this area may then be deleted, moved anywhere on the screen, or copied to a different point on the screen.
- Other features include selectable display colours, TAB settings, Index names, and many more.
- Diagram is compatible with most dot matrix printers (specify type when ordering), and printouts can be obtained of any specified section of the diagram, in varying sizes and in either horizontal or vertical print mode. With an FX80 type printer up to three screens may be printed across the width of the carriage, and there is no limitation (apart from the diagram size) to the number of screens that can be printed in the vertical direction – up to six mode 0 screens will fit vertically on an A4 sheet.
- The latest version of DIAGRAM is now fully compatible with Marconi Tracker Ball, which allows 'scrolling' of the screen and many of the editing features to be carried out using the tracker ball.
- DIAGRAM is supplied in an attractive hard backed disc wallet with keystrip and comprehensive instruction manual.

£25 supplied only on disc 40/80T. Please specify printer type when ordering
+VAT p&p free

MARCONI TRACKER BALL £51.50
+VAT p&p £1.75

All orders sent by return of post

Many of our customers have said they think that DIAGRAM is worth twice the price, so order now before we put the price up!

39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL. ☎ Tel: 01-599 1476.

POWERPLAY
THE GAME OF THE GODS

The fantasy quiz game that transforms you and your opponents into mighty ancient gods.
You control four great warriors fighting for your honour in the Temple of Apollo. Demonstrate your superior knowledge and they will will transform into stronger beings – but you must master the use of 'mutations', 'teleports' and 'challenges' to emerge from the battle victorious!

BBC B 40/80 Disk
£14.95

- ★ A Strategic Board Game for 2 to 4 players
- ★ Arcade style 3D graphics action
- ★ Rapid access to over 2000 questions on four topics
- ★ Special facility to create your own questions
- ★ Speech synthesis feature included

Available at good computer stores or direct from Arcana Software Design

ARCANA SOFTWARE DESIGN

ARCANA SOFTWARE DESIGN
AVONDALE WORKSHOPS
WOODLAND WAY
KINGSWOOD
BRISTOL BS15 1QH

Please quote this magazine if ordering directly

From Page 167

```
 score
 1430 DEFPROCscore
 1440 S%=S%+100
 1450 VDU4
 1460 IF S%=5000 PROCbonus
 1470 COLOUR 2:PRINTTAB(8,2);S%
 1480 VDU5
 1490 ENDPROC
 1500 REM Shows the craft as it enter
s Hyperspace
 1510 DEFPROCinitial
 1520 COLOUR2:PRINTTAB(0,2)"  SCORE 0
00          "
 1530 PRINTTAB(0,4)"
 "
 1540 VDU31,H%,28:COLOUR1:CALL CRAFT%
 1550 COLOUR 6
 1560 FOR P=0 TO 250 STEP 2
 1570 SOUND&11,0,P,1
 1580 SOUND&10,-15,7,5
 1590 PROCmove
 1600 IF P=50 PRINTTAB(2,4)"WARNING"
 1610 IF P=100 PRINTTAB(2,4)"MEGAROID
S AHEAD"
 1620 IF P=200 PRINTTAB(2,4)"FASTEN S
EAT  BELT"
 1630 FOR X=0 TO 100:NEXT X
 1640 NEXT
 1650 PRINTTAB(2,4)"
 "
 1660 ENDPROC
 1670 REM Prints players score and th
e High Score
 1680 DEFPROCend
 1690 VDU5
 1700 FOR P=1 TO 6
 1710 IF M1%<>0 PROCleft
 1720 IF M2%<>0 PROCcentre
 1730 IF M3%<>0 PROCright
 1740 NEXT
 1750 VDU4
 1760 IF S%>HI% THEN HI%=S%:PROCmusic
 1770 COLOUR 7:PRINTTAB(0,2)"Your sco
re is ";S%
 1780 PRINTTAB(0,4)"High score is ";H
I%
 1790 IF INKEY(-82)THEN 1800 ELSE 179
0
 1800 PROCvariables
 1810 PROCinitial
 1820 ENDPROC
 1830 REM Introduction to the game
 1840 DEFPROCintro
 1850 PRINTTAB(9,6) CHR$(141);CHR$(13
6);CHR$(131);"Megaroids"
 1860 PRINTTAB(9,7) CHR$(141);CHR$(13
6);CHR$(131);"Megaroids"
 1870 PRINTTAB(8,8)"by Peter Mujtaba"
 1880 PRINTTAB(0,10)"You are fleeing
from the CYLONS and havejust entered
Hyperspace.SUDDENLY you    realise th
at you are in the middle of a megaroi
d storm.Your only means of        surv
ival is by dodging the megaroids !"
 1890 PRINTTAB(0,15)"       You need f
ast reflexes and nerves of steel to S
URVIVE"
 1900 PRINTTAB(5,22)"Press SPACE to c
ontinue"
 1910 IF INKEY(-99) THEN 1920 ELSE 19
10
 1920 ENDPROC
 1930 REM Displays functional keys
 1940 DEFPROCinstructions
 1950 COLOUR2
 1960 PRINTTAB(8,3)"KEYS"
 1970 PRINTTAB(2,7)"Z.............LEFT
"
 1980 PRINTTAB(2,9)"X.............RIGH
T"
 1990 PRINTTAB(0,11)"To replay the ga
me      press 'S'"
 2000 VDU5
 2010 FOR P=1 TO 7
 2020 PROCleft
 2030 FOR X=0 TO 100:NEXT X
 2040 NEXT
 2050 VDU4
 2060 COLOUR1
 2070 PRINTTAB(2,30)"PRESS"
 2080 VDU5
 2090 FOR P=1 TO 7
 2100 PROCcentre
 2110 FOR X=0 TO 100:NEXT X
 2120 NEXT
 2130 VDU4
 2140 COLOUR3
 2150 PRINTTAB(8,30)"SPACE"
 2160 VDU5
 2170 FOR P=1 TO 7
 2180 PROCright
 2190 FOR X=0 TO 100:NEXT X
 2200 NEXT
 2210 VDU4
 2220 COLOUR6
 2230 PRINTTAB(14,30)"BAR"
 2240 IF INKEY(-99) THEN 2250 ELSE 22
40
 2250 ENDPROC
 2260 REM Adds a bonus score when a s
```

```
core of 5000 is reached
 2270 DEFPROCbonus
 2280 COLOUR1:PRINTTAB(0,4)"BONUS 100
0"
 2290 FOR P=0 TO 250 STEP 5
 2300 SOUND&12,-15,P,1
 2310 FOR X=0 TO 60:NEXT X
 2320 NEXT
 2330 PRINTTAB(0,4)"          "
 2340 S%=S%+1000
 2350 ENDPROC
 2360 REM Selects level of difficulty
 2370 DEFPROCdifficult
 2380 CLS
 2390 PRINTTAB(5,15)"0 IS DIFFICULT"
 2400 PRINTTAB(5,17)"5 IS EASY"
 2410 INPUT TAB(0,10)"Please enter le
vel of difficulty(0-5)"DIF
 2420 DIF%=DIF*20
 2430 ENDPROC
 2440 REM Plays a piece of music when
 a high score has been obtained
 2450 DEFPROCmusic
 2460 RESTORE 2510
 2470 FOR P=1 TO 23
 2480 READ PITCH,DURATION
 2490 SOUND1,5,PITCH,DURATION:SOUND2,
5,PITCH+2,DURATION
 2500 NEXT
 2510 DATA149,9,129,4,113,4,129,5,101
,18,149,9,129,4,113,4,129,4,101,15,14
1,8,137,4,129,4,137,5,109,15,137,7,12
9,4,121,6,101,16,137,7,129,4,121,6,10
1,4,0
 2520 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 223.

Thank you.

Online Aid is a co-ordinated effort by the computer industry to raise money to help relieve the famine in Africa. And possibly the prevention of a recurrence.

Any money received will be managed by the Band Aid Trust and used for both short and long term projects.

From the list below you can see we've already had many donations and offers of help. But the picture opposite, from David Bailey's book 'Imagine', only serves to remind us how urgently help is still needed.

The closing date for donations is February 1986.

If you would like to contribute, please send your donations to: The Honorary Treasurer, Online Aid, Lading House, 10-14 Bedford Street, London WC2E 9HE.

For further information, telephone Claire Gooding on 01-642 7945 or Paul Walton on 01-515 2739.

Andrew Gumbrell Computing
Ashton-Tate
Brother International Europe
Linotype
Text 100
Sphinx
MGB Computer Systems
Husky Computers
Oyez Computers
Newbury Data Recording
LSI Computers
Micro Peripherals
Data Training
Data Logic
Next Computer
Vistec Business Systems
Safe Computing
AM Programmers
Lotus Development
Xitan
Computacenter
Accent Computers
McDonnell Douglas
Personal Computers
Granada Business Centres
Mills Associates
Mitel Telecom
Rental Research
Jones Sewing Machine
Philips Business Systems
Comshare
Ferrari Software
Quest International
Epson (UK)
Compel
TMS Computer Authors
Pericom
Wasp Software
Consultants (Computer & Financial)
Data Sciences International
Kalamazoo Business Systems
Owl Computer Training
Nestar Systems
Jarogate
IBL Network Systems
CSC Computer Sciences
Langton Electronic Publishing
Butler Cox & Partners
Institute of Data Processing Managers
Thorn EMI
BOS Software
Duncan Databases
TABS Software
Canon (UK)
Olympia Business Machines
Prime Computers
NMW Computers
Star Computer Group
Convergent Solutions
Paxton Computers
CAP

MAJOR SPONSORS:
Aspect Advertising (Production)
Programmes (Telesales)

ASSOCIATE SPONSORS:
Prontaprint (Charing Cross Rd.)
The Publishing Companies
Fennel Associates
Speed Couriers
BEC Couriers
Setters
Aston Technology
EMAP
IPC
Wace Gee & Watson
Cattanach Poole P.R.
Eric Leach Marketing
Sterling P.R.
McCormack & Dodge
Wickes Associate International
Sheridan Communications
Pims & Broad St. Associates
Peter Hopkin
Alan Wood

More please.

ONLINE AID

From Page 89

```
  10 REM (c) The Micro User
  20 PROCinit
  30 PROCassemble
  40 PROCsave
  50 END
  60 DATA Find, &1FF, Replace, &2BA,
GenUtil, &2DA
  70 DATA &88D3, &8A13, &98F1, &98F5
, &A86C, &AD38, &B53A, &BCAA
  80 DATA &8951, &8A8C, &991F, &9923
, &A07B, &AD12, &B50E, &BC8D
  90 :
 100 DEF PROCinit
 110 CLS
 120 FOR I%=0 TO 1
 130 PRINT TAB(0,I%) CHR$141 CHR$132
 CHR$157 CHR$131 "BASIC Edit Utility
Generator"
 140 NEXT
 150 REPEAT
 160 PRINTTAB(3,5) CHR$131 "Find, Re
place or GenUtil (F/R/G)?";
 170 a%=INSTR("FRG",CHR$(GET AND 95)
)
 180 UNTIL a%
 190 type%=a%-1
 200 :
 210 FOR I%=0TOtype%
 220 READ type$,L%
 230 NEXT
 240 basic%=2+(?&8015=ASC"1")
 250 base%=&900
 260 z%=&70
 270 name$=type$
 280 REPEAT
 290 PRINTTAB(0,5) SPC(240) 'TAB(0,1
3) SPC(240) 'TAB(0,18) SPC(200)
 300 PRINTTAB(3,5) CHR$130 type$" Ut
ility will be created. "''TAB(4)"Set-
up values are as follows:"
 310 base$ = "&"+STR$~base%
 320 work$ = "&"+STR$~z%
 330 PRINT 'TAB(4) "BASIC" TAB(23) b
asic%
 340 PRINT TAB(4) "Code area" TAB(33
-LENbase$) base$
 350 PRINT TAB(4) "Work area" TAB(33
-LENwork$) work$
 360 PRINT TAB(4) "Name" TAB(33-LENn
ame$) name$
 370 clear% = FNclear
 380 PRINT TAB(3,17) CHR$131 "OK to
continue?"
 390 a%=95 AND GET
 400 IF a%<>89 AND a%>=32:PROCalter
 410 UNTIL a%=89 OR a%<32
 420 :
 430 work1  = z%
 440 work2  = z%+&1
 450 work3  = z%+&2
 460 work4  = z%+&3
 470 slen   = z%+&4
 480 rlen   = z%+&5
 490 rend   = z%+&6
 500 diff   = z%+&7
 510 f1     = z%+&8
 520 f2     = z%+&9
 530 lptr   = z%+&A
 540 start  = z%+&C
 550 finish = z%+&E
 560 imlen  = &6FF
 570 :
 580 page   = &18
 590 ptrb   = &19
 600 ptroff = &1B
 610 inta   = &2A
 620 crom   = &F4
 630 :
 640 romlat = &FE30
 650 gsinit = &FFC2
 660 gsread = &FFC5
 670 osargs = &FFDA
 680 osrdch = &FFE0
 690 osnewl = &FFE7
 700 oswrch = &FFEE
 710 osbyte = &FFF4
 720 oscli  = &FFF7
 730 :
 740 IF basic%=1 RESTORE 70 ELSE RES
TORE 80
 750 READ tline0, getchb, plnum0, pl
num5, getnmb, instr0, ptoken, inslin
 760 ENDPROC
 770 :
 780 DEF FNclear
 790 IF base%>&BFF OR base%+L%<&B01
: =0
 800 PRINT TAB(3,14) CHR$7 CHR$131 "
Utility will corrupt Fn-keys"
 810 IF type%=2 : =0
 820 PRINT TAB(3) CHR$131 "Reset key
s after use (Y/N)?";
 830 =-((95 AND GET)=89)*5
 840 :
 850 DEFPROCalter
 860 INPUT 'TAB(4) "BASIC" TAB(32) z
$
 870 basic% = FNnewval(basic%,1,2)
 880 INPUT TAB(4) "Code area" TAB(29
) "&" z$
 890 base% = FNnewval(base%,&800,&7D
00)
 900 INPUT TAB(4) "Work area" TAB(30
) "&" z$
 910 z% = FNnewval(z%,&4F,&70)
 920 INPUT TAB(4) "Name" TAB(25) z$
 930 IF z$<>"" : name$=z$
 940 ENDPROC
 950 :
 960 DEF FNnewval(old%,lo%,hi%)
 970 IF z$="" : =old%
 980 x% = EVAL("&"+z$)
 990 IF x%<lo% OR x%>hi% : VDU7 : =o
ld%
1000 =x%
1010 :
1020 DEF PROCassemble
1030 FOR opt% = 0 TO 2 STEP 2
1040 P% = base%
1050 IF type%=0 PROCfind
1060 IF type%=1 PROCreplace
1070 IF type%=2 PROCgeneral
1080 NEXT
1090 PRINT TAB(0,14) SPC(160)
1100 IF P%-base%<>L%+clear% : PRINT
TAB(3,14) CHR$131 "Length " ~P%-base%
" in Error" : STOP
1110 PRINT TAB(4,14) "Checksum :"~FN
sum
1120 ENDPROC
1130 :
1140 DEF FNsum
1150 S%=0
1160 FOR J%=base% TO P%-1
1170 S%=S%EOR(J%MOD256*?J%)
1180 NEXT
1190 =S%
1200 :
1210 DEF PROCfind
1220 [OPT FNdiscinit
1230 OPT FNsaveptr
1240 OPT FNfindcmd
1250 OPT FNparam1
1260 OPT FNstr1
1270 OPT FNparam2
1280 OPT FNdiscend
1290 OPT FNnext
1300 :
1310 JSR print
1320 BEQ next
1330 :
1340 OPT FNdisplay
1350 :
1360 JMP cont1
1370 :
1380 OPT FNrest
1390 ]ENDPROC
1400 :
1410 DEF PROCreplace
1420 [OPT FNdiscinit
1430 OPT FNsaveptr
1440 OPT FNfindcmd
1450 OPT FNparam1
1460 OPT FNstr1
1470 OPT FNstr2
1480 OPT FNparam2
```

```
1490 OPT FNdiscend
1500 OPT FNeditline
1510 OPT FNnext
1520 :
1530 BMI replace
1540 :
1550 OPT FNdisplay
1560 OPT FNreplloop
1570 OPT FNrest
1580 ]ENDPROC
1590 :
1600 DEF PROCgeneral
1610 [OPT opt%
1620 \Initialise Utility
1630 LDA #entry MOD256
1640 STA &200
1650 LDA #entry DIV256
1660 STA &201
1670 RTS
1680 :
1690 .entry
1700 \*line entry point
1710 \get command line location
1720 STX &F2
1730 STX ptrb
1740 STY &F3
1750 STY ptrb+1
1760 :
1770 OPT FNsaveptr
1780 OPT FNparam1
1790 :
1800 \get requested type (F or R)
1810 JSR gsread
1820 AND #&5F
1830 CMP #&52
1840 BNE notrepl
1850 \Replace requested - set flag b
t7
1860 ROR f1
1870 BNE notfind
1880 :
1890 .notrepl
1900 CMP #&46
1910 BNE paramerr
1920 :
1930 .notfind
1940 JSR gsread
1950 BCC paramerr
1960 CLC
1970 JSR gsinit
1980 BEQ paramerr
1990 OPT FNstr1
2000 BIT f1
2010 BPL onestr
2020 :
2030 OPT FNstr2
2040 :
2050 .onestr
2060 OPT FNparam2
2070 :
2080 RTS
2090 :
2100 .paramerr
2110 OPT FNbrk("Parameters?")
2120 :
2130 .endline
2140 BIT f1
2150 BVC noedit
2160 :
2170 OPT FNeditline
2180 OPT FNnext
2190 :
2200 BIT f1
2210 BVS replace
2220 JSR print
2230 BEQ next
2240 BMI replace
2250 :
2260 OPT FNdisplay
2270 :
2280 BIT f1
2290 BVC cont1
2300 :
2310 OPT FNreplloop
2320 OPT FNrest
2330 ]ENDPROC
2340 :
2350 DEF FNdiscinit
2360 [OPT opt%
2370 \Find the BASIC ROM
2380 LDX #0
2390 LDY #&FF
2400 LDA #&BB
2410 JSR osbyte
2420 LDA crom
2430 PHA
2440 \page in the BASIC ROM
2450 SEI
2460 STX crom
2470 STX romlat
2480 CLI
2490 ]
2500 =opt%
2510 :
2520 DEF FNsaveptr
2530 [OPT opt%
2540 \Save BASIC stack pointers
2550 LDA &4
2560 PHA
2570 LDA &5
2580 PHA
2590 \save and reset WIDTH
2600 LDA &23
2610 PHA
2620 LDY #&FF
2630 STY &23
2640 \set lptr to start of program
2650 INY
2660 LDA page
2670 STA lptr+1
2680 LDA #1
2690 STA lptr
2700 ]
2710 =opt%
2720 :
2730 DEF FNfindcmd
2740 [OPT opt%
2750 \get location of parameter list
2760 LDX #work1
2770 JSR osargs
2780 LDA work1
2790 STA &F2
2800 STA ptrb
2810 LDA work2
2820 STA &F3
2830 STA ptrb+1
2840 ]
2850 =opt%
2860 :
2870 DEF FNparam1
2880 [OPT opt%
2890 CLC
2900 JSR gsinit
2910 \if zero, no parameters found
2920 BEQ checkline
2930 LDA #0
2940 STA f1
2950 ]
2960 =opt%
2970 :
2980 DEF FNstr1
2990 [OPT opt%
3000 \get "find" string into start o
f string buffer, length in X-reg.
3010 LDX #&FF
3020 :
3030 .ploop1
3040 JSR gsread
3050 INX
3060 \if -ve, string is too long
3070 BMI paramerr
3080 STA &600,X
3090 BCC ploop1
3100 \store length to slen
3110 STX slen
3120 ]
3130 =opt%
3140 :
3150 DEF FNstr2
3160 [OPT opt%
3170 \get "replace" string into stri
ng buffer, above "find" string.
3180 CLC
3190 JSR gsinit
3200 BEQ paramerr
3210 :
```

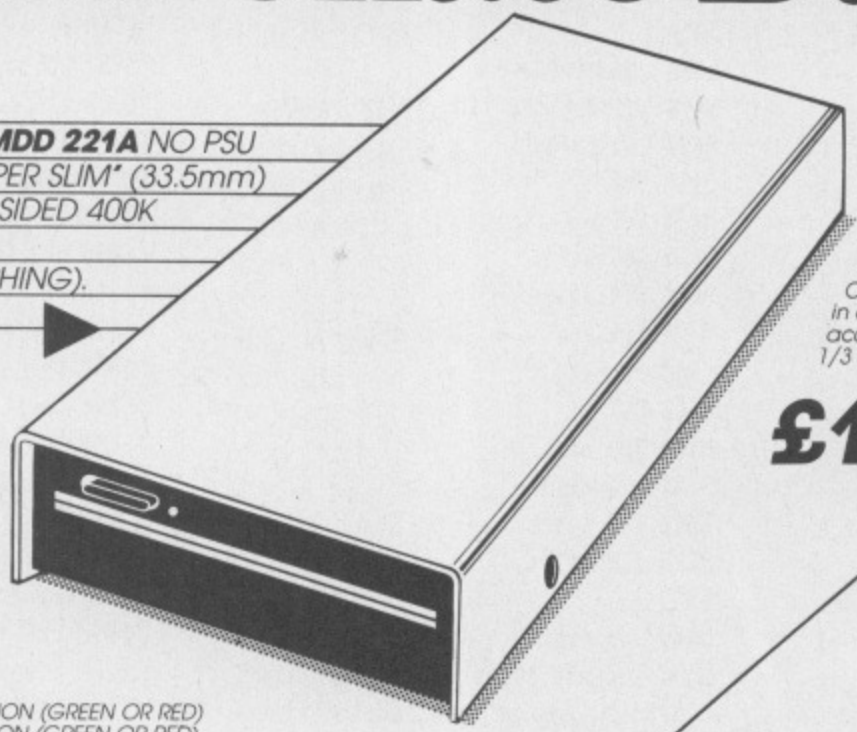
From Page 173

```
3220 .ploop2
3230 JSR gsread
3240 BCS endp2
3250 STA &600,X
3260 INX
3270 BNE ploop2
3280 :
3290 .endp2
3300 \X contains top of string
3310 STX rend
3320 TXA
3330 \get length of "replace" string
3340 SEC
3350 SBC slen
3360 BMI paramerr
3370 STA rlen
3380 \get difference in lengths of "
find" and "replace" strings
3390 SBC slen
3400 STA diff
3410 ]
3420 =opt%
3430 :
3440 DEF FNparam2
3450 [OPT opt%
3460 \get remaining params
3470 JSR getparams
3480 :
3490 .checkline
3500 LDY #1
3510 \get line no. to A/X
3520 LDA (lptr),Y
3530 TAX
3540 DEY
3550 LDA (lptr),Y
3560 CLC
3570 CPX start
3580 SBC start+1
3590 BCC next       \line no. < start
3600 LDA (lptr),Y
3610 STA inta+1
3620 STX inta
3630 CLC
3640 CPX finish
3650 SBC finish+1
3660 BCC okline     \line no. < finis
h
3670 BNE exit       \line no. > finis
h
3680 CPX finish
3690 BEQ okline     \line no. = finis
h
3700 :
3710 .exit
3720 JSR osnewl
3730 :
3740 .errexit
3750 JSR osnewl
3760 \restore BASIC pointers etc.
3770 PLA
3780 STA &23
3790 PLA
3800 STA &5
3810 PLA
3820 STA &4
3830 ]
3840 =opt%
3850 :
3860 DEF FNdiscend
3870 [OPT opt%
3880 \page back previous ROM
3890 PLA
3900 SEI
3910 STA crom
3920 STA romlat
3930 CLI
3940 :
3950 \reset Fn-keys, if appropriate
3960 OPT FNclearkeys
3970 :
3980 RTS
3990 :
4000 .paramerr
4010 OPT FNbrk("???")
4020 :
4030 .endline
4040 ]
4050 =opt%
4060 :
4070 DEF FNeditline
4080 [OPT opt%
4090 \check if line was line edited
(f2<>0)
4100 LDA f2
4110 BEQ noedit
4120 \check if line is already print
ed (ie "A" option not selected)
4130 BIT f1
4140 BPL edit
4150 JSR print
4160 :
4170 .edit
4180 \replace current program line w
ith the edited version in the keyboar
d buffer
4190 JSR editprog
4200 :
4210 .noedit
4220 ]
4230 =opt%
4240 :
4250 DEF FNnext
4260 [OPT opt%
4270 :
4280 .next
4290 \move on to next line
4300 LDA lptr
4310 CLC
4320 LDY #2
4330 ADC (lptr),Y
4340 STA lptr
4350 BCC checkline
4360 INC lptr+1
4370 BCS checkline
4380 :
4390 .escape
4400 \save current position, in case
continuation is requested
4410 LDY #0
4420 LDA (lptr),Y
4430 STA start+1
4440 INY
4450 LDA (lptr),Y
4460 STA start
4470 JMP errexit
4480 :
4490 .okline
4500 \Line is within range. Detokeni
se it, and start searching after the
line no.
4510 JSR getline
4520 LDA #5
4530 STA inta
4540 :
4550 .cont1
4560 INC inta
4570 :
4580 .cont2
4590 \continue search for "find" str
ing.
4600 \set BASIC stack pointer to poi
nt to the length byte and "find" stri
ng.
4610 LDA #6
4620 STA &5
4630 LDA #&FF
4640 STA &4
4650 LDA slen
4660 STA &36
4670 JSR instr0
4680 \check for escape condition
4690 BIT &FF
4700 BMI escape
4710 \check if match found
4720 LDA inta
4730 BEQ endline
4740 \Match found - was operation to
be Global or Selective?
4750 BIT f1
4760 BPL display
4770 ]
4780 =opt%
4790 :
4800 DEF FNdisplay
4810 [OPT opt%
```

```
 4820 :
 4830 .display
 4840 \has line already been displaye
d?
 4850 LDA f2
 4860 BNE printed
 4870 \change displayed flag, and pri
nt line
 4880 INC f2
 4890 JSR print
 4900 :
 4910 .printed
 4920 LDA imlen
 4930 SEC
 4940 SBC inta
 4950 TAX
 4960 \move cursor back to the start
of the matched string
 4970 PHA
 4980 LDA #8
 4990 JSR poscsr
 5000 \beep, and get response from th
e keyboard
 5010 LDA #7
 5020 JSR oswrch
 5030 JSR osrdch
 5040 TAY
 5050 PLA
 5060 \move cursor on to the end of t
he line
 5070 TAX
 5080 LDA #9
 5090 JSR poscsr
 5100 ]
 5110 =opt%
 5120 :
 5130 DEF FNreplloop
 5140 [OPT opt%
 5150 \check for escape, then for res
ponse of <space>, <return>, <tab>, et
c.
 5160 BIT &FF
 5170 BMI escape
 5180 CPY #&21
 5190 BCS cont1
 5200 :
 5210 .replace
 5220 \replacement is to be made. Wil
l the edited line be longer or shorte
r?
 5230 LDA diff
 5240 BMI shorter
 5250 BNE longer
 5260 :
 5270 .replace2
 5280 LDX slen
 5290 LDY inta
 5300 :
 5310 .rloop
 5320 \copy replacement string into c
urrent line at required position
 5330 LDA &600,X
 5340 STA &6FF,Y
 5350 INX
 5360 INY
 5370 CPX rend
 5380 BNE rloop
 5390 :
 5400 .reprint
 5410 \adjust the line image length
 5420 LDA imlen
 5430 TAX
 5440 CLC
 5450 ADC diff
 5460 STA imlen
 5470 \if the line is displayed, eras
e and reprint it
 5480 BIT f1
 5490 BMI noprint
 5500 LDA #&7F
 5510 JSR poscsr
 5520 JSR print
 5530 :
 5540 .noprint
 5550 \adjust point for continuation
of search, and set line edited flag
 5560 LDA inta
 5570 CLC
 5580 ADC rlen
 5590 STA inta
 5600 INC f2
 5610 JMP cont2
 5620 :
 5630 .shorter
 5640 \Line will be shorter - close u
p the line image
 5650 CLC
 5660 LDA inta
 5670 ADC slen
 5680 TAX
 5690 ADC diff
 5700 TAY
 5710 :
 5720 .sloop
 5730 LDA &6FF,X
 5740 STA &6FF,Y
 5750 CPX imlen
 5760 BEQ send
 5770 INX
 5780 INY
 5790 BNE sloop
 5800 :
 5810 .send
 5820 LDA rlen
 5830 BNE replace2
 5840 BEQ reprint
 5850 :
 5860 .longer
 5870 \Line will be longer - open up
line image
 5880 CLC
 5890 LDA imlen
 5900 TAY
 5910 ADC diff
 5920 BCS noroom2
 5930 TAX
 5940 :
 5950 .lloop
 5960 LDA &700,Y
 5970 STA &700,X
 5980 DEX
 5990 DEY
 6000 CPY inta
 6010 BCS lloop
 6020 BCC replace2
 6030 :
 6040 .editprog
 6050 \reset line edited flag
 6060 LDY #0
 6070 STY f2
 6080 \load line number into integer
accumulator
 6090 LDA (lptr),Y
 6100 STA inta+1
 6110 INY
 6120 LDA (lptr),Y
 6130 STA inta
 6140 \set pointer to the line image
for BASIC tokenise line routine
 6150 BEQ rotate
 6160 JMP paramerr
 6170 :
 6180 .rotate
 6190 \rotate Carry to bit 7, (Set fo
r "A" type operation), and type flag
 6200 LDA #5
 6210 STA &37
 6220 LDA #7
 6230 STA &38
 6240 JSR tline0
 6250 \replace program line, starting
after the line no.
 6260 LDY #5
 6270 JSR inslin
 6280 RTS
 6290 ]
 6300 =opt%
 6310 :
 6320 DEFFNrest
 6330 [OPT opt%
 6340 :
 6350 .noroom
 6360 JSR swapvectors
 6370 :
 6380 .noroom2
 6390 OPT FNbrk("Too long")
```

Today's Technology at Yesterday's Prices from Chase Data.

1 **CANON SINGLE MDD 221A** NO PSU
CANON 221A "SUPER SLIM" (33.5mm)
80 TRACK DOUBLE SIDED 400K
FLOPPY DISC DRIVE
(40/80 TRACK SWITCHING).

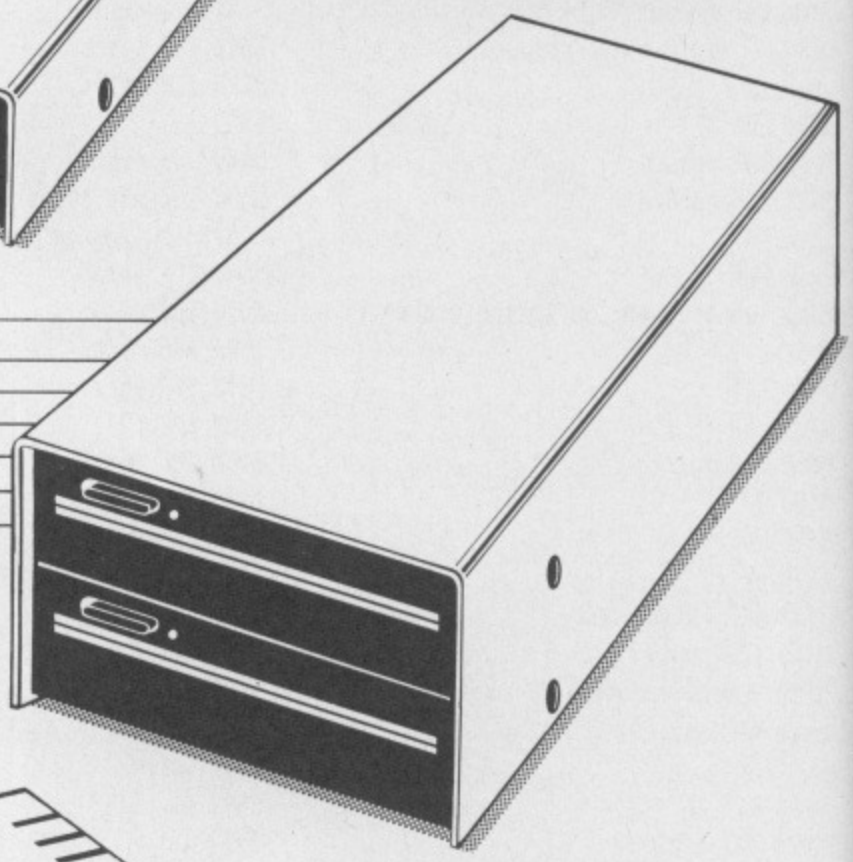


SPECIFICATIONS:
80 track double sided disc drive. 40/80 track switching with dual colour LED. Capacity 400K in single density, operates in double density. Direct drive, track to track access 3 ms in 96 TPI mode. Dimensions:- 1/3 standard height, only 33.5mm.

£125.00 INC

All Canon 40/80 switchable disc drives feature an on-board dual-colour LED on the front panel to show track mode selected. This is coupled with our own unique two-stage illumination. To give a clear operating status, as follows.

40 TRACK MODE: _____ *LED GREEN*
80 TRACK MODE: _____ *LED RED*
POWER ON: _____ *HALF-ILLUMINATION (GREEN OR RED)*
DRIVE SELECTED: _____ *FULL-ILLUMINATION (GREEN OR RED)*



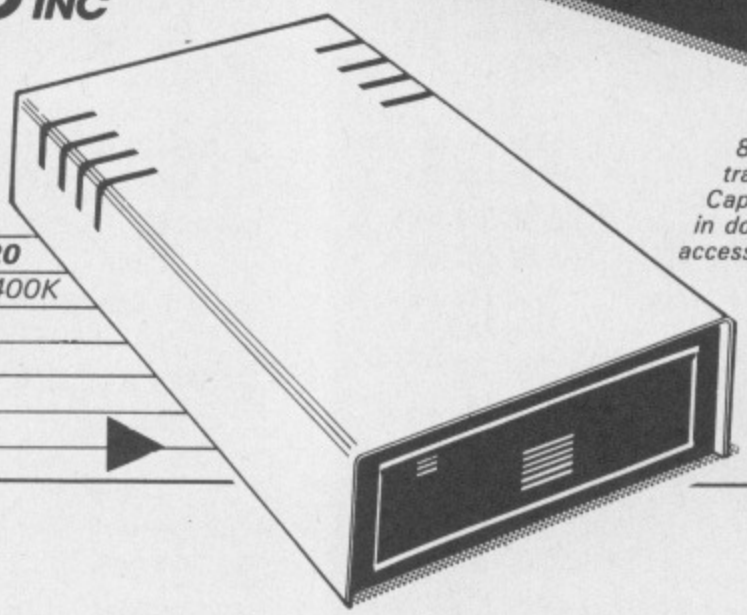
2 **CANON DUAL MDD 221A**
WITH PSU

SPECIFICATIONS:
80 track double sided disc drive. 40/80 track switching with dual colour LED. Capacity 800K in single density, operates in double density. Direct drive, track to track access 3 ms in 96 TPI mode. Dimensions:- 1/3 standard height, only 33.5mm.

£279.00 INC

SPECIAL OFFER
WHILE STOCKS LAST

3 **CANON SINGLE MDD 220**
80 TRACK DOUBLE SIDED 400K
FLOPPY DISC DRIVE
(40/80 TRACK SWITCHING)



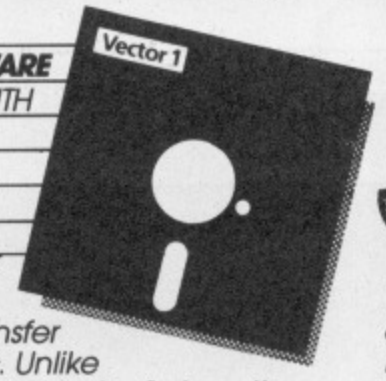
SPECIFICATIONS:
80 track double sided disc drive. 40/80 track switching with dual colour LED. Capacity 400K in single density, operate in double density. Direct drive, track to tr access 3 ms in 96 TPI mode.

£95 INC

CHASE DATA LTD THE DISC DRIVE COMPANY WITH DIRECT PURCHASE FROM JAPAN AND A PROFESSIONAL AFTER SALES SERVICE.

4 CHASE DATA SOFTWARE

NOW COMPATIBLE WITH UDM & OPUS DFS
PLEASE STATE WHEN ORDERING



VECTOR 1 The ultimate tape to disc utility. *Vector 1allows you to transfer almost all your tape software to disc. Unlike others, you only need to buy 1 copy of Vector 1 since it transfers tapes to specially formatted program discs. This is easily the most powerful tape to disc utility available.*

Vector 2 New 1.2 VER. Disc to disc utility. *Vector 2 allows you to make backup copies of all your valuable disc software. It is the most advanced utility of its kind available.* ***It is a condition of sale that neither of these products are used for infringement of copyright.***

Vector 1 **£12** *On its own*
£11 If purchased with disc drive
Vector 2 **£12** *On its own*
£11 *If purchased with disc drive*
Vector 1 & 2 **£23**

5 DISCUS

Test utility for testing your own disc drive, at regular intervals to avoid the dreaded flop of your floppy. Menu driven, easy to use, 40 or 80 track versions.
TESTS: *Motor speed, read/write, steptest, alignment test,* step and read/write test, read only test.*
£8.00 *inc.* ***£7.00*** *if purchased with disc drive.*
**This test requires an oscilloscope and alignment disc.*

6 DIAGRAM

A PROGRAM WHICH ALLOWS YOU TO STORE VERY LARGE DIAGRAMS — UP TO 39 MODE 0 SCREENS — AND VIEW OR EDIT THEM BY SCROLLING THE COMPUTER SCREEN AROUND OVER ANY PART OF THE DIAGRAM

FEATURES

- *Draw diagrams, schematics, plans etc., in any aspect ratio, e.g. 10*3, 2*12 screens.*
- *Access any part of the diagram rapidly by entering an index name, e.g. TR6, R5 etc., to display a specific section of the diagram, and then scroll around to any other part of the diagram using the cursor keys.*
- *Up to 128 Icons may be predefined for each diagram, e.g. Transistors, resistors etc., in full mode 0 definition, up to 32 pixels horizontally by 24 vertically.*
- *Hard copy printouts in varying print sizes up to 9 mode 0 screens on an A4 size sheet, compatible with most dot matrix printers.*
- *Many other features including, selectable display colours, comprehensive line drawing facilities, TAB settings, etc.*
- *Disc contains sample diagrams and two versions of the program, one of which will work from a 16K sideways RAM.*
- *Comprehensive instruction manual.*

EPROMS

QUALITY EPROMS BY 'HITACHI'

2764-250 NS	**£2.50**
27128-250 NS	**£4.00**

INCLUSIVE OF P&P & VAT

£28.75 ***Including P&P & VAT*** *Supplied only on disc 40T/80T compatible.*

DON'T FORGET YOUR VECTOR 1 & 2 WHEN ORDERING.

All inclusive price list: *This means: disc drive + case + all power & data cables + UK carriage + utilities disc & manual + VAT.*

Model	CANON 210	220	221A	596D
Formatted Capacity per drive on BBC Micro:	200K	400K	400K	SANYO 400K
Single Drive & Case:	£75	£95	£125	£149
Single Drive & Case/PSU: *u/c — UPGRADEABLE	—	£124	£173*u/c	£174
Dual Drive & Case	—	£209	—	£279
Dual Drive & Case/PSU:	£185	£224	£279	£309

FUJI FLOPPY DISCS

	Per box 10	If purchased with disc drive
40 TK SS DD	£17.60	£15.60
40 TK DS DD	£24.50	£22.50
80 TK DS DD	£28.60	£26.60

These prices include VAT & P&P.

Support:
Warranty: All disc drives sold by Chase Data Ltd come with a full one-year warranty on parts & labour with optional extended warranty on all drives.

Extended Warranty
Your Insurance of trouble free operation.
When ordering your disc drive, ask about our second and third year extended warranty scheme. This covers ALL PARTS AND LABOUR and costs from as little as £15.00 on single drives and £23.00 on dual drives.

Payment:
By Post:
Send your remittance (cheques only please) with your order to: Chase Data Limited, Unit 2, Crabtree Road, Thorpe Industrial Estate, Egham, Surrey TW20 8RN.
By Phone: ***(Tel: 0784-38487).*** *Allow up to 21 days for delivery.*

CHASE DATA

From Page 175

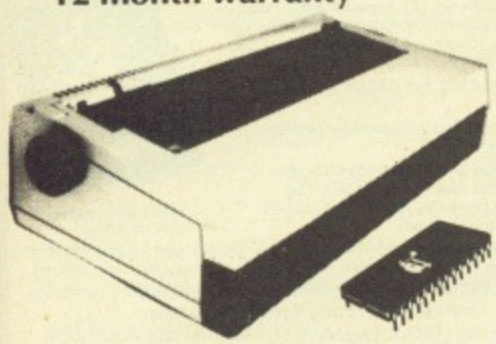
```
 6350 :
 6360 .getparams
 6370 STY ptroff
 6380 \set the default range for line
s to be searched
 6390 LDA #&80
 6400 STA finish+1
 6410 LDX #0
 6420 STX start+1
 6430 STX start
 6440 STX finish
 6450 STX work2
 6460 \find required starting line fo
r search
 6470 JSR number
 6480 BCS endparam
 6490 LDX #2
 6500 \was there only one parameter?
- if so set finish line to start line
 6510 CMP #&0D
 6520 BEQ oneline
 6530 \find required finishing line n
o.
 6540 JSR number
 6550 CMP #&0D
 6560 BEQ endparam
 6570 \still more in parameter list -
is it an "A" or "a"?
 6580 JSR getchb
 6590 AND #&5F
 6600 CMP #&41
to bit 6
 6660 ROR f1
 6670 RTS
 6680 :
 6690 .oneline
 6700 JSR repeat
 6710 :
 6720 .endparam
 6730 CLC
 6740 BCC rotate
 6750 :
 6760 .number
 6770 STX work2
 6780 \get next char and test for end
of line
 6790 JSR getchb
 6800 CMP #&0D
 6810 BEQ nomore
 6820 JSR getnmb
 6830 LDX work2
 6840 \If carry clear, no number was
found
 6850 BCC default
 6860 :
 6870 .repeat
 6880 \transfer number to start or fi
nish
 6890 LDA inta
 6900 STA start,X
 6910 LDA inta+1
 6920 STA start+1,X
 6930 JSR getchb
 6940 :
 6950 .default
 6960 \Carry clear indicates more par
ameters to be processed
 6970 CLC
 6980 :
 6990 .nomore
 7000 RTS
 7010 :
 7020 .nvect
 7030 \diverted OSWRCH writes to keyb
oard buffer & counts the characters w
ritten
 7040 STX work3
 7050 LDX inlen
 7060 STA &700,X
 7070 INC inlen
 7080 BEQ noroom
 7090 LDX work3
 7100 RTS
 7110 :
 7120 .swapvectors
 7130 \swap original and replacement
OSWRCH vectors
 7140 LDX #1
 7150 SEI
 7160 :
 7170 .swaploop
 7180 LDA &20E,X
 7190 LDY ovect,X
 7200 STA ovect,X
 7210 TYA
 7220 STA &20E,X
 7230 DEX
 7240 BEQ swaploop
 7250 CLI
 7260 RTS
 7270 :
 7280 .getline
 7290 STY work1
 7300 STY inlen
 7310 STY f2
 7320 \intercept OSWRCH, saving the o
ld vector
 7330 JSR swapvectors
 7340 \Print the line no. using a fie
ld width of 5
 7350 JSR plnum5
 7360 \get the length of the line
 7370 LDY #2
 7380 LDA (lptr),Y
 7390 STA work2
 7400 :
 7410 .inline
 7420 \get next character in the curr
ent line of the BASIC program
 7430 INY
 7440 LDA (lptr),Y
 7450 \Check if the end of line has b
een reached. If so, restore OSWRCH &
exit
 7460 CPY work2
 7470 BEQ swapvectors
 7480 :
 7490 \check if character is a quote
 7500 CMP #&22
 7510 BNE cline
 7520 \It is - invert quotes flag, an
d print a quote
 7530 LDA #&FF
 7540 EOR work1
 7550 STA work1
 7560 LDA #&22
 7570 :
 7580 .qmode
 7590 JSR oswrch
 7600 JMP inline
 7610 :
 7620 .cline
 7630 \Check if character is within q
uotes. If so, print it out without de
tokenising.
 7640 BIT work1
 7650 BMI qmode
 7660 \Check if character is the star
t of a tokenised line no.
 7670 CMP #&8D
 7680 BEQ linenum
 7690 \Print character, detokenising
it if necessary
 7700 JSR ptoken
 7710 JMP inline
 7720 :
 7730 .linenum
 7740 \get 1st byte of encoded line n
o.
 7750 INY
 7760 LDA (lptr),Y
 7770 ASL A
 7780 ASL A
 7790 PHA
 7800 AND #&C0
 7810 \get 2nd byte
 7820 INY
 7830 EOR (lptr),Y
 7840 STA inta
 7850 PLA
 7860 ASL A
 7870 ASL A
 7880 \get last byte of encoded line
no.
 7890 INY
 7900 EOR (lptr),Y
 7910 STA inta+1
 7920 STY work4
```

```
 7930 \print the decoded line no., wi
thout any leading spaces
 7940 JSR plnum0
 7950 LDY work4
 7960 BNE inline
 7970 :
 7980 .print
 7990 \print the line image (in the k
eyboard buffer).
 8000 JSR osnewl
 8010 LDX #1
 8020 :
 8030 .pline
 8040 LDA &6FF,X
 8050 JSR oswrch
 8060 INX
 8070 CPX imlen
 8080 BNE pline
 8090 RTS
 8100 :
 8110 .poscsr
 8120 \reposition the cursor
 8130 JSR oswrch
 8140 DEX
 8150 BNE poscsr
 8160 RTS
 8170 :
 8180 .ovect
 8190 OPT FNdataword(nvect)
 8200 ]
 8210 =opt%
 8220 :
 8230 DEF FNclearkeys
 8240 IF clear%=0 : =opt%
 8250 [OPT opt%
 8260 LDA #&12
 8270 JSR osbyte
 8280 ]
 8290 =opt%
 8300 :
 8310 DEF FNbrk(a$)
 8320 x%=FNdataword(0)
 8330 $P%=a$
 8340 P%=P%+LENa$
 8350 ?P%=0
 8360 P%=P%+1
 8370 =opt%
 8380 :
 8390 DEF FNdataword(x%)
 8400 ?P%=x%MOD256
 8410 P%?1=x%DIV256
 8420 P%=P%+2
 8430 =opt%
 8440 :
 8450 DEF PROCsave
 8460 $&700 = "SAVE "+name$+" "+STR$~
base%+" "+STR$~P%
 8470 X%=0
 8480 Y%=7
 8490 CALL oscli
 8500 IF base%<&C00 AND P%>&B00 : VDU
7 : PRINT TAB(0,17) SPC(80) TAB(3,17)
 CHR$129 "Function Keys now reset" :
*FX18
 8510 IF clear% : PRINT TAB(3) CHR$12
9 "Utility will reset keys when used"
;
 8520 PRINT ''TAB(3) CHR$130 type$ "
Utility saved"
 8530 PRINT 'TAB(3) CHR$134 "To use,
enter" CHR$131 "*" name$
 8540 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 223.

B+/B+TA+TEXPRO®
=ELECTRONIC WP TYPEWRITER

12 month warranty



- Compatible with TA7020 and BBC B
- For Disk or Tape filing system
- Proportional spacing and 12 c.p.i.
- Full justification
- Shadow printing
- Auto underscore
- Versatile centring
- Right justification
- Decimal alignment

20 cps Triumph Adler Daisywheel Printer
Including 2 Printwheels, Ribbon & TEXPRO® WP ROM
Parallel Interface (serial available)

£395 inc VAT complete with full instructions
Carriage UK £10, Parallel Cable £7, Serial Cable £9.

TEXPRO® ROM (for 7020 only)
£39 incl instructions, postage

ORDER DESK 01-423 1933

Prices are strictly cheque with order
Sorry no credit cards
Allow 7-10 days order processing
Visits strictly by prior arrangement or
Contact your local BBC dealer with this ad

ComCo Engineers Limited
Biro House Stanley Road
Harrow Middlesex
HA2 8UW

For the BBC Microcomputer

Business Scriven & Rudge Software

introduce

The Basic Small Business Package

Why use The Basic Small Business Package?
Because it will save you time, money and headaches; because it is accurate, legible and efficient; because it does the things you want it to.

Sales Invoicing
The Sales Invoicing function will deal efficiently with itemised charging, labour and materials, interim or stage payments, etc. Other features include, automatic letter heading and invoice numbering, single key main customer and date entry, date validation, variable VAT rating, etc. All invoice details are automatically recorded in the Sales Ledger.

Sales Ledger
The Sales Ledger holds details of all invoices created by the Sales Invoicing function. Features include:
- *A Main Customer Analysis to show you who your best customers are.*
- *Single invoice enquiry where you can see the original on screen, or get a statement printed.*
- *Examine the contents of a ledger file on the screen, or print a summary of the file.*

All details collected on the Sales Ledger are also collected by the VAT Accounts and Summary function.

Purchase Ledger
The Purchase Ledger records all your business expenses for collection by the VAT Accounts and Summary function.
Features include:
- *Variable VAT rates.*
- *A separate fuel ledger with provision for traders who are only allowed to claim a percentage of VAT paid on fuel, by Customs and Excise.*
- *Provision of a reference number with which to 'tag' your original invoice.*
- *Enquiry functions on Sales and Purchase Ledger.*

VAT Accounts and Summary
The VAT functions take details from the Sales and Purchase Ledgers to produce VAT accounts and summaries as required by Customs and Excise. These reports are produced quickly and easily in a legible and accurate form, without the need for any calculation by the user.
Features include:
- *VAT summary report for Sales.*
- *VAT summary report for fuel and other purchases.*
- *VAT reconciliation.*

If you enjoy spending hours or even days producing your VAT accounts, do not use this function. It is much too quick, much too accurate, and much too easy.

Supplied on 40 or 80 track Disc for just £54.00 plus 15% VAT.
Order direct from the address below:

SCRIVEN & RUDGE BUSINESS SOFTWARE
3 Chesterton Lane, Cirencester, Glos. GL7 1XG.

PRINTERLAND

ORDERED TODAY - DELIVERED TOMORROW

Free WITH ALL PRINTERS: BBC USERS PRINTERS GUIDE.
Getting the best from your printer is not easy.

We supply a **free** booklet with all printers which explains how to obtain all the features available on your printer. Without this you could waste many hours. Buy elsewhere and you'll pay far more and get far less.

	EX VAT	INC VAT
■ DOT MATRIX		
SHINWA CPA80	£165.00	£189.75
EPSON FX80 F/T+	£314.00	£361.10
EPSON FX100 F/T+	£425.00	£488.75
■ DOT MATRIX PLUS NEAR LETTER QUALITY		
EPSON LX80 (Good)	£190.00	£218.50
CANON 1080A (Better)	£225.00	£258.75
JUKI 5510 (Best)	£249.00	£286.35
CANON 1156	£335.00	£385.25
■ DAISY WHEEL		
QUENDATA 1120	£225.00	£258.75
EPSON DX100 SPECIAL OFFER	£356.00	£409.40
■ COLOUR PRINTERS		
EPSON JX-80 SPECIAL OFFER	£450.00	£517.50
■ PRINTER TYPEWRITER COMBINED		
JUKI 2200	£245.00	£281.75
■ ACCESSORIES		
WORDWISE +	£43.00	£49.45
BBC PRINTER CABLE	£8.00	£9.20
■ MONITORS		
PHILIPS 7502 GREEN	£75.00	£86.25

NOW ONLY 3 MINUTES FROM JUNCTION 23 M62
(MANCHESTER 25 MINUTES/LEEDS 20 MINUTES)
NB: FROM EAST USE JUNCTION 24

156 LONGWOOD GATE, LONGWOOD
HUDDERSFIELD
Tel 0484 646048/9

1st

IN BROMLEY

BROMLEYS FIRST SPECIALIST COMPUTER STORE

We are official Acorn Dealers with high standards to maintain and take pride in friendly and efficient advice and service.

See our extensive range of printers, monitors, disc drives, software and books.

Data Store

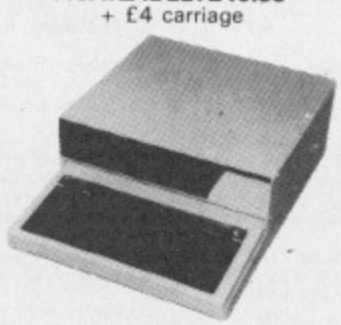
6 Chatterton Road, Bromley, Kent. 460 8991

Expandable console for the BBC Micro

As supplied to Universities, Colleges, Schools, Business and Home Users.

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. Available now 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.

SPECIAL TORCH MODEL AVAILABLE: £40.99
+ £4 carriage



Bolt on expansion module £14.99 + £2 p&p

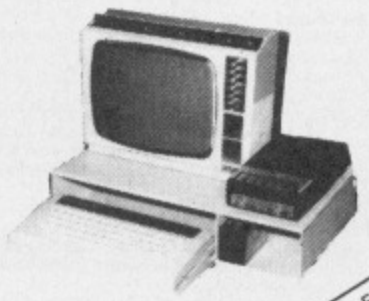
Free security bracket to educational users on request.

Matching Printer Stand, can double for VDU Stand over the micro – only £14.99 + £2 carriage

ELECTRON CONSOLE

The console will house the ELECTRON and will safely support the expansion interfaces which will plug into the rear of the micro and will support the VDU at eye level. Tidies up all wiring between the micro, cassette and VDU. The console stores the cassette and tapes and will allow space for drives at a later date.

Electron console as shown £29.99 + £3 p&p



• STOCK-TAKING SALE

Mail order only - viewing by appointment
Please add 15% VAT.
For further information or send cheque to:

Silent COMPUTERS
73 LANSDOWNE ROAD, LONDON N17
TEL: 01-801 3014 (24 Hr Ansaphone)

POOLSWINNER

THE ULTIMATE POOLS PREDICTION PROGRAM

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available – 22000 matches over 10 years. The database updates automatically as results come in.
- **PREDICTS** Not just SCOREDRAWS, but AWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture – choose as many selections as you need for your bet. The precise prediction formula can be set by the user – you can develop and test your own unique method.

Boxed, with detailed instruction booklet

- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **DISC/MICRODRIVE COMPATIBLE** Tapes supplied with conversion instructions.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

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

PRICE £15.00 (all inclusive)

NOW AVAILABLE

FIXGEN 85/6 AT LAST: No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish fixtures for 1985/6. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner.
POOLSWINNER with FIXGEN £16.50 (all inclusive)

COURSEWINNER V3
THE PUNTERS COMPUTER PROGRAM

NOT JUST A TIPSTER PROGRAM, Coursewinner V3 can be used by experts and occasional punters alike. You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricasts etc. The database includes vital course statistics for all British courses. You can update the database – never goes out of date.

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

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

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

VISA phone 24 hrs

selec SOFTWARE

phone 24 hrs

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

(Send for full list of our software)

From Page 107

```
 700 IFX%<2 GOTO740
 710 IFA%(X%-1,Y%)>0 GOTO740
 720 PROCpush:A%(X%,Y%)=A%(X%,Y%)OR8
:X%=X%-1:A%(X%,Y%)=A%(X%,Y%)OR2
 730 H%=1:GOTO740
 740 UNTIL H%=1 OR G%=5
 750 IFG%=5:PROCpull
 760 UNTILN%=399:DRAWX%*20+439,Y%*16
:IFIS%<5 REPEAT:REPEATIN%=GET:UNTILIN
%=32:PROCinst:UNTILIS%=5
 770 ENDPROC
 780 DEFPROCshuffle:LOCAL G%
 790 FORG%=1TO4:R1%=RND(4):R2%=RND(4
):H%=B%(R1%):B%(R1%)=B%(R2%):B%(R2%)=
H%:NEXT
 800 ENDPROC
 810 DEFPROCpush:N%=N%+1:DRAWX%*20+4
39,Y%*16:GCOL0,0:DRAWX%*20+439,Y%*16:
GCOL0,3
 820 P%(PT%)=X%:Q%(PT%)=Y%:PT%=PT%+1
 830 ENDPROC
 840 DEFPROCpull:DRAWX%*20+439,Y%*16
:GCOL0,0:DRAWX%*20+439,Y%*16:GCOL0,3
 850 PT%=PT%-1:X%=P%(PT%):Y%=Q%(PT%)
 860 ENDPROC
 870 DEFPROCtel:CLS:EG%=EG%-100:MOVE
145,112:DRAW145,992:DRAW1185,992:DRAW
1185,112:DRAW145,112:FORP%=20TO1STEP-
1:FORQ%=1TO20:IFNOTA%(Q%,P%)AND1 MOVE
Q%*52+93,P%*44+68:DRAWQ%*52+145,P%*44
+68
 880 IFNOTA%(Q%,P%)AND2 MOVEQ%*52+14
5,P%*44+112:DRAWQ%*52+145,P%*44+68
 890 IFA%(Q%,P%)>15 VDU5:MOVE105+Q%*
52,36+P%*44+68:PRINT"?":VDU4
 900 NEXTQ%,P%:VDU5:MOVE105+X%*52,36
+Y%*44+68:PRINT"*":MOVE625,1024:PRINT
"^":VDU4:MOVE613,992:GCOL0,0:DRAW665,
992:VDU31,9,2:PRINT"* = YOU"SPC6"? =
OBJECT":VDU31,11,0:PROCspace:ENDPROC
 910 DEFPROCdirection
 920 ON D% GOTO930,940,950,960
 930 L%=8:R%=2:T%=4:X1%=0:Y1%=1:GOTO
970
 940 L%=4:R%=1:T%=2:X1%=1:Y1%=0:GOTO
970
 950 L%=2:R%=8:T%=1:X1%=0:Y1%=-1:GOT
O970
 960 L%=1:R%=4:T%=8:X1%=-1:Y1%=0:GOT
O970
 970 ENDPROC
 980 DEFPROClook:PROCdirection:CLS:N
%=1:P%=X%:Q%=Y%:E%=0
 990 IFP%=10ANDQ%=20 AND D%=1 PROCdo
or:ENDPROC
1000 IFA%(X%,Y%)ANDL% COLOUR1:VDU31,
1,19,60,30
1010 IFA%(X%,Y%)ANDR% COLOUR1:VDU31,
18,19,62,30
1020 COLOUR3:REPEATN%=N%+1:IFNOTA%(P
%,Q%)ANDT% E%=1:GOTO1110
1030 P%=P%+X1%:Q%=Q%+Y1%
1040 IFP%=10ANDQ%=20 GCOL0,1 ELSE GC
OL0,3
1050 IFA%(P%,Q%)ANDL% PROCpassleft E
LSE MOVEN%*H1%,N%*V1%:DRAWN%*H1%,1023
-N%*V1%:DRAWN%*H1%+H1%,1023-N%*V1%-V1
%:DRAWN%*H1%+H1%,N%*V1%+V1%:DRAWN%*H1
%,N%*V1%
1060 IFP%=10ANDQ%=20 GCOL0,1 ELSE GC
OL0,3
1070 IFA%(P%,Q%)ANDR% PROCpassright
ELSE MOVE1280-N%*H1%,N%*V1%:DRAW1280-
N%*H1%,1023-N%*V1%:DRAW1280-N%*H1%-H1
%,1023-N%*V1%-V1%:DRAW1280-N%*H1%-H1%
,N%*V1%+V1%:DRAW1280-N%*H1%,N%*V1%
1080 IFP%=10ANDQ%=20 AND D%=1 AND N%
<5 PROCdoor
1090 IFA%(P%,Q%)>15 AND N%<6 VDU5:GC
OL0,2:O%=A%(P%,Q%)DIV&10:MOVE655-((LE
NO$(O%)/2)*64),N%*V1%+32:PRINT;O$(O%)
:GCOL0,3:VDU4
1100 PROCcheckwr
1110 UNTILN%=8 OR E%:IFP%=10ANDQ%=20
GCOL0,1
1120 IFE% MOVEN%*H1%,1023-N%*V1%:DRA
W1280-N%*H1%,1023-N%*V1%:DRAW1280-N%*
H1%,N%*V1%:DRAWN%*H1%,N%*V1%:DRAWN%*H
1%,1023-N%*V1%
1130 ENDPROC
1140 DEFPROCpassleft:GCOL0,3:MOVEN%*
H1%,N%*V1%:DRAWN%*H1%,1023-N%*V1%:MOV
EN%*H1%,1023-N%*V1%-V1%:DRAWN%*H1%+H1
%,1023-N%*V1%-V1%:DRAWN%*H1%+H1%,N%*V
1%+V1%:DRAWN%*H1%,N%*V1%+V1%:ENDPROC
1150 DEFPROCpassright:GCOL0,3:MOVE12
80-N%*H1%,N%*V1%:DRAW1280-N%*H1%,1023
-N%*V1%:MOVE1280-N%*H1%,1023-N%*V1%-V
1%:DRAW1280-N%*H1%-H1%,1023-N%*V1%-V1
%:DRAW1280-N%*H1%-H1%,N%*V1%+V1%:DRAW
1280-N%*H1%,N%*V1%+V1%:ENDPROC
1160 DATA KEY,SILVER,GOLD,DIAMOND,RI
NG,PEN,PAPER,WAND,FOOD,FORK,SWORD,COM
PASS,SACK,WATER,SPONGE
1170 DEFPROCdoor:N%=N%+1:GCOL0,1:PLO
T4,N%*H1%+H1%*2,1023-N%*V1%:PLOT4,128
0-N%*H1%-H1%*2,1023-N%*V1%:PLOT85,N%*
H1%+H1%*2,N%*V1%:PLOT85,1280-N%*H1%-H
1%*2,N%*V1%:GCOL0,2:PLOT4,N%*H1%+32+H
1%*2,1023-N%*V1%-32
1180 PLOT4,1280-N%*H1%-32-H1%*2,1023
-N%*V1%-32:PLOT85,N%*H1%+32+H1%*2,500
:PLOT85,1280-N%*H1%-32-H1%*2,500:GCOL
0,0:VDU5:MOVEN%*H1%+32+H1%*2,468:PRIN
T"!":VDU4:GCOL0,3:N%=N%-1:ENDPROC
1190 DEFPROCget:IF A%(X%,Y%)<16 ENDP
ROC
1200 IFI%>0 AND I%(13)<1 ANDA%(X%,Y%
)DIV&10<>13 COLOUR1:CLS:SOUND1,-15,5,
5:PRINT"You don't have""the sack":PR
INT'':COLOUR3:PROCspace:ENDPROC
1210 IFI%(10)=0ANDA%(X%,Y%)DIV&10=9:
CLS:COLOUR1:PRINT"You don't have""th
e FORK!":PRINT'':COLOUR3:SOUND1,-15,5
,5:PROCspace:ENDPROC
1220 IFI%(15)=0ANDA%(X%,Y%)DIV&10=14
:CLS:COLOUR1:PRINT"You don't have""t
he SPONGE!":PRINT'':COLOUR3:SOUND1,-1
5,5,5:PROCspace:ENDPROC
1230 IFI%(5)=0ANDA%(X%,Y%)DIV&10=11:
CLS:COLOUR1:PRINT"You don't have""th
e RING!":PRINT'':COLOUR3:SOUND1,-15,5
,5:PROCspace:ENDPROC
1240 I%=I%+1:I%(A%(X%,Y%)DIV&10)=1:A
%(X%,Y%)=A%(X%,Y%)EOR(A%(X%,Y%)DIV&10
*&10):SOUND1,-15,160,3:SOUND1,-15,100
,5:ENDPROC
1250 DEFPROCinvent:COLOUR2:PRINT"You
 have..."'':COLOUR1:Z1%=0:FORZ2%=1TO15
:IFI%(Z2%) PROCgram:Z1%=1
1260 NEXT:IFZ1%=0:PRINT''"NOTHING!"
1270 PRINT'':ENDPROC
1280 DEFPROCgram:IF Z2%=2 OR Z2%=3 O
R Z2%=7 OR Z2%=9 OR Z2%=14 PRINT"SOME
"; ELSE PRINT"A ";
1290 PRINTO$(Z2%):ENDPROC
1300 DEFPROCsee:IF A%(X%,Y%)>15 SOUN
D1,-15,100,1:SOUND2,-15,30,3:COLOUR2:
PRINT"You are next to..":COLOUR1:Z2%=
A%(X%,Y%)DIV&10:PROCgram
1310 ENDPROC
1320 DEFPROCspace:PRINT"PRESS THE SP
ACE BAR";:REPEATUNTILGET=32:ENDPROC
1330 DEFPROCdrop:CLS:PROCinvent:IFI%
=0 COLOUR3:PROCspace:ENDPROC ELSE COL
OUR1:PRINT"What do you""want to drop
"':COLOUR3:INPUTDR$:Z1%=0:REPEATZ1%=Z
1%+1:UNTILDR$=O$(Z1%) OR Z1%=15:IFDR$
<>O$(Z1%) GOTO1380
1340 IFI%>2 AND Z1%=13 PRINT''"Sorry
, you're""carrying too much""to dro
p the SACK!!":GOTO1380
1350 IFA%(X%,Y%)>15 PRINT''"There's
something""here already!":GOTO1380
1360 A%(X%,Y%)=A%(X%,Y%)ORZ1%*&10:I%
(Z1%)=0:I%=I%-1:ENDPROC
1370 PRINT''"You don't have it!!"
1380 SOUND1,-15,150,3:SOUND1,-15,50,
3:PRINT'':COLOUR2:PROCspace:ENDPROC
1390 DEFPROCcomp:IFI%(12)=0 ENDPROC
ELSE VDU31,0,3:COLOUR1:PRINT"You are
facing ";:COLOUR2:ON D% GOTO 1400,141
0,1420,1430
```

→

FOR CONNOISSEURS
OF ACTION, LEISURE OR LEARNING

The ANSWER BACK QUIZ Series **ONLY £9.95 each**
BBC, Electron

ANSWER BACK – JUNIOR *General Knowledge for ages 6-11*
Combines a wealth of fascinating information on a multitude of topics with a compelling "Princess & Dragon" game for youngsters.

ANSWER BACK – SENIOR *General Knowledge for ages 12 and over*
Space game fans yearn to learn whilst destroying the aliens! Includes a gigantic general knowledge database of questions and answers.

ANSWER BACK – SPORT *Mega-Sports Game for ages 14-adult*
Includes machine-code football and tennis games together with a mind-bending collection of sports quizzes.

ALL ANSWER BACK PROGRAMS include simple commands for creating and saving an unlimited number of new multiple choice question files AND are fully compatible with our new range of accessory tapes "FACTFILE 500".

The FACTFILE 500 Series **ONLY £3.95 each**
BBC, Electron

Each pack contains a massive supplementary database of 500 questions and 2,000 multiple choice answers for use with any of the above ANSWER BACK programs. FACTFILE 500 packs are available on an ever increasing range of leisure and educational subjects for youngsters, CSE/O-Level students and adults. FACTFILE 500 subjects include: Arithmetic, Spelling, Sport, History, Natural History, First Aid, Science, English Words, England, Scotland, Wales and many more. Write or phone for latest subject list and age ranges.

The MODERN LANGUAGE Series **ONLY £8.95 each**
BBC, Electron, Spectrum
CBM64, AMSTRAD CPC range

Easily the most popular and successful Foreign Language Learning programs of all time. Complete with extensive vocabulary files which may be extended or modified indefinitely by users.

The French Mistress (Level A or Level B)
The German Master (Level A or Level B)
The Spanish Tutor (Level A or Level B)
Choose Level A for thousands of nouns; Choose Level B for verbs, adjectives, adverbs, phrases etc.

IDENTIFY EUROPE **ONLY £7.95**
BBC, Electron

Provides a fascinating and competitive way of discovering and learning the geography of Europe. The program will provide countless hours of amusement and all the family is sure to benefit from it. Includes an incredibly detailed map of Europe. Suitable for all ages, 6-Adult.

ALL PROGRAMS available on 40 or 80 track disc for BBC – only £1 extra.

ALL PRICES include VAT, P&P and 24 hour despatch. Send cheque, PO or quote your Access number.

Access

KOSMOS SOFTWARE

KOSMOS SOFTWARE LTD
1 Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX
Tel: (05255) 3942

CONTRACT BRIDGE
BRIDGE-MENTOR II
"The Disc Version"

NOW ON DISC!

We are pleased to announce the NEW disc version of this internationally acclaimed software for the BBC/ELECTRON.
Rewritten for disc with many NEW features!

Practice your bidding: Perfect your card-play: Create your own archive of interesting hands

With high resolution colour graphics and sound, BRIDGE-MENTOR II guides you, step-by-step, through expertly analysed hands. A host of features including the spectacular "AUTOPLAY" option. The package now includes the famous "Challenge" hands archive . . . in total-over 60 testing hands to improve your game . . . with unlimited scope for more !!!

For Individual Practice, Analysis and Archiving

£17.50 (includes "The Challenge" archive)
(State 40/80 track disc)

Cheques to:- MINIC BUSINESS SERVICES, 12 WOBURN CLOSE, BUSHEY, HERTS WD2 3XA.

Compumart
Mega Deals

Best Prices for
BLANK DISKS
in the UK.
Top Quality 5¼" Bulk Packed Disks
(Hub-Ringed and in White Envelopes with a Lifetime Warranty)

FREE!!! Plastic Library Case worth £2 when you buy 10 Disks

FREE!!! Perspex Disk Storage Box worth £10 when you buy 50 Disks

10 – 5¼" SINGLE SIDED/DOUBLE DENSITY BLANK DISKS (with FREE case)	£9.95	+ £1 p&p
10 – 5¼" DOUBLE SIDED/DOUBLE DENSITY BLANK DISKS (with FREE case)	£13.95	+ £1 p&p
50 – 5¼" SINGLE SIDED/DOUBLE DENSITY BLANK DISKS (with FREE Storage Box)	£49.95	+ £2 p&p
50 – 5¼" DOUBLE SIDED/DOUBLE DENSITY BLANK DISKS (with FREE Storage Box)	£69.95	+ £2 p&p

GOODS DESPATCHED: Same day 1st Class Post
MONEY BACK GUARANTEE: If you are not completely satisfied with your purchase we will either exchange your disks or give a FULL REFUND – that's the Compumart Guarantee.

Access VISA

Please send cheques/postal orders to: Compumart, (Dept MU) 71 Gracedieu Road, Loughborough Leics. LE11 0QF Tel (0509) 262259

See Our Great Deals on Atari's in this issue

From Page 181

```
1400 PRINT"NORTH":ENDPROC
1410 PRINT"EAST":ENDPROC
1420 PRINT"SOUTH":ENDPROC
1430 PRINT"WEST":ENDPROC
1440 DEFPROCwand:IFI%(8)=0 ENDPROC E
LSE COLOUR2:VDU31,0,5:PRINT"Your posi
tion= ";:COLOUR3:PRINT;X%;",";Y%:ENDP
ROC
1450 DEFPROCkey:IFI%(1)=0 CLS:COLOUR
1:PRINT"You need the KEY"'"to leave!!
"'':COLOUR3:PROCspace:ENDPROC
1460 CLS:COLOUR2:PRINT"Are you sure"
'"you want to leave?":REPEATG%=GET:UN
TIL(G%OR96)=121 OR (G%OR96)=110:IF(G%
OR96)=110 ENDPROC ELSE PROCgameover:E
NDPROC
1470 DEFPROCgameover:CLS:VDU19,0,4,0
,0,0:IFEG%<1 EG%=0
1480 FORZ1%=1TO15:IFI%(Z1%) SC%=SC%+
EG%*5
1490 NEXT:SC%=SC%+I%*100:COLOUR1:PRI
NT'SPC3"CLAUSTROPHOBIA"':PROCinvent:C
OLOUR3:PRINT"And ";:COLOUR1:PRINT;EG%
;:COLOUR3:PRINT" Energy left"':FORZ%=
1TO10000:NEXT:COLOUR2:PRINT"You have
sold"'"your goods for"':COLOUR3:PRINT
;SC%;" CREDITS"
1500 IFEG%=0 COLOUR1:PRINT'"However,
as you"'"ran out of energy,"'"you ar
e now dead.":COLOUR3:GOTO1530
1510 IFSC%<50000 COLOUR1:PRINT'"This
is not enough"'"to repair your ship"
':COLOUR3:PRINT"Press SPACE to"'"Re-e
nter the maze":REPEATUNTILGET=32:RE%=
1:ENDPROC
1520 PRINT'"Congratulations!"'"You h
ave paid for"'"the repair of"'"your s
paceship."'
1530 VDU31,0,30:COLOUR1:PROCspace:RU
N
1540 DEFPROCeat:CLS:IFI%(9)=0 COLOUR
2:PRINT"You don't have"'"any FOOD!"''
:PROCspace:ENDPROC
1550 COLOUR1:PRINT"Lovely!":I%(9)=0:
EG%=EG%+100:COLOUR3:PRINT'':FD%=0:PRO
Cspace:ENDPROC
1560 DEFPROCquaff:CLS:IFI%(14)=0 COL
OUR2:PRINT"You don't have"'"any WATER
!"'':PROCspace:ENDPROC
1570 COLOUR1:PRINT"That's better!":I
%(14)=0:EG%=EG%+100:COLOUR3:PRINT'':W
T%=0:PROCspace:ENDPROC
1580 DEFPROCenergy:EG%=EG%-1:IFEG%<1
 PROCgameover ELSE IFEG%DIV100<>E%/1
00 ENDPROC
1590 CLS:SOUND1,-15,200,5:COLOUR3:PR
INT"Your energy level"'"is down to "
;:COLOUR1:PRINT;EG%''
1600 IFEG%>300 PRINT'':COLOUR2:PROCs
pace:ENDPROC
1610 SOUND2,-15,100,5:PRINT"I sugges
t you"
1620 IFEG%<101 GOTO1670
1630 IFFD%=1 AND I%(9)=1 PRINT"eat y
our FOOD (E)"'':COLOUR3:PROCspace:END
PROC
1640 IFWT%=1 AND I%(14)=1 PRINT"drin
k your WATER (Q)"'':COLOUR3:PROCspace
:ENDPROC
1650 IFFD%=1 PRINT"find some FOOD"''
:COLOUR3:PROCspace:ENDPROC
1660 IFWT%=1 PRINT"find some WATER"'
':COLOUR3:PROCspace:ENDPROC
1670 PRINT"think about leaving"'':CO
LOUR3:PROCspace:ENDPROC
1680 DEFPROCwrite:IFI%(6)=0 CLS:COLO
UR1:PRINT"You don't have"'"the pen"''
:COLOUR3:PROCspace:ENDPROC
1690 IFI%(7)=0 OR WR%=5 I%(7)=0:CLS:
COLOUR1:PRINT"You don't have"'"any PA
PER"'':COLOUR3:PROCspace:ENDPROC
1700 WR%=WR%+1:WR1%(WR%)=X%:WR2%(WR%
)=Y%:SOUND1,-15,20,2:SOUND2,-15,40,2:
SOUND3,-15,60,2:ENDPROC
1710 DEFPROCcheckwr:FORZ5%=1TOWR%:IF
P%=WR1%(Z5%) AND Q%=WR2%(Z5%) AND N%<
6 VDU5:GCOL0,1:MOVE466,N%*V1%+32:PRIN
T"NOTE ";Z5%:GCOL0,3:VDU4
1720 NEXT:ENDPROC
1730 PRINT'"You are exploring the ru
ins of an ancient settlement on
 a planet not far from Alpha Centaur
i, when a large maze- like structure
suddenly grows around you."
1740 PRINT'"Before you know it you a
re trapped, with all your posessi
ons, and various treasures you have
 discovered, scatteredaround in diffe
rent places."
1750 PRINT'"Your spaceship being in
urgent need of repair, you are not c
ontent with simply escaping, but need
 to re-discover as much of the tre
asure as you can."
1760 GOTO1970
1770 PRINT'"You can move about the m
aze, turning left and right, and m
oving in the direction you are
facing."
1780 PRINT'"Objects can be picked up
 and dropped. If you find the PEN a
nd PAPER, you can drop up to 5 notes
 as place markers."
1790 PRINT'"Your combined physical e
nergy and power pack runs to 2000 uni
ts. If your energy gets too low, you
can eat or drink any FOOD or WATER y
ou find, though this results in a
 loss of Credits upon escape."
1800 GOTO1970
1810 PRINT'"In return for a favour y
ou did for a Denebian telepath, yo
u have been given the ability to tel
eport your mind out of your body fo
r short periods, thus enabling you
 to look down at a plan view of t
he maze."
1820 PRINT'"However, you find this e
xtremely tiring and lose large amount
s of energy each time you do so."
1830 PRINT'"If your energy starts to
 run out you can always try leavin
g the maze to re-charge and go b
ack."
1840 GOTO1970
1850 PRINT'"The arrow keys turn you
left and right and move you forwards
."
1860 PRINT'"G = Get object"
1870 PRINT"D = Drop object"
1880 PRINT"E = Eat"
1890 PRINT"Q = Drink"
1900 PRINT"I = Inventory"
1910 PRINT"W = Write note and drop i
t"/
1920 PRINT"T = Teleport"
1930 PRINT"K = Look at this page"
1940 GOTO1970
1950 PRINT'"Please wait..."
1960 PRINT'"Or press RETURN to see t
he instructions again.":ENDPROC
1970 PRINT'SPC8"Press SPACE to conti
nue";:ENDPROC
1980 DEFPROCinst:CLS:IS%=IS%+1:IFIS%
=6 IS%=5
1990 ON IS% GOTO1730,1770,1810,1850,
1950
2000 DEFPROCkeys:GOTO1850
2010 DEFPROCgaps:FORZ%=1TO25:R1%=RND
(18)+1:R2%=RND(18)+1:ON RND(4) GOTO 2
020,2030,2040,2050
2020 A%(R1%,R2%)=A%(R1%,R2%)OR4:A%(R
1%,R2%+1)=A%(R1%,R2%+1)OR1:GOTO2060
2030 A%(R1%,R2%)=A%(R1%,R2%)OR2:A%(R
1%+1,R2%)=A%(R1%+1,R2%)OR8:GOTO2060
2040 A%(R1%,R2%)=A%(R1%,R2%)OR1:A%(R
1%,R2%-1)=A%(R1%,R2%-1)OR4:GOTO2060
2050 A%(R1%,R2%)=A%(R1%,R2%)OR8:A%(R
1%-1,R2%)=A%(R1%-1,R2%)OR2
2060 NEXT:ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 223.

From Page 115

```
ess letters"'CHR$134;"and then press
RETURN:- ";:INPUT N1$
  830UNTIL LEN(N1$)<9:N2$="COMPUTER"
  840IF computer=1 PRINTTAB(0,21);spa
ce$:space=GET:ENDPROC
  850REPEAT
  860VDU28,0,20,39,6:CLS:VDU26
  870PRINTTAB(0,9);CHR$(129);"Please
enter the name of Player 1"'CHR$(129)
;"in 8 or less letters: ";
  880INPUT N1$
  890UNTIL LEN(N1$)<9
  900REPEAT
  910PRINTTAB(24,15);SPC(10)
  920PRINTTAB(0,14);CHR$(131);"Please
 enter the name of Player 2"'CHR$(131
);"in 8 or less letters: ";
  930INPUT N2$
  940UNTIL LEN(N2$)<9
  950PRINTTAB(0,21);space$:space=GET
  960ENDPROC
  970DEF PROCinit
  980FORX=1TO10:FORY=1TO10:B(X,Y)=0:N
EXT:NEXT
  990FORY=0TO11:B(0,Y)=25:B(11,Y)=25:
NEXT
 1000FORX=0TO11:B(X,0)=25:B(X,11)=25:
NEXT
 1010move=1:winner=0:player=0
 1020K=RND(-TIME)
 1030ENDPROC
 1040DEFPROCgrid
 1050COLOUR2:PRINTTAB(0,2);"a moment.
.."
 1060VDU5,19,3,0,0,0,0
 1070FORI=320 TO 896STEP 64:FORK=320T
O896 STEP64:MOVEI,K:PRINT;hole$:NEXT:
NEXT
 1080VDU4,19,3,4,0,0,0
 1090COLOUR0:PRINTTAB(0,2) SPC(10):VD
U5:GCOL0,2
 1100Z=65:FORY=300TO876 STEP64:MOVE22
4,Y:PRINT;CHR$(Z):Z=Z+1:NEXT
 1110Z=0:FORX=320 TO896STEP64:MOVEX,9
60:PRINT;Z:Z=Z+1:NEXT
 1120RESTORE2980:FORY=736TO480 STEP-6
4:READ Z$:MOVE50,Y:GCOL0,1:PRINT;Z$:N
EXT
 1130PROCupdate(0,48,1)
 1140MOVE384,224:PRINT:"Who will";SPC
(12);"go first?"
 1150letters=LEN(N1$)+LEN(N2$)+4:spac
e=(20-letters)/2
 1160MOVEspace*64,128:PRINT;N1$;" OR
";N2$
 1170spacer=space+(LEN(N1$)/2)-1.5:MO
VEspacer*64,90:PRINT"(1)":MOVE(space+
LEN(N1$)+(LEN(N2$)/2)+2.5)*64,90:PRIN
T"(2)"
 1180REPEAT:p=GET:IF p<49 OR p>50 VDU
7:UNTIL p=49 OR p=50
 1190IF p=50 player=1 ELSE player=2
 1200PROCblank
 1210ENDPROC
 1220DEFPROCupdate(D,E,F)
 1230VDU5,24,1024;400;1279;800;:CLG
 1240GCOL0,2
 1250MOVE1024,768:PRINT"Lastmove";SPC
(4);D;CHR$(E);SPC(10);"Pegsto  play";
SPC(4);51-F
 1260VDU26
 1270ENDPROC
 1280DEFPROCblank
```


APPROVED
for use with telecommunication systems run by British Telecommunications in accordance with the conditions in the instructions for use

TANDATA FOR

Tandata's complete communications package for the BBC Micro includes a Tm 110 sma auto-dial modem and matching Micropack complete with software, cable and instruction manual.

In short, everything you ne to turn your BBC into an instant powerful viewdata terminal. You can access Prestel, including Micronet 800 and Viewfax, download telesoftware programmes – many of them free of charge, shop post and carry out home banking. You can even send and receive messages and telexes.

And Tandata's special Christmas Promotion of only £99.00 (plus VAT & carriage) saves you £49.00 off the usual pri

```
1290VDU4,28,0,31,19,24,12,26,5
1300ENDPROC
1310DEF PROCgo
1320IF player=1 player=2 ELSE player
=1
1330IF player=2 AND computer=1 PROCc
omp:X=256+(64*x):Y=256+(64*y):GOTO154
0
1340*FX15,0
1350GCOL0,player
1360IF player=1 letters=LEN(N1$)+7 E
LSEletters=LEN(N2$)+7
1370space=(20-letters)/2
1380MOVEspace*64,224
1390IFplayer=1PRINT;N1$;"'s turn" EL
SE PRINT;N2$;"'s turn"
1400REPEAT:MOVE192,160:PRINT"Column?
(0-9) ":n=GET:IF n<48 OR n>57 VDU7
1410UNTIL n>47 AND n<58
1420x=n-47:MOVE1006,160:PRINT;x-1
1430*FX15,0
1440REPEAT:MOVE192,128:PRINT"Row?
(A-J) ":m=GET:IF m<65 OR m>74 VDU7
1450UNTIL m>64 AND m<75
1460y=m-64:MOVE1006,128:PRINT;CHR$(m
)
1470*FX15,0
1480IF B(x,y)>0 VDU7:PROCblank:MOVE1
28,224:PRINT"Already Occupied";SPC(28
);"Go again":delay=INKEY(200):PROCbla
nk:GOTO1340
1490X=256+(64*x):Y=256+(64*y)
1500MOVEX,Y:GCOL0,player:PRINT;hole$
1510GCOL0,2:MOVE64,64:PRINT;"'SPACE'
to confirm":MOVE96,32:PRINT;"Any key
to change"
1520check$=GET$
1530IF check$<>" " MOVEX,Y:GCOL0,3:P
RINT;hole$:PROCblank:GOTO1350
1540MOVEX,Y:GCOL0,3:PRINT;hole$:MOVE
X,Y:GCOL0,player:PRINT;peg$
1550IF player=1 B(x,y)=1 ELSE B(x,y)
=6
1560move=move+1:IF move=51 winner=3
1570PROCupdate(x-1,y+64,move)
1580PROCblank
1590IF x>4 AND x<6 AND y>4 AND y<6 c
entre=centre+1
1600xx=x:yy=y
1610ENDPROC
1620DEFPROCcheck
1630FOR Z=1TO6:t=FNtotal1(Z,y)
1640IF t=5 OR t=30 GOTO 1800
1650NEXT
1660FOR Z=1TO6:t=FNtotal2(x,Z)
1670IF t=5 OR t=30 GOTO 1800
1680NEXT
1690IF x>1 AND y>1 THENx=x-1:y=y-1:G
OTO1690
1700FOR Z=0TO5:C=x+Z:R=y+Z:IF C>6 OR
R>6 GOTO 1730
1710t=FNtotal3(C,R)
1720IF t=5 OR t=30 GOTO 1800
1730NEXT
1740x=xx:y=yy
1750IF x<10 AND y>1 THEN x=x+1:y=y-1
:GOTO1750
1760 FOR Z=0TO5:C=x-Z:R=y+Z:IFC<5 OR
R>6 GOTO 1790
1770t=FNtotal4(C,R)
1780IF t=5 OR t=30 Z=6
1790NEXT
1800IF t=5 OR t=30 winner=player
```


TACOMMUNICATIONS FOR YOUR BBC

INSTANT AUTO-DIAL

Plug the ROM chip into your BBC, connect it to the Tm 110 modem, and you're ready to go. Auto-dial up to 8 telephone numbers with a single key-stroke – the modem will automatically log-on to Prestel, re-dial if the number is unobtainable. The internal loud speaker, LED's and screen messages monitor call progress of the built-in V23 (1200/75 bps) Smart Modem.

COMPLETE SOFTWARE FEATURES

The software, instantly available from ROM, covers virtually all your communications requirements. Full colour Prestel, or conventional 80 column scrolling terminal, with its own editor for easy off-line messages or page preparation. Pages and data can be stored to disk/cassette or recalled and can be printed. Pages can be tagged on line for quick recall, and programs can be down-loaded using the telesoftware down-loader.

It's ideal for Prestel, Micronet 800, Viewfax 258, private viewdata systems, Easylink, Telecom Gold and many Bulletin Boards.

FULL SUPPORT

A telephone Help Desk gives you full support, and an Installation Service is available for business customers.

Tandata

Tandata Marketing Limited

Albert Road North, MALVERN, Worcs. WR14 2TL.
Telephone: 06845 68421. Telex: 337617 Tandat G.
Prestel *799# Telecom Gold 81 : TANOOI

To order your sample Tandata communications package of modem, software and all leads for your BBC or to find out more, simply complete the coupon.

Please send me a Tandata complete communications package for the BBC at £116.15 (including VAT and carriage)

I enclose a cheque made payable to Tandata Marketing Ltd. OR charge my ACCESS/VISA number

_____

Expiry Date _____

I would like further details on your BBC communications package ☐ (please tick)

Name _____

Address _____

_____

_____

_____

_____

Send to:
Tandata Marketing Limited,
Albert Road North, Malvern, Worcs. WR14 2TL.

Prestel is a registered trade mark of British Telecommunications plc. Micronet 800 is the trading style of Telemap Ltd. and British Telecommunications plc.

MU03

LARGEST COMPUTER CENTRE in MANCHESTER

COMPUTERS	
Apricot F1E	£644
Apricot F1	£918
Apricot F2	£1385
Apricot PC (2 x 315K disk)	£1493
Apricot PC (2 x 720K disk)	£1679
Apricot other	POA
Advance 86b 256K	£675+VAT
Ferranti 860	Promotional Price
Ferranti 860XT	Promotional
BBC Range	POA
Amstrad 6128 Green	£298
Amstrad 6128 Colour	£398
Amstrad 8256	£458.85
Atari 520ST	£749.99
Commodore C128	POA
Memotech 500	£99.95
Memotech 512	£129.95
Sanyo 555	£799+VAT
Olivetti M21	Call
Olivetti M24	Call

THIS MONTH'S BARGAINS

Advance 86B (256K, Perfect Software, 1 year's maintenance)	£600+VAT

BBC

Greek Operating System	£62.10
French Operating System	£62.10
Shugart 400K 40/80 Disc	£119.95
Shugart Dual 2 x 400K Plus PSU	£229
Datagem	£79.95

BBC DEALERSHIP
Beebug Soft, Computer Concepts, Gemini, Akhter

PRINTERS	
Canon PW1080	£289
Shinwa	POA
Epson LX80	£269.95
Juki 6100	£389.00
Brother HR15	£385.00
Brother HR10	Call
Panasonic	£319.95
Smith Corona (Fastex 80)	£165.00
Brother EP44	£234.95
Brother M1009 (Cent + RS232)	£195.95
Full Star Range of Printers	POA
Seikosha GP505 (Spectrum)	£89.95
Seikosha GP50A	£115.00

Computer Furniture
hago, Opus, Shincrest

Disk Drives
Opus, Pace, Cumana also Quest Winchesters

Computer repairs available

Thought of the day – We have 15 different types of BBC Joysticks – have we gone BANANAS?

Personal Exporters to over 50 countries.

Large Showroom. All items include VAT unless indicated.
Now FREE delivery mainland UK. Personal Export Scheme.
No VAT on Export. No Orders too Small

MIGHTY MICRO

268 Wilmslow Road
Fallowfield, Manchester M14 6WL
Tel: 061-224 8117
Easy access M56, M61, M62, M63

LOW COST ELECTRONICS CAD

ANALYSER I and II

Performance analysis of Linear Circuits using the IBM PC, BBC Model B and Sinclair Spectrum 48K Micros.

Simulates Resistors, Capacitors, Inductors, Transformers, Bipolar and Field effect Transistors and Operational Amplifiers in any circuit configuration.

Performs Frequency Response Analysis on Circuits with up to 30 Nodes and 100 Components for Phase and Gain, Input Impedence and Output Impedence, and Group Delay.

Ideal for the analysis of Active and Passive Filters, Audio, Wideband and R.F. Amplifiers, Linear Integrated Circuits etc, etc.

Analyser can greatly reduce or even eliminate the need to breadboard new designs.

Used by industrial and university R&D Departments worldwide. Very easy to use. Prices from £20. Payment by Access or American Express welcome.

For further details write or phone:

NUMBER ONE SYSTEMS LIMITED,
DEPARTMENT MU,
9A CROWN STREET, ST IVES,
HUNTINGDON,
CAMBS. UK, PE17 4EB
TEL: 0480 61778
TELEX: 32339

FLOPPY-WISE PLUS

THE **SUPER-ROM** TO ECLIPSE ALL OTHERS

NEW

40 COMMANDS ON A 16K CHIP

PLUS

- ZAP/SEARCH any area of memory including 2nd PROC and S/W ROM/RAM
- EDIT any disc (sector or ID) including non-standard formats
- Full ROM/RAM manipulation system (Save, Load, Edit, Enable, Disable)
- All FLOPPY WISE commands are here (Inc. improved CLONE to back-up your valuable disc, AUTOSAVE, MCOPY and PROTECT).

PLUS

Must not be used to infringe copyright laws.

"Thoroughly Recommended" Micro User Nov. '85

COMMAND LIST: Ascii, Autosave, Bad, Bmove, Clear, Clm, Clone, Convert, Crom, Derrors, Download, Dsearch, Dspace, Dtape, Dts, Dzap, Edit, Fcompare, Find, Format, Free, Idzap, Mcopy, Menu, Move, Msearch, Mzap, Prepare, Protect, Ramload, Rcopy, Recover, Restore, Roms, Rsearch, Rzap, Tdisk, Tds, Tokens, Verify.

STILL ONLY £29.95 + £1p&p

*** FULLY TUBE COMPATIBLE ***

BARCLAYCARD VISA

SOFTWARE SERVICES
65 South Mossley Hill Road, Allerton,
Liverpool L19 9BG.
Tel: 051-427 7894.

Access

RICKSOFT

The complete *Software Service* for the BBC Micro

ARCADE, ADVENTURE, EDUCATIONAL SOFTWARE

HIRE with option to buy – £1 – £1.50 per fortnight – up to 75% discount when buying.

BUY ONLY – Hundreds of titles at too cheap to print prices – Continuously changing stock – Latest titles and huge back catalogue.

Telephone ordering – next day Service
Life Membership £10

For all the information on RICKSOFT send name and address to:

RICKSOFT Dept C
78 WARREN DRIVE, HORNCHURCH
ESSEX RM12 4QX.
Or Ring 04024 47722.

From Page 185

```
1810ENDPROC
1820DEF PROCassess
1830IF player=2 OR computer=0 OR win
ner>0 OR move<5 ENDPROC
1840MOVE256,224:PRINT;"Thinking ..."
1850line=0:merit=0:marker=0:V=move M
OD5:col=0:row=0
1860mixer%=RND(4)
1870ON mixer% GOTO 1880,1890,1900,19
10
1880PROChoriz
1890PROCvert
1900PROCdiag1
1910PROCdiag2:IF mixer%=1 ENDPROC
1920PROChoriz:IF mixer%=2 ENDPROC
1930PROCvert: IF mixer%=3 ENDPROC
1940PROCdiag1
1950ENDPROC
1960DEFPROChoriz
1970FOR R=1TO10:FORC=1TO6
1980t=FNtotal1(C,R):tot=t+B(C+5,R)
1990PROCtotals(1,5,0,4,0)
2000NEXT:NEXT
2010ENDPROC
2020DEFPROCvert
2030FORC=1TO10:FORR=1TO6
2040t=FNtotal2(C,R):tot=t+B(C,R+5)
2050PROCtotals(2,0,5,0,4)
2060NEXT:NEXT
2070ENDPROC
2080DEFPROCdiag1
2090FOR C=1TO6:FORR=1TO6
2100t=FNtotal3(C,R):tot=t+B(C+5,R+5)
2110PROCtotals(3,5,5,4,4)
2120NEXT:NEXT
2130ENDPROC
2140DEFPROCdiag2
2150FOR C=10TO5 STEP-1:FORR=1TO6
2160t=FNtotal4(C,R):tot=t+B(C-5,R+5)
2170PROCtotals(4,-5,5,-4,4)
2180NEXT:NEXT
2190ENDPROC
2200DEFPROCtotals(J,K,L,M,N)
2210IF t<2 ENDPROC
2220IF t=24 merit=39+J:col=C:row=R:E
NDPROC
2230IF t=4 AND merit<36 merit=35+J:c
ol=C:row=R
2240IF tot=18 AND B(C,R)=0 AND B(C+K
,R+L)=0 AND merit<32 merit=31+J:col=C
:row=R
2250IF t=18 AND merit<28 AND move>30
merit=27+J:col=C:row=R
2260IF tot=3 AND B(C,R)=0 AND B(C+K,
R+L)=0 AND merit<28 AND marker<1 meri
t=27+J:col=C:row=R
2270IF t=18 AND merit>27 AND merit<3
2 merit=27+J:marker=2:col=C:row=R
2280IF t=12 AND B(C,R)=0 AND B(C+M,R
+N)=0 AND merit<24 merit=23+J:col=C:r
ow=R
2290IF t=2 AND merit<12 AND move>10
AND B(C,R)=0 AND B(C+M,R+N)=0 merit=1
1+J:col=C:row=R
2300IF (t=2 OR t=3) AND merit<8 AND
move>6 AND (V=1 OR V=2) merit=7+J:col
=C:row=R
2310IF t=12 AND merit<4 AND move>10
merit=3+J:col=C:row=R
2320ENDPROC
2330DEFPROCcomp
2340IF move<3 REPEAT:x=8-RND(4):y=7-
RND(2):UNTIL B(x,y)<1:g=INKEY(100):EN
DPROC
2350IF move<5 REPEAT:x=8-RND(4):y=8-
RND(4):UNTIL B(x,y)<1 AND (B(x+1,y)=6
 ORB(x-1,y)=6 OR B(x,y-1)=6 OR B(x,y+
1)=6 OR B(x+1,y+1)=6 OR B(x-1,y+1)=6)
:ENDPROC
2360position=2:line=(merit MOD4)+1:t
rial=0
2370IF merit>23ANDmerit<36:ON line G
OTO2390,2420,2450,2480
2380IF merit<24 OR merit>35 GOTO2500
2390IF col>=3 position=1
2400IF col<3 AND B(col+1,row)=0 posi
tion=2
2410GOTO2500
2420IF row>=3 position=1
2430IF row<3 AND B(col,row+1)=0 posi
tion=2
2440GOTO2500
2450IF col>3 OR row>3 position=1
2460IF col<=3 AND row<=3 AND B(col+1
,row+1)=0 position=2
2470GOTO2500
2480IF col<7 OR row>3 position=1
2490IF col<7 AND row>3 AND B(col-1,r
ow+1)=0:position=2
2500IF merit<20 AND merit>12 positio
n=1
2510IF marker>0 position=1
2520IF merit>35 position=0
2530IF merit>3 PROCplacepeg(position
):ENDPROC
2540best=0
2550FOR col=2TO9:FOR row=2TO9
2560IF B(col,row)>0 GOTO 2620
2570value=FNtest(col,row)
2580IF value>best best=value:x=col:y
=row
2590IF value=best AND col>2 AND col<
9 AND row>2 AND row<9 x=col:y=row
2600IF value=best AND col>3 AND col<
8 AND row>3 AND row<8 x=col:y=row
2610IF value=best AND col>4 AND col<
7 AND row>4 AND row<7 x=col:y=row
2620NEXT
2630NEXT
2640ENDPROC
2650DEFPROCplacepeg(loop)
2660FOR I=loop TO 5
2670ON line GOTO 2680,2690,2700,2710
2680IF B(col+I,row)>0 NEXT ELSE x=co
l+I:y=row:GOTO 2720
2690IF B(col,row+I)>0 NEXT ELSE x=co
l:y=row+I:GOTO 2720
2700IF B(col+I,row+I)>0 NEXT ELSE x=
col+I:y=row+I:GOTO 2720
2710IF B(col-I,row+I)>0 NEXT ELSE x=
col-I:y=row+I
2720I=6:NEXT
2730ENDPROC
2740DEF PROCresult
2750PROCblank
2760IF winner=3 MOVE268,224:GCOL0,2:
PRINT;"It's a draw":GOTO2810
2770IF winner=1:score1=score1+1: win
ner$=N1$
2780IF winner=2:score2=score2+1: win
ner$=N2$
2790letters=LEN(winner$)+5:space=(20
-letters)/2
2800MOVEspace*64,224:GCOL0,winner:PR
INT;winner$;" wins":VDU7,7,7,7
2810VDU7,7,7,7
2820MOVE480,170:GCOL0,3:PRINT"SCORE"
2830letters=LEN(N1$)+LEN(N2$)+5:spac
e=(20-letters)/2
2840MOVEspace*64,120:GCOL0,3:PRINT;N
1$;"-";score1;" ";N2$;"-";score2
2850ENDPROC
2860DEFPROCnewgame
2870PRINTTAB(0,8);CHR$134;"Do you wi
sh to change players?  Y or N"
2880reply$=GET$
2890IF reply$="Y" OR reply$="y" CLS:
PROCplayers
2900ENDPROC
2910IF ERR=17 PROCblank:GOTO230
2920IF ERR<17 OR ERR>17 GOTO10
2930DEF FNtotal1(C,R)=B(C,R)+B(C+1,R
)+B(C+2,R)+B(C+3,R)+B(C+4,R)
2940DEF FNtotal2(C,R)=B(C,R)+B(C,R+1
)+B(C,R+2)+B(C,R+3)+B(C,R+4)
2950DEF FNtotal3(C,R)=B(C,R)+B(C+1,R
+1)+B(C+2,R+2)+B(C+3,R+3)+B(C+4,R+4)
2960DEF FNtotal4(C,R)=B(C,R)+B(C-1,R
+1)+B(C-2,R+2)+B(C-3,R+3)+B(C-4,R+4)
2970DEFFNtest(m,n)=B(m-1,n+1)+B(m,n+
1)+B(m+1,n+1)+B(m-1,n)+B(m+1,n)+B(m-1
,n-1)+B(m,n-1)+B(m+1,n-1)
2980DATA F,I,V,E,S
```

This listing is included in this month's cassette tape offer. See order form on Page 223.

COMLEX

Unit 7, Fife St., Nuneaton, Warks. CV11 5PR.
Tel: 0203 371371
Mon-Fri 9am-5.30pm.

COMPUTERS

BBC B ..... P.O.A.
BBC B + DFS ..... P.O.A.
BBC B + Opus Cumana DFS ..... P.O.A.
Amstrad PCW 8256 .. £458.00
Atari 520ST £749.00
Advance 86B 256k ... £678.00
Ferranti 860 256k ... £1207.00
Ferranti 860XT 256k £1899.00
Ferranti 860XT20 256k £2299.00

Sperry – complete range 25% off
Olivetti – M24 640k with 20 Meg Hard Disk £2245.00

At great cash & carry prices

DISC DRIVES

OPUS	CUMANA	
5400	CSXL100 ..	£84.00
5401	CSX100 ...	£94.00
5402	CSX200D	£117.00
5802	CSX400 .	£129.00
5401SD	CS100 ...	£115.00
5402SD	CS200D .	£139.00
5802SD	CS400 ...	£157.00
5401D	CD200 ...	£217.00
5402D	CD400D .	£277.00
5802D	CD800S .	£282.00

Challenger £239.00
DNFS Kit £65.00
Opus DDFS £45.00
Cumana DDFS £45.00
Acorn Plus III (+ 10 disks) £219.00
80tk DSDD disks (Box of ten) £12.95

MONITORS

Microvitec 1431 ... £189.00
Microvitec 1451 ... £279.00
Microvitec 1441 ... £399.00
Philips 7502 green .. £79.00
Philips 7522 amber .. £85.00

EPROMS

27128 ..... £3.50
2764 ..... £1.99
8271 ..... £42.00

MODEMS

Pace (with Commstar) £149.00
WS2000 ..... £129.00
AMX Mouse £74.95

PRINTERS

Mannesman Tally MT80 ..... £199.00
Epson LX80 + tractor £249.00
Epson FX80 ..... £330.00
Epson FX85 ..... POA
Epson FX105 ..... POA
Epson MX100 ..... £420.00
Epson FX100 ..... £487.00
Epson JX80 ..... £488.00
Epson LQ1500 ..... £949.00
Cannon 1080A £279.00
Cannon 1156A £379.00

DAISYWHEEL

Juki 6000 ..... £209.00
Juki 6100 ..... £359.00
Juki 6300 ..... £899.00
Epson DX100 ..... £379.00
Silver Reed 400 .... £316.00
Silver Reed 500 .... £373.00
Silver Reed 550 .... £574.00
Silver Reed 770 .... £834.00
Cut Sheet Feeder for 550 and 770 .... £230.00
Listing Paper (2000 sheets) £15.00

*** PHONE IF PRINTER NOT LISTED ***

SOFTWARE

View £49.95
Viewsheet £49.95
Viewstore £57.49
Accelerator £59.95
Intersheet £49.95
Speech ROM £29.95
Wordwise £35.95
Wordwise+ £47.95
Print Master £27.50
Disc Doctor £27.50
Graphics £27.50
Iso Pascal £62.00
Logo £62.00
View Printer Driver/Generator .. £11.00
HiView £52.00
UltraCalc II £72.00
Clares BROM £31.50
Clares Betabase £24.00
Clares Replica £12.00
Exmon II B/E £26.95
Toolkit B/E £24.95
Spellcheck II 40/80 .. £28.95
Sleuth £26.95
MuRom £26.25
Help £22.50

NOW ALSO AT:

14 Holmefield, Off Hope Road,
Sale, Manchester
Tel: 061-976 3763

CALLERS BY APPOINTMENT ONLY

ALL PRICES INCLUDE VAT + DELIVERY

FACT FILE 500

for BBC and Electron

Expand your KOSMOS ANSWER BACK QUIZ with . . .

NATURAL HISTORY	**(Ages 10+)**	**£3.95**
ARITHMETIC	**(Ages 6-11)**	**£3.95**
SPELLING	**(Ages 8-12)**	**£3.95**
ENGLISH WORDS	**(Ages 12+)**	**£3.95**
KNOW ENGLAND	**(Ages 12+)**	**£3.95**
KNOW SCOTLAND	**(Ages 12+)**	**£3.95**
FIRST AID	**(Ages 13+)**	**£3.95**
GENERAL SCIENCE	**(Ages 14+)**	**£3.95**
JUNIOR GENERAL KNOWLEDGE *	**(Ages 6-11)**	**£3.95**
SENIOR GENERAL KNOWLEDGE *	**(Ages 12+)**	**£3.95**
SPORT *	**(Ages 14+)**	**£3.95**

** Same content as ANSWER BACK program of same title*

All FACTFILE 500 packs are compatible with . . .
ANSWER BACK "JUNIOR" QUIZ, "SENIOR" QUIZ and "SPORTS" QUIZ
YOU MUST HAVE AN "ANSWER BACK" PROGRAM TO USE THE FACTFILES

Each FACTFILE 500 pack contains an amazing database of 500 fascinating questions and 2000 multiple choice answers. The above list is only the start, dozens more leisure and educational titles will be added to the range shortly.

All FACTFILES are also available on 40 or 80 track BBC disc, £5.45 each

ALL PACKS INCLUDE £50 PRIZE DRAW ENTRY COUPON

ALL PRICES include VAT, P & P and 24-hour despatch
Send cheque, PO or quote your Access number

KOSMOS S·O·F·T·W·A·R·E

1 Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX
Tel. (05255) 3942

FILE SLAVE UTILITY

A complete disc based utility for logging and running up to 464 different programs.

Functions include:

+ Fully automatic *run, *exec, chain or download and run.
+ View files and names on any disc.
+ Print files and names in alphanumeric or disc order.
+ Up to 116 program names per screen in alphanumeric order.
+ Programmable printer and disc drives selection.
+ Menu driven – single keystroke commands.
+ High speed – all machine code.

For BBC model B with DFS/DNFS
Please state 40 or 80 track.
£15.99 incl. post and packing.

To: **FSU, 94 Bishops Road, Cambridge CB2 2NR.**

SPECIAL ANNOUNCEMENT

If you have written software that is either too small to sell on its own or you don't know how to go about selling it – write to us and we will market it for you.

Nothing considered too trivial provided it is original and infringes no existing copyright.

FSU,
94 Bishops Road,
Cambridge CB2 2NR.

From Page 105

```
  10 ON ERROR GOTO 1290
  20 REM Wordsquare Solver
  30 REM (c) The Micro User
  40 MODE 1
  50 PROCinit
  60 PROCread_data
  70 PRINT"Printer Output (Y/N) ?"
  80 *FX15,1
  90 key$=GET$
 100 IF key$="Y" OR key$="y" PROCpri
nt
 110 CLS
 120 PROCscreen
 130 PROCread_grid
 140 COLOUR1
 150 add_word=0:TIME=0
 160 REPEAT
 170 rx=0:ry=0
 180 FORL%=0TO700:NEXT
 190 IF INKEY(-74) PROCstart_end
 200 IF add_word=2 PROCvalidate
 210 IF INKEY(-26) rx=-1
 220 IF INKEY(-122) rx=1
 230 IF INKEY(-58) ry=-1
 240 IF INKEY(-42) ry=1
 250 ax=ax+rx:ay=ay+ry
 260 IF ax=width ax=0 ELSE IF ax<0 a
x=width-1
 270 IF ay=height ay=0 ELSE IF ay<0
ay=height-1
 280 VDU31,ax+topx+1,ay+topy+1
 290 UNTIL correct=words
 300 PRINTTAB(0,27)"Printer Output (
Y/N) ?"
 310 *FX15,1
 320 key$=GET$
 330 IF key$="Y" OR key$="y" PROCpri
nt
 340 PRINT
 350 *FX4
 360 COLOUR 3
 370 END
 380 DEFPROCinit
 390 VDU23,224,&AA,&55,&AA,&55,&AA,&
55,&AA,&55
 400 *FX4,1
 410 ?&FE00=10:?&FE01=0
 420 DIMword$(30),wpos(1,1)
 430 DIMfound(30)
 440 READwidth,height
 450 letters=width*height
 460 DIM grid letters+1
 470 block=224:correct=0
 480 topx=3:topy=3
 490 ayx=0:ayy=0
 500 ENDPROC
 510 DEFPROCread_data
 520 word=0
 530 REPEAT
 540 READword$(word)
 550 word=word+1
 560 UNTILword$(word-1)="THEEND"
 570 words=word-1
 580 ENDPROC
 590 DEFPROCread_grid
 600 FORloop=0TOheight-1
 610 READA$
 620 IF LEN(A$)<>width CLS:PRINT''"D
ata error":END
 630 $(loop*width+grid)=A$
 640 PRINTTAB(topx+1,topy+loop+1);A$
 650 NEXT
 660 ENDPROC
 670 DEFPROCscreen
 680 PRINTTAB(topx,topy)STRING$(widt
h+2,CHR$(block))
 690 FORrow=1TOheight
 700 PRINTTAB(topx,row+topy)CHR$(blo
ck)STRING$(width,CHR$32)CHR$(block)"
 "
 710 NEXT
 720 PRINTTAB(topx,height+topy+1)STR
ING$(width+2,CHR$(block))
 730 FORrow=1TOwords
 740 PRINTTAB(30,row+2)word$(row-1)
 750 NEXT
 760 ENDPROC
 770 DEFPROCtime
 780 PRINTTAB(8,0);INT(TIME/100);" s
ecs"
 790 ENDPROC
 800 DEFPROCstart_end
 810 wpos(0,add_word)=ax
 820 wpos(1,add_word)=ay
 830 add_word=add_word+1
 840 SOUND1,-15,100,1
 850 FORL%=0TO1000:NEXT
 860 PRINTTAB(0,0);
 870 IF add_word=1 PRINTCHR$(block)
ELSE PRINT;" "
 880 ENDPROC
 890 DEFPROCvalidate
 900 add_word=0
 910 IF wpos(0,0)=wpos(0,1) AND wpos
(1,0)=wpos(1,1) VDU7:ENDPROC
 920 dx=SGN(wpos(0,1)-wpos(0,0))
 930 dy=SGN(wpos(1,1)-wpos(1,0))
 940 loop=-1
 950 loop=loop+1
 960 IF loop=words VDU7:ENDPROC
 970 IF found(loop) GOTO 950
 980 Q%=dx*LEN(word$(loop))+wpos(0,0
)
 990 R%=dy*LEN(word$(loop))+wpos(1,0
)
1000 IF Q%<-1 OR Q%>width OR R%<-1 O
R R%>height THEN 950
1010 loop2=0:match=TRUE
1020 REPEAT
1030 Q%=loop2*dx+wpos(0,0)
1040 R%=width*((loop2*dy)+wpos(1,0))
1050 IF?(grid+Q%+R%)<>ASC(MID$(word$
(loop),loop2+1,1)) match=FALSE
1060 loop2=loop2+1
1070 UNTIL(NOT match) OR loop2=LEN(w
ord$(loop))
1080 IF NOT match GOTO 950
1090 FOR loop2=0 TO LEN(word$(loop))
-1
1100 Q%=loop2*dx+wpos(0,0)
1110 R%=loop2*dy+wpos(1,0)
1120 PRINTTAB(Q%+topx+1,R%+topy+1)MI
D$(word$(loop),loop2+1,1)
1130 NEXT
1140 PRINTTAB(29,loop+topy)"*"
1150 found(loop)=TRUE
1160 correct=correct+1
1170 PROCtime
1180 ENDPROC
1190 DEFPROCprint
1200 *FX3,10
1210 PRINT''
1220 FORloop=0 TO letters-1
1230 IF loop MOD width=0 PRINT''STRI
NG$(10," ");
1240 VDU?(loop+grid),32,32
1250 NEXT
1260 PRINT''
1270 *FX3
1280 ENDPROC
1290 *FX4
1300 REPORT:PRINTERL:END
```

This listing is included in this month's cassette tape offer. See order form on Page 223.

Leigh Computer Systems

Authorised Acorn Service Centre. ACT and Ferranti Computer Dealer

COMPUTERS

BBC B	POA
BBC B + DFS	POA
Advance 86B	£678.00
Amstrad PCW 8256	£458.00
Atari 520ST	£749.00
Ferranti 860	POA
ACT	POA
Olivetti (M24, etc) – excellent discounts	POA
Sperry Range – excellent discounts	POA
North Star Multi User	POA

DISC DRIVES

OPUS	CUMANA	Inc. VAT £
5400	CSXL100	89.95
5401	CSX100	99.95
5402	CSX200D	119.95
5802	CSX400S	139.95
5401SD	CS100	124.00
5402SD	CS200D	149.00
5802SD	CS400	169.00
5401D	CD200	239.00
5402D	CD400D	285.00
5802D £295	**CD800S**	**315.00**
Challenger		£239

PRINTERS

Mannesman Tally MT80	£199.00
Epson LX80 + Tractor	£249.00
Epson FX80	£330.00
Epson FX85	POA
Epson FX105	POA
Epson MX100	£419.00
Epson FX100	£485.00
Epson JX80	£488.00
Epson LQ 1500	£949.00
Canon 1080A	£279.00
Canon 1156A	£379.00

DAISYWHEELS

Epson DX100	£379.00
Juki 6000	£209.00
Juki 6100	£369.00
Juki 6300	£899.00
Silver Reed 400	£316.00
Silver Reed 500	£373.00
Silver Reed 550	£574.00
Silver Reed 770	£834.00
Cut Sheet Feeder for 550 or 770	£230.00
Listing Paper (2000 sheets)	£15.00

● **PRINTERS NOT LISTED – PHONE** ●

MONITORS

Microvitec 1431	£189.00
Microvitec 1451	£279.00
Microvitec 1441	£399.00
Philips 7502 green	£84.00
Philips 7522 amber	£89.00

ROMS

Accelerator	£59.95
Intersheet	£52.00
Speech ROM	£29.95
Wordwise+	£52.00
Printmaster	£31.00
Disc Doctor	£31.00
Graphics	£31.00

Beebugsoft range available

ADD-ONS

DNFS Kit	£75.00
Opus DDFS	£55.00
Cumana DDFS	£55.00
HCR Programmer	£57.00
AMX Mouse	£79.00

EPROMS

27128	£3.50
2764	£2.25
8271	£42.95

EDUCATIONAL ORDERS SUPPLIED

– Price list available on application –

P&P **80p** small items. **£7** large items

All Prices include VAT

75 CROSS STREET
SALE
MANCHESTER
Telephone: 061-905 2144

7 COVENTRY ROAD
HINCKLEY
LEICS.
Telephone: 0455 612139

CROSSWARE

SOFTWARE DEVELOPMENT TOOLS FOR THE BBC MICROCOMPUTER

CROSS · ASSEMBLERS

FULLY SUPPORTED QUALITY SOFTWARE

When you purchase a product to help you write software the intention is to make life easier for yourself. You want something that provides comprehensive facilities, is easy to use and above all dependable; and it helps to know that you can talk directly to the producers of the software to ask their advice, even if you have purchased the product from a retailer or distributor.

That's exactly what you get with Crossware cross-assemblers.

We have been supplying industry, education and home users for more than a year with some of the finest software available for the BBC micro.

Our latest XR series cross-assemblers come on 16k ROMs, each with a utilities disc. They offer high speed disc-to-disc assembly, are Econet compatible, and are available for the following target micro-processors:

Order Code	Target Processors	Price
6801XR	6800,6801,6802,6301...6301X	**£48.00**
6805XR	6805,146805,6305	**£48.00**
6809XR	6809 family	**£48.00**
8085XR	8085,8080A	**£48.00**
Z80XR	Z80, HD64180	**£48.00**
68000XR	68000,68008	**£56.00**
65C02XR	65C02, 65SC02, 6502	**£38.00**

(prices exclude VAT)

Further information from:
CROSSWARE PRODUCTS
2 The Lawns, Melbourn, Royston, Herts SG8 6BA
Telephone: 0763 61539

SUPAGAME2

CREATE YOUR OWN ADVENTURE!

Let your imagination run wild!
Make the most of your disk-based BBC micro.
You don't have to be a programmer!
Powerful Teletext screen editor
Sounds, animation and many more exciting features
Draw Sprites and Pictures in Modes 1 and 2

IT'S AS MUCH FUN WRITING GAMES AS PLAYING THEM!
VERSION 2. Payment with order £19.95 (incl. VAT)
or request a fact sheet (S.A.E.)

QUIXLEARN

COMPUTER ASSISTED LEARNING

A comprehensive AUTHORING SYSTEM for the BEEB
Teaching material on any subject may be prepared
Gives fully interactive Student lessons
Text and pictures in Modes 1 and 2 and Teletext
Ideal for preparing lectures, training courses, advertising sequences, and demonstrations.
NO RESTRICTIONS ON COPYING YOUR OWN LESSONS!

Payment with order:
Teletext Version £45 (incl. VAT + P&P)
Advanced Version £75 (incl. VAT + P&P)
or request a fact sheet from:

QUIXOR LTD.
7 Haslemere Avenue,
HALE BARNS, CHESHIRE WA15 0AU
State 40 or 80 track DISK DRIVE

From Page 92

```
 740 JSR load_file
 750 JSR update_pointers
 760 INC no_of_files
 770 .nxt_file JSR osnewl
 780 LDA last_file:BEQ load_loop:BNE
set_for_save
 790 :
 800 .noroom
 810 JSR message
 820 OPT FNequs(" _ No room")
 830 OPT FNequb(&0D)
 840 OPT FNequb(255)
 850 .set_for_save
 860 LDA no_of_files:BEQ end
 870 STA last_file:JSR init_pointers
:JSR osnewl
 880 JSR output_drive \ set output d
rive
 890 .save_loop
 900 JSR check_presence:JSR message
 910 OPT FNequs("Save ")
 920 OPT FNequb(255)
 930 JSR print_filename
 940 JSR message
 950 OPT FNequs(" (Y/N) ? ")
 960 OPT FNequb(255)
 970 JSR end_addr
 980 JSR get_yn
 990 CPY #ASC"Y":BNE no_save
1000 JSR save_file
1010 .no_save
1020 JSR update_pointers
1030 DEC last_file:BNE save_loop
1040 JSR message
1050 OPT FNequb(&0D)
1060 OPT FNequb(&0D)
1070 OPT FNequs("Another copy (Y/N)
? ")
1080 OPT FNequb(255)
1090 JSR get_yn
1100 CPY #ASC"Y":BEQ set_for_save
1110 .end RTS
1120 :
1130  \  *** SUBROUTINES ***
1140 :
1150 .skipsp
1160 LDA (cmd_ptr),Y:INY
1170 CMP #ASC" ":BEQ skipsp
1180 DEY:BEQ ucp2
1190 :
1200  \ update command pointer
1210 .update_cmdptr
1220 INC cmd_ptr:BNE ucp:INC cmd_ptr
+1
1230 .ucp DEY:BNE update_cmdptr
1240 .ucp2 RTS
1250 :
1260  \ set file storage area etc
1270 .init_pointers
1280  \ filestore_ptr = filestore
1290 LDA #filestore MOD 256:STA file
store_ptr
1300 LDA #filestore DIV 256:STA file
store_ptr+1
1310  \ filename_ptr = fileinfo
1320  \ fileinfo_ptr = fileinfo + na
melength
1330 LDA #fileinfo MOD 256:STA filen
ame_ptr
1340 CLC:ADC #namelength:STA fileinf
o_ptr
1350 LDA #fileinfo DIV 256:STA filen
ame_ptr+1
1360 ADC #0:STA fileinfo_ptr+1
1370 RTS
1380 :
1390  \ find end addr+1 of the file
1400 .end_addr
1410 LDY #8:LDA (fileinfo_ptr),Y:INY
\ get file size
1420 CLC:ADC filestore_ptr:STA temp
1430 LDA (fileinfo_ptr),Y
1440 ADC filestore_ptr+1:STA temp+1
1450 RTS
1460 :
1470  \ update pointers for file sto
rage etc
1480 .update_pointers
1490  \ filename_ptr = fileinfo_ptr
+ 10
1500 CLC:LDA fileinfo_ptr:ADC #10:ST
A filename_ptr
1510 LDA fileinfo_ptr+1:ADC #0:STA f
ilename_ptr+1
1520  \ fileinfo_ptr = filename_ptr
+ namelength
1530 CLC:LDA filename_ptr:ADC #namel
ength:STA fileinfo_ptr
1540 LDA filename_ptr+1:ADC #0:STA f
ileinfo_ptr+1
1550 LDA temp:STA filestore_ptr
1560 LDA temp+1:STA filestore_ptr+1
1570 RTS
1580 :
1590  \ get next file name from the
command line
1600 .get_filename
1610 LDY #0:STY newname:JSR skipsp \
ignore leading spaces
1620 .gfname
1630 LDA (cmd_ptr),Y
1640 CMP #&0D:BEQ lastfile2 \ last f
ile terminated by &0D
1650 CMP #ASC" ":BEQ got_file
1660 JSR osasci:CMP #ASC"*":BEQ aste
risk
1670 STA (filename_ptr),Y
1680 INY:BNE gfname
1690 .lastfile2 INC last_file
1700 .got_file
1710 LDA #&0D:STA (filename_ptr),Y \
&0D as file name terminator
1720 TYA:INY:JSR update_cmdptr
1730 CMP #namelength:BCS len_err
1740 RTS
1750 .asterisk
1760 LDA #&0D:STA (filename_ptr),Y
1770 TYA:PHA:INY:JSR update_cmdptr
1780 .asterisk2
1790 LDA (cmd_ptr),Y
1800 CMP #&0D:BEQ lastfile3
1810 CMP #ASC" ":BEQ got_file2
1820 STA newname,Y:JSR osasci
1830 INY:BNE asterisk2
1840 .lastfile3 INC last_file
1850 .got_file2
1860 LDA #&0D:STA newname,Y
1870 TYA:INY:JSR update_cmdptr
1880 TAX:PLA:CMP #namelength:BCS len
_err
1890 CPX #namelength:BCS len_err
1900 RTS
1910 .len_err
1920 JSR message
1930 OPT FNequs(" _ Bad filename")
1940 OPT FNequb(255)
1950 SEC:RTS
1960 :
1970 .get_drive
1980 JSR get_filename:JSR osnewl:LDY
#0
1990 LDA (filename_ptr),Y
2000 CMP #ASC"0":BCC dr_err
2010 CMP #ASC"4":BCS dr_err
2020 RTS
2030 .dr_err
2040 BRK
2050 OPT FNequb(&CD)
2060 OPT FNequb(&0D)
2070 OPT FNequs("Bad drive")
2080 OPT FNequb(&0D)
2090 OPT FNequb(0)
2100 :
2110  \ call osfile with A=5
2120  \ save load addr, exec. addr a
nd file size
2130 .get_filesize
2140 JSR set_blk
2150 LDA #5:JSR osfile
```

EPROMS, 8271

(Phone for quantity discounts)

	Ex VAT	Inc VAT
1-9 27128 Hitachi 250nS Eprom	2.56	2.95
10+ 27128 Hitachi 250nS Eprom	2.30	2.65
1-9 2764 Hitachi 250nS Eprom	1.70	1.95
10+ 2764 Hitachi 250nS Eprom	1.57	1.80
1-9 6264LP-15 8K x 8bit Ram	3.43	3.95
10+ 6264LP-15 8K x 8bit RAM	2.83	3.25
8271 Floppy Controller	33.91	39.00
Disc CMOS/TTL Chips	4.77	5.49
Acorn 8271 Disc Interface	42.61	49.00
Acorn 1770 Disc Interface	42.61	49.00
View Wordprocessor Rom	40.87	47.00
Wordwise Plus Rom	38.70	44.50
Printmaster Rom	23.91	27.50
Inter-Sheet Rom	40.87	47.00

(Full range of Roms available)

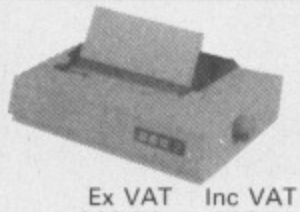
SPECIAL OFFER

BBC B+

- *64K RAM including Separate Screen Memory*
- *6 ROM sockets* ● *Enhanced DFS*
- *1770 Western Digital chip* ● *Buffered Tube*
- *Buffered 1 Mhz Bus* ● *No utilities disc required*
- *ROM Manager installed*

	Ex VAT	Inc VAT
BBC B Plus (64k)	355.65	409.00
BBC B Plus (128k)	389.57	448.00

TAXAN KP810



with BBC cable & paper
£263.00 (£228.70 + VAT)
(Phone to check price)

	Ex VAT	Inc VAT
KP910 17" width printer	328.70	378.00
KP810 Paper roll	3.43	3.95
KP810 Dust Cover	4.00	4.60
KP810 Print ribbon	5.48	6.30

SP-1000 (SEIKOSHA)

with BBC cable & paper **£215.00** (£186.96 + VAT)

JUKI 6100

with BBC cable **£299.00** (£260.00 + VAT)

LX-80 *(EPSON)*

with BBC cable & paper **£229.00** (£199.13 + VAT)

	Ex VAT	Inc VAT
LX-80 Tractor Unit	18.22	20.95
LX-80 Sheet Feeder	47.83	55.00
LX-80 Dust Cover	4.00	4.60
LX-80 Print Ribbon	3.90	4.49

DISC DRIVES/MONITORS

	Ex VAT	Inc VAT
CD800S 800k dual + PSU 40/80	198.26	228.00
CDSX800 800k dual No PSU 40/80	160.00	184.00
CS400 400k single + PSU 40/80	112.17	129.00
CSX400 400k single No PSU 40/80	93.91	108.00
Philips P1114 TV/Monitor	173.04	199.00
Philips BM7502 Green Monitor	68.70	79.00
Philips BM7522 Amber Monitor	72.61	83.50

Mitsubishi 400k 40/80 Track Drive by Cumana & Acorn DFS £149.95 inc. VAT

DISKETTES

	13.90	15.99

10 in library case. D/S Q/D 96tpi. Lifetime warranty
(15% discount on quantities of 100+)

Phone for our best price before placing your order
EDUCATIONAL & GOVERNMENT ORDERS WELCOME
All products have a 12 month no quibble guarantee
Prices subject to variation without prior notification
Carriage 92p (80p + VAT) Securicor £6.90 (£6.00 + VAT)

WeServe

Micro Dept.
128 West Street,
Portchester,
Hants.
PO16 9XE.
Tel: 0705 325354

CAREY ELECTRONICS

computing and communications

For The BBC Microcomputer System — computers · peripherals · software

ALL ACORN & ACORNSOFT PRODUCTS	
Acorn PRESTEL Adapter	139.00
Acorn MUSIC 500	199.00
ATPL SYMPHONY	125.00
ATPL "SIDEWISE" ROM board	43.70
Aries-B32 RAM extension	92.00
GCC RAM/ROM 15	100.79
GCC STARdataBASE	77.30
Datapen LIGHT PEN	25.00
SINGLE DRIVES (without P.S.U.)	
40T D/S 200K Pace PSD 2	104.65
40/80T. D/S. 400K. PSD 3	113.85
Mitsubishi MD 400 A	114.00
DUAL DRIVES (all with P.S.U.):	
40T. D/S. 2 x 200K. (400K) Pace PDD 2 P	247.25
Cumana CD 400 D	299.95
40/80T. D/S. 2 x 400K. (800K) Pace PDD 3 P	255.30
Mitsubishi MD 802 D	299.00
Cumana CD 800 S	329.95
All drives include cables, formatting disk & instructions.	

BBC Model B Plus with DFS	469.00
BBC Model B Plus DFS/Econet	517.00
BBC Model B Plus 128K	499.00
6502 Second Processor	199.00
Z80 Second Processor	399.00
PRINTERS:	
Canon PW-1000 A	329.19
Juki 6100	382.38
Shinwa CPA 80	198.95
Integrex Colourjet 132, from	654.35
Epson RX-80	260.19
PRINTER BUFFER:	
upGRADE TURBO 64K	161.00
MODEMS:	
Pace Nightingale	136.85
Miracle WS 2000	149.44
Tandata Tm 110	113.85
COMMUNICATIONS SOFTWARE:	
Pace COMMSTAR	34.00
Miracle DATABEEB	28.75
Tandata TAN-ROM	56.35
MONITORS (14" R.G.B.):	
Microvitec 1431 (Std. Res.)	249.00
Microvitec 1451 (Med. Res.)	299.00
Philips 7502 (12" Green)	85.00

PRICES INCLUDE VAT. PLEASE ADD P&P. Printers & Computers £9.00
Drives & Modems £5.75. Software £1.15 (Post free with Modem)
MUCH MORE AVAILABLE, so if it isn't mentioned — we may still have it,
IF NOT WE CAN GET IT.
We are also able to supply: AUDIO & VIDEO TAPES & ACCESSORIES and ELECTRONIC COMPONENTS for the COMPUTER ENTHUSIAST & RADIO AMATEUR.

Mail Orders To:
7 Church Road, WALTON-ON-NAZE, Essex CO14 8DF.
Tel: Frinton-on-Sea (02556) 6993 (callers by appointment).

The new 'CARE' range of programs
for **BBC B** and **ELECTRON** from

CASH CARE – £11.95

Bank account AND Savings account. Full Analysis – 60 categories. Budget Forecasts. 3-D Bar Charts. Password Protection. Easy storage of data. Printouts of all accounts and Bar Charts.

BUILDING SOCIETY CARE – £9.95

Checks the complex interest calculations involved on a day to day basis. Shows interest earned to date. Spreadsheet display. Easy storage of data. Printout of account to date.

VAT CARE – £14.95

Checked & Approved by H.M. Customs & Excise. 240 Sales AND 240 Purchases each month. Three month period. ALERT warning if VAT 2% or more incorrect. Easy storage of data. Printout with monthly & 3 monthly totals.

PLUS our range of QUALITY games:
Supergolf – £7.50 **Trafalagar – £8.00**
Polar Perils – £7.95 **Bunfun – £6.50**

Buy Two – Deduct 20%

All BBC programs available on disc – add £2.00

SQUIRRELSOFT

Dept MU, 4 Bindloss Avenue, Eccles, Manchester M30 0DU.
24 Hour answering service – 061-789 4120.

Cheques, P.O.s Same day despatch.

From Page 191

```
 2160 CMP #1:BNE file_not_found
 2170 LDY #0
 2180 .gfs2 LDA param_blk+2,Y:STA (fi
leinfo_ptr),Y
 2190 INY:CPY #10:BNE gfs2
 2200 CLC:RTS
 2210 .file_not_found
 2220 JSR message
 2230 OPT FNequs(" _ not found")
 2240 OPT FNequb(255)
 2250 SEC:RTS
 2260 :
 2270 .set_blk
 2280 LDA filename_ptr:STA param_blk
 2290 LDA filename_ptr+1:STA param_bl
k+1
 2300 LDA #0:LDY #2
 2310 .sb STA param_blk,Y:INY:CPY #18
:BNE sb
 2320 LDX #param_blk MOD 256:LDY #par
am_blk DIV 256
 2330 RTS
 2340 :
 2350 .load_file
 2360 JSR set_blk:LDA filestore_ptr:S
TA param_blk+2
 2370 LDA filestore_ptr+1:STA param_b
lk+3
 2380 LDA #&FF:JSR osfile \ load file
 2390 LDA newname:BEQ no_rename:LDY #
0
 2400 .yes_rename
 2410 LDA newname,Y:STA (filename_ptr
),Y
 2420 INY:CMP #&0D:BNE yes_rename
 2430 .no_rename
 2440 RTS
 2450 :
 2460 .check_presence
 2470 JSR set_blk:LDA #5:JSR osfile
 2480 CMP #1:BNE not_present
 2490 JSR message
 2500 OPT FNequb(&0D)
 2510 OPT FNequb(129)
 2520 OPT FNequs("It exists on the de
stination disk.")
 2530 OPT FNequb(&0D)
 2540 OPT FNequb(255)
 2550 .not_present
 2560 RTS
 2570 :
 2580 .save_file
 2590 JSR set_blk:LDY #0
 2600 .sf
 2610 LDA (fileinfo_ptr),Y:STA param_
blk+2,Y
 2620 INY:CPY #8:BNE sf
 2630 LDA filestore_ptr:STA param_blk
+10
 2640 LDA filestore_ptr+1:STA param_b
lk+11
 2650 LDA temp:STA param_blk+14
 2660 LDA temp+1:STA param_blk+15
 2670 LDY #param_blk DIV 256:LDA #0:J
MP osfile
 2680 :
 2690  \ get 'Y' or 'N'
 2700 .get_yn
 2710 LDA #15:LDX #1:JSR osbyte \ flu
sh input buffer
 2720 .yn
 2730 JSR getkey
 2740 AND #&5F:CMP #ASC"Y":BEQ yn2
 2750 CMP #ASC"N":BNE yn
 2760 .yn2
 2770 TAY:JSR osasci:JMP osnewl
 2780 .getkey
 2790 JSR osrdch \ get a char in A
 2800 CMP #&1B:BEQ escape:RTS
 2810 .escape
 2820 BRK
 2830 OPT FNequb(17)
 2840 OPT FNequb(&0D)
 2850 OPT FNequs("Escape")
 2860 OPT FNequb(&0D)
 2870 OPT FNequb(0)
 2880 :
 2890 .print_filename
 2900 LDY #0
 2910 .pfn
 2920 LDA (filename_ptr),Y
 2930 CMP #&0D:BEQ pfn2
 2940 JSR osasci:INY:BNE pfn
 2950 .pfn2
 2960 RTS
 2970 :
 2980 .message
 2990 PLA:STA temp:PLA:STA temp+1
 3000 LDY #1
 3010 .mes
 3020 LDA (temp),Y
 3030 CMP #255:BEQ mes2
 3040 JSR osasci:INY:BNE mes
 3050 .mes2
 3060 INY:TYA:CLC:ADC temp:STA temp
 3070 LDA #0:ADC temp+1:STA temp+1
 3080 JMP (temp)
 3090 :
 3100 .command
 3110 OPT FNequs("*DCOPY")
 3120 .cmdend
 3130 :
 3140 .input_drive
 3150 OPT FNequs("DRIVE ")
 3160 .in_dr
 3170 OPT FNequs("0")
 3180 OPT FNequb(&0D)
 3190 :
 3200 .output_drive
 3210 LDA in_dr:CMP out_dr:BNE output
_dr2
 3220 JSR message
 3230 OPT FNequb(131)
 3240 OPT FNequs("Insert destination
disk & tap a key")
 3250 OPT FNequb(&0D)
 3260 OPT FNequb(255)
 3270 LDA #15:LDX #1:JSR osbyte:JMP g
etkey
 3280 .output_dr2
 3290 LDX #output_dr MOD 256:LDY #out
put_dr DIV 256
 3300 JMP old_cli \ issue *DRIVE 1 co
mmand & return
 3310 .output_dr
 3320 OPT FNequs("DRIVE ")
 3330 .out_dr
 3340 OPT FNequs("0")
 3350 OPT FNequb(&0D)
 3360 ]:NEXT
 3370 :
 3380 CX=0
 3390 FOR IX=codeX TO PX-1
 3400 CX=CX+?IX
 3410 NEXT:PRINT''"Checksum=";CX
 3420 DIM XX 30:YX=XX DIV 256
 3430 $XX="S.DCOPYMC "+STR$~(codeX)+"
 "+STR$~(PX)
 3440 PRINT'"Do you want to save the
machine code"'"(Y/N) ?";
 3450 A$=GET$:PRINTA$:IF A$="Y":CALL
&FFF7
 3460 END
 3470 :
 3480 DEFFNequb(AZ)
 3490 ?PX=AZ:PX=PX+1
 3500 =IX
 3510 :
 3520 DEFFNequs(A$)
 3530 $PX=A$:PX=PX+LEN(A$)
 3540 =IX
```

This listing is included in this month's cassette tape offer. See order form on Page 223.

SURPLUS PRINTER SALE

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

PROFESSIONAL MATRIX PRINTER

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

£149 plus VAT and £11.50 p/p

£69 plus VAT and £5.75 p/p

PERSONAL COMPUTER PRINTER

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

MAINS COOLING FANS

Miniature fans as used on professional mini-computers – these little fans are whisper-quiet and guaranteed not to generate any interference with sensitive electronics. Blade diameter 4 inch. Ideal for micro systems – these could save you hundreds of pounds in heat damage!
Offered at a fraction of usual price

Brand new, only **£6** plus VAT p/p £1

FLOPPY DISKS (5¼ INCH)

Brand new diskettes from top names at an amazing price. Double density and fully guaranteed.

Single sided **£14** for 10.
Double sided **£16** for 10.
Add VAT and £2 p/p

MAINS FILTERS

Protect your expensive equipment from mains noise and dangerous spikes. These are as used on mainframe computers and are complete with circuit breaker and full instructions. Rated 230v at 10amp.

Only **£5** each plus VAT p/p £3

CHILTERN ELECTRONICS

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

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

Telephone or send your order to **Tim Reading**
We accept personal cheques or telephone your Access card No.
All items despatched within 24 hours
Open Mon – Fri 9-5pm, Sat 9-1pm.

Vine Micros

THE LEADERS IN
TAPE TO DISC TRANSFER
FOR THE BBC COMPUTER

AN EXCITING NEW DISC UTILITY

100% effective

REPLAY

A 'MUST' for all DISC USERS

THIS IS A UNIQUE HARDWARE/ROM-BASED SYSTEM

£35·00 inclusive of VAT and post.

BBC 'B' Disc Drive Users - Do you want 100% TAPE TO DISC TRANSFER?
Have you heard about the REPLAY System from VINE MICROS? The *only* system around that can dump anything in the computer memory into disc . . . AND THAT'S NOT ALL! Just look at these extra features. . . .

- GAMES can be stopped and saved directly to disc at any time. This means that you can resume play from *where you left off* and don't need to work through earlier screens time after time.
- STOPPED SCREENS can be re-loaded from disc and printed via a suitable routine, enabling a permanent record of those high scores!
- GAME IMPROVEMENTS can be built in! Infinite lives - Hyperspeed - Extra gears - Different background colours - Edit your own improvements or work from the data sheets supplied by us.
- PAUSE facility built in. * PLUS - most disc to disc transfer.

The **REPLAY** System will not turn you into a pirate! It solely provides a facility for an individual user.

Resulting discs are not recognised by a different computer.

*** Consists of ROM with additional hardware *** *** Easy to fit with detailed instructions, no soldering ***

FOR BBC 'B' with O.S. 1.20 - FITTED WITH THE FOLLOWING DFSs (State type).

NOW FOR UDM, CHALLENGER AND OFS

Type R8271
Acorn DFS/DNFS Watford and Pace
Single Density

Type R1770
Opus 3.45 and Solidisk DFS.

Type R2791
Opus 3.15.

Type R2793
Opus 3.35.

N.B. If you have an extension ROM board, please make sure that there is still room on the MAIN computer board for the REPLAY ROM
£8.00 DISCOUNT offered for T.D. ROMs to those users wishing to up-grade to REPLAY. (Mail Order Only).

Available by post from:

VINE MICROS, MARSHBOROUGH, NR. SANDWICH, KENT CT13 OPG.

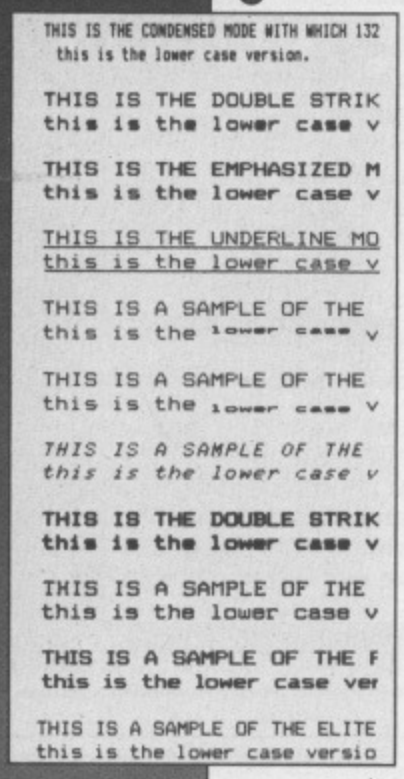
Telephone: (0304) 812276
(or your local Dealer)

VISA

ACCESS

FOR ONCE A DEAL WORTH MORE....

STAR SG10 — DOT MATRIX PRINTER



- ★ Epson and IBM compatible print codes
- ★ Externally accessible DIP-switches
- ★ High resolution bit-image graphics
  standard characters
  9×11 dot
  STAR block graphics
  6×6 dot
  IBM block graphics
  12×11 dot
  User defined
  8×(4-11) dot
  Near letter quality (NLQ)
  17×11 dot
- ★ Downloader character sets — enables you to design your own characters
- ★ Normal (10CPI), Elite (12CPI) Condensed (17CPI) NLQ (10CPI) Italics, enlarged, super and subscript styles
- ★ High 120 CPS print speed, NLQ 55 CPS — the market cannot compare. Bidirectional, logic seeking.
- ★ Hex dump facility
- ★ Touch-sensitive control panel
- ★ Standard parallel centronics interface
- ★ 2K print buffer — expandable to 10K
- ★ Reel to reel ribbon — infinitely cheaper than cartridge
- ★ Print head — can be replaced by user with ease.

COURIER SERVICE

Credit cards and BS cheques — immediately. Other cheques — 24 hours after clearance (3-4 working days). **£10.00** for any amount of items purchased as long as order includes a printer. **£3.00** for paper orders alone.

ONE YEAR GUARANTEE

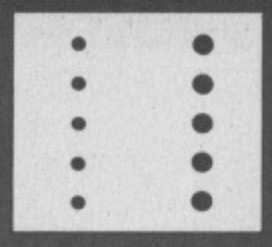
RRP £259.00 + VAT

SALE PRICE

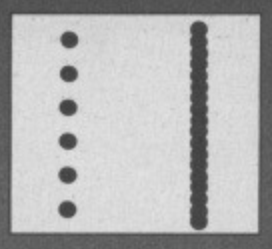
£199.95 plus VAT

Datastar Systems Official Distributor

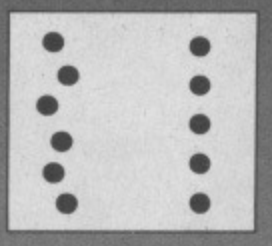
Unicom House, 182 Royal College Street, London NW1 9NN
Telex 295931 UNICOM G. Export enquiries welcome.
Personal callers welcome. Monday-Friday 9am-6pm



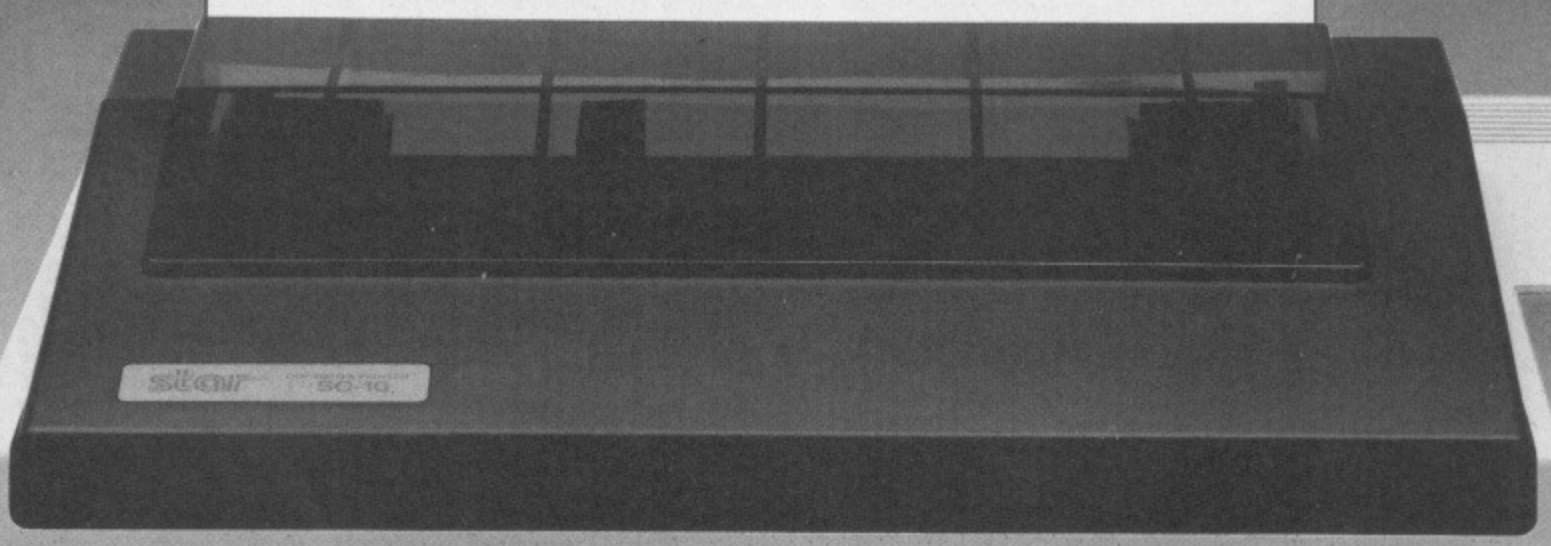
Micro-precision allows print wires with a diameter that reduces the space between dots.



In the NLQ mode the heads move back enough to print — overlapping the adjacent dots.



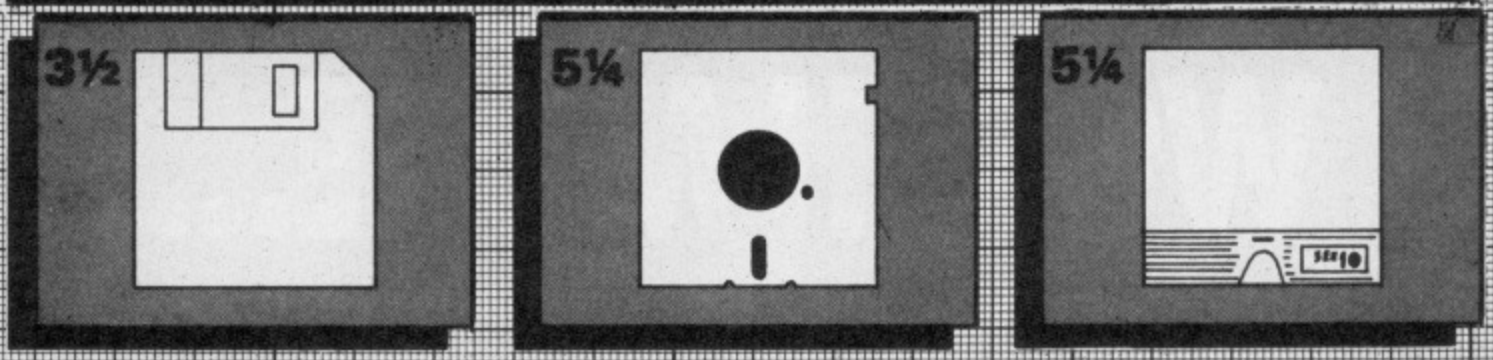
Precise alignment of the wire elements is important in attaining quality.



Credit Card Hot Line 01-482 1711

Official and educational orders welcome

TOP QUALITY DISCS AT COMPETITIVE PRICES



3½" Nashua Microdiscs

	Per Box of 10	+ 10 Boxes
SS/DD 135tpi	£28.00	£27.00
DD/DD 135tpi	37.00	36.00

Authorised Nashua Distributor

5¼" Nashua Floppy Discs
Lifetime Guarantee

	Per Box of 10	+10 Boxes
SS/DD 48tpi	£11.00	£10.00
DS/DD 48tpi	15.00	14.00
SS/DD 96tpi	16.00	15.00
DS/DD 96tpi	18.00	17.00
1.6M 96tpi	40.00	38.00

5¼" Own Label
Floppy Discs in Library Case
Lifetime Guarantee

	Per Box of 10	+10 Boxes
SS/DD 48tpi	£10.00	£ 9.00
DS/DD 48tpi	13.00	12.00
DS/DD 96tpi	16.00	15.00

Micro Resources Limited

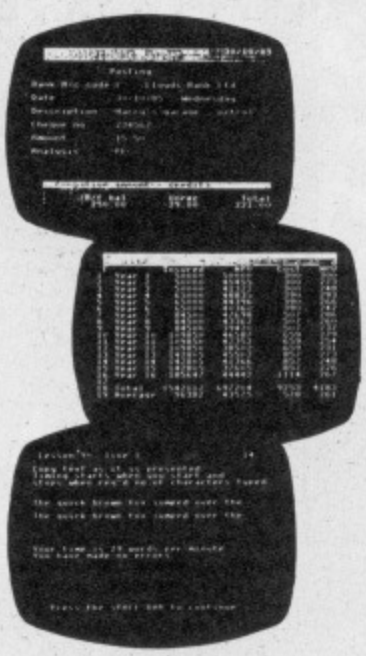
Southfield House, 11 Liverpool Gardens
Worthing, Sussex BN11 1RY
Worthing (0903) 213174

VISA

Special prices for Software Houses
from 75p per disc in bulk packed form
Send payment or phone to use credit card
Large quantity and Education Discounts given
All prices include delivery, please add VAT at 15%
Trade enquiries welcome, send for dealer price list

contex computing

For the BBC Micro



The Bank Manager Maintain close control of your personal cheque, credit card and savings accounts. 36 separate accounts held online. Regular posting of cheques and receipts, while the program automatically posts standing orders, provides immediate access to all current balances. Virtually an unlimited number of standing orders and postings may be held, disc space dependent. Full reconciliation facilities quickly and reliably match details against statements. Reconcile, unreconcile, amend, delete and search. Analyse transactions comparing actual expenditure against budgets in up to 99 separate categories. Comprehensive report options may be displayed or printed. Plus a versatile print command language allowing personalised analysis and bank reports. Look ahead at your future day by day cash commitments and save on bank charges. Foreign currency support; graphics; corrupted file recovery; sideways RAM support (optional). Professionally designed for flexibility and ease of use. No fixed time entry periods. Automatically rolls forward each period. A very comprehensive system complete with manual and many online help screens. Disc systems only **£17.50**

Spreadsheet Mk V Inexpensive and very versatile. Evaluate financial and statistical models up to 26 columns and 99 rows to a maximum of 1,000 cells. 9 digit accuracy. Individually variable column widths (1-30 characters) and decimal positions (0-7). Text, data or formulae in any cell; save, restore/merge; modify; column sort; variables; left/right justification; absolute/relative cell ids; mode 7 graphics; horizontal/vertical evaluation; programmable input and printing command language; multi column and row insert or delete; colour; many user parameters; extensive online help. Complete with example models and manual. Disc systems only **£17.50**

Typing Tutor Quickly learn to touch type. Over 90 smoothly graded lessons graduate you from the basic home keys to complete keyboard mastery. Unique word scan line checking provides a good indication of your progress showing the target 'words per minute' and percentage correct. You may revise the targets or change the lesson contents as required. An audio key click provides confirmation of positive key depressions. Establish a good typing rhythm using the self configurating metronome. A free format option allows any text to be practised with some simple page layout facilities while Typing Tutor provides the timing in words per minute. Cassette **£9.50** Disc **£11.50**

CONTEX COMPUTING, 15 Woodlands Close, Cople, Bedford MK44 3UE Tel: 02303 347

Please rush me ..... ☐ cassette ☐ 40tk ☐ 80tk

Enclosed £ ..... or debit my Access card no .....

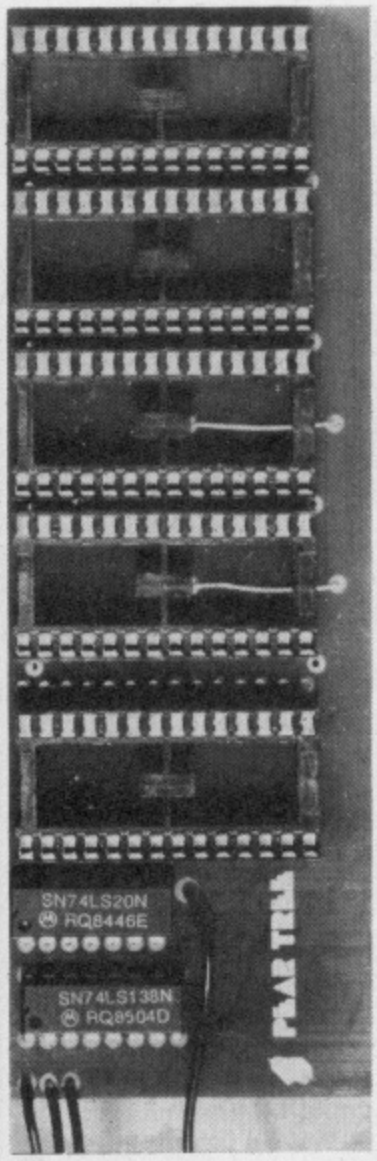
Access

Name .....

Address .....

.....

FAST Delivery



MR 2000 MINI ROM BOARD

GIVES 4 EXTRA ROM SOCKETS ON BBC 'B'

PLUG IN – SWITCH ON

MEASURES 128 x 44 mm

FULL INSTRUCTIONS ENCLOSED

ONLY **£14.95** inc VAT/P&P

CHEQUE/P.O. PAYABLE TO

PEAR TREE COMPUTERS LTD
PEAR TREE MEADOW
ELLINGTON THORPE
HUNTINGDON CAMBS
PE18 0AW

Orders by ACCESS welcome

DISC DRIVES FOR BBC

D80SMP	dual drive (2 x 400k) 40/80 switchable double sided + monitor stand + PSU	**£299** (b)
S80SP	single drive (400k) 40/80 switchable double sided + PSU	**£120** (b)
S80S	single drive (400k) 40/80 switchable double sided	**£99** (b)
D35	dual 3½" drives (2 x 400k) 80 track double sided	**£200** (b)
S35	single 3½" drive (400k) 80 track double sided	**£115** (b)

Bare Half-height 80 track double sided	**£80** (b)
Bare 3½" 40 track single sided	**£55** (b)
Bare Full height 80 track double sided	**£60** (b)

ACORN INTERFACE			**£50** (c)
ACORN DNFS			**£69** (c)
1770 UPGRADE			**£47** (a)
ADFS UPGRADE			**£28** (a)
8271	**£40** (a)	**27128**	**£3** (a)
2764	**£2** (a)	**6264LP**	**£4** (a)

NEW

Quantity discounts available

SINGLE TO DUAL DRIVE CONVERSION SETS

Allows two single Drives 0 to be automatically configured as DRV0 and DRV1	**£15** (a)
Single/Dual power lead converter	**£9** (a)

DISKETTES

All discs guaranteed and have lifetime warranty.

	10 of	25 of
40tk SSDD	**£11.00**	**£25.00**
80tk DSQuad	**£13.50**	**£32.00**

3½" SSDD	**£32.00**
3½" DSDD	**£38.00**
3" DSDD	**£35.00**

DATALIFE

40tk SSDD	**£14.25**
40tk DSDD	**£18**
80tk Quad	**£24**

Add £9 for a 50 capacity storage box with smoked perspex lid dividers and non-slip rubber feet.

Carriage & VAT included. No more to pay

UTILITY SOFTWARE

ACORNSOFT			
Viewstore	**£55** (a)	Basic Editor	**£29** (a)
Viewsheet	**£48** (a)	Graphics ROM	**£28** (a)
Hi-View	**£45** (a)	Termulator	**£32** (a)
View 3.0	**£80** (a)	Logo	**£60** (a)
View 2.1	**£48** (a)	Comal	**£45** (a)
View Printer Driver	**£11** (a)	Iso-Pascal	**£60** (a)
COMPUTER CONCEPTS			
Speech ROM	**£29** (a)	Intersheet	**£48** (a)
Wordwise +	**£45** (a)	Accelerator	**£58** (a)
Interchart	**£32** (a)	Printmaster	**£28** (a)
CLARES			
Brom	**£30** (a)	B-Base	**£22** (a)
Replica III	**£14** (a)	B-Base Utilities	**£11** (a)
Profile	**£11** (a)	B-Accounts	**£22** (a)
BEEBUGSOFT			
Help ROM	**£22** (a)	Toolkit	**£25** (a)
Sleuth	**£27** (a)	Exmon II	**£27** (a)
Spellcheck	**£17** (a)	Murom	**£27** (a)
Spellcheck II	**£29** (a)	Adv. Disc Toolkit	**£33** (a)

SYSTEMS UTILITY

Sector edit Acorn and UDM, enable/disable multiple ROMs, even across Break, list ROMs, etc **Only £20** (a)

Case -slimline	**£13.80** (c)	full height	**£18.98** (c)
Cable-single data	**£7.00** (a)	dual data	**£10.50** (a)
single power	**£3.50** (a)	dual power	**£4.74** (a)

UDM 100% board	**£17.50** (a)
UDM DDFS 3.1	**£65.00** (a)
UDM Rom Ram expansion board	**£55.00** (b)
UDM 3.1 upgrade (Return old UDM DFS chip)	**£5.75** (a)

Carriage charges – (a): £1 (b): £10 (c): £2
All prices include VAT

CD **CARSON DEVELOPMENTS (MU)**
84 Highfield Road, Romford, Essex RM5 3RU
Telephone: 0708 27043

PRO-SOFT

BUSINESS SOFTWARE

SALES CLERK

A suite of programs designed to allow the user to quickly and easily produce high quality:-

INVOICES DELIVERY NOTES CREDIT NOTES STATEMENTS

with minimum input and "on screen" formatting of the document layout.

An outstanding feature of the system is its versatility, with an 80 column input screen being used which exactly represents the body of the document being produced. Variable paper lengths may be used but assuming 11" paper, documents may consist of 36 x 1 line entries, 1 x 36 line entry or any combination totalling not more than 36 lines. (The number of available lines remaining is continually displayed). Each line may contain up to 39 characters of description, with spaces, blank lines and messages being inserted as required.

Other features include:

* Zero and Standard (user definable) V.A.T. rates on same document.
* V.A.T. analysis table printed on invoices and credit notes.
* Discount may be given as a percentage or an amount.
* Works with any printer using plain or our pre-printed paper.
* User definable single keys and abbreviations for quick input.
* Maintains users document number sequences (with optional override).
* Disc contains detailed user guide which may be displayed or printed.
* Requires only 40T SS disc (also available on 80T SS disc).

The suite includes an 80 entry Customer Database and a Configuration routine which allows the user to inform the system of his business details and the features of his printer. The Customer Database stores the names, addresses and telephone numbers of regular customers to be used by the document printing routines, saving hours of typing. The Database entries may also be displayed, amended, deleted and added to at any time.

"SALES CLERK" is particularly suitable for use by the self-employed and small businessman with little or no previous computer experience being required to produce high grade documents. It is also suitable for computer training purposes and should be of use to Schools, Colleges and other Training Agencies.

Introductory Price £30.00 inclusive of VAT and P&P

SEND CHEQUE/PO or SAE FOR SAMPLE DOCUMENTS TO:-

146 Crosland Road, Oakes, Huddersfield, W.Yorks. HD3 3SU. Tel: (0484) 659186

ECONET VERSION AVAILABLE SOON, PLEASE ENQUIRE

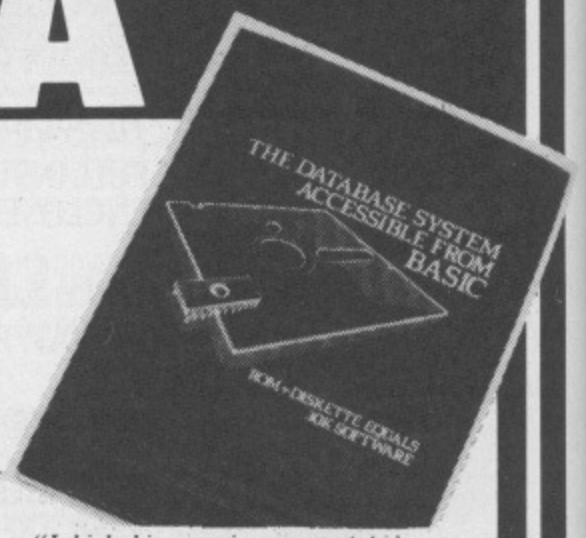
QUALITY SOFTWARE BONANZA

FOR THE CHRISTMAS PERIOD ONLY – THREE QUALITY PRODUCTS FOR THE PRICE OF ONE

SUPERB REVIEW

FILEAID

THE REVOLUTIONARY DATA BASE system accessible from BASIC



FILEAID is a database system which is accessed via BASIC. It provides all the facilities required for complex data handling. FILEAID extends the capabilities of BASIC by providing fourteen new commands which allow you to create and access indexed files on diskette.

FILEAID gives you the ability to write sophisticated applications without worrying about the format data actually takes on the diskette. No matter what the application is, FILEAID will handle it.

One advantage of FILEAID is that you write your programs in BASIC, the language you already know, unlike other database systems.

What good is a database if you can't write your own programs to access it? BASIC is more flexible than any of the database languages.

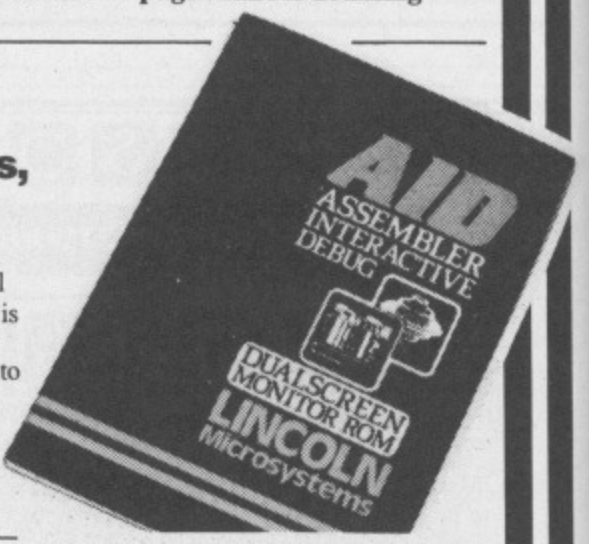
"I think this sytem is a very useful idea which should make life much easier.."
The Micro User November 1985

● Record Fields may be Integer/Real/String ● Random Access Functions: READ/INSERT/REPLACE/DELETE/ REVERSE – DELETE ● Sequential Access Functions: TOP/BOTTOM/READNEXT/READPREV ● Multiple Volume Support – Maximum 4 Drives ● Unlimited Number of Files per program ● BACKUP/RESTORE Utilities ● Maximum Records per File 65,000 (depending on Disc Space) ● Maximum Record Size 4096 Bytes ● Maximum of 196 Fields (BASIC Variables) per Record ● File AUDIT/INFORMATION Functions ● Comprehensive 77 page Manual detailing Concepts/Facilities/Examples ● Free telephone/address directory system

SUPERB REVIEW

AID

THE ORIGINAL DUALSCREEN Machine Code Monitor used extensively by professionals in Schools, Universities as well as in business



Read what "The Micro User" thinks...

"My immediate impression of Aid was that is 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

"This dual screen feature is a cracker"
Acorn User. March 1985

NEW PRODUCT

DFS-AID

THE GREAT TIME SAVER for Disc users

- ●GENERAL PURPOSE DISC MANAGEMENT PACKAGE
- ●INSTANT FULL SCREEN DISC DIRECTORY MENU
- ●INSTANT HELP FUNCTIONS
- ●FUNCTION KEY SCROLLING
- ●SINGLE KEY-STROKE COMMANDS INCLUDE:
  - **–BROWSE –EXECUTE**
  - **–COPY –LOAD**
  - **–DELETE –COMPACT DISC**
  - **–EDIT**
  - **–LOCK**
  - **–RENAME**
  - **–UNLOCK**

THINK QUALITY GO LINCOLN this Christmas

ALL THREE ROM PRODUCTS ONLY £35
(p&p £2.00
Overseas £3.00)

INDIVIDUAL ROM PRICES

FILEAID.....	£35
AID.....	£28
DFS-AID.....	£19

ORDER NOW!
(While stocks last)

LINCOLN Microsystems

P.O. BOX 74, BRADFORD, WEST YORKSHIRE BD6 3RN

EQUate your strings into machine code

I AM unable to find much information on the Assembly language word EQUate in Basic II. There is a small mention in the Advanced User Guide only.

I would be very grateful if you would advise me if you have covered this word in features in your magazine in the past and, if so, what the references are. – **Richard Grant, Gosforth.**

● The EQUate commands – not available on Basic I BBC Micros – provide an easy way of including data and strings in machine code programs.

All of them update the program counters – *P%* and *O%* – by the appropriate value as if the equates were 6502 instruction bytes.

The BBC assembler recognises four EQUate commands:

```
EQUB &xx
EQUW &xxxx
EQUD &xxxxxxxx
EQUS "some text"
```

The first will insert a single byte into memory when it is assembled. For example:

```
10 FOR pass=0 TO 3 STEP 3
20 P%=&C00
30 [OPT pass
40 LDA data
50 JSR &FFEE
60 RTS
70 .data EQUB 65
80 ]
90 NEXT
100 CALL&C00
```

This program prints the character corresponding to the byte of data stored at the location pointed to by the variable *data*.

The EQUB in line 70 stores the byte, 65, in memory and adds one to the program counter P% to move to the next free location.

EQUW is similar to EQUB but stores two bytes of data in memory instead. These correspond to the low and high bytes of the number or variable given in the expression:

```
EQUW &FFEE
```

You should note that the order of the bytes isn't as you'd expect. The &EE in the example above is stored before the &FF.

This is the way 16 bit values are held in memory by processors such as the 6502. If you're familiar with machine code you'll understand this odd arrangement.

EQUD is yet another version of EQUB, except this time four bytes are written into memory.

As with EQUW, the order of the bytes is reversed. Take, for example the following expression:

```
.long EQUD &FFEEDDCC
```

When this is assembled the four sequential locations pointed to by the label *long* will contain &CC. &DD, &EE and &FF.

Finally EQUS inserts the Ascii characters of the specified string into sequential locations of memory:

```
EQUS "ABC"
```

This will store inserts of the values 65, 66 and 67 into a program – the Ascii codes of ABC.

You'll notice this time that the codes are entered into memory in the correct order.

You can find more EQUate examples on page 93 of the January 1985 issue of *The Micro User*.

Program unfulFILLed

I AM writing a drawing program for my BBC Micro which is almost complete except for a fill routine.

I have developed my own routine that will fill almost any shape on any colour background, and will fill over a ready filled shape, but it is extremely slow.

Does anyone know of a fast fill routine that will fill on any colour background, or over a ready filled shape? – **R. Dunbar, Maidstone.**

● Flood fill routines aren't very easy to write as you've found out.

Getting them to work at a decent speed is also another problem – especially if they're written in Basic. For this reason the best flood fills are in machine code.

The Acornsoft Graphics Extension ROM (GXR) contains one of the better flood fill routines for the BBC Micro.

It allows you to fill areas of the screen with user-defined patterns as well as colour. However the program required to achieve this is extremely complex.

Perhaps one of our readers has a fast flood fill that could be used in a future issue of *The Micro User*. If you have why not let Mr Dunbar and all our other readers in on the secret of how fill routines work?

Database data, please

I HOPE that this letter will be read by primary teachers who are using the program Junior Database published in your Education Special number 2.

If any teachers could spare time to write to me directly about any of the work they are doing with the program, I would be very grateful indeed.

Of particular interest would be the way they organise the children to use the computer, and the way in which the data base work links with current project or topic work.

In return we might be able to share some ideas tried by Cambridgeshire primary teachers. – **Andrew Davis, Education Department, Homerton College, Cambridge.**

Musical additions

IN the May 1985 issue of The Micro User *you published a utility called Musical Events. Here are some additions and modifications that will allow it to be used on more than one channel.*

```
10020 p=PAGE-1024:mem=p+4:m
us2=&70:mus3=&78:music=p+15
:amp=1
10035 ?mus3=2:mus3?1=0:mus3
?2=amp MOD 256:mus3?3=amp D
IV 256
10050 p=PAGE-1009:PROCmusic
10055 p=PAGE-1009+max*2:mus
ic2=p:PROCmusic
10060 FOR i=0 TO 3 STEP 3
10070 P%=&900
10100 CMP #4:BEQY1:JMPOUT:.
Y1
10140 LDA#128:LDX#250:JSR&F
FF4:CPX#15:BNECHAN2
10161 .CHAN2
10162 LDA#128:LDX#249:JSR&F
FF4:CPX#15:BNEUNEQ
10165 LDXmem:LDAmusic2,X:ST
Amus3+4:LDA#0:STAmus3+5:INX
:LDAmusic2,X:STAmus3+6:LDA#
0:STAmus3+7
10166 LDX#mus3 MOD256:LDY#m
us3 DIV256:LDA#7:JSR &FFF1
10180 LDAmem:SEC:SBC#max:BM
IUNEQ
10300 max=88
```

The data for channel two should now be typed in, starting at line 10360. To obtain a chord effect for the tune, add or change the following lines:

```
10295 RESTORE
10310 READa: IF a=-1 ENDPR
OC
10315 a=a-3*(p>music+max-1
AND a>15 AND a<>30)
10316 ?p=a
```

This method checks if it is channel two data that it is reading in, checks that it is not a duration value, and if both of these conditions are true then it adds 3 to the value before poking it into memory.

It works on the example tune for the program and will work

From Page 199

on any other tune so long as the duration does not go above 15 and the pitch below 16.

I hope these additions interest you and help you to create more complex tunes. – **Roderick Warren, Lewes.**

● Well done Roderick. Your modifications certainly add an extra dimension to what is already a superb utility.

Resources . . .

MRS B. Berry of National London wrote to you in the November issue of The Micro User *enquiring if anyone ran courses teaching Wordwise.*

I would like to inform you that we do!

The Friends Centre is an independent adult centre in Brighton town centre.

We have run a variety of courses using the BBC Micro, including office skills and vocational preparation, computer programming and computer studies, adult literacy and basic education and teacher training and have run research projects funded by both the DES and the EEC.

Wordwise, and now Wordwise +, has been an integral part of this programme, and besides teaching people to use it we have also used it for creative writing and clerical training.

We are currently interested in developing other ways of using the machine as a resource such as graphics for art classes, databases for local history projects, especially applications relevant to adult basic education and we welcome any experience or observations of any BBC Micro users. – **John Traxler, Project Coordinator, Friends Centre, Ship Street, Brighton BN1 1AF.**

. . . for courses

I NOTICED with interest the letter from Mrs B. Berry who seemed to have a problem locating a venue for training.

The Skillcentre Training Agency has a number of New Technology Access Centres situated up and down the country and courses can be run at these centres.

Alternatively we can run in company courses if the company is situated out of easy reach of the centres. – **Mike Eden, Marketing Manager, Rochdale Skillcentre, Chichester Street, Rochdale OL16 2AG.**

Letter of the Law

I ATTACH a copy of a letter I have sent today to Acorn which is self explanatory:

'I have recently purchased a programme which relies on using joysticks and found one joystick only operates intermittently.

On investigation I noted that the analogue input socket was not very steady when engaging the D plug. This proved to be due to the analogue socket not being secured in place by nuts and bolts.

The socket is purely supported by the pin connections into the printed circuit board, even though slots are available in the printed circuit board and socket to take nuts and bolts.

The result of this manufacturing error is that one of the soldered pin connections has cracked.

I am the original owner of the computer and can therefore be sure that the analogue socket was never secured correctly.

The micro is well out of guarantee, but as this is a latent defect from manufacture, I trust you will arrange for the work to be carried out by my local dealer at no cost to myself.'

I'd appreciate your advice on whether this is a common fault and what is my legal position concerning this defect.

I am aware from my employment, that in major building contracts which includes the purchase of electronic equipment, manufacturing defects which can be proven are covered by law for up to 12 years. – **M. Crowther, Oxon.**

● We have found that only more recent BBC Micros have screws fixing the analogue connector to the main circuit board. Obviously, screws are supposed to be holding the connector in place but they seem to be missing.

The joystick connector is likely to suffer from all sorts of wear and tear especially from people playing games.

It would therefore seem rather an unusual move not to fix the connector.

Recovering the cost of the repair is a civil matter between yourself and the manufacturer.

Castle conquered

JOHN Bennett wrote to Micromail asking for hints for the final stages of Castle Quest. Here they are:

When you escape from the prison take the stool as you drop from the ledge and store it, then press JUMP and UP at the same time under the ladder and you should climb up it – you may need a little practice with this.

When you are near the bucket, store everything so your hands are empty. Jump off the edge and you should land near some red swordsmen.

Dodge or kill them and get the blue aqualung and jump into the water. Go back up to the edge where you jumped to the swordsmen, jump off the very

RAM card and Wordwise

I HAD long thought to buy the Watford 32k RAM card and did so after reading your review in the August issue of The Micro User. *I have been extremely pleased with it, especially for use with Wordwise Plus and Watford's own Word Aid – a powerful combination.*

After reading your review I fitted the controlling ROM in socket 14 of my ATPL board (15 is sideways RAM) so I was interested to read the letter from David Fell of Watford Electronics in the October magazine.

*I appreciate that by putting the RAM ROM in a higher priority socket than Wordwise one cannot enter Wordwise directly by *W.*

*But if one only wants to use the word processor without the standard RAM facilities incorporated in the *XW. command one can easily switch them out – or leave them in force, for the standard settings are virtually never a nuisance.*

I find it most useful, almost essential in fact, to have the RAM ROM above the Basic ROM so that I have clear and immediate indication that the RAM is "in" or "out" from the initial VDU display following power-up, Break and Ctr+Break.

This is because some of my programs hang on booting if the RAM is in use.

*I appreciate this can be determined with *H.RAM but even in this condensed form the procedure is tedious and irritating.*

I know that I could put Wordwise in 14, ROM RAM in 13 and Basic in 12, but that leaves me with a way to go to find Basic on power-up, and it does tend to confuse most commercial discs – especially with auto-boots.

Might I mention Contex Computing. This small concern produces some high quality and useful programs. They are very user-friendly and come well packaged with excellent instruction booklets and seem to be problem free.

I have ordered from them twice, a total of four programs, and was delighted when, on the second occasion, I ordered three programs to receive a generous discount for a "bulk" order and the fact that Contex put two programs on one disc.

In fact the Spreadsheet and Bank Manager programs are really suites of programs in their own right, combining good graphics facilities – useful for explaining cash flows and so on to the real bank manager – with a comprehensive range of normal utilities.

What's more, the company appears to fill orders on a same day or return-of-post basis. They deserve to succeed.

Thank you for your excellent and most enjoyable magazine. – **D.J. Baker, Craven Arms, Shropshire.**

edge with your aqualung on and you should bang your head on the wall and fall straight down.

As you are falling press P and you should pick up the bucket, then go left, up the ladder and get the bucket in your hands. Now go down into the water for a second and back up.

Your bucket should be filled with water – to test this press THROW and water should come out, but if this is done you must fill the bucket again.

Now store your bucket and wear your aqualung and go to the witch. When she is coming throw the water at her and she should die.

Drop down the hole where the wand is. Take the wand and drop the stool. Jump on to the stool and out of the hole.

Go to the right hand side of the troll's bridge and down the ladder to the yellow swordsmen. Kill them both, go right to the edge, then throw the wand right and it should hit the wall and open the bit of wall where the treasure is. – **Marc Walton, Elland.**

Lower case variables

MY eye was caught by a letter from M.E. Thompson of London in the October issue of The Micro User, *in which he requested a utility to convert Basic variables from upper to lower case.*

As a teacher I too have felt the need for such a utility for my pupils' use. I therefore wrote this listed program some months ago. Since then it has been used by many schoolchildren constantly and no problems have come to light.

It converts all variable names other than single letter variables – whether followed by a numeral and/or type designator, % or $, or not – to lower case. This includes PROC and FN names.

Here's a brief outline of how the program works. A base pointer is located in zero page pointing to the first byte of each program line.

This is indexed with Y (using post-indexed indirect addressing) to point to the next byte to be considered.

All Ascii characters in upper case are converted to lower case by ORing the byte with 32 and stored in a buffer in zero page (lines 400-420).

They are only transferred back into the program area when the whole variable name has been converted and then only if more than one character has been converted (lines 1160-1300).

As they are transferred, the lower case variable name is printed on the screen (lines 1310-1410). Though strictly unnecessary, this does provide some assurance that something

```
  10 REM Change upper case
variables to l/c
  20 REM G.W.Brown
  30 REM March 1985
  40 pointer=&70:xtemp=&72
:flag=&73:buffer=&74
  50 oswrch=&FFEE
  60 FOR pass%=0 TO 3 STEP
3
  70 P%=&900
  80 [
  90 OPT pass%
 100 LDA #(PAGE+1) MOD 256
 110 STA pointer
 120 LDA #(PAGE+1) DIV 256
 130 STA pointer+1
 140 .begin1
 150 LDY #0
 160 LDA (pointer),Y
 170 CMP #128
 180 BCC notend
 190 RTS
 200 .notend
 210 INY
 220 INY
 230 LDX #0
 240 .unflag
 250 LDA #0
 260 STA flag
 270 .begin2
 280 INY
 290 LDA (pointer),Y
 300 CMP #32
 310 BNE check
 320 JSR change
 330 JMP begin2
 340 .check
 350 CMP #65
 360 BCC colon
 370 CMP #91
 380 BCS then
 390 INC flag
 400 ORA #32
 410 STA buffer,X
 420 INX
 430 BNE begin2
 440 .colon
 450 JSR change
 460 CMP #58
 470 BEQ unflag
 480 .star
 490 CMP #42
 500 BNE linend
 510 LDA flag
 520 CMP #0
 530 BEQ newline
 540 BNE begin2
 550 .linend
 560 INC flag
 570 CMP #13
 580 BNE quotes
 590 .newline
 600 LDY #2
 610 LDA (pointer),Y
 620 CLC
 630 ADC pointer
 640 STA pointer
 650 BCC begin1
 660 INC pointer+1
 670 JMP begin1
 680 .quotes
 690 CMP #34
 700 BNE and
 710 .nextq
 720 INY
 730 LDA (pointer),Y
 740 CMP #13
 750 BEQ newline
 760 CMP #34
 770 BNE nextq
 780 BEQ begin2
 790 .and
 800 CMP #38
 810 BNE begin2
 820 .hex
 830 INY
 840 LDA (pointer),Y
 850 CMP #48
 860 BCC begin2
 870 CMP #58
 880 BCC hex
 890 CMP #65
 900 BCC begin2
 910 CMP #71
 920 BCC hex
 930 BCS begin2
 940 .then
 950 JSR change
 960 CMP #&8C
 970 BEQ unflag
 980 .else
 990 CMP #&8B
1000 BNE rem
1010 JMP unflag
1020.rem
1030 CMP #&F4
1040 BEQ newline
1050 CMP #&DC
1060 BEQ newline
1070 .goto
1080 CMP #&8D
1090 BEQ on3
1100 JMP begin2
1110 .on3
1120 INY
1130 INY
1140 INY
1150 JMP begin2
1160 .change
1170 CPX #2
1180 BCC ret
1190 STX xtemp
1200 DEC xtemp
1210 PHA
1220 TYA
1230 PHA
1240 .again
1250 DEY
1260 DEX
1270 LDA buffer,X
1280 STA (pointer),Y
1290 CPX #0
1300 BNE again
1310 .print
1320 LDA buffer,X
1330 JSR oswrch
1340 CPX xtemp
1350 BEQ restore
1360 INX
1370 BNE print
1380 .restore
1390 LDA #32
1400 JSR oswrch
1410 JSR oswrch
1420 PLA
1430 TAY
1440 PLA
1450 .ret
1460 LDX #0
1470 RTS
1480 ]
1490 NEXT pass%
```

From Page 201

is happening, and may trap inadvertent use of such invalid variable names as LETTER as an unexpected "ter" would be shown.

Lines 140-190 check for an end of program byte.

Lines 480-540 prevent the conversion of star commands and their associated parameters to lower case. This is particularly important in the case of function key definitions.

The asterisk at the beginning of these commands is distinguished from the asterisk signifying multiplication by a flag which is cleared at the start of a new line by a colon, and by the keywords THEN and ELSE, and set in all other cases (except by a space.)

Lines 590-670 update the base pointer at the end of a program line.

Lines 670-780 ignore all characters within quotes. Meanwhile the Return character is checked for, as the inadvertent omission of the closing quotes would otherwise have a disastrous effect.

Lines 760-930 prevent the corruption of valid hex digits.

Lines 1020-1060 ensure that REM and DATA statements are not altered.

Lines 1070-1150 skip over the four bytes denoting line numbers after GOTO, GOSUB, THEN, ELSE, RESTORE and TRACE. One or more of these bytes could well lie in the range 65 to 90, and could thus be corrupted.

As it stands, the code is assembled at &900 – though this could be altered if required – and occupies just short of one page.

A few bytes from &70 on are used as work space, the exact number depending on the longest variable name to be converted. – **Geoffrey W. Brown, Newbury.**

● Mr Brown has put a lot of effort into this one. We're grateful for his contribution and hope our readers find it useful.

Super service

I KNOW it is not common for Micromail to contain letters other than those of a technical nature. However, I feel so strongly about my recent experiences that credit should go to the people concerned.

Some time ago I purchased a printer for my BBC Micro from Boots The Chemist (Leeds branch) and unfortunately had a problem with it seizing up on four separate occasions.

Each time I returned it to the store and each time it was exchanged for a new one. On my last visit I expressed concern that I should be having the same problem time and time again.

The floor supervisor immediately offered a full refund, or to exchange it for a different, far more expensive model, the difference in cost being absorbed by the company.

The other company that deserves a round of applause is Computer Village (Hazeldine Research). My faulty ROM/RAM board was sent to them for modification and was returned within two days of posting.

May I now take this public opportunity of complementing both companies on the excellent manner in which these problems were handled.

I therefore would be most grateful if you would publish this letter, as I feel that such quality of service is sadly a rarity nowadays. I am in no way connected with either of these two companies. – **Ron Dawson, Otley.**

● We like to pass on credit where it is due. So it's full marks to Boots The Chemist and Hazeldine Research.

And finally, with tongue firmly in cheek . . .

Suffering is relatives . . .

Dear Trev,

Thank goodness that the festive season is over and done with. Why does it always seem an eternity until the Twelfth Night? There's only a dozen of the damn things, yet they seem to go on for ever, a torment of hangovers and bellringing.

And this year it was worse. This year the Dragon Lady of Wilmslow (as Andrea's mother is known to those out of earshot of the DL and A) came to stay. There was no way out of it, she hadn't been for years and I'd run out of infectious diseases.

Not that I'm prejudiced against OAPs. I spent a whole childhood giving up my bus seat to them and having my toes trodden on in return. No, it's just this particular senior citizen who brings out the pro-euthanasia stance in me.

Have you ever met her? She looks like one of those nice old ladies who always turns out to be the killer in the made-for-TV movies. The only difference is that she's covered in GAB badges (Geriatrics Against the Bomb) and doesn't knit. Instead she rings bells. And takes over the spare bedroom so I can't get at my micro.

Christmas Eve was gloomy. "What's wrong, Bob?" the Dragon Lady asked. I pretended not to hear. Have you noticed the way that parents look on their adult offspring as grandchild-producing machines? I think it goes along the lines of "I suffered, you can". Anyway, I was beginning to realise that she wasn't trying to get me into campanology when she kept asking A if I knew the ropes.

"It's his thing", said A, which didn't help. "He's been separated from it for a day now and he's getting withdrawal symptoms".

"Oh you mean the Model B in the back bedroom?" she asked, perking up. "It's all right but I think it's got a bit of dicky RAM."

At this I leapt straight into it.

"Are you into micros?" I asked.

"Oh yes, my first husband and I toured all the Aegean islands before the war".

She blames her hearing aid. I reckon it's deliberate. Incidentally, she's got through four husbands, three of whom died in suspiciously gallant circumstances during WWII. As Remembrance Day approaches you'll find her outside the local Smiths with her "Buy a Poppy or Else" badge.

The last husband was a bank manager who became the only amateur bomb disposal man in Europe. He was known to the local press as "the man who had Death as his friend" and having met his wife I know what they meant.

"No, I mean microcomputers", I persisted doggedly.

"Oh a bit", she answered coyly", "but I find them a little boring after the real thing".

"What's the real thing?" I asked, amazed.

"Well whatever it is, it's not that thing you've got up in the back bedroom", A answered nastily.

It was then that I discovered that the Dragon Lady had, for a time, worked on the early computers at Manchester University. Apparently she was the only one who didn't mind breaking her nails, so she got to flick the switches.

"Are you still into computers?" I couldn't resist asking.

"Oh yes, in fact I've come out of retirement and got a part time job at the Data Protection Registry. And I've found something very interesting upstairs".

My heart missed a beat as I thought she might have found the pile of Programming and Efficiency *magazines under the bed.*

"You've got a list of all the Romchester Bellringers, but you're not registered. You're nicked, sonny".

And such was my Christmas. I now know what they mean when they say suffering is relatives. Cheers, **Bob**

Clear as MUD

RECENTLY some confusion has arisen over the advertisements you have carried in your magazine indicating that the game MUD was available from Muse.

I should like to point out that Muse is a national organisation which exists to help all those involved in education to make effective use of small computer systems in the promotion of learning. The organisation has been in existence for over 10 years and is well known in the field of educational computing at home and abroad.

MUD is not a program which is available from our software catalogue. It appears that the name Muse has recently been adopted by Multi-User Entertainments, who indeed promote the game MUD. – **Mrs Diana Thomson, Honorary Secretary, Muse.**

Cheatin' speedin'

HAVING got the disc version of MRM's Q-Man's Brother, I became bored with the speed at which Q-Man's Brother travelled.

So I resorted to the ultimate remedy – good ol' cheating.

While experimenting with the Tab key, which operates the smart bomb, I discovered that holding it down quickly uses up all your bombs.

What is not obvious is that if you keep it held down the paint can, or paint roller freezes, and allows you to travel at double speed. Unfortunately so does your time allowance.

This should not be a problem if you work out a suitably fast route to finish the grid. – **Mike Openshaw, Ferndown.**

● Unfortunately MRM are no longer trading, but a lot of their titles are still being produced by Blue Ribbon.

There are no doubt quite a few gamesters out there who would be grateful for this hint.

Over much recursion

CONGRATULATIONS, at last a magazine that prints useful programs. I found the Basic Analyser most useful, even though I only have part 1 so far.

Having been involved with computers since 1970 it is refreshing to see at least some of the potential of the computer exploited.

Before disability forced me to give up work in 1978 I was a professional programmer, and my only cavil about this program was the degree of recursion, in other words, PROCs or functions calling themselves.

In the context of this program it was a good solution, but I would not recommend its use as a normal practice.

The following is a little routine to change screen characters' colour in Mode 7. I use it on a function key, but it could easily be incorporated into a program and gives cyan characters on a black background at a cost of one character for each line.

```
*KEY0F.I%=0TO24:P.TAB(0,I%)
CHR$134;:N.:VDU28,1,24,39,0
!M
```

– **David Bone, Brighton.**

Fail safe

HAVING already found Geoff Turners' Disc Scanner very useful, my only reservation is that it is all too easy to mistakenly answer Y when asked if a file is to be deleted.

The following few lines spooled on to your listing add an element of caution without unduly slowing down the operation:

```
 120 IF G$="Y" THEN PROCsu
re
 1410 IF G$="N" THEN 1450
 1490 DEF PROCsure
 1500 PRINT TAB(4,23);SPC(3
4);
 1510 PRINT TAB(4,24);SPC(3
4);
 1520 PRINT TAB(4,23);"DELE
TE ";F$;" - SURE? (Y/N)";
 1530 PRINT TAB(4,24);"DELE
TE ";F$;" - SURE? (Y/N)";
 1540 REPEAT: G$=GET$: UNTI
L G$="Y" OR G$="N"
 1550 IF G$="N" THEN 1450
 1560 ENDPROC
```

– **Nigel Brown, Wolverhampton.**

Use your micro to speed up your mail . .

and next-day delivery is guaranteed!

Everyone knows that "first class" mail is far from perfect. The Consumers' Association reported in June that two out of every five first class letters fail to be delivered the day after they are posted.

So if you have an urgent letter that just HAS to be delivered tomorrow, what do you do?

If you have a home or business computer the answer is at your fingertips.

You compose the letter on your computer. Then, in a simple operation that takes only a few seconds, you send it down the telephone line to MicroLink, the electronic mail service operated in association with Telecom Gold.

That's the end of your part in the story. From now on electronics take over. Your letter is fed automatically into the national British Telecom Telemessage service. It's switched to the delivery office nearest the recipient's address, where it's printed out on a letter-quality printer and put into a distinctive yellow envelope. And providing it was sent any time up to 8pm, it is delivered by the local postman by breakfast time the next day. Exactly as you'd typed it out the day before.

And how much does this ultra-fast service cost? From just £1.25 to send a letter of up to 350 words to any address in the UK (and an extra £1.70 to any address in the USA). You can also have it accompanied by a colourful greetings card (choose from 16 different varieties) for another 65p.

Telemessages is just one of many services offered by MicroLink that are designed to speed up communications. Find out more by returning the coupon below.

Please send me more information about your speedy Telemessage service and other aspects of MicroLink.

Name_____

Address_____

MicroLink in association with TELECOM GOLD

Send to: MicroLink, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Now YOU can fly with the legendary Red Arrows – in the most challenging flight simulation ever!

It's the most exciting flight simulator ever written for a home computer – the product of many months of dedicated work by some of Britain's top programmers, enthusiastically aided by the talents of aircraft designers, engineers, mathematicians – and the Red Arrow pilots themselves.

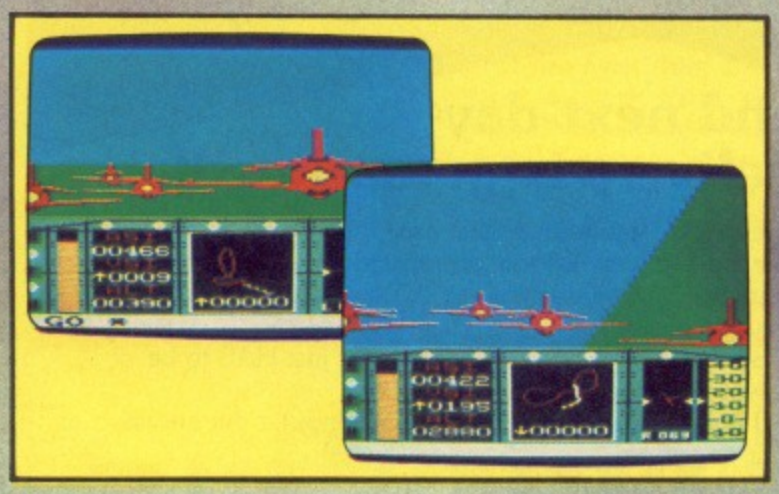
Every ounce of power contained in the micro, and its enhanced sound and graphics capabilities, is used to give the utmost realism to re-creating the most spectacular aeronautical displays ever seen in the skies of Britain.

You start by practising take offs and landings. Then, once you have won your wings, you fly in formation as part of the Red Arrows team. There's no margin for error as you fly a mere six to 10 feet from each other – at speeds of between 300 and 350 miles an hour!

But the real drama begins as you plunge into the death-defying manoeuvres that have been thrilling crowds at air shows for the last 21 years.

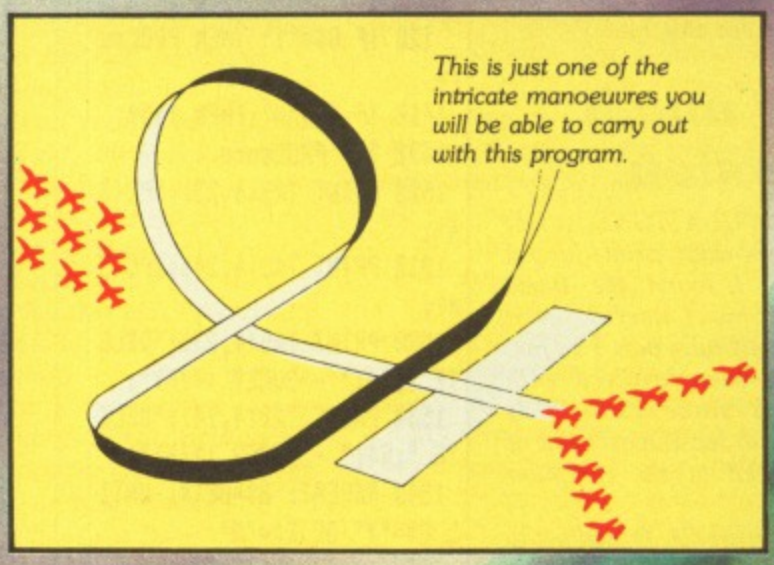
On the panel in front of you are all the instruments you need – plus a screen giving you an external view of the complete formation you are flying. Slip out of line for a second and the eagle-eyed Red Leader will be on the radio ordering you back into position.

The program comes with a detailed flight handbook that will soon give you the confidence to take YOUR place alongside the ace pilots of the Red Arrows, even if you've never flown before!



FREE RED ARROW CONTEST

Everyone buying the program can enter an exciting competition. Winners will be given a VIP visit to the Red Arrows base at RAF Scrampton, the wartime home of the Dambusters, including two nights' accommodation at a luxury hotel. While at Scampton you will be invited to sit at the controls of a Hawk.



ORDER FORM

BBC B, B+, 128

Tape	£8.95	2334
5¼" Disc 40 Track	£11.95	2335
5¼" Disc 80 Track	£11.95	2351
3" Disc	£12.95	2336

I wish to pay by:

☐ Access/Mastercard/Eurocard No.

☐ Barclaycard/Visa No.

☐ Cheque/PO made payable to Database Publications Ltd.

Expiry date: /

Name _____

Address _____

_____

Signed _____

Send to: Database Software, 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: **061-480 0171** *Don't forget to quote your credit card number and full address.*

Put yourself in the pilot's seat of the most manoeuvrable fighter in the RAF!

RED ARROWS

"Very challenging, entertaining and well researched program . . . Destined to be a sure fire hit"

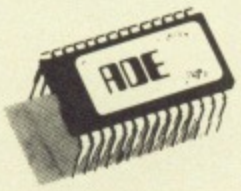
– Computer Trade Weekly

"One of the best flight simulators to be released for a long time"

– Home Computer Weekly

SYSTEM SOFTWARE

ROMs FOR THE BBC MICROCOMPUTER



The complete program development package for assembly language programmers. ADE is the de facto industry standard for professional software writers using the BBC microcomputer. The 16k ROM contains a full 6502 MACRO assembler; a dynamic text editor; a front panel debugging monitor and disassembler. ADE comes complete with a 160 page comprehensive reference manual and a utility/macro library disc.

The ASSEMBLER features macros with library facilities; nestable conditional assembly; flexible listing options (with or without macro expansion); hex, decimal, binary and ASCII data formats; dummy section; full range of arithmetic and logical operators; symbol table sort and dump; file chaining and 29 powerful pseudo ops. Source and object files are kept on disc so there is no limit on program size or location. Now significantly enhanced to include local label BLOCK command, and can output to any number of object files. Use with the 2nd processor for really fast assembly.

The EDITOR is designed with the programmer in mind for writing both programs and documentation. The editor includes a very powerful command language (including macros) that enables much editing to be done on a semi-automatic basis. It features full screen editing and deferred edit modes; no limit to document size; edit with backup facilities and a versatile text formatter.

Now includes 80 column mode when using the 2nd processor.

The DEBUGGER is instantly accessible for inspecting, modifying and disassembling machine code programs. Features include full 64 byte display in hex, ASCII and disassembled format; registers; stack; single step; breakpoints; memory search and much more.

Price £60 inc vat. Please specify 40 or 80T utility disc.

SPY2 is a front panel debugging monitor, disassembler and disc utility ROM. SPY2 is instantly accessible to the programmer for inspecting, modifying, debugging and disassembling machine code programs. SPY2 also features a relocator and program trace facilities. SPY2 will access any ROM either in the sideways ROM sockets or on an extension board. ROM memory may be displayed, single-stepped through or disassembled.

SPY2 includes a set of powerful disc recovery commands for interrogating, editing and retrieving data stored on a floppy disc. SPY2 also includes a disc formatter as well as a non-destructive single track reformatter.

In all SPY2 has a comprehensive set of 23 utility commands. These are supported by an excellent Reference Manual.

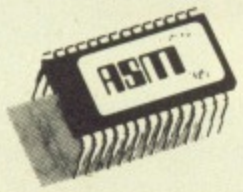
The SPY2 front panel encompasses all the superb, easy-to-use facilities of the renowned SPY debugging monitor PLUS additional commands for toggling and finding breakpoints; relocating machine code programs; single stepping through subroutines in one go and facilities for accessing the front panel from programs in RAM or ROM with breakpoints, OSBYTE or CTR-F.

SPY2 features a versatile disassembler with hex dump, full and intelligent disassembly. This identifies data areas in the program; these being displayed as a hex/ASCII dump. Operating system calls are labelled creating very readable code. The powerful trace facilities enable program instructions and register contents to be traced to printer whilst the program is running. Indispensable for graphics programs as they can be stepped through whilst observing the effects on the screen.

SPY2 features a disc sector editor displaying the contents of a whole sector; disc search facilities for finding byte patterns or strings and free disc space. Files may be recovered by creating a directory entry with all the data concerning the deleted file. Directory entries can be easily amended using the *AMEND command. The *FORMAT command formats discs with any number of tracks. A verify command checks discs. The *REFORMAT command is extremely useful for recovering information from a bad track, reformatting it and restoring the data.

SPY2 is fully compatible with the 2nd processor.

The most comprehensive of all debugging/disc utility ROMs. **Price £30 inc vat.**



ASM provides all the superb features of the ADE macro assembler on its own ROM.

The program source file may be written using any editor (even Wordwise or View!). Complete with reference manual and utility/macro library disc. Use the assembler that professional software writers use.

Price £35 inc vat. Please specify 40 or 80T utility disc.

SYSTEM Dept B 12 Collegiate Crescent, Sheffield S10 2BA

NEW

IF YOU HAVE AN APPLICATION FOR A TRULY RELATIONAL DATABASE LOOK NO FURTHER

SYSTEM DELTA

WRITTEN BY BARRY J. STEARN B.Sc.

FOR ONLY £54·95 — THE CARD INDEX APPLICATION
Access 5 unrelated files, 8000 cards, over 250 fields, fast search, default entries, mathematics, print formats etc.

The disc is supplied with the System Delta Utilities 16K ROM which may be used with the Advanced Guide to create your own applications from simple mailing lists to fully relational stock controls.

Further applications will be released shortly.

MINERVA

MINERVA SYSTEMS 69 SIDWELL STREET EXETER DEVON EX4 6PH TELEPHONE 0392 37756

Computer Aided Design

TO DESIGN A BOX

* Fits the BBC B
* Drawings produced on the
  - Epson printer
  - Parfitt plotter
  - Roland DG800 plotter
  - Penman plotter

1. Select the style of box.
2. Select the timber.
3. Input the overall sizes.
4. View an image of the box.
5. Turn the image around.
6. Print out a drawing that shows also the cost, and a cutting list.

Only £29.95
includes 40T disc, documentation, audio cassette

Teachers' Software **11 Park View, Aller Park, Newton Abbot, Devon TQ12 4NX**

Send s.a.e. for leaflet . . .

CAREY ELECTRONICS

computing and communications

For The BBC Microcomputer System — computers · peripherals · software

BEEBUGSOFT: (ROMs)		ACORNSOFT: (ROMs)		COMPUTER CONCEPTS:	
Dumpmaster II	31.00	View	59.00	Accelerator	64.40
Exmon II	32.00	Viewsheet	59.00	Caretaker	33.35
Help II	31.00	Viewstore	59.00	Communicator	69.00
Icon Master	34.00	CHALICE: (ROMs)		Disc Doctor	33.35
Murom	32.00	The Scythe	24.00	Graphics ROM	33.35
Romit	34.00	ROM Master	16.00	Inter-Chart	36.80
Sleuth	32.00	CLARES: (ROM)		Inter-Sheet	56.35
Spellcheck III	36.00	Brom	34.50	Speech	33.35
Toolkit Plus	39.00	GEMINI: (ROMs)		Termi II	33.35
Wordease	29.00	Data Gem	79.95	Wordwise	46.00
Prices include VAT.		L.B.O.	19.95	Wordwise Plus	56.35

Mail Orders To: (Please add 50p P&P)
7 Church Road, WALTON-ON-NAZE, Essex CO14 8DF.
Tel: Frinton-on-Sea (02556) 6993 (callers by appointment).

High Capacity Slimline Precision Mitsubishi Drives

2 YEAR GUARANTEE on 5¼" drives

●● AT AMAZINGLY LOW PRICES ●●

Single 400K 40/80Tk	£114
Single 400K 40/80Tk + PSU	£139
Dual 2 x 400K 40/80Tk	£215
Dual 2 x 400K 40/80Tk + PSU	£269
Dual 2 x 400K 40/80Tk + PSU encased in buff monitor stand	£299
Single 3.5" 400K 80Tk	£114
Single 3.5" 400K 80Tk + PSU	£139
Dual 3.5" 2 x 400K 80Tk	£199
Dual 3.5" 2 x 400K 80Tk + PSU	£219

All drives include cables, formatting disc, utilities and user guide

CREDIT CARD HOTLINE 0702 337161

To Clarke Coysten Computers 332 London Road, Southend, Essex
Please send me _____
Name _____
Address _____
I enclose cheque for £ _____
Credit Card no. _____
Sig. _____

S P I D E R

REAL-TIME CONTROL FOR THE BBC MICRO

Look out for the SPIDER

SPIDER – stamps out I/O bugs

£65.00 including VAT

A breakthrough in ease-of-use for all Control Applications

Here's what you get:

- ***Additional BASIC commands – which can be safely mixed with existing BASIC keywords.***
- ***Invoke BASIC PROCs from function keys or by external events.***
- ***Run up to 8 independent countdown timers.***
- ***The SPIDER is a powerful combination of RAM and ROM mounted on a butterfly board – it leaves the Beeb's memory intact.***
- ***It's easy to install with no soldering required – and a comprehensive manual is supplied.***

SEND NOW FOR OUR INFORMATIVE LEAFLET – YOU'LL BE SURPRISED AT HOW POWERFUL A SPIDER CAN BE!

Paul Fray Ltd
Willowcroft, Histon Road, Cambridge CB4 3JD
Telephone: (0223) 66529

VT100 & 4010 EMULATION

A Terminal Emulation ROM for the BBC Computer

* Over 100 Supported escape sequences
* Supports VAX EDT, FMS, Allinone etc.
* File transfer * Macro Facility
* Colour Graphics * Session Logging
* many other features

£70 + VAT. Special rates for Educational Establishments.
Quantity Discounts

Enquiries and orders to:-

LIVERPOOL UNIVERSITY
'Terminal Emulation ROM',
Computer Science Department,
PO Box 147, Liverpool L69 3BX
Tel: 051-709 6022 Ext. 2854

DISKETTES

5.25"	SS/DD 48TPI	DS/DD 48TPI	SS/QD 96TPI	DS/QD 96TPI
Storage Master	£14.00	£17.00	£19.00	£22.00
Nashua	£14.00	£17.50	£19.00	£22.00
Maxell	£18.00	£23.00	£24.00	£28.00
Maxell Twin Pack	£4.00	£4.60	—	—
3.5" Diskettes Storage Master	£26.00	£37.00	—	—
Maxell	£38.00	£52.00	£39.00	£52.00

MAXELL CF2 3" COMPACT DISKS

(Individually Packed)

5 Disks	£20.50
10 Disks	£39.00

74LS00	25p
74LS10	25p
7438	40p
74LS123	60p
74LS163	60p
74LS244	75p
74LS393	75p
4020	60p
4013	50p
LM324	45p

All Prices include VAT and P&P

EPROMS

BBC COMPATIBLE

2764-250ns	£2.50
27128-250ns	£3.50
4164	£1.00
6116LP-3	£2.50
6264LP-15	£4.00
65C02 CMOS CPU	£9.00
8271	£39.50

CMOS + TTL ICS also available

FLORA ELECTRONICS

14 Lever Street
Piccadilly
Manchester M1 1LN
Tel: 061-228 3553

MICROMAN Computers

ACORN SPECIALIST COMPUTER CENTRE

BBC COMPUTERS:	
BBC B Plus 64K	449.00
BBC B Plus 128K	479.00
BBC B Plus Upgrade 64-128K	39.95
ADFS Upgrade	30.00
1770 Upgrade	49.95
Acorn DFS Upgrade inc DNFS	99.00
ACORN PERIPHERALS:	
Teletext Receiver	149.00
Prestel Receiver	139.00
6502 2nd Processor	199.00
Z80 2nd Processor	399.00
IEEE Interface	325.00
Music 500	199.00
ECONET SYSTEM:	
Full Service Available	
HARD DISCS	
Acorn 10MB Hard Disc + Level 3	1699.00
Acorn 30MB Hard Disc + Level 3	2499.00
ELECTRON COMPUTER:	
Electron	75.00
Plus One Interface	59.95
Electron View	29.95
Electron Viewsheet	29.95
Electron Database	19.95
Electron Logo	59.80
EXPANSION BOARDS	
ATPL Sidewise ROM Board	43.70
Aries B32 RAM Expension Board	92.00
Aries B12 ROM Board	46.00
Aries B12c	5.75
Computer Village ROM Board	49.00
RAMROM 15	99.99
ROMX 13	40.25
SOLIDISK PRODUCTS:	
Solidisk 32K Sideways RAM	53.00
Solidisk 64K Sideways RAM	80.00
Solidisk 128K Sideways RAM	125.00
256K Solidisk	175.00
***Full upgrades available**	
Solidisc DDFS 2.0 Interface	45.00
Solidisk ADFS 2.1 Interface	55.00
Solidisk CPU Case + Keyboard	33.00
'Solidisk Printer Offer'	343.85
EPROM PROGRAMMERS-ERASERS-I/CS	
Eprom Programmer	20.95
Eprom Programmer + ZIF Socket	25.95
Eprom Eraser	20.95
Eprom Eraser with Timer	25.95
Eproms 2764 8K Mitsi/Hitachi	2.95
Eproms 27128 16K Hitachi/Fujit	3.95
RAM 6264LP-15 8K	4.95
Phone for Quantity prices - 5+	
MONITORS (INC. CABLE):	
Microvitec 1431 Standard	229.00
Microvitec 1451 Medium	299.00
Philips TV/Monitor/PAL CT2007	209.00
Philips Green 7502	89.00
Philips Amber 7522	94.00
MODEMS/BULLETIN BOARD S-WARE:	
Pace Nightingale + Commstar	159.85
Pace AutoDial/AutoAnswer Board	56.35
Pace Auto Dial Utilities Disc	11.50
Pace OBBS Bulletin B Software	25.00
BBC FIRMWARE:	
View ROM	59.80
View 3 ROM - NEW -	89.00
Viewsheet ROM	59.80
View Store ROM	59.80
Speech Synthesizer	55.00
BCPL ROM	59.80
ISO-Pascal ROM	69.00
LOGO ROM	69.00
COMAL ROM	49.85
Acorn Basic Editor ROM	29.90
Acorn Termulator ROM - NEW -	34.50
Graphics Ext. ROM - NEW -	29.90
Ultracalc 2 Spreadsheet ROM	79.50
Open Logo ROM	69.95
Logotron Logo ROM	69.00
Wordwise ROM	44.85
Wordwise Plus ROM	56.35
Graphics ROM	33.35
Disc Doctor ROM	33.35
Printmaster ROM (Epson/Star)	33.35
Communicator ROM	69.00
Termi II Emulator ROM	33.35
Gremlin Debug ROM	33.35
Inter-Sheet ROM - NEW -	56.35
Inter-Chart ROM - NEW -	44.85
Accelerator ROM - NEW -	64.40
The Speech ROM - NEW -	33.35
Caretaker Basic Utility ROM	33.35
Commstar EPROM	34.00
System ADE ROM	60.00
System SPY ROM	30.00
Merlin Scribe ROM	59.95
Merlin Database ROM	49.00
Merlin Data Scribe ROM	95.00
Gemini Datagem Database ROM	79.95
Beebug: Full range.	
Sleve Plus ROM - NEW -	39.95
Floppy-Wise Plus ROM - NEW -	29.95
Basic Extension ROM	19.95
Vine TD ROM 8271 Version	18.00
Vine Replay 1770 Version	35.00
Star Database	77.30
Jukit ROM	P.O.A.
Fontaid	30.00
DISC DRIVES (NO PSU):	
Pace PSD1 SS/40T/100K	99.00
Pace PSD1B (above in dual case)	121.90
Pace PSD3 DS/40T-80T/400K	114.95
Pace PSD3B (above in dual case)	134.55
Pace PDD3 DS/40T-80T/800K	209.95
Cumana CSX100 SS/40T/100K	99.00
Cumana CSX400 DS/40T-80T/400K	114.95
DISC DRIVES (INC PSU):	
Pace PSD3P DS/40T-80T/400K	135.95
Pace PSD3PB (above in dual case)	156.40
Pace PDD3P DS/40T-80T/800K	255.95
Cumana CS100 SS/40T/100K	129.95
Cumana CS400 DS/40T-80T/400K	135.95
Cumana CD800S DS/40T-80T/800K	255.95
OPUS PRODUCTS:	
Opus Challenger	249.95
RAM Disc Upgrade to 512K	49.95
Opus DDOS Interface	99.00
Opus 5401 40T/100K Disc Drive	85.00
DISC UTILITIES/ LANGUAGES:	
Full range Acorn, Clares, Beebug etc.	
DISCS/STORAGE BOXES:	
Mr Floppy 5.25" DS/DD/80T (10)	16.50
Wabash 5.25" DS/DD/80T (10)	16.50
70 Lockable Disc Storage Box	13.95
100 Lockable Disc Storage Box	15.95
CONTROL & GRAPHICS:	
Commotion EV1 Camera	129.80
AMX Mouse inc SUPER ART	89.95
AMX Desk	24.95
AMX Utilities	14.95
AMX Paintpot	14.95
AMX Super Art ROM	49.95
AMX Pagemaker	49.95
AMX 3D Xicon	24.95
AMX Database	24.95
AMX Zam	24.95
Marconi Trackerball RB2	59.80
RB21 (Colour Icon Software)	69.50
Robin Light Pen (Standard)	29.90
PRINTERS:	
Canon PW-1080A (Special offer) (inc cable, paper and 8K RAM)	289.00
Canon PW-1156A	459.00
Star SG10 NLQ	259.00
Shinwa CPA80 Parallel	199.00
Shinwa CPA80 Serial	239.00
Epson LX80 NLQ	258.75
Juki 6100 Daisywheel	379.00
Juki 2200 Typewriter/Printer	299.00
JOYSTICKS:	
Voltmace 14b Handset	14.95
Voltmace 3b Single	12.00
Voltmace 3b Dual	19.95
CAD SYSTEMS:	
Bitskik 1	375.00
Bitstik Multi-plotter Driver	79.00
Bitstik 2	914.25
Bitstik 2 Upgrade	517.50
PLOTTERS:	
Roland DXY-800 A3 Plotter	483.00
Roland DXY-880 A3 Plotter	943.00
Roland DXY-980 A3 Plotter	1380.00
Watanabe A3 Plotter (6 pen)	1026.52
Epson HI80 Plotter (4 pen)	458.85
Hitachi A3 Plotter (4 pen)	569.25
Linear Graphics Plotmate	343.85
Penman Plotter	228.85
Penman Micad Special Pack	249.00
Penman Utilities Special Pack	249.00
Benson A3-A0 Plotters	P.O.A.

ACORN APPROVED SERVICE CENTRE

SHOP OPEN 9-6 Mon-Sat.

We stock a large range of books, educational and games software

EDUCATIONAL & INDUSTRIAL ENQUIRIES WELCOME

MAIL ORDER SALES
Next Day Delivery – £8.00
Small Items 1st Class Post – £1.00
Prices include VAT

RAINFORD INDUSTRIAL ESTATE, MILL LANE, RAINFORD, ST. HELENS, MERSEYSIDE
PHONE 074488 5242

ATTENTION
ALL BBC MICRO USERS!

AT LAST! A NO-SNAGS DISC-BASED WORD PROCESSOR AT AN AFFORDABLE PRICE

WASP is ready to run
No ROM chip required – it all lives on disc.
No special printer driver needed – use any printer.
Black-on-white text for ANY monitor or TV.
Runs on any BBC micro (except 16K) with DFS.
All commands visible on screen.
Complete with easy-to-use manual and tutor.
Designed for the first time user as well as the pro.

WASP is professional
All the features you need including:
80 column display; any length of document up to disc capacity; text search; block insertions; file merging; page control; page numbering; broken paragraph control; right justification; underline; bold emphasis; etc.

ATTENTION ALL TEACHERS!

WASP is ideal for schools
Transfers from machine to machine.
Inexpensive duplication licence.
Special version available for use on an Econet.
For MATHEMATICS and FOREIGN LANGUAGES insert your own fonts of up to thirty special characters.

TRIED AND TESTED
WASP is used by research students at the Cambridge University Department of Engineering.

WASP – WORD AND SYMBOL PROCESSOR – £19.95
including postage & packing

Orders and enquiries to: (please state whether 40 or 80 track disc required)

ABBEY SOFTWARE
73 Common Road, Weston Colville, CAMBRIDGE CB1 5NS

The 1st choice

EXPRESS BBC REPAIRS!

BBC repairs between £14 and £45.

WHY PAY HIGH 'FIXED' PRICES

(We do not charge you for our fancy premises by charging high 'fixed' prices!)

Reputations take time to build, we have been repairing ZX 81's, Spectrums, QL's, Apples and BBC's professionally, for 2½ years – who is coming second?

1st in all U.K. with While-u-Wait repairs! with INTERNATIONAL repair service!

1st FOR PROFESSIONALISM – "Of all the repair companies 'Sinclair User' spoke to, **MANCOMP** seemed the MOST PROFESSIONAL when it came to advice and a helpful attitude" AUG 85.

1st FOR HONESTY – We let you watch your computer being repaired and if there is nothing wrong with it, we will tell you!!!

1st FOR REPUTATION & HELPFULNESS – "I have come across a firm that will be more than willing to advise you as to how to remedy your problems. They are called **MANCOMP** and as well as repairing faulty computers, are also quite willing to discuss your problems with you and offer reasonably cheap and more importantly CORRECT CURES" Phil Rogers POPULAR COMPUTING WEEKLY JAN 85.

Every parcel sent by Royal Mail Receipted Post and insured for return journey!
(For next day delivery include £1.50 extra).
(Securicor by prior arrangement).
On-site maintenance for Apples, I.B.M.'s and most makes of printers also available.
Guaranteed 4hr response!

WHY DELAY – OUR ESTIMATES ARE FREE AND WITHOUT OBLIGATION. IF YOU DO NOT LIKE OUR ESTIMATE WE WILL RETURN THE COMPUTER **AND** REFUND THE POSTAGE INCURRED!

MANCOMP LTD
(Dept. MU1)
Printworks Lane, Levenshulme, Manchester M19 3JP
Phone 061-224 1888.
OR 061-224 9888.
OPEN MON - SAT 9am to 7pm

EXTRA-SPECIAL DISCOUNTS FOR EDUC INST., H.M. FORCES, CHARITIES, HOSPITALS, ETC!

Hardware and software design probems? Contact us for the complete service, from design through to manufacture.

What we do today . . . others do tomorrow!

NOTE OUR PRICES AND WATCH OTHERS FOLLOW THE LEADER

IDS

Star Value

5¼" disks 79p

Prices per box of 10 (excl VAT)	1-4	5-9	10-24	25-49
SS/DD 48 tpi	7.90	7.40	7.20	7.05
DS/DD 48 tpi	9.90	9.20	8.90	8.60
DS/QD 96 tpi	13.90	13.10	12.80	12.60

Add £7.95 for Economy 50 Storage Case

* Unbranded, full specification disks
* Well known manufacturers
* Hub rings
* Envelopes, labels, w/p tabs
* Full no-quibble guarantee

3½" disks SS £2.20 DS £2.99

Prices per box of 10 (excl VAT)	1-4	5-9	10-24	25-49
Single sided 135 tpi	22.90	21.50	20.80	19.90
Double sided 135 tpi	29.90	27.90	26.80	25.80

Add £1.99 per box if See10 Library Case is required

* Recommended for BBC, IBM, Commodore, Apple etc
* Double Density, suitable for single density use

Free Delivery

Storage

3½"	See10 Library case	2.30
	Econ 30 Stg case	5.95
	60dsk Stg Case, lock	15.95
5¼"	See10 Library case	2.30
	Exec. 50 Stge case, lock	15.95
	Exec. 100 Stge case, lock	21.95

3" disks £2.99

Prices per box of 10 (excl VAT)	1-4	5-9	10-24	25-49
CF2	29.90	28.90	27.90	26.90

Single disks **£3.50** each 5 off **£3.20** each

1. All prices include 2nd Class delivery (U.K. mainland) but exclude VAT. For urgent deliveries please telephone for delivery charges. overseas add £5 per 100 disks or part thereof for air freight.
2. Telephone orders can be accepted from Government bodies, schools, etc, or with a VISA card.
3. Send cheque made payable to "IDS Computer Supplies", with order to the address below. Don't forget the V.A.T.

BARCLAYCARD VISA

IDS Computer Supplies

Dept S0 15 Darin Court Crownhill Milton Keynes MK8 0AD Telephone (0908) 569655

BEEB BODY BUILDING PACKS ORDER FORM

Pack 16 component list:

- 1 length of 34 way ribbon cable
- 1 34 way IDC socket

Pack 30 component list:

- 1 SL6270C VOGAD
- 2 MF6-50 filters
- 1 ZN449E A/D converter
- 1 ZN558E-8 D/A converter
- 1 74LS02
- 2 74LS42
- 19 resistors
- 12 capacitors
- 1 printed circuit board
- 1 Aux power supply connector and cable
- 7 IC sockets
- 1 BC183 transistor
- 34 wad IDC socket

Please send me:

	Pack 16	**£5.25**	☐ ____
	Pack 30	**£38.00**	☐ ____
Assembled	**Pack 30**	**£42.00**	☐ ____
		TOTAL	____

All prices include postage and VAT.
Overseas orders add £3.00 if you want airmail delivery.

Please make cheques payable to Musbury Consultants and send to Musbury Consultants, 8 Fairhill, Helmshore, Rossendale, Lancs BB4 4JX.

Name _____

Address _____

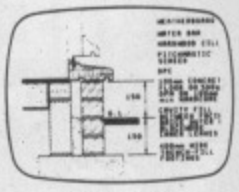
_____

THE AMAZING GRAFPAD II

AVAILABLE FOR IMMEDIATE DESPATCH FROM Viglen

THE ULTIMATE IN GRAPHIC INPUT DEVICES FOR THE BBC MICRO.

Using Grafpad for tracing



Architectural design with DDX Software

Free-hand drawing Icon Software

GRAFPAD II: ● A brilliant British invention manufactured in Gt. Britain, unequalled in the world of graphics input.

SPECIFICATION
Resolution:
1280 x 1024 pixels
Repeatability:
1 pixel
Output rate:
2000 co-ordinate pairs per sec.
Interface:
parallel
Origin:
LH corner or selectable
Dimensions:
350 x 260 x 12 mms.

IT COMBINES IN ONE DEVICE ALL THE FACILITIES OF PREVIOUS ATTEMPTS AT INPUT DEVICES. THE APPLICATIONS ARE AS NUMEROUS AS THAT OTHER COMMONLY HELD DEVICE—A PEN!—AND INCLUDE: ● Option Selection ● Form Input ● Data Collection ● Logic Design ● Circuit Design ● Picture creation ● Picture storage ● Picture retrieval ● Construction design ● C.A.D. ● Text Illustration ● Games ● Pattern Design ● Education ● PCB Design

● A4 SIZE DRAWING AREA ● HIGH RESOLUTION COLOUR ● HOME AND BUSINESS USE ● VARIETY OF OPTIONAL PROGRAMMES ● FREE HAND DRAWING ● CIRCUIT DIAGRAMS ● C.A.D. ● PCB LAYOUTS ● EASY TO USE

FREE ICON DRAWING SOFTWARE WITH EACH GRAFPAD II ON DISC

£59.50 inc. VAT

EDUCATION & DEALER ENQUIRIES WELCOMED

Post to: Viglen Computer Supplies, Unit 7, Trumpers Way, Hanwell W7 2QA. Phone: 01-843 9903.

Please Send me (specify items) _____ I enclose Cheque/P.O. for £_____ Add £2 p&p or £8 for courier insured delivery.

Cheques payable to Viglen Computer Supplies or debit my ACCESS/BARCLAYCARD No. _____

NAME:_____ ADDRESS _____

_____

You can pay by credit card or telephone your order.

Signature _____

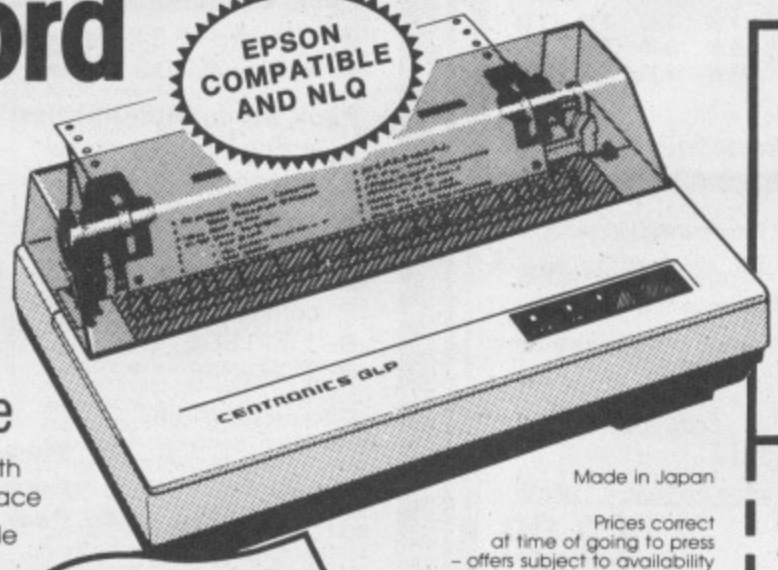
The Great Little 80 column Printer from Viglen at a price everyone can afford

ONLY

£149

(INCLUDING VAT)

with interface cable



- All printers come standard with both serial and parallel interface
- 12cps near letter quality mode
- Normal 50cps draft printing
- Tractor and friction feed as standard
- Uses normal A4 sheet paper or continuous stationery
- Original plus 2 copies
- Bidirectional logic seeking
- 48 International characters
- Subscripts, superscripts and underlining.
- Also available for IBM.

Made in Japan

Prices correct at time of going to press – offers subject to availability

Post to:
Viglen Computer Supplies
Unit 7, Trumpers Way
Hanwell, W7 2QA
Tel: 01-843 9903

Showroom/factory open
Monday – Friday 9.30–5.30
Saturday 9.30 – 4.00

THE BEST PARTNERS FOR YOUR COMPUTERS

How to order by post – 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 the address shown left. Allow seven days for delivery, add £8.00 carriage, packing and ins. 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 items required.

Credit cards valid if signed by card holder. Address on coupon must be same as card holder.

Please send me (state quantity)
_____ GLP printer(s)
I enclose Cheque/P.O. for £ .....
add £8.00 carriage

State whether BBC, QL or IBM .....

Name .....

Address .....

.....

.....

I prefer to pay by ACCESS/BARCLAYCARD
(delete whichever is not applicable)

Card No .....

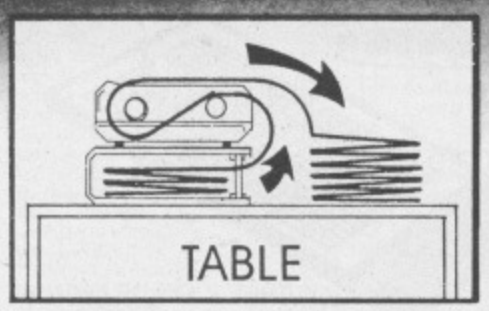
Signature .....

TYPE-BBC

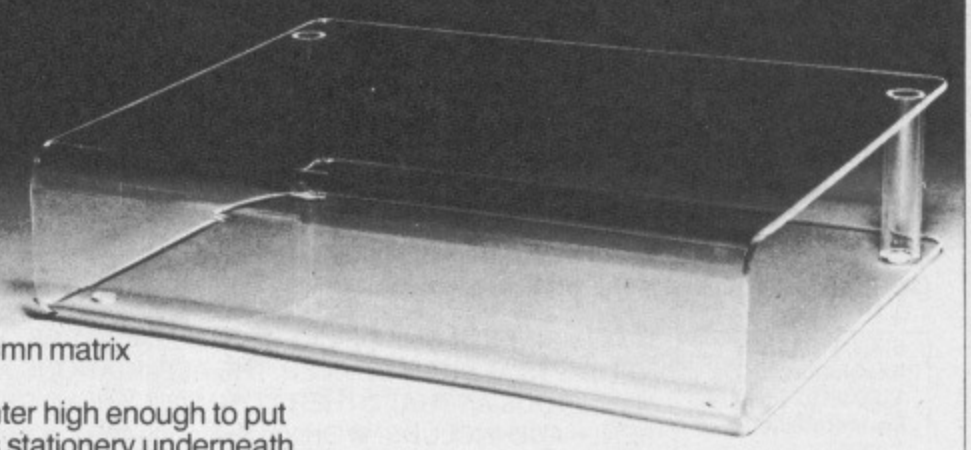
NEW! A PRINTER STAND

from

Viglen COMPUTER SUPPLIES



Printer Stand
£16.95 INC. VAT
Carriage & Packing £3.00



- For 80 column matrix printers
- Raises printer high enough to put continuous stationery underneath
- Beautifully finished in clear perspex • Viglen quality every time
- Will accept paper up to 12½" wide • Non slip rubber pads

Dimensions: 15" (380mm) wide (320mm) deep 4" (90mm) high
Also available 136 column stand @ £27 inc. VAT.

COME TO VIGLEN FOR A FAST, FRIENDLY, PERSONAL SERVICE

DEALER ENQUIRIES WELCOME

Prices subject to change without notice

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

MU1

Please send me _____ (qty) PRINTER STANDS at £19.95 each. enclose Cheque/P.O. for £ _____ made out to VIGLEN COMPUTER SUPPLIES or debit my ACCESS/BARCLAYCARD No. _____

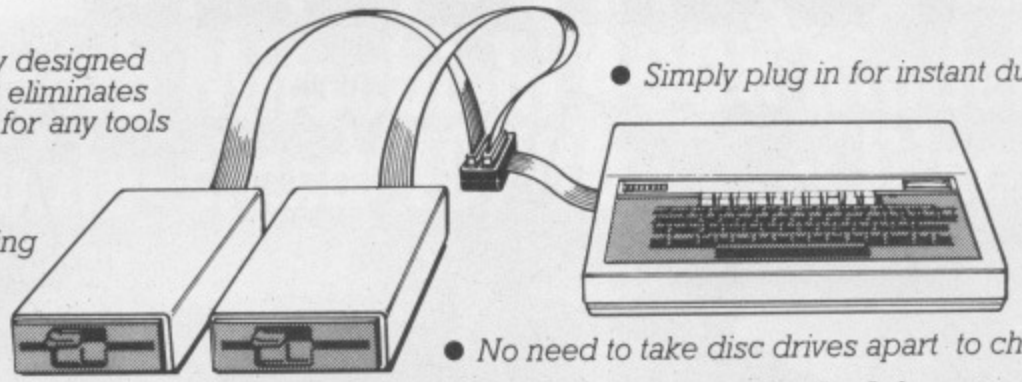
Name _____ Signature _____

Address _____

DUAL DRIVES FOR LESS THAN £17?

Convert your single disc drives into duals for only £16.95 inc. VAT

- *Specially designed circuitry eliminates the need for any tools*
- *Simply plug in for instant dualling*
- *No soldering*
- *No mess*
- *No need to take disc drives apart to change links*



The Viglen DUCK (Dualling Up Connector Kit) can convert single drives to duals, instantly!

Just plug the **Viglen Duck** into the BBC micro and any two single disc drives to create a dual disc drive. Drives will be configured Drive 0 and Drive 1 automatically.

- *Fast Back-Up*
- *Fast Copying of Files*

The **Viglen Duck** will dual-up any make or type of single disc drives *with PSU* (power supply unit). If you have disc drives *without* built-in PSU, then you will require a dual power connector for the BBC micro – available from Viglen for only **£8.00** inc VAT.

- Postage and packing **£2.50** inc. VAT.
- *Official Orders from Government and Educational Establishment welcomed.*

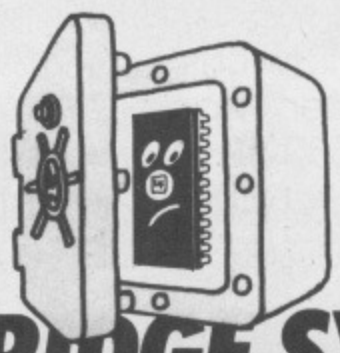
Viglen

Orders to: Viglen Computer Supplies
Unit 7, Trumpers Way, Hanwell W7

Credit Card holders may order by telephone: **01-843 9903**

All prices correct at time of going to press

YOUR ROMS WOULD BE HAPPIER IN A VIGLEN ROM CARTRIDGE SYSTEM



Tel: 01-843 9903
ACCESS/BARCLAYCARD
Credit Card holders can purchase by telephone. Please give Card No., Name, Address, and items required.

The safest way to look after your growing collection of ROMs is to store them in Viglen's specially designed cartridge systems, this not only keeps them happy, but also removes the risk of damage to your BBC micro.

There are two systems – the 'Standard' and the 'Low Profile'. Viglen is the leading producer of both.

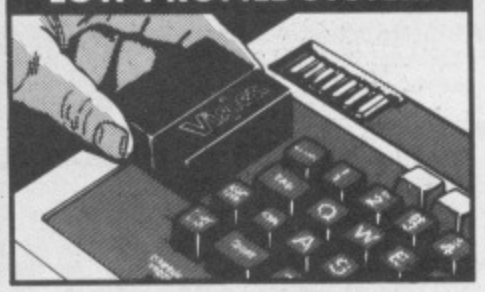
ADVANTAGES OF VIGLEN ROM CARTRIDGE SYSTEM

● All cartridges are gold-plated for durability and reliability, unlike others which are only silver plated. ● No need to switch machine off between cartridge changes. ● Insert and remove 'Wordwise' 'View' 'Disc Doctor', etc., at will, from your micro in absolute safety. ● Low, low power consumption unlike other systems. ● Save on memory.

THE STANDARD SYSTEM

The Standard System used extensively in education is preferred, due to its robust construction and ease of use.

LOW PROFILE SYSTEM



With the sideways entry on the low profile system access to the escape and tab keys are slightly restricted. However Viglen betters its rivals in this respect by being 3mm lower.

Personal Callers
Mon – Fri 9.30-5.30pm Sat 9.30-4pm

Post to: VIGLEN Unit 7 Trumpers Way Hanwell W7 2QA

Please send me (state type and quantity) _____ Kit(s) _____ Cartridges

I enclose Cheque/P.O. for £_____ Please add £2.50 for postage and packing (50p only for single cartridge)

I prefer to pay by ACCESS/BARCLAYCARD * (Delete whichever is not applicable).

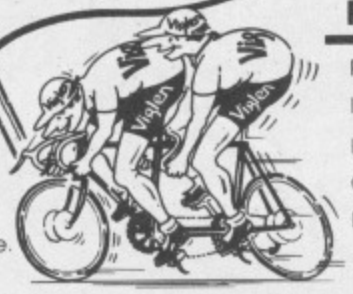
Card No. _____ Signature _____

Name _____ Address _____

MU1

Credit Cards valid if signed by Cardholder. Address must be the same as card holder's.

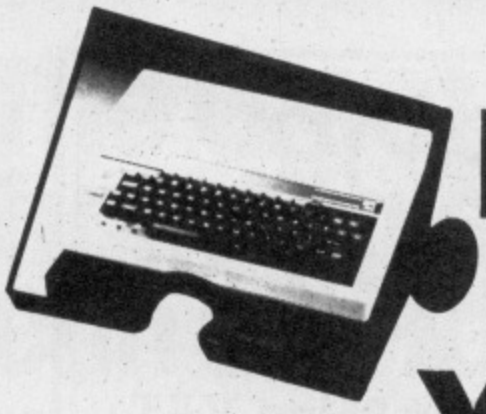
Viglen

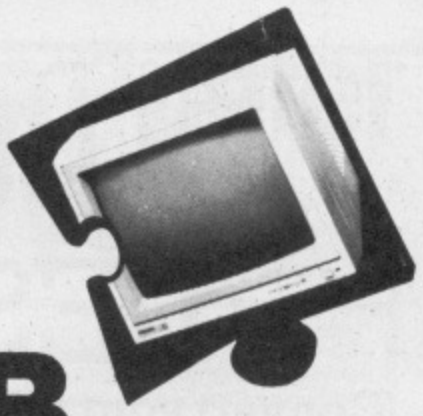


PRICE FOR COMPLETE KIT, including 1 cartridge, 1 Cable Assembly, 1 Blanking Off Plate (used if system is removed), 1 Socket Cover (used when no cartridges are resident), 1 Cartridge Storage Rack. **£15.95**

Extra Cartridges: £2.95 each, four for £11.00, ten for £26.50. Kit comes with 1 ROM Cartridge. All prices inc. VAT.

PC-LOOK FOR YOUR BEEB





with the **Viglen** PROFESSIONAL CONSOLE UNIT

Give your BBC Micro System the professional PC-look by replacing your existing lid with this smartly styled package. House your computer, monitor, disk drives & ROM cartridge system neatly in this strongly constructed, high impact ABS unit, colour matched to the BBC micro, and give yourself an outfit to impress all who see it.

This unit will support heavyweight monitors including 14" television sets.

Capable of accepting most internal expansion boards such as Solidisk, ATPL Sidewise, Midwich 16, RAMAMP 16+32k Exprom, Computer Village CVX16, HCR Sideways, 6502 2nd processor boards. Fully ventilated. Full fitting instructions.

DEALER ENQUIRIES WELCOME

Package includes:

- Keyboard case
- Screened main unit casing including internal fittings
- 2 metre coiled cable to connect main unit to keyboard
- Blanking plate included to blank out disc drive aperture

£49
(INCLUDING VAT AND COILED LEAD)

Optional Extras: (PRICES INC. VAT)

1. 2 metre coiled cable on its own **£15**
2. Dual-drive data cable **£9**
3. Dual-drive power cable **£5**
4. Special 'cool-running' internal switch mode power supply kit capable of running two half-height drives **£35**
5. Fan kit, only necessary in extreme cases **£35**
6. Fitting available from **£15**

Free parking available

Prices correct at time of going to press – offers subject to availability.

Viglen

How to order:

By post –
Simply fill in the coupon. Enclose your Cheque/P.O. or use your Access/Barclaycard. Please make cheques payable to VIGLEN COMPUTER SUPPLIES and post to the address stated. Allow seven days for delivery. Add £8.00 carriage, packing and insurance.

Or telephone: 01-843 9903
Credit card holders (Access/Barclaycard only) can purchase by telephone. Please give Card No., name, address and items required.

Viglen are also major suppliers to educational and government establishments and welcome further enquiries and orders.

Unit 7, Trumpers Way
Hanwell W7 2QA
Tel: 01-843 9903
Personal callers
Monday – Friday
9.30 – 5.30pm
Saturday
9.30-4pm

Post to: VIGLEN COMPUTER SUPPLES, UNIT 7, TRUMPERS WAY, HANWELL W7 2QA. Telephone: 01-843 9903.

Please send me ___ (Qty) VIGLEN PC Unit(s). Plus Optional Extra(s) ___ State ref numbers

I enclose Cheque/P.O. for £ ___ Please add **£6** for postage, packing and insurance.

I prefer to pay be ACCESS/BARCLAYCARD* Delete whichever in not applicable.

Card No. ___

Signature ___

Name ___

Address ___

Credit Cards valid if signed by Cardholder. Address below must be the same as card holder's.

MU1

A VERY SPECIAL OFFER from Viglen

The Superb Mitsubishi 400K Model M4853 Double-sided 40/80 Track Disc Drive

LATEST

At Viglen's rock bottom prices, everyone can afford to replace inefficient cassette tape units and obtain all the advantages of changing up to discs.

12 MONTH WARRANTY (EXTENDED 2 YEAR WARRANTY AVAILABLE)

£99
(400K 40/80 TRACK)
INC. VAT

Latest Acorn 1.2 DFS (DNFS) Call at factory for free fitting. **£49**
(with disc drive only)

Single Drives 40/80 400K	
Single Drive	£99.00
Drive + Acorn DFS	£148.00
Integral PSU for Single Drive	£22.00

Dual Drives 40/80 800K	
Dual Drives	£198.00
Dual drive + Acorn DFS	£247.00
Integral PSU for Dual Drive	£28.00

All offers include

Utilities Disk includes formatting, verifying, BASIC program comparator, disassembler, Epson screen dump, dual catalogue (giving 62 files), large printing and many others.

Comprehensive Manual
a fact-filled, 56 page document, includes techniques of loading from cassette to disk. Not available elsewhere

Carriage. Add £12 in each case. Usually despatched next day. Price covers courier-delivery and insurance. Prices include VAT.
Prices correct at time of going to press – Offer subject to availability.

Sales Hotline 01-843 9903
Please call for latest prices, product details and to place credit card orders. Government & Educational Establishments enquiries welcome on this number.

After Sales Line 01-571 6313
For dispatch enquiries, invoice queries, service and all other enquiries.

Call in at our Showroom
Weekdays: 9.30-5.30
Saturdays: 9.30-4

Post to: Viglen Computer Supplies, Unit 7, Trumpers Way, Hanwell W7 2QA.

Please send me (specify all items) _____ Add £12 carriage

I enclose Cheque/P.O. for £ _____
Cheques payable to Viglen Computer Supplies.

Name _____

Address _____

I prefer to pay by ACCESS/BARCLAY CARD
(Delete whichever is not applicable)

Card No. _____

Signature _____

Credit Cards valid only if signed by card holder. Address must be the same as card holder.

MU1

the best partners for your computer

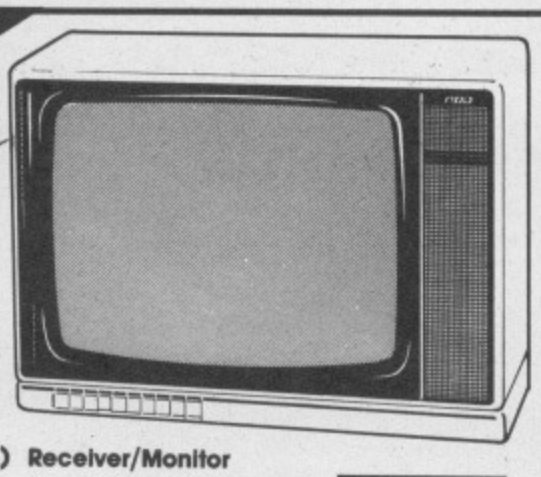
All the peripherals for your BBC Model B

the best service – the best value

Monitors

NEW

PHILIPS Colour TV/ Monitor Model 1114



14" Tube (V34cm) Receiver/Monitor

● Light and compact finished in white with dark picture surround. ● In-line 14" picture tube provides a sparkling picture in seconds. ● Designed to give exceptional reliability and performance. ● 10 pre-select channel buttons. ● ● Headphone/tape recorder socket with separate loudspeaker mute switch. ● ● Loop aerial and main aerial connection ● RF, CVBS and RGB inputs.

Price **£199** inc. VAT

PHILIPS Model BM7502 Green Screen Mono

ONLY £85 INC. VAT

From the highly successful 'Philips 80 Range', here is a monitor specially designed to display graphics and alphanumeric data with perfect clarity.

● 12" high resolution, 20MHz band width, anti-glare screen. ● Composite Video (CVBS) and Audio Input. ● 2000 character (80 x 25) display. ● Amber screen – £5 extra. ● Ideal low price for your BBC B.

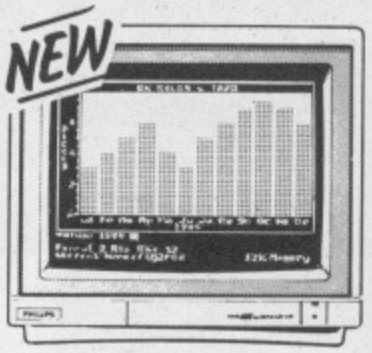
PLEASE ENQUIRE ABOUT OUR EXTENSION KEYBOARDS, KEY PADS & EPROM PROGRAMMER

PHILIPS NEW Colour Monitors Model CM8501

● Std resolution. ● Grey glass screen. ● RGB – linear/TTL – inputs (SCART/8 Pin DIN). ● Audio input. ● Bandwidth 8 MHz. ● Adjustable foot.

Price **£209** INC. VAT

NEW



Model CM8533

● Med. resolution. ● Dark glass etched screen. ● ● Composite video input (phono). ● RGB – linear input (SCART). ● RGB/RGBI – TTL input (8 Pin DIN). ● Audio input. ● Green (Mono) switch. ● Bandwidth 12 MHz. ● Adjustable foot.

Price **£289** INC. VAT

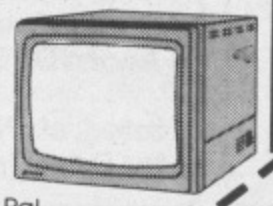
Microvitec Monitors

Standard £199

Med £259

High £395

Med & Pal £295



Printers

Dot Matrix

Taxan Kaga KP810	£269
Canon PW1080A	£279
GLP inc Tractor Feed ..	£149

Daisy Wheel

Juki 6100	£329
Quen Data	£229
Epson DX100	£359

Please add £8 for 1½ metre length printer lead for the BBC micro.

BBC Model B+ £419

Visit our showroom:
Open
9.30 – 5.30
Mon to Sat.
9.30-4.00
Saturdays

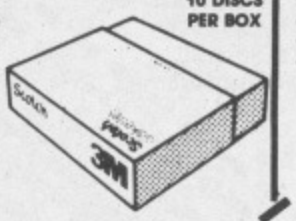
Sales Hotline 01-843 9903

Please call for latest prices, product details and to place credit card orders. Government and Educational Establishments enquiries welcome.

Discs

3M Scotch Discs

5¼" single-sided diskettes



	1-2 boxes	3-9 boxes	10+ boxes
SS 40 TRACK	£14.00	£12.50	£12.00
DS 40 TRACK	£18.00	£16.00	£15.50
SS 80 TRACK	£20.00	£18.00	£17.50
DS 80 TRACK	£24.00	£21.50	£20.00

Prices include VAT

Please add £2 carriage

Prices correct at time of going to press. Offers subject to availability.

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL W7 2QA. Telephone: 01-843 9903.

Please send me _____ Please add £8 carriage per item (except discs) I enclose Cheque/P.O. for £_____

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

Card No _____

Signature _____

Name _____

Address _____

MU1

THE MICRO USER MAIL ORDER OFFERS

Join the Teletext revolution!

– for only £139.95

inc. VAT P&P
RRP £145

TELETEXT There's a great wealth of information and many fascinating features available on the Teletext pages of BBC-TV and ITV – and the Volex 2000B Teletext Adapter is just what you need to make the most of it all.

Latest news, up to the minute sports coverage, travel, weather, television and radio schedules – they're there in colourful detail. The adapter features:

- All the standard teletext options such as Hold Page and Reveal/Conceal.
- Full four channel coverage.
- Powerful ROM-based software.
- Information packed, easy-to-follow manual.

PLUS *You'll find a host of features you wouldn't find in even the most advanced Teletext set. The 2000B Adapter takes full advantage of the BBC Micro's power to allow you to:*

- *Download free telesoftware.*
- *Save and Load any Teletext page.*
- *Print dumps of screen text.*
- *Incorporate Teletext features in your own programs via Applications mode.*

Simple to use, this brilliant combination of Teletext and microcomputer technology provides one of the most comprehensive and up-to-date information systems available today.

Get yourself a Volex Teletext Adapter – your BBC Micro deserves it. After all, it's what Mode 7 was made for . . .

Use the special order form on Page 9 – No stamp needed!

THE MICRO USER MAIL ORDER OFFERS

MUSICALLY INCLINED?

Then either Beebugsoft's Murom or Island Logic's The Music System – our dynamic and harmonic duo – are exactly what you need.

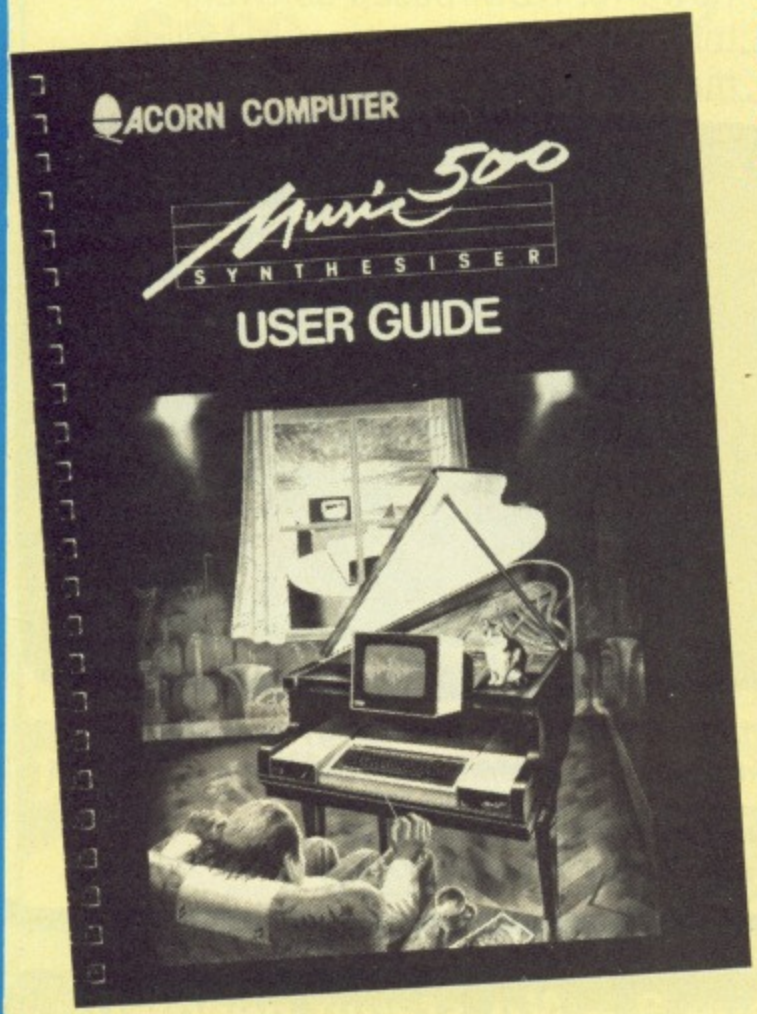
We've managed to come up with unbeatable, value-for money offers on two of the best and, deservedly, most popular music editors for the BBC Micro. Totally different in their approach, both provide user-friendly ways to exploit the full potential of the SOUND and ENVELOPE commands, taking out the maths and putting in the music.

And with our special offer prices, these two superb packages have never been better value. So whichever one you choose, you're certain to be starting off on the right note!

Murom is ideal if you've never learned standard music notation. Instead of dots and sticks, there's single key entry of letters and numbers for most parameters. Your tune appears in a window on a sheet of note letter names, one column for each of the four channels.

The visual note alignment this allows makes synchronising the channels simplicity itself. Edit your compositions step by step, and vary the tempo during playback.

£29.95
inc. VAT P&P



Unleash the musical potential of your micro!

Create concertos . . . synthesise symphonies with the **Acorn Music 500** – the hardware/software combination that will make the BBC Micro a powerful musical tool.

This Midi-compatible synthesiser gives you:

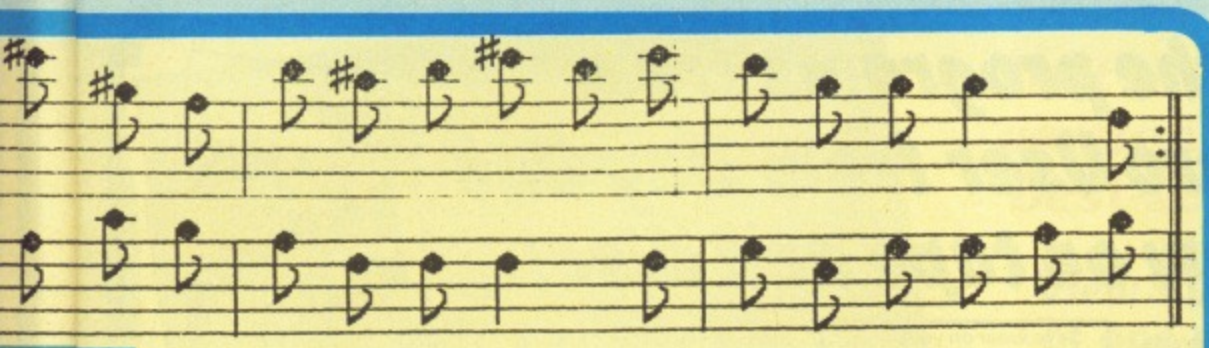
- *16 independent channels, catering for up to eight voices – in effect, the equivalent of an eight-track mixing desk and sequencer.*
- *User-definable waveforms, programmable envelopes, visual synchronisation of channels and pseudo-random noise.*
- *Full stereo output giving a wide range of high quality timbres, tones, and pitch slides.*
- *Ample – the complete music programming language.*

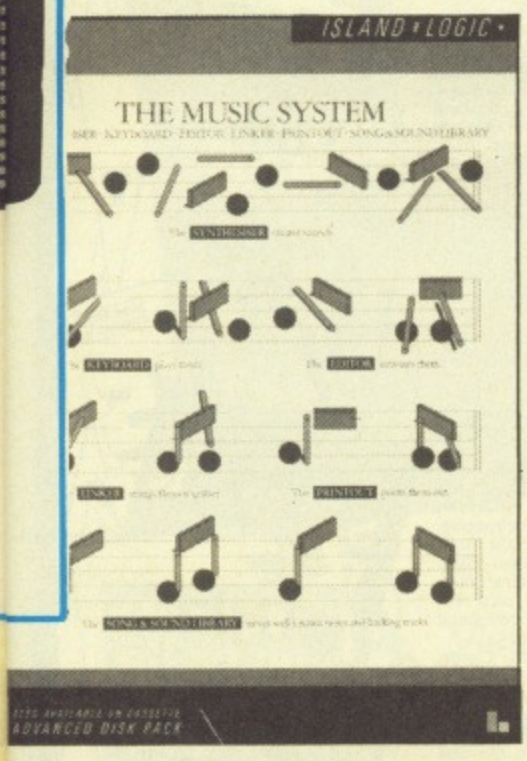
No mere toy, the Music 500 has the power and scope to satisfy the demands of professional and discerning amateur musicians alike. One of the most sophisticated musical add-ons for the microcomputer, with Music 500 you can give full rein to your musical imagination!

And it's never been cheaper . . .

£84.95
inc. VAT P&P
RRP £199

THE MICRO USER MAIL ORDER OFFERS





If you're used to musical notation, or simply typing in from manuscript, **The Music System** is the one for you. Its superb screen presentation – the note sequencer taking the form of a four-track tape recorder – makes it a joy to use. And the ability it gives you to interactively edit the matched pitch and amplitude graphs takes all the difficulty out of the ENVELOPE command.

2 cassette pack **£25.45**
Disc **£25.45**
inc. VAT P&P

Give your Acorn Speech Processor the company it's been longing for – the amazing **SpeechRom** from Computer Concepts.

This power-packed ROM will allow you to fully exploit the tremendous potential of the Acorn speech processor chip. It allows you to:

- Create any word or part word.
- Emphasise syllables and words to give realistic intonation.
- Add pitch to sounds.
- Use it from both Basic and machine code.

In fact once you've fitted it, SpeechRom will shout and sing its own praises.

And if you haven't got a speech processor yet, you've still got chance to take advantage of our low cost offer on the official Acorn speech processor upgrade. This features:

- 164 words and word parts from which you can construct your own new sounds with ease. (No such limitations with SpeechRom fitted.)
- Simple to use from Basic using the SOUND command.
- Two chips – quick and easy to install.
- Suitable for all BBC Micros, with version 4 boards or later.
- A decent British accent.

SpeechRom £29.35 **Speech Processor £29.95**

Buy both for £55.45 (save an extra £3.85)

Upgrade to Basic II for a very special price!

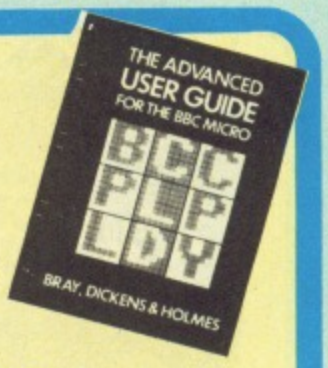
Big saving! – only £23.50

This is what you get with Basic II:

- More accurate calculations.
- An extra file handling command, OPENUP.
- The invaluable OSCLI command, allowing you, for example, to *LOAD files with a variable as the file parameter.
- EVAL will work with PAGE, HIMEM and other pseudo-variables.
- The INSTRing bug has been corrected.
- More efficient handling of string memory.
- EQUB, EQUD and EQUW – invaluable in assembler.
- O% combined with extra values of OPT to enable offset assembly.

Don't miss this exceptional offer

The Advanced User Guide *is the essential companion for the BBC Micro . . . with 512 information-packed pages*



Featured 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. **£11.50**

Use the special order form on Page 9 – No stamp needed!

THE MICRO USER MAIL ORDER OFFERS

ALL the programs from The Micro User from Day One are now on tape and disc!

MARCH 1983: Deathwatch, Bingo and other programs from Vol. 1, No. 1.
APRIL: King Kong, Nim, and other programs from Vol. 1, No. 2.
MAY: Air Strike, Pelmanism, Anagrams, and other programs from Vol. 1, No. 3.
JUNE: Space Pilot, Nomism, and other programs from Vol. 1, No. 4.
JULY: Tenpin, Spacepods, and other programs from Vol. 1 No. 5.
AUGUST: Fruities, Animation, and other programs from Vol. 1 No. 6.
SEPTEMBER: Robin & Marian, Galactic Invaders and other programs from Vol. 1 No. 6.
OCTOBER: Fishing, Joykey and other programs from Vol. 1 No. 7.
NOVEMBER: Goblins, Blackjack and other programs from Vol. 1 No. 8.
DECEMBER: Tower, Santa, and other programs from Vol. 1 No. 9.
JANUARY 1984: Barrels, Noteplay and other programs from Vol. 1 No. 10.
FEBRUARY: Invasion, Frogs and other programs from Vol. 1 No. 11.
MARCH: Mazemunch, Birthday and other programs from Vol 1 No. 12.
APRIL: Microgolf, the simulation. **Eastermaze** and **April Fool,** seasonal games. **Seawall** and **Magic Square,** maths fun. **Filer** and **Album,** sounds database. **TRX1, TRX2, RS423** driver. **Heartrate,** fitness monitor.
MAY: Dug Dig, asteroid adventures. **Damraider,** naval action. **Envaid,** easy envelopes. **Steppers,** Body Building. **Spiro,** graphics windows. **Adventure,** a trapdoor maze. **Renumber,** program utility. **Bigletter,** large type. **Memory,** RAM efficiency.
JUNE: Roadracer, 3D action. **Quadline,** four-in-a-line. **Monitor,** debugging routines. **Toolkit,** 8271 explored. **Areas,** easy maths. **Spell,** spelling education.
JULY: Doomrun, deep space drama. **Backgammon,** the board game. **Keys,** user defined key editor. **Save?** and **Tidisk,** disc utilities. **Alice1** and **Alice2,** mini-adventures. **Terminal1** and **Terminal2,** communication programs. **Acoustic,** software and Body Build Modem.
AUGUST: Castle, enthralling adventure. **Gridman,** a high speed strategy. **Tedit,** Teletext editor. **Dsquare,** number fun. **Dedit,** disc editor. **Input,** the ultimate input routine. **Bells,** Alice's mini-adventure.
SEPTEMBER: Villains, save your crystals. **Rollerball,** game of strategy. **Microterm,** comms terminal. **T/Textdump,** Mode 7 screen dump. **Numbersign,** number skills.
OCTOBER: Wampus, explore the labyrinth. **Balloon,** escape the Goulogs. **Splits,** split screen utility. **Pageram,** paged RAM programs. **Input1/2,** inputs for the disabled. **Morecol,** extended colours. **D/A,** waveform generator. **Integer,** direct addressing speed.
NOVEMBER: Buster, line up the diamond blocks. **Duel,** two player action. **Seaside,** picture fun for the young. **M7letters,** teletext large letters. **Dsceload,** loading disc files to &E00. **6502,** second processor programs. **Synth,** musical Body Building programs.
DECEMBER: Painter, paint the pyramid. **Miner,** delve into the depths. **Snowvad** and **Carol,** seasonal programs. **Garden,** shape-matching. **Medit,** memory editor. **Catalog** and **Save,** disc utilities. **Ladders,** mini-adventure. ***Plus Omega Probe – a machine code game.***
JANUARY 1985: Rover, guide our retriever. **Backgammon,** two player version. **Matchwood,** shape recognition. **Messages,** machine code printing. **Speedtext,** display text at different rates. **Search,** a powerful tool. **Second processor,** Body Building and graphics routines. ***Plus Galactic Tycoon, our superb free game.***
FEBRUARY: Helicopter Dogfight, two player action. **Craal,** dungeon adventure. **Pilot,** the language. **Riddle,** first Pilot program. **Disdump,** the ultimate disassembler. **Talker,** speech chip utility. **Change,** program tidier. **In/out** – output from assembler. ***Plus Atomic Protector – a machine code game.***
MARCH: Astromines, space action. **Castle,** two player catapult battle. **Data Maker,** take the tedium out of entering Data. **Disc Search,** string search utility. **Command,** give your BBC and Epson printer the same character set. **Break Key,** disable Break. ***Plus Flex – a machine code game.***
APRIL: X15, sideways-scrolling spectacular. **Mornington Crescent,** fun on the London underground. **Calculator,** AMX mouse mathematics. **Dithering,** colour mixer. **Chatterbox,** speech chip procedures. ***Plus Rabbit Run – a machine code game.***
MAY: Stellar Rescue, arcade action. **Dominoes,** simulation. **Plot69,** fast Mode 2 plot routine. **Musical Events,** a music interrupt utility. **Pound and Hash,** an Epson printer routine. **Sheila,** micro slide show.
JUNE: Othello, simulation. **Activities,** word association. **Catnap,** arcade enjoyment. **Simon Quackers,** lightpen game. **Shape recognition,** teach your micro to identify. **Stripper,** a routine for removing line numbers. **Epson,** a type-setting utility. **Lprint,** simplifies string output. **Eval,** the Basic command from machine code.
JULY: Fly, an arcade spectacular. **Draughts,** a superb version. **Compox,** 3D noughts and crosses. **Double Height,** large characters in Modes 0-6. **Clock,** alarm utility. **Compacter,** compress Mode 2. **Inside Basic,** basic routines in machine code. **RAMpage and RAMsave,** sideways RAM utilities. **Video,** graphics to music.
AUGUST: Harbour Command, protect a Cornish town. **Fruit Machine,** a gambler's favourite. **Mouse Organ,** AMX mouse music utility. **Flash,** alternative flashing colours. **String Formatter,** prevent end of line word splitting. **M/C Games,** random number and key detection routines.
SEPTEMBER: Ball Lightning, tame the lightning. **Quarters,** game of skill. **6502 Games,** a simple arcade game. **Variable Lister,** track your variables. **Smiley Hunt,** Al's game. **Error handling,** the vital routines.
OCTOBER: Karate, superb martial art action. **Solitaire,** all-time favourite. **Scroller,** text scroll utility. **Case,** an ON PROC command. **Disc Scan,** search for disc files. **Adventure,** avoid the vampire.
NOVEMBER: Whodunnit, solve the murder. **Gloop Gulp,** zany arcade action. **Basic Analyser,** take the drudgery of debugging. **Wordwise F/keys,** get the most from your word processor. **Sideways,** sideways screen clear. **New Modes,** Modes 8, 9 and 10. **Disabler,** prevent star command clashes.
DECEMBER: Wizard's Castle, recover a diamond from the necromancer's lair. **Squares,** 'join the dots' strategy. **McBase,** powerful database. **Alphabet Train,** early spelling. **Basic Analyser,** the vital cross reference tables. **Wordsquare Creator,** to create your own puzzles. **Dumper,** how your programs affect memory. **Subhunt,** the final listing. ***Plus the listings from Body Building and Adventures.***
JANUARY 1986: Megaroids, exciting space action as you avoid the debris and escape the Cylons. **Claustrophobia,** alone in a maze. Can you recover all your possessions and get out in one piece? **Fives,** mind bending version of noughts and crosses. **Music Editor,** superb utility with which to translate musical notation. **Wordsquare Solver,** the program to help you solve them. **Find and replace,** an easy-to-use utility to find and replace any item of text in a Basic listing. **Discopy,** copy and/or rename files from disc to disc in one go. **S-sound,** capture sounds and turn them into electronic effects. **Alice,** another baffling problem.

Save wear on your fingers and ensure all your programs are error-free by using our monthly tapes or discs. They are only:

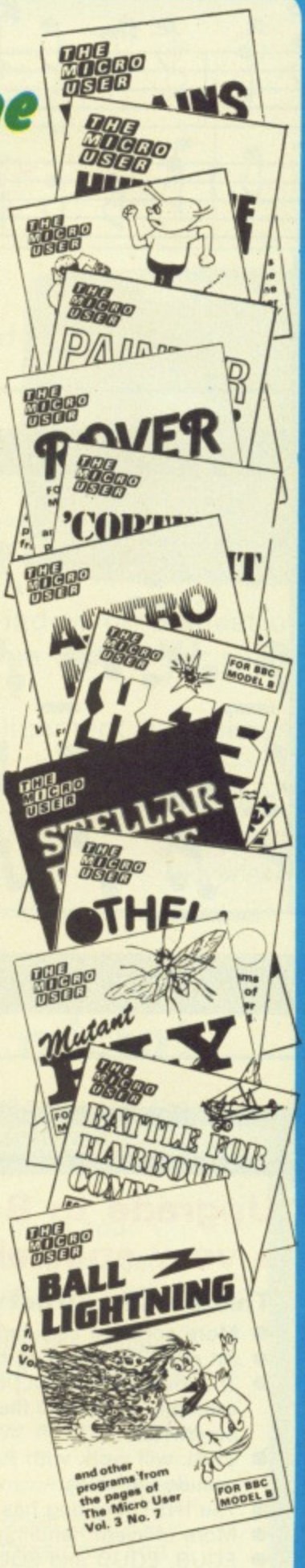
£4.25 cassette
£6.25 5¼" disc
£8.25 3" disc

You can also take out a year's subscription and have them posted to you each month.

Cassette £40
5¼" disc £60
3" disc £80

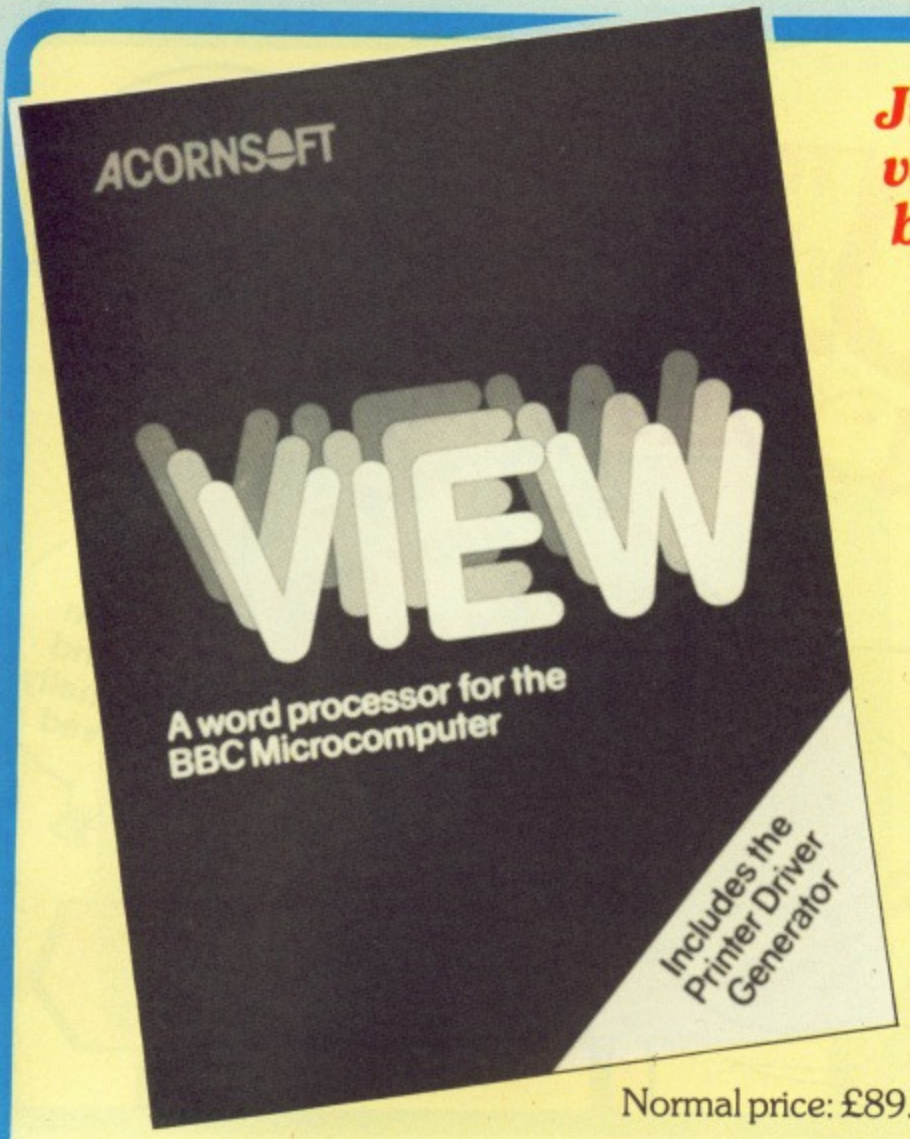
Special Offers!

- Any five of our monthly tapes for only £15.
- All 10 tapes from the 1983 issues for only £25.



Disc Upgrade Service Send your tape complete with inlay card and instructions as supplied and your cheque for £3 (tape to 5¼") or £5 (tape to 3") (not credit card number) with a covering letter stating what is required.

THE MICRO USER MAIL ORDER OFFERS



Just arrived – the latest version of Acornsoft's best-selling word processor

View 3.0 is the enhanced version of one of the most successful word processors ever written for the BBC Micro.

It's just as flexible and comprehensive as the original – but even more powerful and user friendly.

Fully upwards compatible with its predecessors, View 3.0 incorporates many new features including:

- ★ NAME – a new command allowing the naming and renaming of current text.
- ★ SETUP – the format, justify and indent flags can be set from the command screen.
- ★ The majority of commands can be abbreviated.
- ★ Search/change/replace handles all the special View characters.
- ★ Automatic NEW on start up, and OLD on Break.

The package features a new, easy to follow User Guide and a handy quick reference card. It also includes as standard a printer driver generator.

An extra bonus for second processor users is that View 3.0 automatically relocates over the Tube – giving an amazing 47k of memory for text.

Normal price: £89.70 **Micro User price: £80.73** *incl. p&p*

Our special offers on the rest of the View family

View 2.1 – the original package **£52.80**
Viewsheet – the spreadsheet **£52.80**
Viewstore – the database **£54.80**

Any 2 for £99.60

All 3 for £149.99

Getting started in BBC Basic

Based on the highly praised series for beginners in *The Micro User,* 'Getting started in BBC Basic' takes the reader through the fundamentals of writing programs.

Its hands-on approach has been specifically designed to teach the absolute novice not only the formal rules of Basic but also that elusive quality – good programming style.

By working through its many examples, the reader will gain a clear insight into structured programming and will quickly acquire the ability to use structured techniques in creating his own programs.

£5.95

Getting started in Sound & Graphics

'Getting started in Sound & Graphics' shows you how to harness the power of your micro to create dazzling displays and superb sound.

In this compilation of their highly praised series of articles in *The Micro User,* Michael Noels, Paul Jones and Nigel Peters explore the BBC Micro's outstanding sound and graphics capabilities.

Assuming only a rudimentary knowledge of Basic, the authors thoroughly explain all the programming methods involved, ranging from the simplest to the most complex.

£5.95

Use the special order form on Page 9 – No stamp needed!

THE MICRO USER MAIL ORDER OFFERS

Learning can be fun

FUN SCHOOL!

10 programs on each cassette or disc

Help with reading:
From simple shapes and letters to spelling and anagrams

Early learning – the easy way on the BBC Micro and Electron

All programs classroom tested and educationally approved

3 cassettes for 3 age groups
- Under-5's
- Ages 5-8
- Ages 8-12

Help with maths:
From number recognition and counting to simple sums and games of logic

Only £4.95 cassette
5¼" Disc £6.95
3" Disc £8.95

Use the special order form on Page 9. No stamp needed.

Educational Computing on the BBC Micro

9 FULL LENGTH programs designed to stimulate, educate and entertain – both in school and at home

The Micro User Education Special Volume I has now sold out But Volume 2 is still available

It contains nine full length programs written to the highest standards and each picked to combine educational worth with sheer enjoyment. The nine programs cover topics from early reading and simple sums to the rules of punctuation and angle estimation – and there's an excellent introductory database.

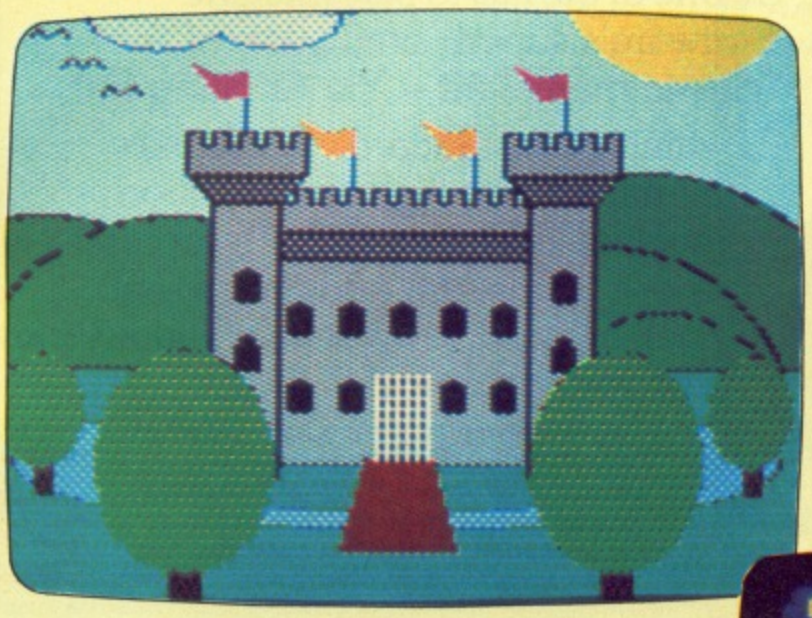
The magazine contains the complete listings of all the programs together with advice on how they can be adapted to cater for individual needs.

Fun Factors: *Arcade style factor learning.* ***Windmill:*** *Word, number and colour recognition.* ***Angler:*** *Angle estimation fun.* ***Spelldroid:*** *Learn to spell with our friendly robot.* ***Tortal:*** *Teach and test the rules of simple addition.* ***Discovery:*** *A strategy based phrase identification game.* ***Punctuation:*** *Test and teach the rules of punctuation.* ***Junior Database:*** *A comprehensive database for the young learner.* ***Chinese Takeaway:*** *Teach and test the rules of simple subtraction.*

Education Special Volume 2	
Magazine	£1.50
Cassette	£4.95
Cassette and Magazine	£6.00
5¼" Disc	£6.95
5¼" Disc and Magazine	£7.95
3" Disc	£8.95
3" Disc and Magazine	£9.95

THE MICRO USER MAIL ORDER OFFERS

The ultimate in graphics for the BBC Micro . . .



Acornsoft's Graphics Extension ROM sets new standards in graphics power and flexibility.

An official product, totally integrated with the operating system, GXR gives the BBC Micro the graphics capability it was designed for.

The 16k ROM provides a wide range of geometric shapes: rectangles, parallelograms, circles, ellipses, arcs, sectors and segments.

In fact there are over 100 different PLOT codes to enhance your micro's displays. As well as superb flood-fill routines – including user-defined patterns – there are dot, dash lines, copy screen sections and a host of other options.

The ROM even incorporates its own sprite routines, giving your programs that machine code feel from Basic.

Powerful, yet easy to implement, GXR makes the BBC Micro the leader in the field of microcomputer graphics.

"If you're wondering what your next upgrade for your BBC Micro should be, look no further".

Micro User, September 1985

Now in the shops at: £29.95

Micro User special price: £26.95

incl. VAT, p&p

Keep your copies neat and complete

These handsome binders are bound in PVC with the Micro User logo in gold blocking on the spine.

£4.25

Your BBC Micro needs protecting!

Our luxury dust cover is made of soft pliable water-resistant transparent vinyl, bound with strong cotton and decorated with the *Micro User* logo in black.

Use the special order form on Page 9 – No stamp needed!

THE MICRO USER MAIL ORDER OFFERS

EXCLUSIVE!

SAVE £5.95

2 bargain offers for subscribers!

Be one of the first to play Imagine Software's superb simulation of the classic martial art – Yie Ar Kung Fu!

Setting new standards in graphics animation, the high-speed action involves defeating EIGHT successively more aggressive opponents – all hell-bent on re-arranging various parts of your anatomy!

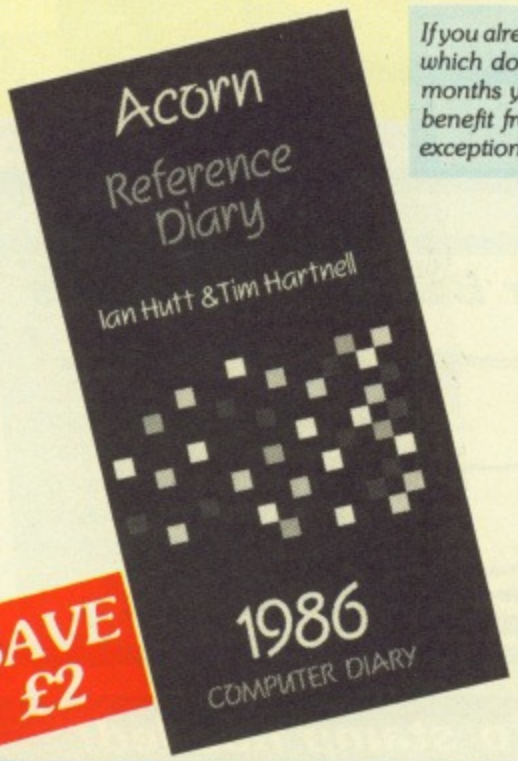
Yie Ar Kung Fu has just hit the shops – at a retail price of £9.95. But we'll send it to you for just £4 when you take out a subscription on the form opposite.
(Not available without subscription.)

£4

To defend yourself you've a choice of manoeuvres that read like an excerpt from the St. Trinians' etiquette book: Flying kick, flying punch, roundhouse kick, lunge punch ... There are ten in all, all guaranteed to bring life back into your run-of-the-mill Saturday night brawl.

So, Grasshopper, if you want to know the inner secrets of the martial arts, but lack the energy needed for the Dojo – Yie Ar Kung Fu is what you're after.

If you already have a subscription which does not expire for several months you can re-order early to benefit from both these exceptional offers.



SAVE £2

Here's a New Year gift that will serve you well during the whole of 1986!

This 138 page pocket reference diary, published by Pitman, contains all the key facts about programming the BBC Micro in a handy, easy-to-use form.

In addition to the one-week-per-page diary, its reference section features a concise guide to the BBC Micro's Operating System, gives the 6502 instruction set and a summary of Basic keywords, and presents vital data about sound and graphics.

The Acorn Reference Diary is now on sale in the shops for £3.95. But we'll send it to you for just £1.95 when you take out a subscription on the form opposite.
(Not available without subscription.)

£1.95

THE MICRO USER **MAIL ORDER OFFERS**

ORDER FORM

Overseas orders:
ALL GOODS NOW SENT AIRMAIL!

Valid to January 31, 1986

Please tick items required in box below £ p

Micro User back issues

March 1983 £1	2009	
April 1983 £1	2010	
May 1983 £1	2011	
June 1983 £1	2012	
July 1983 £1	2013	
Aug 1983 £1	2014	N/A
Sept 1983 £1	2015	
Oct 1983 £1	2016	
Nov 1983 £1	2017	
Dec 1983 £1	2018	
Jan 1984 £1	2019	N/A
Feb 1984 £1	2020	
Mar 1984 £1	2021	N/A
April 1984 £1	2022	
May 1984 £1	2023	
June 1984 £1	2024	
July 1984 £1	2025	
Aug 1984 £1.25	2026	
Sept 1984 £1.25	2027	
Oct 1984 £1.25	2028	
Nov 1984 £1.25	2029	
Dec 1984 £1.25	2030	
Jan 1985 £1.25	2031	
Feb 1985 £1.25	2032	
Mar 1985 £1.25	2033	
April 1985 £1.25	2034	
May 1985 £1.25	2035	
June 1985 £1.25	2036	
July 1985 £1.25	2037	
Aug 1985 £1.25	2038	
Sept 1985 £1.25	2039	
Oct 1985 £1.25	2040	
Nov 1985 £1.25	2041	
Dec 1985 £1.25	2042	

UK. Add p&p 80p per copy (5 or more £3.20) .....
Europe (surface mail). Add p&p £1.50 per copy .....
Overseas (air mail). Add p&p £2.00 per copy .....

Annual subscription

UK & Eire (Sterling only) £15	2001		
Europe: Surface £25	2365	Speedy £40	2003
Overseas: Surface £25	2366	Air £52	2004

Commence with ..... issue

Tick box if ☐ renewal

Yie Ar Kung-Fu *£4.00	2381	
Acorn Reference Diary *£1.95	2367	

***Only available if accompanied by subscription order.**

Annual subscription for cassettes and discs

	UK	Europe/ Overseas		
BBC 'B' cassette	£35	£45	2005	
5¼" disc 40T	£50	£60	2006	
5¼" disc 80T	£50	£60	2007	
3" disc	£65	£75	2008	

Commence with ..... (state month)

Getting Started in Sound & Graphics

UK - £5.95
Europe - £7.45
Overseas - £8.45
2223

Getting Started in BBC Basic

UK - £5.95
Europe - £7.45
Overseas - £8.45
2289

>>>

Mini Office

BBC 'B' cassette £5.95	2231	
Electron cassette £5.95	3062	
5¼" 40T disc £7.95	2232	
5¼" 80T disc £7.95	2233	
3" disc £9.95	2234	

Mini Office II

BBC 'B' cassette £14.95	2368	
5¼" disc 40T £16.95	2369	
5¼" disc 80T £16.95	2370	
3" disc £19.95	2371	

Binders

UK £4.25
Europe £7.25
Overseas £9.25
2221

Dust Covers

£3.95 2220

Music offers

*Acorn Music 500 £84.95 2372

The Music System

2 Tape Pack £25.45	2373	
5¼" disc 40T £25.45	2374	
5¼" disc 80T £25.45	2375	
Beebugsoft Murom £25.95	2376	

* UK only

Volex Teletext Adapter

£139.95 2379

View, Viewsheet & Viewstore

UK orders only

View 3.0 £80.73	2363	
View 2.1 £52.80*	2312	
Viewsheet £52.80*	2313	
Viewstore £54.80*	2337	

*Any 2 £99.60. All 3 £149.99 (View 3.0 excluded)

The Advanced User Guide

UK - £11.50
Europe - £15.00
Overseas - £17.50
2245

Basic II Rom

UK – £23.50
Europe - £24.50
Overseas - £25.50
2219

Red Arrows

Cassette £8.95	2334	
5¼" disc 40 track £11.95	2335	
5¼" disc 80 track £11.95	2351	
3" disc £12.95	2336	

EDUCATIONAL SPECIAL No 2

Magazine only	£1.50	2320	
Cassette only	£4.95	2321	
Cassette + Magazine	£6.00	2322	
Disc (40T) only	£6.95	2323	
Disc (40T) + magazine	£7.95	2328	
Disc (80T) only	£6.95	2324	
Disc (80T) + magazine	£7.95	2315	
Disc (3") only	£8.95	2325	
Disc (3") + magazine	£9.95	2316	

>>>

Don't forget to fill in your address overleaf!
All prices include postage, packing and VAT unless otherwise stated.

TOTAL CARRIED FORWARD OVERLEAF ____

ORDER FORM

THE MICRO USER **MAIL ORDER OFFERS**

	£	p
Total carried forward from previous page		

Single copies of cassettes/discs

☐ Any 5 tapes for £15
☐ All 10 1983 tapes £25

			Tape £4.25	5¼" disc 40 track £6.25	5¼" disc 80 track £6.25	3" disc £8.25
Deathwatch	Mar 1983	2045/48				
King Kong	April 1983	2049/52				
Air Strike	May 1983	2053/56				
Space Pilot	Jun 1983	2057/60				
Tenpin	Jul 1983	2061/64				
Fruities	Aug 1983	2065/68				
Robin & Marian	Sep 1983	2069/72				
Gone Fishin'	Oct 1983	2073/76				
Blackjack/Goblins	Nov 1983	2077/80				
Tower Bridge	Dec 1983	2081/84				
Barrel Battle	Jan 1984	2085/88				
Alien Invasion	Feb 1984	2089/92				
Mazemunch	Mar 1984	2093/96				
Microgolf	April 1984	2097/100				
Damraiders	May 1984	2101/04				
Road Racer	June 1984	2105/08				
Doomrun/Backgammon	July 1984	2109/12				
Castles of Fear	Aug 1984	2113/16				
Villains	Set 1984	2117/20				
Hunt the Wampus	Oct 1984	2121/24				
Blockbuster/Duel	Nov 1984	2125/28				
Painter/Miner + **Omega Probe**	Dec 1984	2129/32				
Rover + **Galactic Tycoon**	Jan 1985	2133/36				
'Copter Dogfight + **Atomic Protector**	Feb 1985	2137/40				
Astro Mines + **Flex**	Mar 1985	2141/44				
X-15 + **Run Rabbit**	April 1985	2145/48				
Stella Rescue	May 1985	2149/52				
Othello	June 1985	2153/56				
Mutant Fly	July 1985	2157/60				
Harbour Command	Aug 1985	2161/64				
Ball Lightning	Sept 1985	2165/68				
Karate	Oct 1985	2169/72				
Whodunnit	Nov 1985	2173/76				
Wizzard's Castle	Dec 1985	2177/80				
Megaroids	Jan 1985	2181/84				

Classic Arcade Games

		Tape £5.95	5¼" disc 40 track £7.95	5¼" disc 80 track £7.95	3" disc £9.95
BBC 'B'	2246/49				
Electron	3064				

Fun School

		Tape £4.95	5¼" disc 40 track £6.95	5¼" disc 80 track £6.95	3" disc £8.95
Under 5's	2338/41				
Age 5-8	2342/45				
Age 8-12	2346/49				

Graphic extension ROM

£26.95 — 2380 ☐

Speech offers

Computer Concepts Speech ROM £25.95 — 2377 ☐

Acorn Speech Extension UK – £29.95 — 2224 ☐

Computer Concepts/Acorn Speech Extension ROMs bundle £55.45 — 2378 ☐

OVERSEAS READERS

Please add £1 postage per item unless otherwise stated.
All overseas items now sent Air mail. ☐

Don't forget to fill in your name and address. **TOTAL**

You can also order by phone, Prestel or MicroLink/Telecom Gold

- Any of the goods listed here can be ordered by telephone.
- Micronet subscribers and other users of Prestel can also use the Prestel mailbox.
- MicroLink subscribers and other users of Telecom Gold can also use the MicroLink mailbox.

Tel: 061-480 0171

Prestel
Key Page 89, then send your order to:
614568383
24 hours

MicroLink/Telecom Gold
72:MAG001
24 hours

Don't forget to quote your credit card number AND your full address.

Payment: please indicate method (✓)

☐ Access/Mastercharge/Eurocard

☐ Barclaycard/Visa

☐ Cheque/PO made payable to Database Publications Ltd.

Expiry Date ___/___

BLOCK CAPITALS PLEASE

Name_____

Address_____

_____

_____

_____ Post Code_____

Signed_____

Post to: **The Micro User, FREEPOST, Europa House, Hazel Grove, Stockport SK7 5NY**

No stamp needed if posted in UK.
Please allow 28 days for delivery.

QUICKSHOT 2 JOYSTICK

£9.95 (inc.)

Plugs into BBC analogue port – no extra interface required
(Works with most games)

Telford Electronics
23 Dalford Court
Hollinswood
Telford, Shropshire
Access/Visa

SPECIAL OFFER!!

We offer from our UK stocks, the following BBC Micro compatible RAMS and EPROMS:

27128-25 at £2.70

2764-25 at £2.10

6264LP-15 at £3.75

6116LP-3 at £2.40

We can also supply 7002C, 6845SP, 74LS series, TTL, capacitors, passives, resistors, etc . . .
Why not send us a list of our current component requirements?

QUANTITY DISCOUNT AVAILABLE!

ROMBYTE LIMITED – (01-402 9461)
65 Blandford Street, London W1H 3AJ

Please send your order and remittance to the above address. A prompt despatch is guaranteed. All prices exclude P&P (50p) and VAT (15%) on the total.

ECONOMICS SOFTWARE FOR BBC & ELECTRON

Recommended and used by schools, colleges and universities.

"EXPLORING THE ECONOMY"

Examine the performance of the UK Economy by manipulating actual data for 26 economic indicators. Over 30 years of data provided. Interesting graphics, plots time trends, functions, etc. plus many other features. Comprehensive manual included. Suitable for all students of economics.
£25.00 (disc only).

"AN INTRODUCTION TO NATIONAL INCOME MODELS"

5 programs plus manual which permit the construction of different models of the economy. Uses graphics to simulate the effects of disturbances. Suitable for A level or equivalent.
Cassette £15.95 Disc £18.45

"DEMAND AND SUPPLY"

3 programs plus manual. Uses interactive graphics to explain demand and supply analysis. Suitable for O & A level etc.
Cassette, £9.95 Disc £12.45

Further details from:

BEECON EDUCATIONAL SOFTWARE
16 Kingrove Avenue, Beeston, Nottingham NG9 4DQ

EPROMS + RAMS

Hitachi 250nS – the reliable ones – BBC compatible.
Prices INCLUDE VAT and UK post – normally by return.

27128 1-2 pcs **£3.15, 3-9 pcs £3.00, 10**- pcs **£2.85**
2764 1-2 pcs **£2.30,** 3-9 pcs **£2.20,** 10+ pcs **£2.10**
27256 1-2 pcs **£6.00,** 3-9 pcs **£5.75,** 10+ pcs **£5.50**
6264 LP 15 RAM 2-9 pcs **£3.75,** 10+ pcs **£3.50**

***** If you see a lower price we will beat it *****

BB-PROM Programmer **£33.95** inclusive
ERASERS:- D1 **£21.95,** D2 (15 min. timer) **£26.50**
**** 15% off EPROMS ordered with BB-Prom or Eraser ****
Send UK cheques/Money Orders/LA or Gov't Orders to:

SILICON CITY, Dept. M,
1 Milton Road, Cambridge CB4 1UY.
ACCESS/VISA orders, telephone 0223 312453

A NEW CONCEPT IN SOFTWARE
Letters, Notes, Reports, Articles, Books . . .
Ease creative writing with

SCRATCHPAD

The ideas organiser for creative writers

Organise your thoughts and make the ideas flow

* A suite of programs based on scientific knowledge about our thought processes
* Written by an established author
* Icon driven
* Completely user-friendly
* Fully tube compatible
* Single or double disk drives
* Spool to your word processor files

SCRATCHPAD makes writing so much easier – all you have to do is add the words.

PRICE £24.95 (incl p&p)

INNOVATIVE SOFTWARE (MU)
41 Walter Road, Swansea

ADVERTISERS INDEX

21st Software	112
Abbey Software	208
Acornsoft	116
Advanced Memory Systems	20, 21
Advanced Technology Products	166
Akhter Computer Group	34, 35
Apex Software	163
Arcana Software Design	168
B.J. Computing	118
Beebugsoft	2, 3, 15, 56, 90, 144, 145
Betasoft	226
Beecon Educational Software	225
CMS	31
Care Electronics	94
Carey Electronics	192, 207
Carson Developments	197
Chalice Software	140
Chase Data	176, 177
Chiltern Electronics	194
CJE Micros	93
Clares Micro Supplies	28, 131
Clarke Coysten Computers	207
Comco Engineers	179
Comlex	188
Compumart	182
Computer Concepts	16, 17
Contex Computing	196
Crossware Products	190
Cumana	18, 19, 70, 100, 161
Data Store	180
Datapen Microtechnology	143
Datastar Systems	195
Display Electronics	148
Doctor Soft	54
Electronequip	120
Epson (UK)	32, 33
Flora Electronics	207
FSU	188
GCC (Cambridge)	108, 109
Gemini	134-137
Grafsales	101
Griffen Computers	55
Hi-Voltage	72
IDS Computer Supplies	128, 209
Innovative Software (MU)	225
Kosmos Software	182, 188
Leigh Computer Systems	190
Leisure Genius	82
Lincoln Microsystems	198
Linear Graphics	67
Liverpool University	207
Mancomp	208
Mannesmann Tally	6
Meedmore (Dist)	128
Merlin Computer Products	71
Micro Resources	196
Microdis	58
Microman Computers	208
Micronet 800	104
Microworld	76-78
Mighty Micro	186
Minerva Systems	206
Minic Business Services	182
Mirrorsoft	152, 153
Morley Electronics	160
MUD	22
Northside Computing	163
Number One Systems	186
Online Aid	170, 171
Opus Supplies	7, 13, 87, 102, 103
Oxford Computer Systems	165
P&H Electronics	162
Pace Micro Technology	86, 129
Paul Fray	207
Peartree Computers	130, 197
Pineapple Software	168
Printerland	180
Pro-Soft Business Software	197
Qual-Soft	52
Quixor	190
Ricksoft	186
Rombyte	225
Scriven & Rudge	179
Selec Software	180
Silent Computers	180
Silicon City	225
Software Invasion	99
Software Services	186
Solidisk Technology	8-12
Speedysoft	147
Squirrelsoft	192
Superior Software	113, 227, 228
System Software	14, 206
Tandata Marketing	184, 185
Teachers' Software	207
Technomatic	59-65
Telford Electronics	225
Torch Computers	47
Twillstar Computers	158, 159
Viglen Computer Supplies	209-214
Vine Micros	194
Voltmace	30
Watford Electronics	36-46
Weserve	192

BETASOFT War Games and Educational Programs

THE PLEADONS are attacking! You alone can save Earth from their onslaught. First you must protect your vital fuel dumps from their missiles and, if your survive, set out to destroy their Mothership. But watch out for the fleets of Zoids – only a central direct hit can penetrate their defence screens. Mission accomplished? Now you must return to base and land safely, avoiding the lethal Grabbers and Sentinels on your final approach. If you make it, don't relax just yet – here comes another wave of Pleadon ships, faster and more vicious than before, assisted by the deadly Walker, which can create energy fields to screen your fire.

Machine code throughout. Joystick and sound off options. Colourful, fast and frantic – a fresh development of a traditional Arcade game theme.

SPECIAL INTRODUCTORY PRICE until January 17th.

New

TELED – the Teletext screen editor – for those who believe the BBC is more than just a games machine.

Design your own text and graphics screens quickly and easily using more than 40 functions available at the touch of a key.

TELED is:

POWERFUL. Machine code routines give you instant access to many types of lines and boxes: circles and ellipses: rapid fill-in of even the most complex shapes: copying of graphics blocks: storage of lines in memory: saving and reloading of screens and a screen dump with positive or negative image options.

USER FRIENDLY. Instructions and reference pages can be called up on the screen during editing: the printed keyslip provides instant reference to the functions available; and a "painless introduction" booklet will show you step by step how to produce a sample screen.

VERSATILE. You will then be ready to move on to create your own designs for all kinds of applications: title and display pages for projects; locations for adventure games; more attractive layouts for your own programs, etc.

RUGGED. Written by a teacher and thoroughly tested in the classroom.

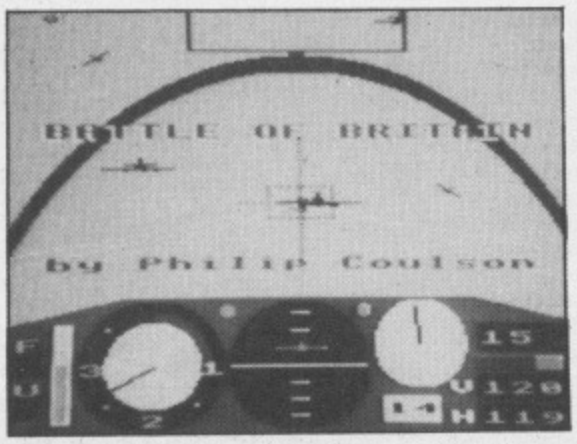
AN EXCELLENT AND AFFORDABLE CHRISTMAS PRESENT FOR THE PRACTICAL COMPUTER USER.

New

METEOROLOGICAL SURVEYS. Another colourful and stimulating Betasoft product which is excellent for both classroom and home use. The program stores details of the weather over a thirty-one day period at up to two hundred locations in the British Isles. Rainfall, temperature, humidity, cloud cover and type, wind speed and direction are displayed in suitable graph, bar chart or pie chart form and summarised in tables. In addition, the information can be displayed as a picture or printed out.

AS AN INTRODUCTORY OFFER, THE DISC WILL INCLUDE AN AMUSING PROGRAM TO TEST YOUR MENTAL ARITHMETIC SKILLS.

New



NOW YOU CAN FLY WITH THE FEW!

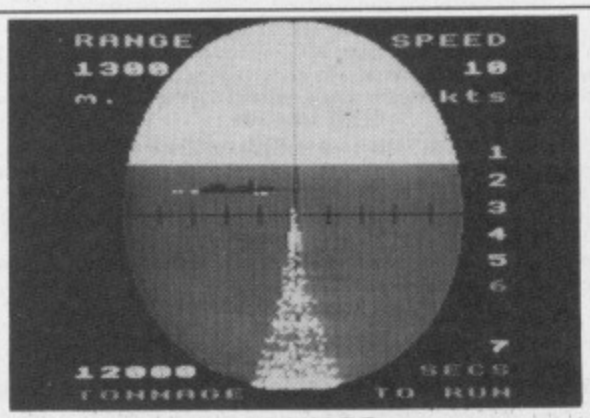
"Battle of Britain" – authentic World War 2 game with full colour graphics, realistic sound and 3D graphics effects, fuel, oxygen, ammunition, detailed briefing, choice of skill levels and pilot's log book (disc version).

Scramble your Spitfire and climb to intercept the incoming Messerschmitts, Heinkels and Junkers. The Sector Controller will help you navigate to your target, but accurate flying is a must for top points. Tally-ho! The sky is suddenly full of planes, and you must use all your skill to hold the enemy in your sights as he jinks and weaves to avoid your fire. You need to keep your wits about you as you avoid firing on friendly planes, shake off the attacking Me 109 from your tail and try to use your limited ammunition to maximum effect. Even if you survive the dogfights you are not yet safe – you still have to navigate home and land without mishap, but a good landing will help to boost your score.

SEA WARFARE GAMES

BLOCKADE. Locate your target on radar and steer a course to intercept. When in position to attack, come to periscope depth. Now you can see your target and read off his range and speed. Choose your moment carefully – for maximum points you must sink all the enemy ships and maintain the blockade. Select from Easy, Normal or Hard targets, and build up your skill and judgement to become a Submarine Ace.

SUBHUNT. You are the Captain of a destroyer in the Atlantic, protecting our convoys from the prowling U-boats. Seek out the invisible enemy with your ASDIC scanner, then attack him with depth charges. But watch out for his torpedoes – if you don't sink him, he may sink you!



BLOCKADE

ALL PRICES REDUCED FOR CHRISTMAS

Special Christmas Stocking Offers:

- Both Sea Warfare games on one tape. A – for BBC Model B B – for Electron only **£8.95.**
- C – All three war games on one disc for BBC only **£19.95.**

To: BETASOFT, 5A St. Stephens Road, Cold Norton, Chelmsford, Essex CM3 6JE

Order Form	Tape				5¼" Disc 40T☐ 80T☐				Name and Address
	Qty	Price	P&P	Total	Qty	Price	P&P	Total	
Pleadons		£7.95	35p						
Blockade		£6.50	35p						
Subhunt		£5.50	35p						
Offer A (BBC)		£8.95	35p						
Offer B (Elec)		£8.95	35p						
Battle of Britain		£8.95	35p			£13.95	50p		
Teled						£11.95	50p		
Met Surveys						£11.95	50p		
Offer C						£19.95	50p		
I enclose cheque/P.O. for:			£				£		

THE ULTIMATE UTILITY FOR THE BBC MICRO

SPEECH!

NO HARDWARE REQUIRED

BBC MICRO

AT last, speech synthesis at a price you can afford. SPEECH! works entirely in software, taking up only 7K of RAM: no hardware whatsoever is required. Unlike other systems, SPEECH! has an unlimited vocabulary: it will say anything you want it to, and is simplicity itself to use. Simply type in: ***SAY I am a talking computer, as easy to use as 1 2 3** . . . and the computer speaks.

Adding a question mark to the end of a word pushes the pitch up (*SAY How are you?) and a full stop pushes it down (*SAY I am really unhappy.) You can even change the overall pitch by using the "*PITCH" command.

SPEECH! has a built-in parser which translates English words into 'phonemes' or speech particles. There are 45 different phonemes, and 8 different pitch settings for vowel sounds. These phonemes can be used directly by using the "*SPEAK" command (e.g. *SPEAK HEH4LOW4), so stress or intonation can easily be added wherever desired. You can even say foreign languages.

Hear SPEECH! for yourself in the loader programs of REPTON 2 and CITADEL.

Every copy of SPEECH! comes complete with 5 programs:

SPEECH!	— the 7K program
DEMO	— shows off all the features
SPELL	— a simple educational program
SAYFILE	— says WORDWISE, VIEW files etc.
RELOCATE	— moves SPEECH! around in memory, onto Sideways RAM, etc.

Applications in:

- games
- business
- education
- utilities

Previously, to get this quality of speech you would have had to pay at least £30. SPEECH! costs only £9.95 on cassette or £11.95 on disc.

SUPERIOR SOFTWARE LTD.

Dept. AU14, Regent House,
Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453.

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

Access

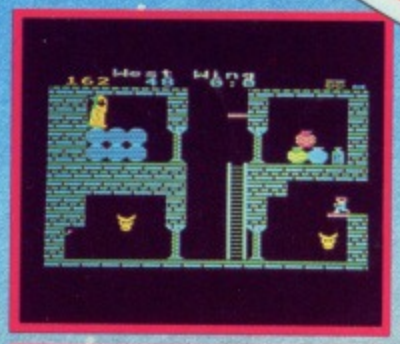
VISA

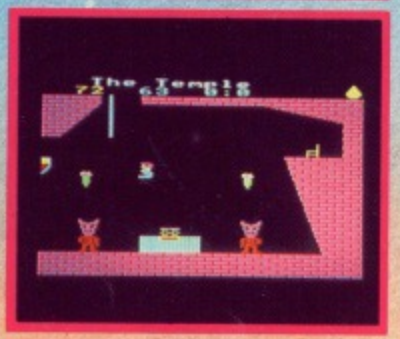
WE PAY UP TO 20% ROYALTIES FOR HIGH QUALITY PROGRAMS

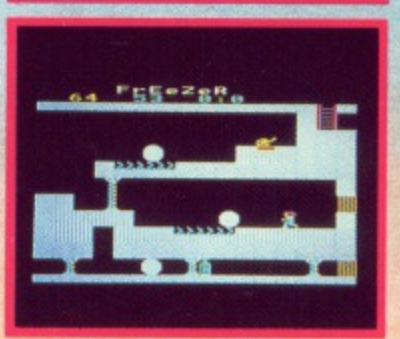
ACORN ELECTRON VERSION RELEASED 1 January 1986. BBC MICRO VERSION AVAILABLE NOW!

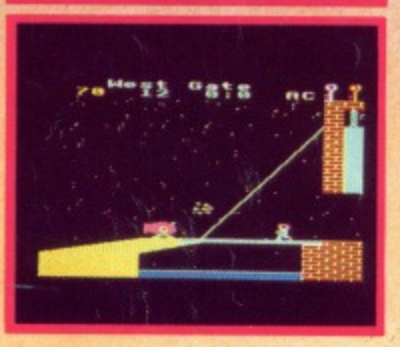
THE BEST ARCADE ADVENTURE EVER

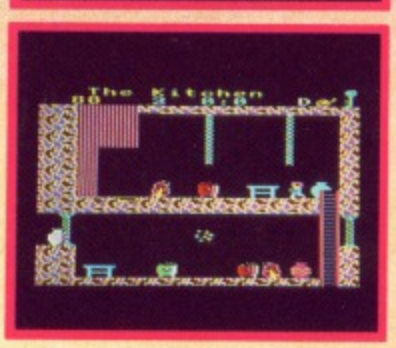
Citadel











ACORN ELECTRON
BBC MICRO

A huge adventure featuring over 100 beautifully detailed screens packed with challenging puzzles and awesome foes. You start in the vast 3-towered citadel with its curious cellar and well. Should you survive the perils within, you can venture on to the witch's house, Stonehenge, the pyramids, and across the desert to the mountains. Cross the ocean and you will reach the mystic temple on the island. You should devise how to use the ice crystal, trampolines, cannonballs, Egyptian statues, etc., to the best advantage in your onerous mission. Cleverly realistic animation (flickering torches, splashing water, and smouldering furnaces), is used throughout to depict your movements and to vividly portray the fearsome monks, mummies and wolves.

COMPETITION — 2 CHANCES TO WIN!

Three crowns have been craftily hidden within the adventure; the first person to locate any two of the three crowns will win **£100.**
The maximum score which can be obtained is 99 points; the first person to reach this score will be presented with an impressive personal engraved shield and a cheque for **£200.**

KEYBOARD OR JOYSTICKS **CASSETTE VERSION £9.95** **BBC DISC VERSION £11.95**

WE PAY UP TO 20% ROYALTIES FOR HIGH QUALITY PROGRAMS

SUPERIOR SOFTWARE LTD.

Dept. XU15, Regent House,
Skinner Lane, Leeds 7.
Tel: 0532 459453.

Access

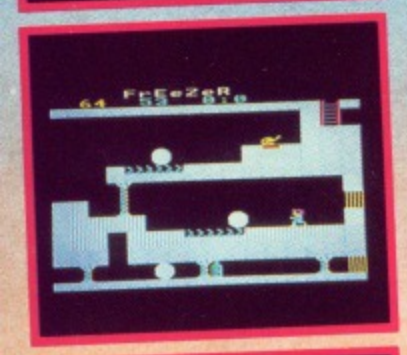
VISA

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

ADVENTURE EVER

odel



eautifully detailed screens packed with challenging
the vast 3-towered citadel with its curious cellar and well.
u can venture on to the witch's house, Stonehenge, the
mountains. Cross the ocean and you will reach the mystic
e how to use the ice crystal, trampolines, cannonballs,
ntage in your onerous mission. Cleverly realistic animation
g furnaces), is used throughout to depict your
ks, mummies and wolves.

ne adventure; the first person

oints; the first person
ssive personal engraved

C DISC VERSION £11.95

LITY PROGRAMS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

THE MICRO USER

January 1986

Vol. 3 No. 11

A Database Publication

THE MICRO USER

Volume 3
Number 11
January 1986
£1.25

Top-selling guide to the BBC