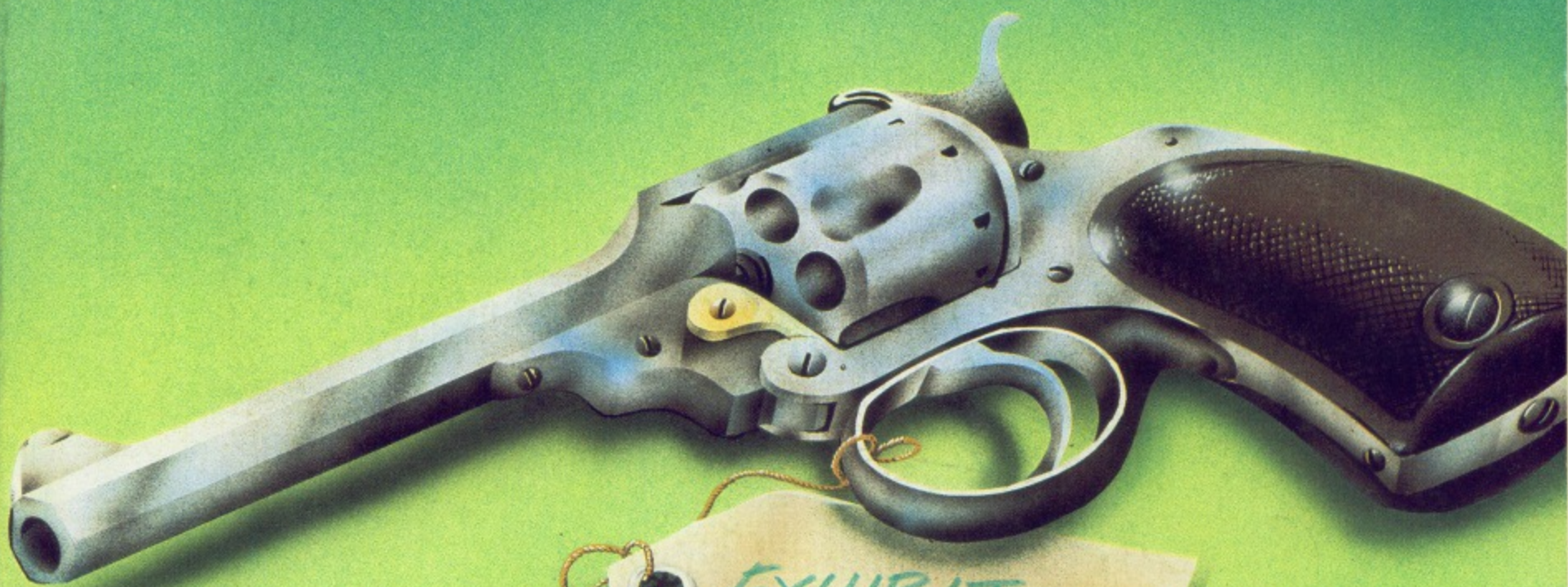


THE MICRO USER

Volume 3
Number 9
November 1985
£1.25

Top-selling guide to the BBC Micro!



Whodunnit?

Can you solve
this intriguing
murder mystery?



3 USEFUL UTILITIES

Modes 8, 9 and 10 revealed
How to disable a paged ROM
More function keys in Wordwise

AUTO DISC
AUG 1984



FAST FILL ROUTINE
JULY 1984



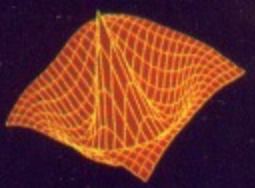
DOMINOES
MAY 1984

BEEBUG Function Key Editor

- 1 - List keys
- 2 - Edit key
- 3 - Delete key
- 4 - Compact to follow
- 5 - Print key buffer area left
- 6 - Expand key
- 7 - Update definitions
- 8 - Exit

Options

FUNCTION KEY EDITOR
MAY 1984



3D SURFACES
JAN 1985



ROM READER
MARCH 1984



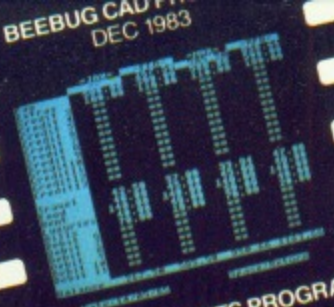
BODY POPPING
MARCH 1985



GRAND PRIX
JUNE 1984

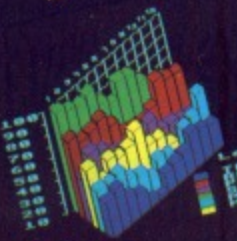


AUTO DISC MENU
AUG 1984



BEEBUG CAD PROGRAM
DEC 1983

HOME ACCOUNTS PROGRAM
NOV 1984



3D BAR CHART GENERATOR
APRIL 1984



GRAPH PLOTTER
MAY 1984



MULTI-MODE GRAPHICS
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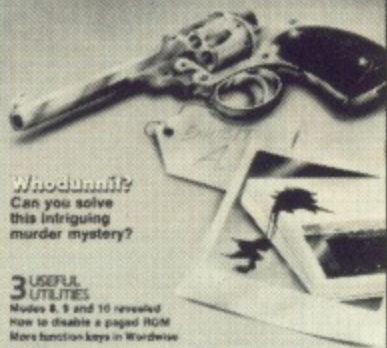


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Vol. 3 No. 9 November 1985

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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.

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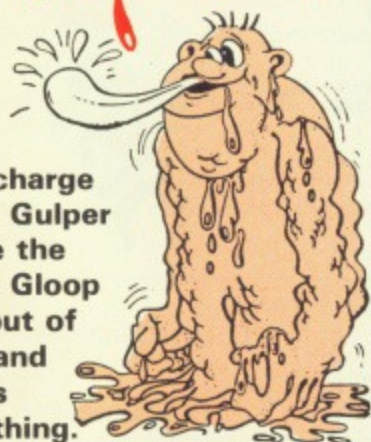
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C.COMPILER, PASCAL, BASIC

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For all BBC B and QL micro users, the Cumana UPGRADE offers the chance to step into a truly professional environment.

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Basic 3 For BBC Computer With Sideways RAM

Until now, only the lucky 32016 co-processor owners could afford to have 10,000 strings or variables at once in their programs. But now with the Solidisk Basic 3, you too, can play with similar facilities.

The Acorn's BAS128, as implemented at present on the 128K BBC PLUS, occupies the main user memory and uses 4 Sideways RAM banks to store both the program and the variables.

The Solidisk BASIC3 is an overlay for the BBC BASIC2, occupies 1 Sideways RAM bank, uses other Sideways RAM banks to store variables and leaves the program in the usual main memory.

The Solidisk version has some significant advantages, mainly:

1) The Solidisk BASIC 3 offers more space:

Size for BASIC: BBCB +SWR32 : +SWR64 +SWR128 +SWR256
128K BBC PLUS : 25.5K 37.5K : 69.5K 133.5K 261.5K

2) The Solidisk BASIC 3 is faster than BAS128, for example in running PCW Basic Benchmark (PCW January 85):

COMPUTER	TIME IN SECONDS	RANK
BBC B + 6502 SECOND PROCESSOR:	9.58	1
BBC B + BASIC 2	14.27	2
BBC B + BASIC 3	18.99	3
ELECTRON	20.44	4
BBC 128K PLUS + BAS128	29.43	5

3) The Solidisk version loads, saves and runs programs in the usual main memory thus requiring no change to the programs.

4) The Solidisk version is available on disk and in ROM (as part of STL TOOLKIT ROM), BAS128 is available only on disc.

PRICES

The listed price comprises the Sideways RAM fully guaranteed for 1 year, comprehensive manual and software pack 1 consisting of 5 diskettes formatted either in 40 or 80 track.

- SWR32 + 5 discs (32k unit, by far the most popular): £53.00
- SWR64 + 5 discs (64k unit, new introduction model): £80.00
- SWR128 + 5 discs (128k unit, the second most popular): £125.00
- Any Extra Software Pack (5 discs): £10.00 Specify 40 or 80 tracks.

As Solidisk Software Support Service has to produce in excess of £25,000 diskettes every month, we regret that we can no longer provide personalised service for disk washing. In extreme cases, when you need to update your software diskette, either reorder a new software package (which is always sold to you at nominal media cost i.e. £10.00 for 5 disks, including new manual, or return the old package with £2.00 to cover post and packing. You may avoid post and packing costs if you call at Solidisk's stand at any BBC micro exhibition or at the Solidisk office.

UPGRADING

Upgrading from a smaller model is very simple: you return the old RAM board to us with your payment for the difference.

The listed prices include new manuals when necessary.

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

WHAT THE SPECIALISTS SAY:

ACORN USER

(JAN 84):

'Exciting ...'

PCN (MAY 84):

'Power to your BEEB'

A&B: 'Break the RAM barrier'

Effective from 15th of JULY 85:

FROM:	TO SWR32	TO SWR64	TO SWR128	TO SWR256
SWR 32		£27		
SWR 64			£50	
SWR128				£60

Solidisk Sideways RAM is compatible with all issues of BBC computers along with most current add-ons.

To date, more than 45,000 Sideways RAMs have been sold.

Sideways RAM is similar to Sideways ROMs such as the BASIC ROM or the DFS ROM but it can be written into. This means that Sideways RAM can run all types of software that are normally available in ROMs.

Solidisk also has a large library of nearly 100 programs to maximise the use of Sideways RAM.

These include important software such as word-processor, database, spreadsheet, spelling, checker, macro Basic, Extended Basic, Virtual Memory, Index, Sprites, RAM Disc, Machine Code monitor, Digitised pictures, SFX etc... and entertaining computer games (Blitz, Meanies, Escape, Seawolf etc).

THE NEW STYLE SWR64 AND 128K:

Solidisk have introduced a new style for the SWR64 and the SWR128.

The new RAM card has the capacity of 64k or 128k, upgradable to 256k and TWO intelligent ROM sockets accepting up to 64k of ROMs.

Each 32k EPROM (or 27256 EPROM) is treated as TWO separate 16k EPROMs and occupies 2 adjacent Sideways ROM banks.

You can use for example STL TOOLKIT + STL WORD PROCESSOR in one, DFS 2.1 and ADFS 2.1 in the other.

If you want to blow 32k EPROMs yourself, you will need the UVIPROM32, a new version of the UVIPROM Eprom Programmer capable of programming the AMD 27256 EPROMs (Programmer: £20.00, Eproms £10.00 each).

SOFTWARE PACK 1 (included with SWR)

The Software package comprises 5 diskettes, formatted either in 40 or 80 track. Please specify when ordering.

Volume 1:

Volume 1 contains all the general applications of Sideways RAM. Menu, Printer Buffer, STL DFS 2.0, STL E00, RAMDISK, RFS (Rom generator), Fast Backup, Quickcopy, Index etc...

Volume 2:

Volume 2 contains the Solidisk Wordprocessor, Spelling Checker and the English Dictionary.

Volume 3:

Volume 3 contains the Solidisk Macro Basic (a program generator), a Linker-Editor, VMP the Virtual Memory Program, Sigen, a program to create your own dictionary and a sample French dictionary.

Volume 4:

Volume 4 contains the Solidisk Database.

Volume 5:

Volume 5 contains the Solidisk Sprites System.

SOFTWARE PACK 2 (optional)

Volume 6:

Volume 6 contains the Solidisk Spreadsheet. Menu driven with standard options to create, edit, recalculate, print, search, sort, report generator and mailmerge.

Unlimited number of rows and columns. Each column can be as small as 2 or as big as 70 characters. All math functions are supported. Complete with home banking and simple portfolio management.

Volume 7:

Volume 7 contains Solidisk Play Tunes System and lots of tunes and write music using ordinary ABCD notation.

Volume 8:

STL Toolkit has 24 star commands (Status, Rwipe, Check, Find, Search and Replace, Mode 8, Join, Keyload, LVAR, Salvage, Expand, Edit etc...).

STL SFX is Solidisk screen effects utility. In mode 2, you can scale, move, reverse, mirror etc with superlative ease.

VDURECORDER is another screen aid utility. It remembers everything sent to the screen. When you want it, *REPLAY will show it all over again but with an incredible speed.

Solimon is a machine code monitor for both 6502 and 65C02.

Volume 9:

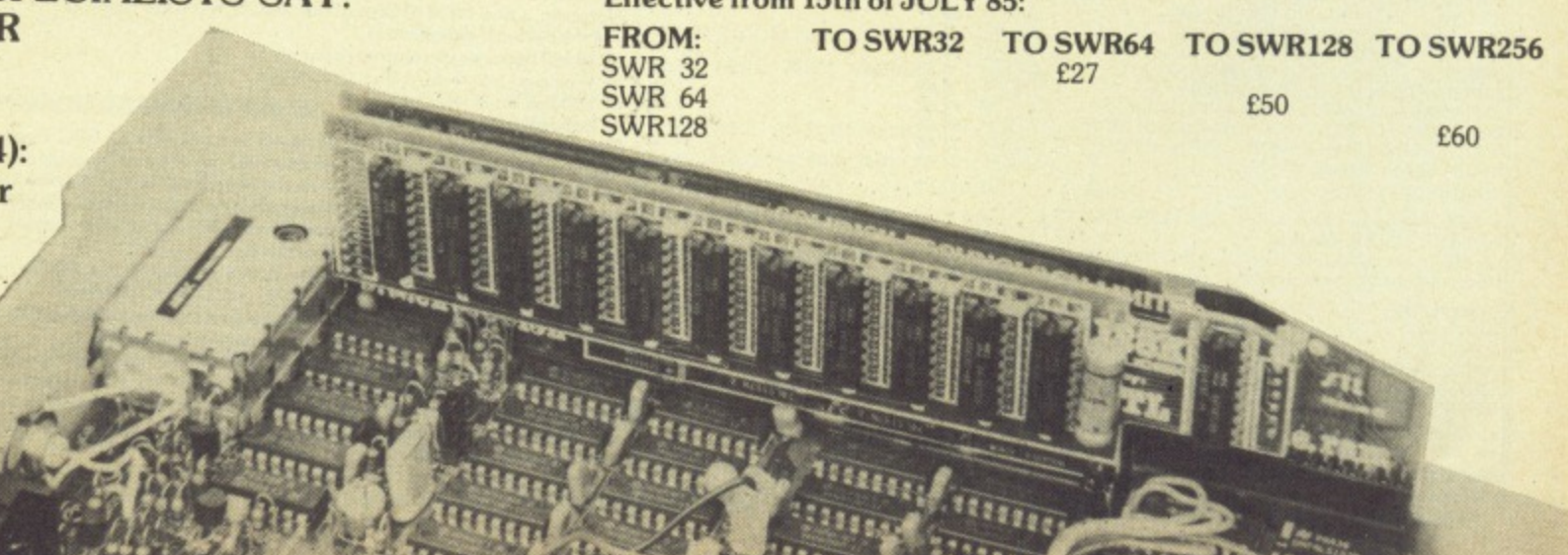
Volume 9 contains the STL ADFS and disc utilities (see next page).

Volume 10:

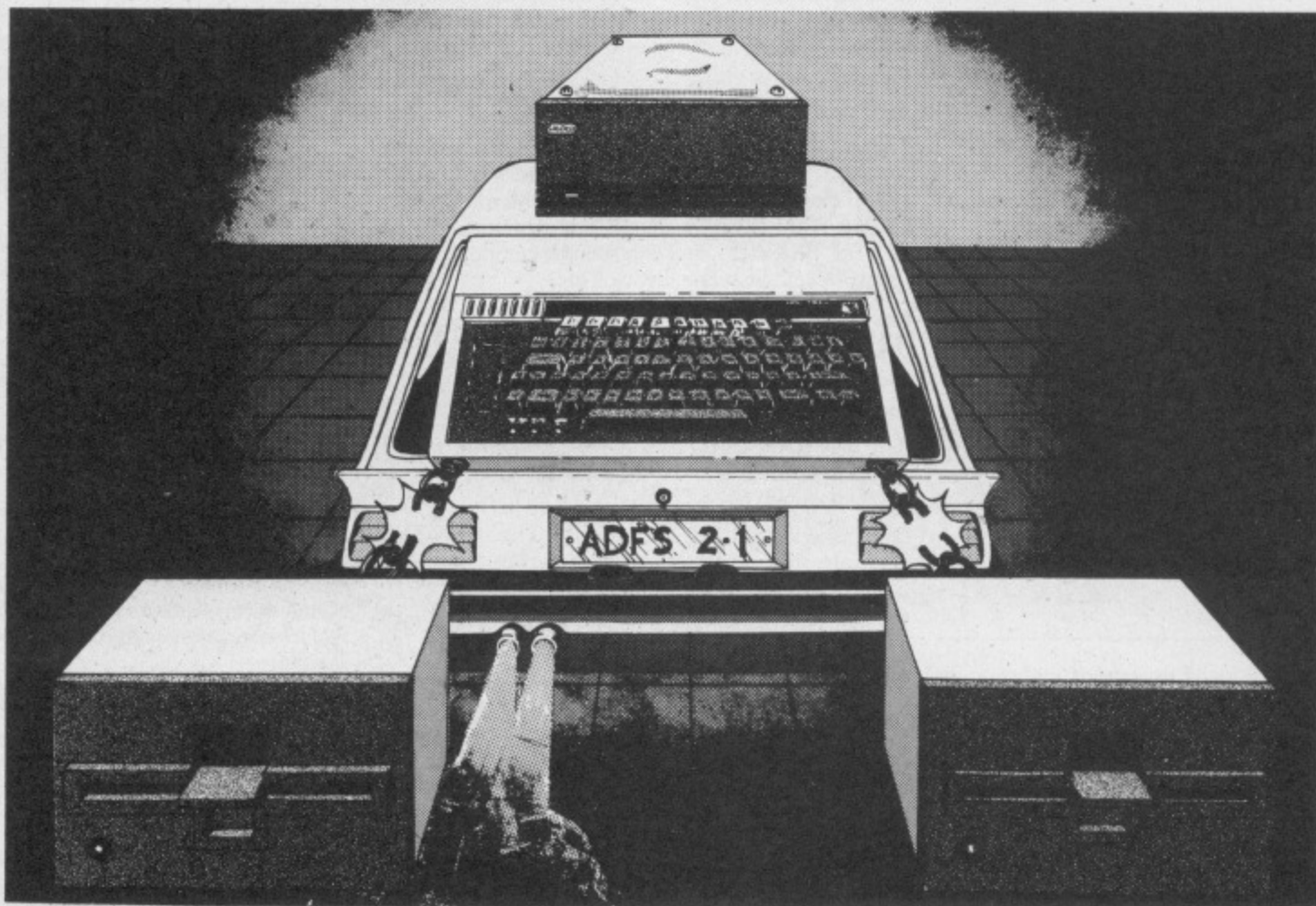
Volume 10 contains the Solidisk Teletext Editor.

Megagame Packs:

Around 70 games are currently under compilation.



LOAD AND RUN IN 100 MILLISECONDS (Or Less)...



Would you believe that your BBC Micro will LOAD and RUN a small BASIC program from your Winchester in less than a TENTH OF A SECOND?

Yes, it's perfectly true when you have a Winchester hard disc for it. How well does your BBC computer compare against the best sellers in 'business micros' such as the IBM PC, the APRICOT, the COMPAQ or the SIRIUS?

Eric Bagshaw, of the prestigious National Computing Centre has devised a series of tests to reflect as closely as possible the performance of various business computers in actual use.

He put computers like the APRICOT, COMPAQ, FORTUNE, IBM, RAI, SIRIUS, XEROX etc. . . through the same tests and published the results in the November 84 issue of PCW and the July 85 issue of Practical Computing but he missed out an important one: the BBC computer.

We had to wait until Gordon Taylor, journalist and reviewer for A&B Computing adapted the Bagshaw Disc Benchmarks to run on the BBC. We were quite astonished by the findings. Just look at the figures below:

BENCHMARKS	WITH FLOPPY*	WITH 20 MB HARD DISC**
BM0 *LOAD SIXTEEN	1.94	0.87
BM1 WRITE SEQUENTIAL FILE	9.57	2.86
BM2 READ SEQUENTIAL FILE	4.30	1.84
BM3 WRITE RANDOM FILE	22.62	10.37
BM4 READ RANDOM FILE	10.20	8.54
BM5 MULTI OPEN AND WRITE SEQ.	68.77	19.29
BM6 MULTI OPEN AND READ SEQ.	4.29	1.54
BM7 MULTI OPEN AND WRITE RANDOM	70.63	19.74
BM8 MULTI OPEN AND READ RANDOM	4.33	1.53
BM9 RANDOM READ IN RANDOM FILE	8.48	1.98
BM10 RANDOM WRITE IN RANDOM FILE	24.62	2.65
BM11 FRONT/END SWAP IN RANDOM FILE	368.06	65.18
BM12 CLOSE UP HOLES IN RANDOM FILE	33.66	18.26
BM13 CLOSE ALL DATA FILES	34.64	9.05
TIME IN SECONDS.....	663.97	163.70

* BBC computer fitted with 1.3 MB Solidisk 5.25" half height floppy disc drives, running Solidisk ADFS 2.1 (double density).
 ** BBC computer fitted with Solidisk XD20/40 Winchester (20MB), running Solidisk ADFS 2.1. Now compare these figures with those published for leading business computers*:

COMPUTER	20 MB**	TIME	RANK
BBC with	20 MB**	164	1
FTS	20 MB	187	2
APRICOT XI	10 MB	192	3
SIRIUS	10 MB	203	4
IBM XT	10 MB	254	5

* Source: PCW September 1984.
 ** BBC computer fitted with Solidisk 20 MB, figure not published in PCW.

The BBC computer with Solidisk equipment is faster than the Fortune, the Apricot, the Sirius and up to 50% faster than the IBM PC-XT!!

At least until the new micros such as the ST520 or the AMIGA gain wide public acceptance (which may never happen), you can be quite sure that your BBC computer will remain the BEST computer around.

This is especially true for those who use the 6502, the Z80* and the 32016 Second Processors and ECONET.

Few have been able to discover the real strength of their BBC system, mostly because of the high price of Acorn Winchesters. Now with Solidisk, price is no longer a barrier.

You can buy a 10 MB 'Minimum Configuration' at only £399.00+VAT**. So, rather than waiting for Acorn to reduce their price, ring us today; we will despatch it to you by DATAPOST within 48 hours (credit card orders only).

* Z80 owners: CP/M BIOS 1.20 will run immediately on the Winchester because Solidisk DFS 2.1 has partitioning capability. This means that you can create 'drives' 4, 5, 6 etc. . . on the Winchester, and backing up your DFS floppy discs onto the Winchester. Normally, a new MFM BIOS and new BOOT ROM are required.

- (**) Minimum Configuration:
- 1) 10 MB drive, net formatted capacity.
 - 2) Western Digital Hard Disc Controller.
 - 3) Solidisk SASI interface.
 - 4) Solidisk ADFS 2.1.

The minimum configuration is designed to work with all BBC Computers fitted with the later Switched Mode PSU (shiny) as on late issue 3, issue 4 and 7 machines alongside a single low power half height floppy disc drive such as the Mitsubishi in the Solidisk Disc Offer, with or without a second processor and with or without the new style low power SWR64/128 board.

If you have any other add-on draining power directly from the computer's PSU, you must order the XD-10 or disconnect the floppy disc drive.

PLEASE NOTE: if you intend to use floppy disks with the ADFS, you must also purchase the Solidisk 1770 DFS interface or the 1770 + 8271 DFDC interface.

All Winchester drive offers contain some useful software such as database, wordprocessor and utilities. See full review in A&B Computing, September 85.

Solidisk also has one of the most efficient software support systems in the country; our engineers are experienced, enthusiast and helpful. Should you need assistance or advice, please do not hesitate to contact us and talk about it, we may be able to help since we may know of people using our Winchesters for programming, off loading mainframes, running Viewstore, running mail orders, medical practices etc. . .

ADVANCED FILING

SOLIDISK 1770 DISC INTERFACE For the BBC Computer

The Solidisk Double Density 1770 Disc Interface enables the standard BBC B computer to use most current types of disk drive. Only 4 components need to be fitted into existing sockets on the computer and this can be done in a few minutes by novice and expert alike. It now can run all Acornsoft games (such as Elite, Aviator, Revs, Magic Mushroom etc. . . .) and most other protected discs (Castles Quest, Island's Music System etc. . . .)

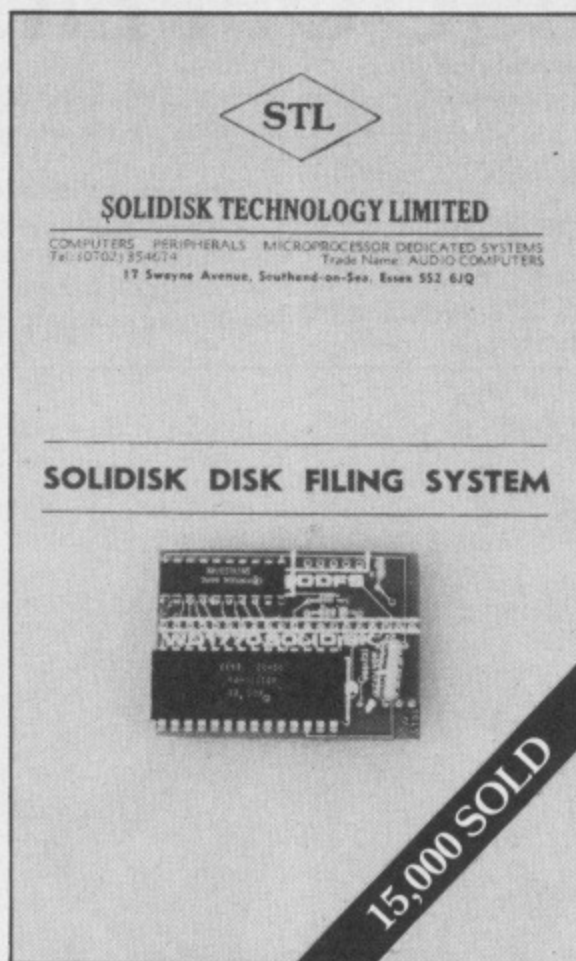
The Disk filing System provides every facility that you would expect such as built-in disc formatter and verifier, automatic 40/80 track switching, programmable disc speed and is upgradable to the Solidisk ADFS.

It also has some significant advantages over the Acorn 1770 system, mainly:

- 1) 60% more storage capacity in double density DFS, giving you up to 640k on a double sided 80 track diskette as opposed to only 400k bytes with the Acorn 1770.
- 2) Better emulation of the 8271: some protected discs (such as the early Acornsoft's Elite game) would not run on the Acorn 1770.
- 3) Built-in useful disk utilities such as TAPEDISC, MZAP, DZAP (disc sector editor), RECOVER, RESTORE etc. . . . which would add to cost if bought separately.

PRICE:

The 1770 Double Density Disc Interface costs £45.00 inclusive of VAT, DFS 2.0 ROM, manual and 1 year guarantee. If you wish, you can also order it with the ADFS ROM and the total cost is £55.00 inclusive.



SOLIDISK ADVANCED DISC FILING SYSTEM for the BBC Computer

The Advanced Disc filing System (ADFS) is now officially endorsed by Acorn and is certainly going to revolutionise software for the BBC Micro.

The Solidisk ADFS, reviewed in A&B Computing 85, whilst comparable to Acorn's ADFS, is very much designed with floppy disk and DFS software compatibility in mind.

The Solidisk ADFS will run most software available for the BBC computer, including all Acorn languages and the View family, Computer Concepts Wordwise and the INTER family, Gemini's Datagem etc. . . .

It also has PAGE at the lowest value, eg &1900 with one channel. It can realistically support up to 10 opened channels without slowing down the program as it does not swap buffer pages to disc. It also has utilities such as *FORM, *VERIFY, *BACKUP etc not found in the Acorn ADFS ROM.

It is also very responsive and double safe, with automatic head settling and read after write automatic error correction.

It runs with all Acorn second processors including the latest 32016 mainframe machine (only Z80 CP/M requires new MFM BIOS) and it is fully supported by the Solidisk Toolkit ROM. The Solidisk ADFS is available for the BBC B or PLUS fitted with the Solidisk 1770 Disc Interface or the Acorn 1770 as a TWO ROM chip set, consisting of the DFS 2.1 and the ADFS 2.1. A 32k ROM may be supplied in lieu of the 2 ROMs on request. It costs £20.00 when purchased separately like this.

SOLIDISK 1770 + 8271 Disc Interface For the BBC Computer

As Acorn are now backing the Advanced Disc Filing System, many of you, having got the 8271 Disc Interface, wonder what you are going to do next.

If you get the Acorn 1770 upgrade, you will have to part with your 8271 and possibly a few expensive pieces of software such as the old Elite or Replica II which won't run without the 8271. It is still only a single density DFS.

The alternative is to get the Solidisk 1770+8271 Disc Interface (known as the DFDC, acronym for Dual Floppy Disc Controller) which will let you keep the 8271 which you already have and add 1770 Double Density capability.

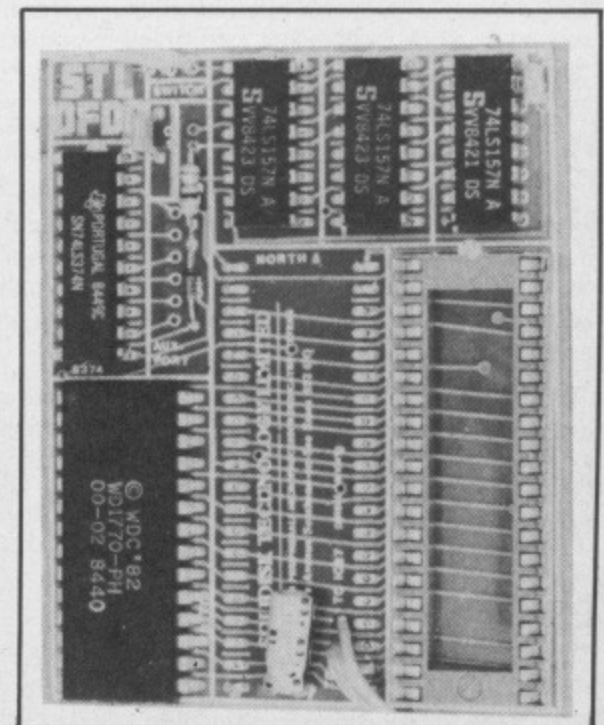
It is low cost, today and easy to fit.

At a flick of a switch, you can select either the 8271 or the 1770 Floppy Disc Controller.

You will have the best of both worlds: compatibility with the 8271 and fascination with the 1770 ADFS.

It is probably the fastest, more powerful and versatile Disc System for the BBC.

The DFDC costs £60.00 including VAT, manual, DFS 2.0 ROM and ADFS 2.1 ROM.



SOLIDISK MITSUBISHI DISC OFFER

A Complete Disc System containing everything you need, including 1 Blank Diskette, at a new low price of only £200.00 inclusive.

The Mitsubishi Offer Comprises:

- One Mitsubishi MF4853, Double Sided, 80 Track Disc Drive. Cased in beige with all leads.
- One Solidisk DDFS complete Disc Upgrade with 2.0 ROM.
- One Verbatim MD525 Blank Diskette.
- One Software Pack and User Manuals.
- Full one year guarantee.

FREE: ADFS ROM!

HARDWARE:

As described earlier as shown opposite.

THE SOFTWARE:

The software comprises 5 diskettes, formatted in 80 tracks.

Volume 1:

Solidisk Word Processor and Spelling checker with English dictionary. Easier than View, Wordwise or Scribe, you enter the WP by *WP filename, then start typing. What you see on the screen will be exactly printed on paper.

Most useful commands are all displayed on the top part of the screen.

It features 80 column screen throughout with direct on screen justification, automatic margins, page numbering, Wordstar like editing commands for block move, block delete, block copy, print, save, load text to cursor, insert and overwrite, search and replace, total word count, word frequency count, free space, *commands etc. Solidisk WP loads and saves texts in under 1 second flat and also you may save the edited version as many times and under any filename you like.

It has the unusual ability to spellcheck your document without leaving it, simply by typing in Control-U.

It has self dictionary generating capability too. You may create any dictionary you like by just simply entering the words.

IMPORTANT:

If you upgrade to a twin Mitsubishi disc system, Solidisk will offer you, subject to stock availability, a completely free set of CPU and keyboard case as shown earlier.

You should return your disc drive with payment for another Mitsubishi MF4853 (£160.00) or alternatively, save by ordering right now a Fantastic Offer at only £340.00.

The keyboard is 12 mm lower than the normal BBC case, 2-3 degrees more angled, weighs only 5lbs, does not skid about on the desk while enjoying 2 feet of freedom from the computer unit — and makes a lot of difference to typists (even 2 fingered ones!)

The CPU accommodates 2 disk drives and withstands any heavy weight monitor while providing easy attachment for the whole system, CPU and disk drives, to the desk if need be. Good ventilation to the power supply too and hides all untidy cables away.

PRICE

The complete CPU and keyboard case costs £30.00 inclusive + £3.00 post and packing. The system could be yours free as part of the Mitsubishi twin discs offer.

Volume 2:

Volume 2 contains Solidisk Database. It is a random access system, completely menu driven and easily customised to suit any particular filing need.

It features unlimited filesize and number of records, supports all maths functions and 80 column screen throughout.

It is simple to understand and to use. You take one of the 15 different options to start. Each option will then lead to a new menu and so on. Mostly you only have to enter an appropriate data or hit the RETURN key.

You can design new databases, list all records, edit them, merge them, split them, making mailshot with Solidisk WP etc. . . We use it to process all your orders.

Volume 3:

Volume 3 contains Solidisk Spreadsheet. Menu driven with standard options to create, edit, recalculate, print, search, sort, report generator and mailmerge.

Unlimited number of rows and columns. Each column can be as small as 2 or as big as 70 characters. All math functions are supported. Complete with home banking and simple portfolio management.

Volume 4:

Volume 4 contains the Solidisk tape to disc program and a selection of computer games.

Volume 5:

Volume 5 contains MBASIC, SIGEM and other disc utilities.



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.

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.

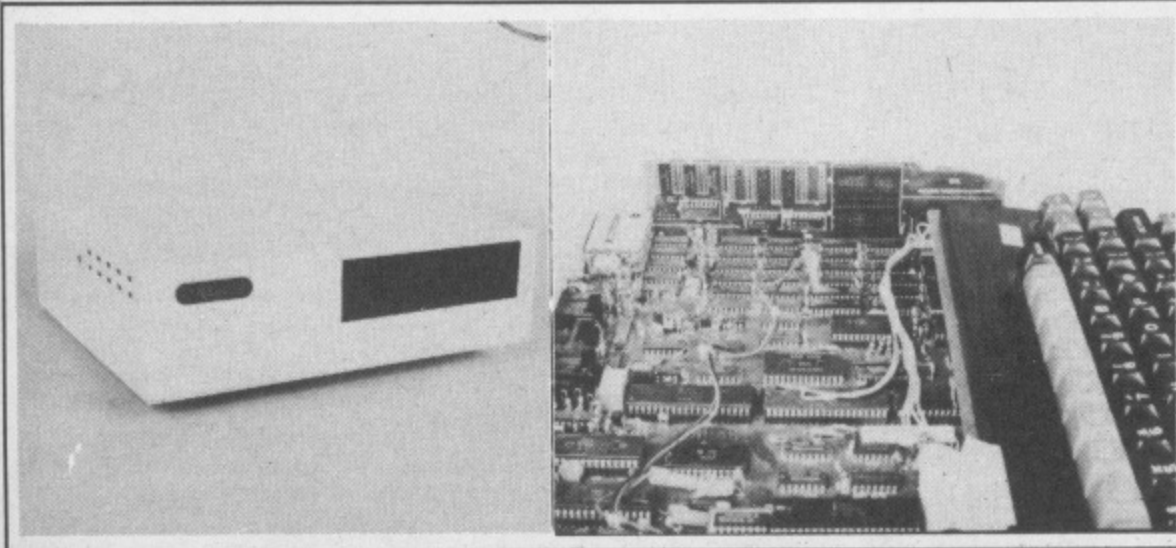
They do not sell our equipment, but they can generally fit it for you absolutely free of charge. If you would like to take advantage of this unparalleled service, ring us once you have our equipment for the name and telephone number of your nearest one. All areas are currently covered, but we still intend 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&H
BBC SIDEWAYS RAM:		
SWR32	£53.00	£2.00
SWR64	£80.00	£2.00
SWR128	£125.00	£2.00
SWR256	£175.00	£2.00
Software pack 2	£10.00	£2.00
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	£1.00
1770 Double Density with ADFS	£55.00	£1.00
1770 + 8271 DFDC with ADFS	£60.00	£1.00
DISC OFFERS:		
640k with ADFS Disc Offer	£200.00	£3.00
(£10.00 Datapost)		
1.3MB with ADFS, CPU and keyboard case	£340.00	£5.00
(£10.00 Datapost)		
WINCHESTER DISC DRIVES:		
XD-10 without PSU 10MB (Minimum config)	£399.00	+ VAT
XD-10 10MB (with additional PSU)	£460.00	+ VAT
The following prices include keyboard and CPU case:		
XD-20/40 20 MB	£699.00	+ VAT
XD-20/40 TWIN (40 MB)	£1100.00	+ VAT
XD-30/60 30 MB	£900.00	+ VAT
XD-30/60 TWIN (60MB)	£1300.00	+ VAT
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 x 5	£24.00	£1.00
27128 x 3	£25.00	£1.00
27256 (to be used on UVIPROM32)	£10.00	£1.00
UVIPROM Eprom programmer; suitable for 2764, 27128	£19.00	£2.00
UVIPROM32 Eprom programmer, special for AMD27256	£20.00	£2.00
UVIPAC Eprom Eraser	£21.00	£2.00
DISKETTES:		
Datalife MD525 SS/DD	£17.00	£1.00
Datalife MD557 2S/4D	£28.00	£1.00
MISC.		
CPU and KEYBOARD case	£30.00	£4.00
Solidisk TOOLKIT a must for ADFS	£10.00	£1.00
DFS + ADFS if purchased separately	£20.00	£1.00
EFS for the Electron	£59.00	£1.00
Special 3.5" Electron disc offer	£197.00	£3.00
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

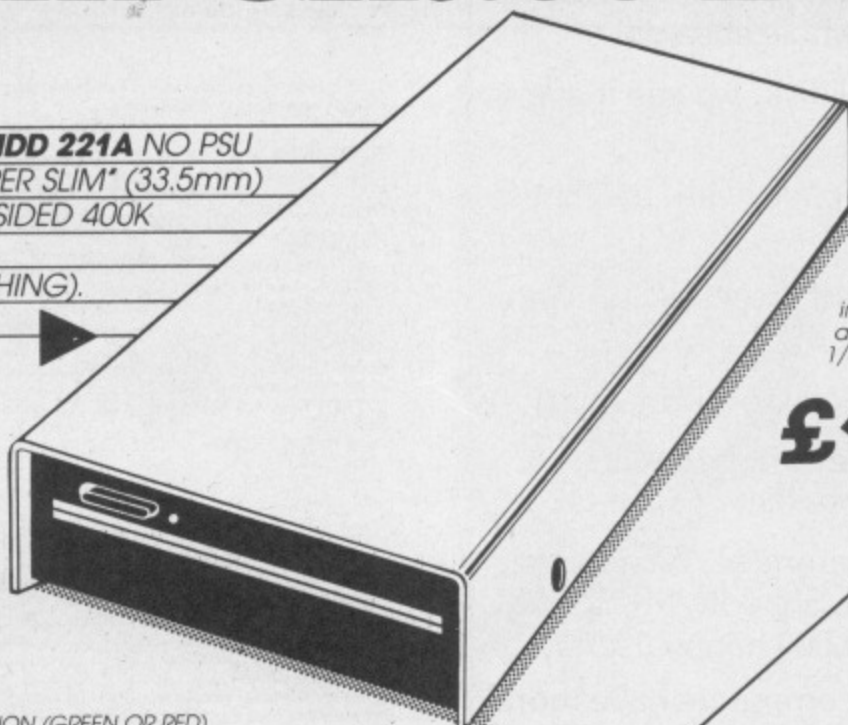
(16 lines)

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).

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)



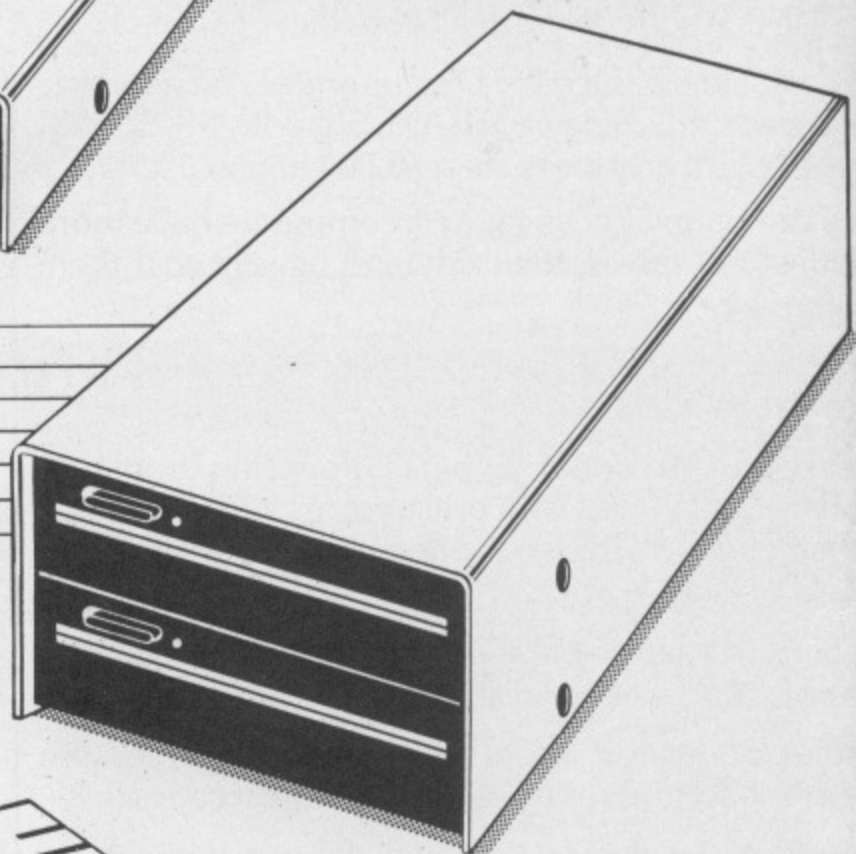
SPECIFICATIONS:
 80 track double sided disc drive. 40/80 track switching with dual colour LED. Capacity 400K in single density, operates in double density. Direct drive, track to track access 3 ms in 96 TPI mode. Dimensions:- 1/3 standard height, only 33.5mm.

£125.00 INC

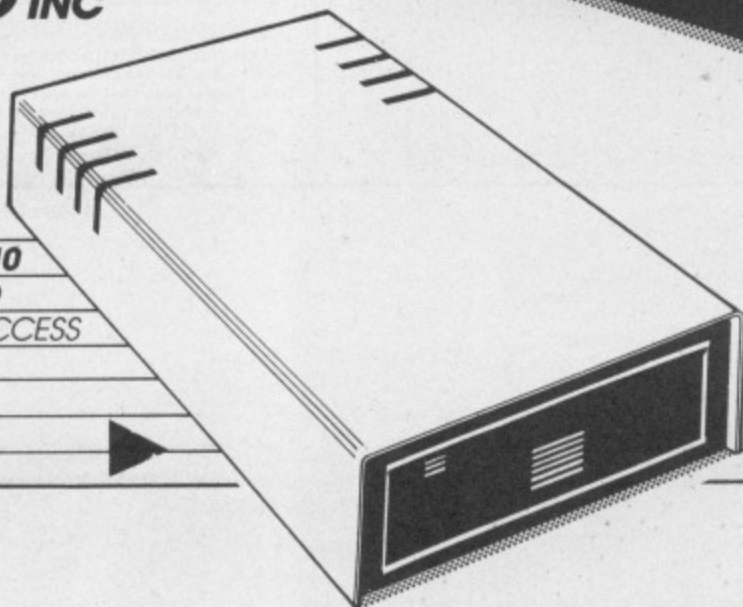
2 **CANON DUAL MDD 221A**
WITH PSU

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



3 **CANON SINGLE MDD 210**
40 TRACK DOUBLE SIDED
6ms TRACK TO TRACK ACCESS
HEAD LOAD SOLENOID
DIRECT DRIVE

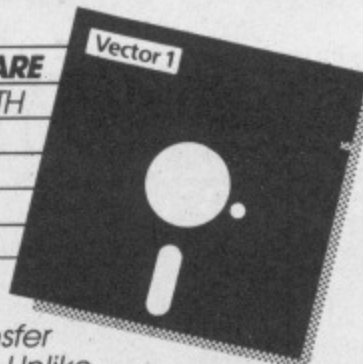


£75.00 INC

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 1 allows 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 **£16** On its own
£15 If purchased with disc drive
- Vector 2 **£16** On its own
£15 If purchased with disc drive
- Vector 1 & 2 **£30**

6

DIAGRAM

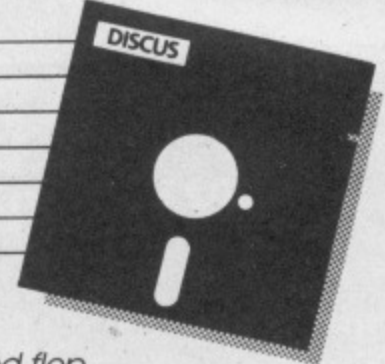
A PROGRAM WHICH ALLOWS YOU TO STORE VERY LARGE DIAGRAMS — UP TO 39 MODE 0 SCREENS — AND VIEW OR EDIT THEM BY SCROLLING THE COMPUTER SCREEN AROUND OVER ANY PART OF THE DIAGRAM

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,

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.

EPROMS

QUALITY EPROMS BY 'HITACHI'

2764-250 NS	£3.00
27128-250 NS	£5.00

INCLUSIVE OF P&P & VAT

- 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.

£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	£119	£125	£149
Single Drive & Case/PSU: *u/c — UPGRADEABLE		—	£144	£173*u/c	£174
Dual Drive & Case		—	£229	—	£279
Dual Drive & Case/PSU:		£185	£244	£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

SEE US ON STAND 47 ON THE 27th - 29th SEPTEMBER AT THE BBC MICRO USER SHOW MANCHESTER.

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
 6809 £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 £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 5 1/4" drives £5.50
 Brand NEW metal cases with internal PSU etc for above drives, below cost!!!
 DSKC 1 for 2 HH or 1 FH 5 1/4" drive £39.95 + pp £4.50
 DSKC 2 for 1 HH or 1 FH 5 1/4" 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, £255.00, 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 synchronous 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



DISPLAY ELECTRONICS

HOT LINE DATA BASE



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
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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.

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



BT 600 Jack plug and cable £2.25 Carriage and Ins. £10.00

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.

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. Composite 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 PSUs £3.00

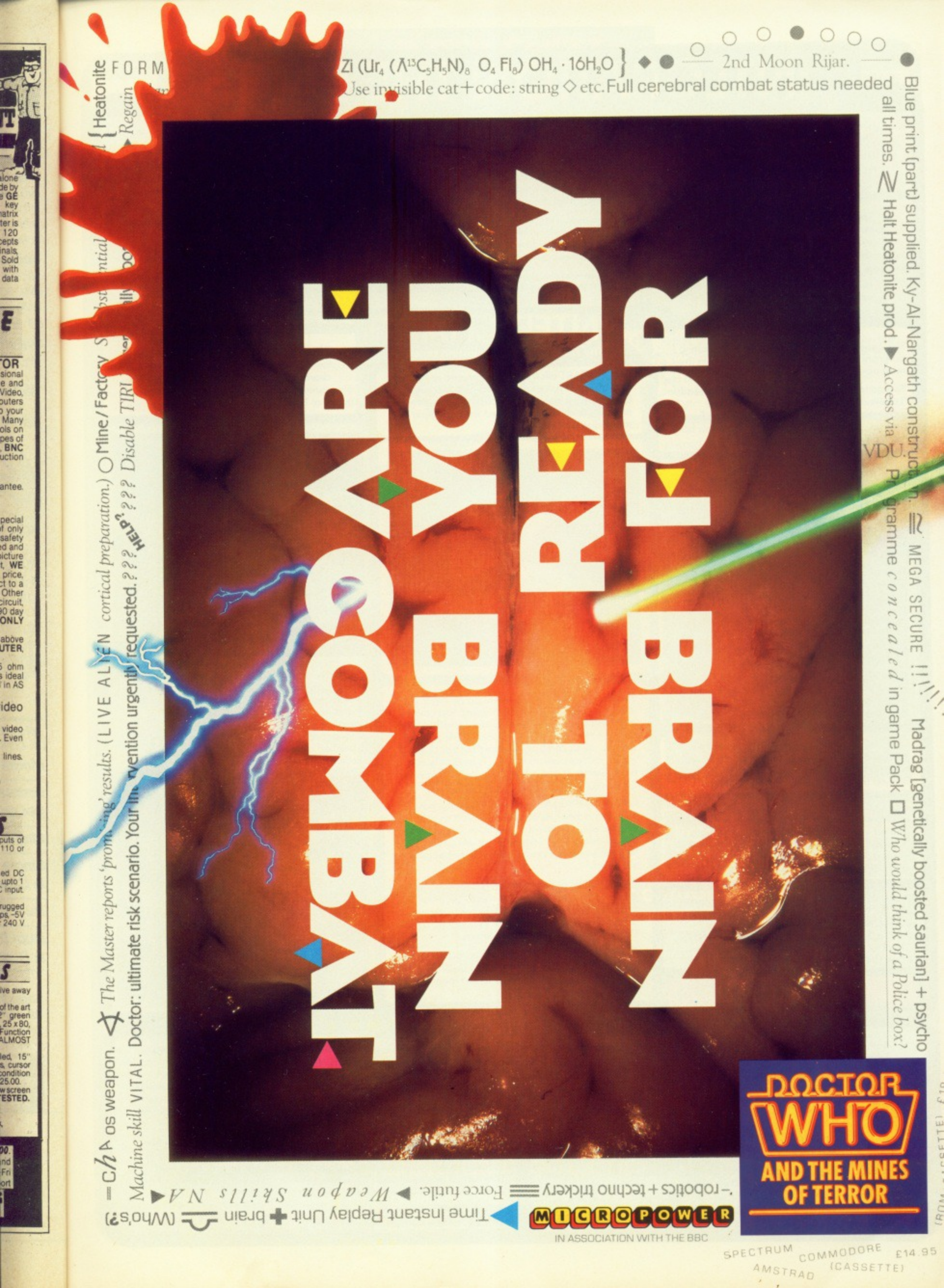
VDU TERMINALS

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.

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 Regent Way, Upper Norwood, London SE19 3XF
 Telephone 01-679 4414 Telex 894502 Data 01-679 1888





LIVE! YOU ARE NOT READY FOR BRITAIN COMBAT

DOCTOR WHO
AND THE MINES OF TERROR

MICROPOWER

IN ASSOCIATION WITH THE BBC

Time Instant Replay Unit + brain (Who's?)
Force futile. Weapon Skills NA

Machine skill VITAL. Doctor: ultimate risk scenario. Your invention urgently requested.???

Zi (Ur₄ (Λ¹³C₅H₅N)₈ O₄ Fl₈) OH₄ · 16H₂O } 2nd Moon Rihar.
Use invisible cat + code: string ◇ etc. Full cerebral combat status needed

Blue print (part) supplied. Ky-Al-Nargath construction. MEGA SECURE
all times. Halt Heatonite prod. Access via VDU. Programme concealed in game Pack Who would think of a Police box?

Heatonite FORM
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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.

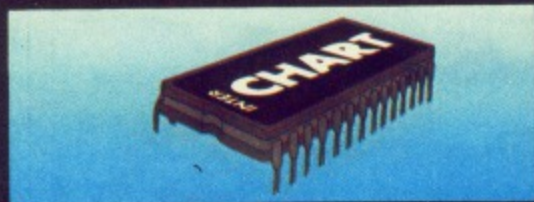
Put simply, this means that INTER-SHEET can use multiple spreadsheets and use data from one sheet in another sheet, and INTER-CHART can plot graphs using data taken directly from a spreadsheet. When INTER-WORD and INTER-BASE are available then these will be able to use data from the other packages in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

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.

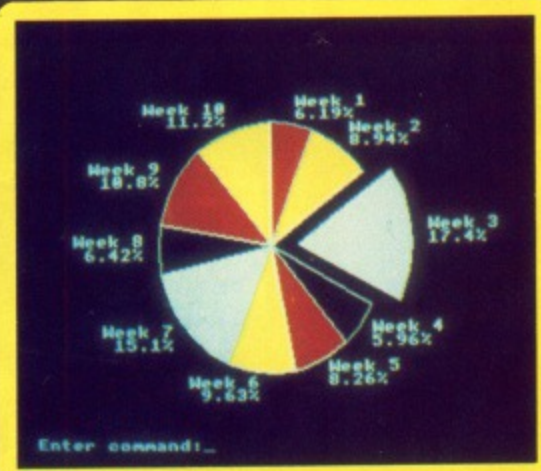
Once the data has been entered a straightforward editor allows any previous data to be altered or new values to be inserted at any position.

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').

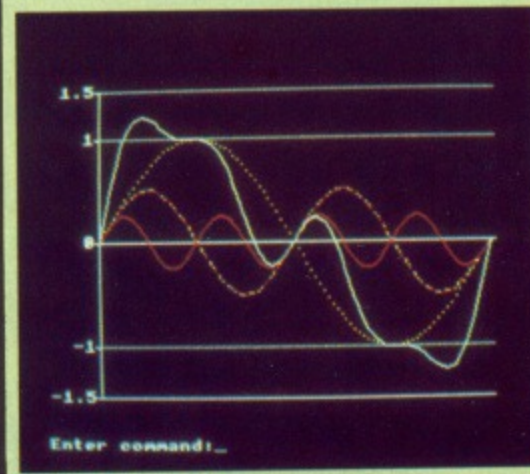
PRINTERS: INTER-CHART has a built in screen dump routine for all EPSON matrix printers and compatibles. It is possible to use other screen dump routines from within (or external to) INTER-CHART for other printers or plotters.

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

The electronic spreadsheet program

FACTS

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.

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

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).

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

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.



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.



ROM BASED SOFTWARE FOR THE BBC MICRO

Spreadsheet comparisons

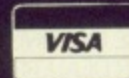
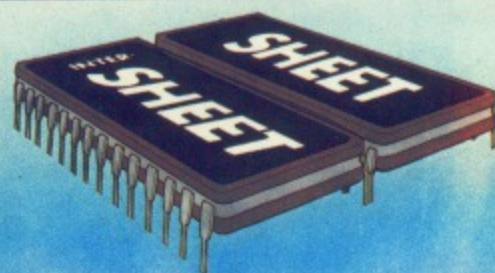
Times in seconds	VIEW-SHEET	ULTRA-CALC 2	INTER-SHEET
Replicate SIN(PI) into boxes A1 to Z50	66	65	7
Recalculate the above	28	33	5
Number of bytes free with above sheet	4664	1415	8400
Price (Exclusive of VAT)	£52.00	£69.13	£49.00

PRICE: £56.35 incl.



Computer Concepts

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



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, overlapping colour windows, colour patterns and an extended Icon set in all graphic modes.

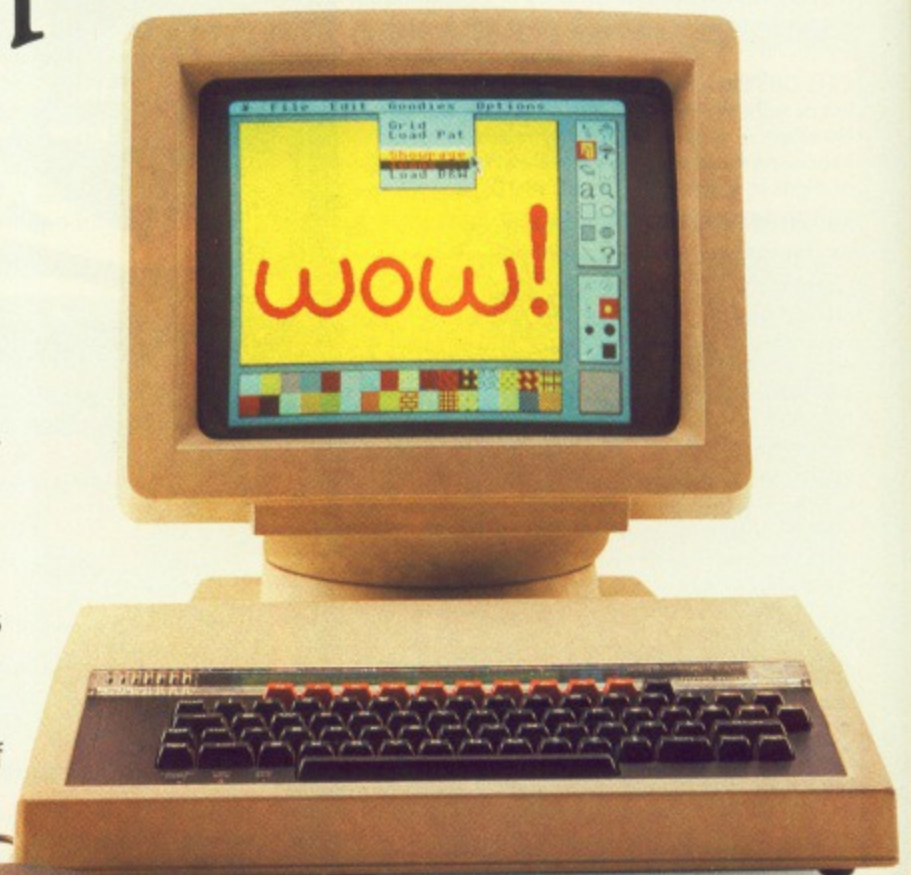
Specially written to be usable with the vast majority of BBC Systems including 2nd processors, the Aries RAM Board, the BBC + Shadow mode, tape, DFS and ADFS.

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.

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 irresistible 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

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 dodecahedron.

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

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

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 calendar

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

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.

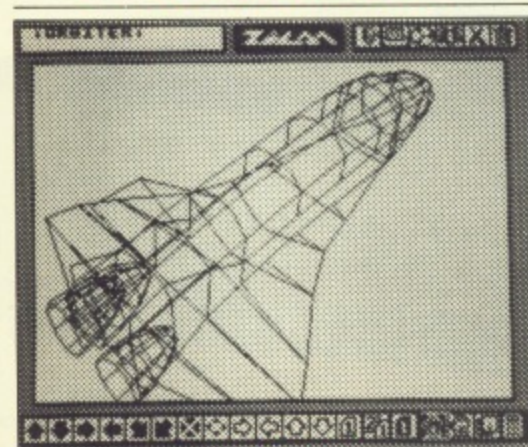
AMX PAINT POT

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

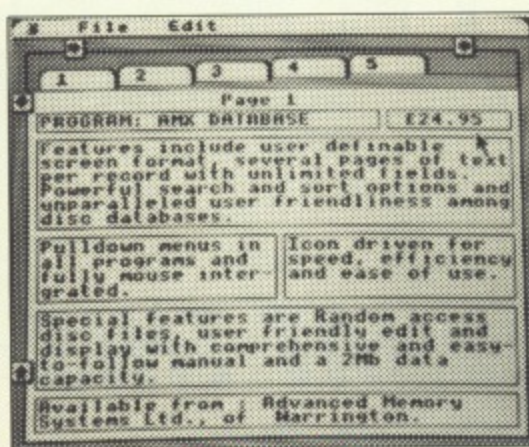
They will burst into life with rich, vibrant colours, and with a palette of 256 different shades you should not be short of inspiration.

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

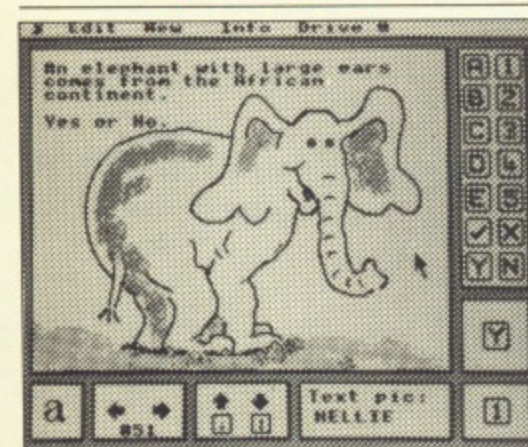
To start you off we have included eight exciting pictures in the program.



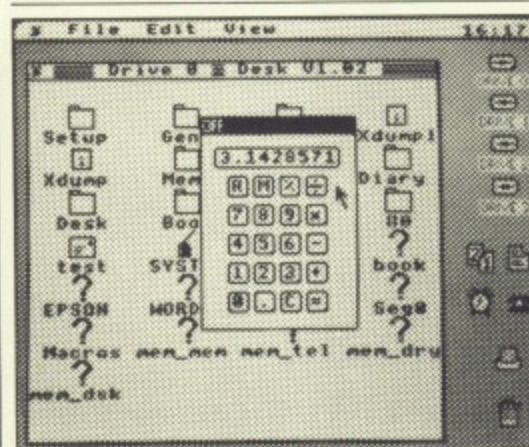
AMX 3D ZICON
£24.95 INC VAT, DISC



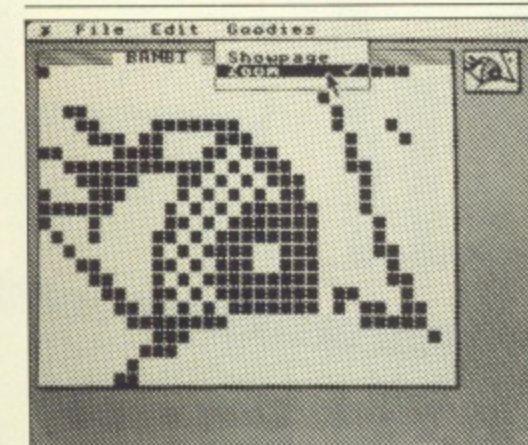
AMX DATABASE
£24.95 INC VAT, DISC



AMX XAM
£24.95 INC VAT, DISC



AMX DESK
£24.95 INC VAT, DISC



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



AMX PAINT POT
£14.95 INC VAT, DISC

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.

QUICK TO LEARN

THAT'S...

MINI OFFICE



SPREADSHEET

	A	B	C	D	E	F
1	MONEY	JANUARY	FEBRUARY	MAR	APR	MAY
2	MORTGAGE	85.72	85.72	85.72	85.72	85.72
3	FOOD	46.24	41.42	41.42	41.42	41.42
4	FUEL	46.25	47.28	47.28	47.28	47.28
5	LEISURE	20.00	20.00	20.00	20.00	20.00
6	OTHER	99.85	17.12	17.12	17.12	17.12
8	TOT SPENT	298.06	211.55	211.55	211.55	211.55
11	EARNINGS	321.21	321.21	321.21	321.21	321.21
12	B. FWD.	27.25	0.00	0.00	0.00	0.00
14	TO SPEND	348.46	321.21	321.21	321.21	321.21
15	SPENT	298.06	211.55	211.55	211.55	211.55
17	REMAINING	0.00	109.66	109.66	109.66	109.66
19	SAVE	0.00	82.25	82.25	82.25	82.25
20	C.FWD.	0.00	27.41	27.41	27.41	27.41

JUST LOOK WHAT THIS PACKAGE CAN DO!

WORD PROCESSOR – Ideal for writing letters or reports! *Features:* Constant time display ● Constant word count (even shows words per minute) ● Normal or double-height text on screen or printout.

SPREADSHEET – Use your micro to manage your money! *Features:* Number display in rows and columns ● Continuous updating ● Update instantly reflected throughout spreadsheet ● Save results for future amendments.

GRAPHICS – Turn those numbers into an exciting visual display! *Features:* 3D bar chart ● Pie chart ● Graph.

DATABASE – Use it like an office filing cabinet! *Features:* Retrieve files at a keystroke ● Sort ● Replace ● Save ● Print ● Search.

DATABASE

RECORD No. 1 SURNAME: JONES FIRST NAME: SIMON ADDRESS1: 6 BROAD LANE ADDRESS2: LIVERPOOL TELEPHONE: 051-632 8000 AGE: 42	RECORD No. 1 SURNAME: ANDREWS FIRST NAME: JAMES ADDRESS1: 12 ELF ROAD ADDRESS2: HEREFORD TELEPHONE: 321-623451 AGE: 13
RECORD No. 2 SURNAME: ANDREWS FIRST NAME: PETER ADDRESS1: 12 ELF ROAD ADDRESS2: HEREFORD TELEPHONE: 321-623451 AGE: 19	RECORD No. 2 SURNAME: ANDREWS FIRST NAME: PETER ADDRESS1: 12 ELF ROAD ADDRESS2: HEREFORD TELEPHONE: 321-623451 AGE: 19
RECORD No. 3 SURNAME: SMITH FIRST NAME: JANE ADDRESS1: 42 HIGH STREET ADDRESS2: SALFORD TELEPHONE: 823-61421 AGE: 27	RECORD No. 3 SURNAME: BRINN FIRST NAME: YIETH ADDRESS1: 15 MILL ADDRESS2: WARRINGTON TELEPHONE: 853-809 AGE: 30
RECORD No. 4 SURNAME: YATES FIRST NAME: IAN ADDRESS1: 177 FORD ROAD ADDRESS2: GULLHAM TELEPHONE: 452-986 76543 AGE: 35	RECORD No. 4 SURNAME: BROWN FIRST NAME: IAN ADDRESS1: 17 LEA ADDRESS2: NORWICH TELEPHONE: 811-7 AGE: 21
RECORD No. 5 SURNAME: ANDREWS FIRST NAME: JAMES ADDRESS1: 12 ELF ROAD ADDRESS2: HEREFORD TELEPHONE: 321-623451 AGE: 13	RECORD No. 5 SURNAME: BROWN FIRST NAME: JIM ADDRESS1: 8 ELF ADDRESS2: NANTW TELEPHONE: 681 AGE: 11

...and it's all at
price of just

MINI, EASY TO USE

BBC MODEL 'B' and ELECTRON

	D	F	G	H	I	J	K	L	M	N	O	TOTAL
	MAR	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER			
85.72	91.37	91.37	91.37	91.37	91.37	91.37	85.34	85.34	85.34	85.34	85.34	1055.75
26.71	41.23	38.29	32.71	27.98	35.99	40.89	29.89	35.85	48.23	46.45	46.45	460.26
36.81	25.41	20.04	22.34	16.85	24.96	29.77	35.85	30.00	30.00	30.00	30.00	305.00
27.00	25.00	25.00	25.00	19.49	26.89	107.90	38.02	38.02	79.49			651.56
56.87	49.29	18.45	29.96									2858.14
254.91	232.50	191.15	201.38	180.69	219.21	292.90	228.80	289.51				4111.55
												25.40
												4156.72
												2858.14
												1278.58
												958.94
												119.65

GRAPHICS

WORD PROCESSOR

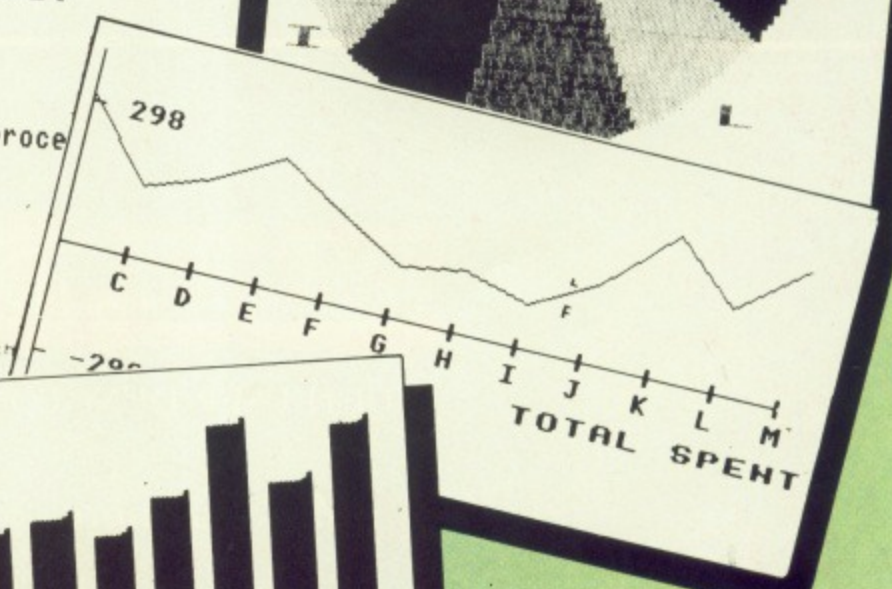
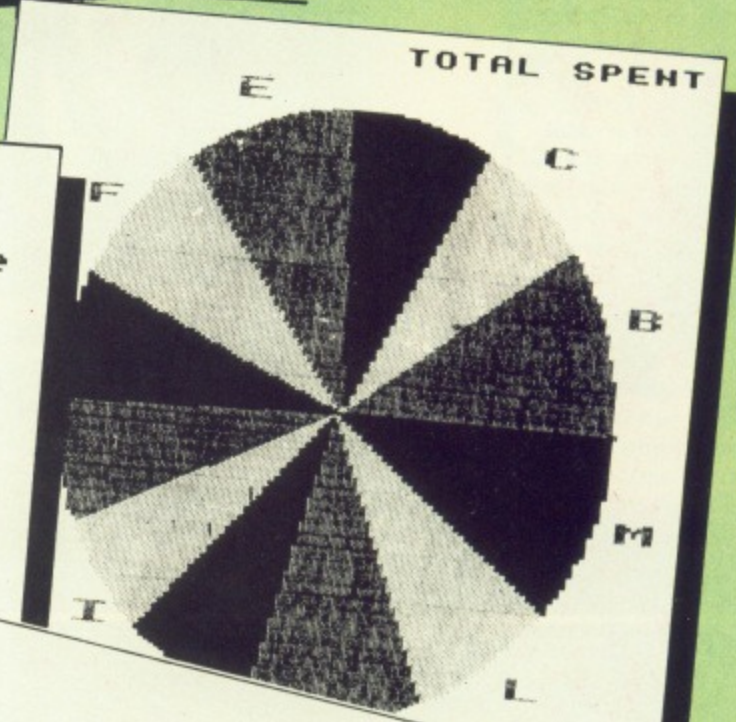
This is a demonstration of the MINI OFFICE word processor showing the various printout options available.

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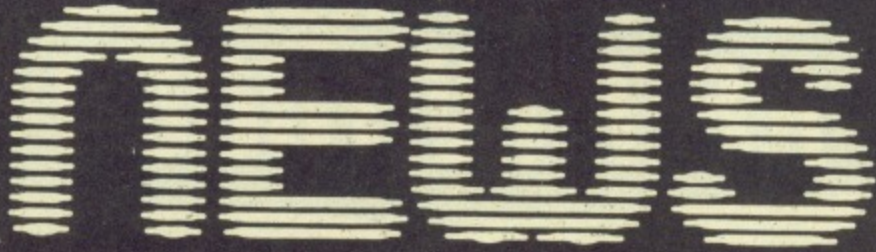
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NEW PRODUCTS LINING UP FOR THE SHOW

A SURVEY has revealed that more than 20 leading peripheral manufacturers are currently working against the clock to launch new products at the Electron & BBC Micro User Christmas Show.

Ex - Acorn executives launch a cut price micro chip plant

A TRIO of key executives who helped put the BBC Micro on the map have launched a new company which may similarly revolutionise the British computing industry.

Drawing heavily on technology previously developed by Acorn's back room boys, the team has set up a unique cut price chip fabrication plant.

Known as Qudos - Quick Design on Silicon - it is hoped that it will become the catalyst for a whole new generation of UK micro designers.

The venture has brought together Dr Herman Hauser, co-founder of Acorn, Dr Andy Hopper, the company's former research director, and Peter O'Keefe, ex-marketing boss.

Also joining them is Dr Haroon Ahmed, director of the microelectronics department at the world famous Cavendish Laboratory in Cambridge.

Initially aimed at colleges and small companies, the service will enable semi-custom chip design to be undertaken at dramatically reduced prices.

Qudos software is currently available for educational establishments for £500, when comparable software in the industry could cost up to £30,000.

This package will enable students to prepare first time designs - laying out the circuit, simulating and checking it - on a

floppy disc.

For as little as £100 per chip a prototype can then be made by Qudos using an electron beam machine to etch directly into the silicon.

"What we are doing is offering the opportunity to design silicon chips to people who would never have been able to afford it before", Peter O'Keefe, the Qudos managing director, told *The Micro User*.

How has Qudos managed to achieve the dramatic price breakthrough?

"We already had the software available thanks mainly to Andy Hopper and the work done by Acorn's VLSI team", says Peter O'Keefe.

"The other major capital outlay in a project like this lies in the electron beam machines, which usually cost £1 million each.

"We have got around this by building our own. So we'll have three at a substantially reduced cost. All in all, we have drawn entirely on our own team's technological expertise to keep the costs down to a minimum".

Currently Qudos employs 12 people at its 5,500 sq ft headquarters building in the Science Park at Cambridge. However the company expects the payroll to have doubled by Christmas.



AMX Pagemaker in action

AMX BRING OUT SUPER MOUSE

ENTER Super Mouse. The add-on for the BBC Micro which won such critical acclaim that it reached the final of the Peripheral of the Year Award 1985 has finally met its match - an enhanced version of itself.

Back room boys at Advanced Memory Systems of Warrington who produced the AMX Mouse have now come up

with a package that takes it into new territory.

Combining the new AMX Super ROM and Super Art program, it extends the original facilities to include pull down menus, overlapping colour windows, colour patterns and an icon in all graphic modes.

It has been specially written for most BBC systems including second

processors, the Aries RAM Board, the BBC B+ Shadow mode, tape, DFS and ADFS.

The package will work even without the mouse itself. Priced at £49.95, it can be used with just the keyboard or joystick.

However AMS claims it really comes into its own when used with the

But such is the sensitivity in the marketplace, not one firm contacted would provide even the barest details of their top secret projects.

You'll have to wait for the show", one managing director told *The Micro User*. "After all, even a whisper in this highly competitive community can be disastrous.

"But you can rest assured that everyone will be doing their level best to be ready for the show, which is universally viewed as the highlight of the BBC Micro year".

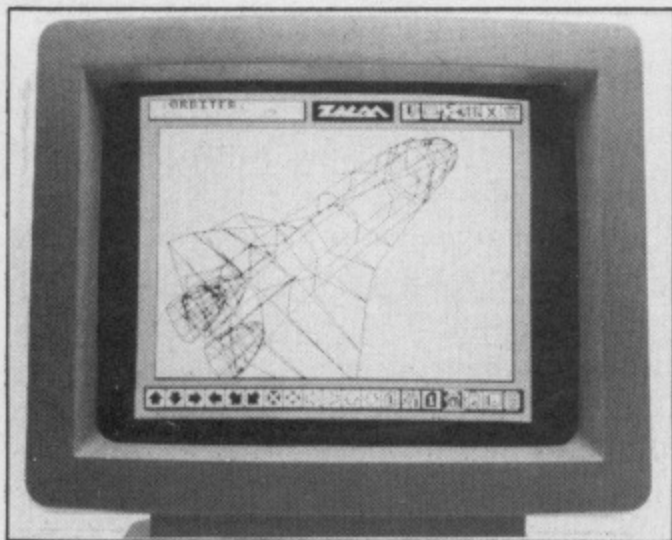
The show is to be held from November 14 to 17 at the New Horticultural Hall, Westminster, the same venue as the last show, which then broke all previous records.

Advance ticket sales have never been heavier and most stands had been sold six months ago.

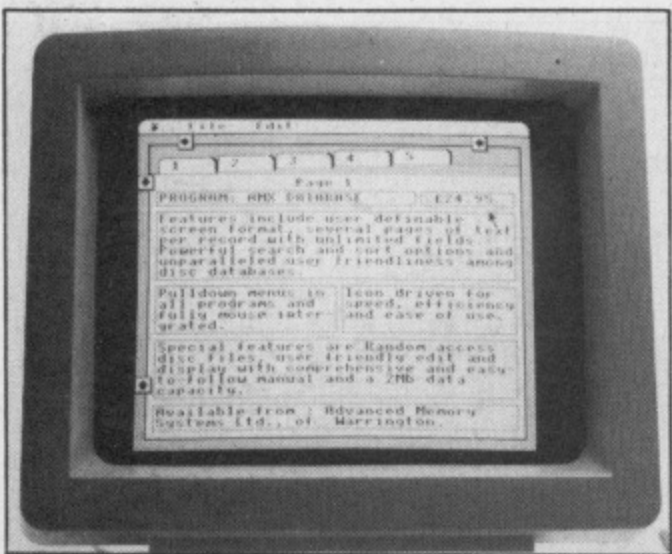
"This show has always proved to be the major BBC Micro event of the year", said Derek Meakin, joint managing director of Database Publications, the organisers.

"And this one should prove to be a bonanza - the biggest event featuring the BBC Micro that has ever been seen.

"No wonder the manufacturers are aiming so many new products for this show".



Graphics by 3D Zicon and, below, the 1,000 field database



From Page 23

AMX mouse, which can be bought for a further £40.

The new package will also run with any of the 10,000 AMX mice already sold to users of the BBC Micro.

It is the 16k ROM which provides either the tape or disc user with a Mode 1 colour drawing program. But users with a disc based system will find numerous additional facilities can be selected direct from screen.

Colour pictures can be created in pixel resolution up to A4 size by scrolling the screen window. Other functions include use of icons, additional text styles, copy facilities and colour zoom.

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

Asked to explain the differences between the old mouse package and the new one, a company source replied: "It's a bit like Clark Kent turning into Superman really - only this is Super Mouse..."

AMX has also launched a range of icon-

driven software for mouse owners to get their teeth into.

The leader of this pack is likely to be the AMX Pagemaker, a high resolution A4 typesetting and artwork system.

Comprising two ROMs, 8k and 16k, it features a fast scrolling page, wide selection of typefaces and fonts and a cut and paste facility.

A full A4 page - or any part of it - can be dumped to printer in high resolution.

With the AMX 3D Zicon, it becomes possible to transform three dimensional vector data and translate them into on-screen graphics.

AMX Database offers a filing program featuring 1,000 records with unlimited fields per record, together with a search and sort facility.

On the educational front, AMX XAM allows the creation of a multiple choice exam which could not be altered by the examinee.

Prices range from £14.95 to £49.95.

"We have designed these to stretch people's minds without stretching their budget", said an AMS spokesman.

BBC MICRO HELPS SIMPLY RED TO KEEP IN TOUCH

HARD work and talent have smoothed the path to stardom for Britain's hottest pop group, Simply Red.

But the success story of the six youngsters from Manchester also owes a lot to thoughtful planning and efficient organisation - stemming from a back-room operation whose cornerstone is a BBC Micro.

While they are busy songwriting and performing, the micro keeps track of their engagements, correspondence, accounts - in fact all the records that don't have a hole in the middle.

This month Simply Red move on to a new level of high tech sophistication when they become the first pop stars to introduce telecomputing into their organisational structure.

When their current national tour with superstars UB40 ends they will embark on their first major solo countrywide series of concerts.

All the time they are on the road they will be in contact with their Manchester headquarters through the medium of MicroLink, Britain's fastest-growing electronic mail service.

The group's road manager will have a portable computer with him for communication via modem and MicroLink to



the BBC Micro at Manchester for updates to their schedule, news of contracts and recording offers and instructions from the group's manager, Elliot Rashman and associate manager Andrew Dodd.

When that tour ends early in December Simply Red are off to Belgium, Holland and France. In January they tour the rest of Europe and then head for America.

And the portable micro will go with them everywhere - as much a part of their equipment as the guitars and drums.

The group's manage-

ment bought their BBC Micro earlier this year on the advice of computer enthusiast Andrew Dodd in time to help with the extra workload resulting from demands for Simply Red's services following their smash hits "Money's Too Tight To Mention" and "Come To My Aid".

"The computer is now an indispensable part of our organisation", Elliot Rashman told *The Micro User*.

"All our accounts; our files, our address index are on the system. We use it as a word processor for correspondence, invoicing and information sheets for the band and the road managers.

"We've been able to load a lot of our work on to the BBC Micro because it is so user friendly that we have quickly been able to take advantage of what it can do for us.

"Now we are very much into telecomputing and our MicroLink membership means that wherever the band is in the world they are only seconds away from getting the latest information from myself and Andrew here at the office".

Safer transfer

IF transferring taped programs to disc is giving you problems, Vine Micros claims its new Replay system for the BBC Micro gives 100 per cent success with next to no effort.

The system includes a stop and save routine, a facility to print out any screen, and most disc-to-disc transfer.

Arcade adventure games can be loaded from

where the user left off, and hard copies can be made of the player's performance.

Vine promises Replay won't turn users into pirates. Because of encoding, the discs produced on one computer are not useable on another, making the system completely personal.

Replay is in ROM with additional hardware.

Price: £35.

'Fix it' sparks new language

A "JIM'LL Fix It" television programme five years ago was the inspiration for an information scientist's involvement in designing teaching packages which has culminated in him producing a radical new computer language system for the BBC Micro called MicroCodil.

Dr Chris Reynolds, of Brunel University, Uxbridge, saw Jimmy Saville fix it for a boy who wanted a computer to do his homework for him. That gave the educator and computing expert the idea of writing software to help his own students.

Over the years he has steadily developed his programs and has now come up with MicroCodil, a teaching package which he says

"provides the user with a knowledge-based environment which contains all the tools a novice needs to handle null and multiple values, ranges, approximate matching — both numeric and spelling errors — probabilities, and fuzzy matching".

These facilities, he says, are totally missing in most conventional languages, and are often difficult to use in sophisticated research-based artificial intelligence and expert systems packages which only run on very powerful computers.

Dr Reynolds says MicroCodil is an integrated language system for the BBC Micro based on "a very simple yet extremely powerful model of human thought processes.

"This provides a friendly

environment which can be used to support classroom applications, to assist in computer appreciation classes, or to demonstrate a wide range of advanced information technology concepts to computer science students", he said.

The package utilises windows to provide the user with alternative views into the system, and colour to provide dramatic syntax checking of the user's typing.

MicroCodil consists of two discs containing almost 200k of programs, knowledge bases and help files. The price is £25 for a double sided 80 track disc.

It is available on a double sided 40 track disc for the same price or on two single sided discs for £30.

OXFORD PASCAL

PUBLISHER Holt Saunders has brought out a definitive guide to Oxford Pascal for the BBC Micro, recommended by Oxford Computer Systems.

Its author, Ian Sinclair, who has written more than 30 books on computer-related topics, says: "Pascal has been a language waiting for a good implementation and I believe Oxford Pascal is just that".

Price is £7.95.

3D graphics

A FULL 3D graphics development system for the BBC Micro that allows the user to create, display, modify and store 3D graphics images has been launched by Glentop Publishers.

The Honeyfold system permits images to be included in the user's own software, either from Basic or machine code.

Available on 40 or 80 track, the system costs £25.

Comms system

A VIEWDATA communications system for the BBC Micro has been released by Xyllyx.

It includes all necessary software, cables and modem and costs £99.

Welfare worker wants software

COMMUNITY worker Stasia Sykes wants to find a socially motivated programmer willing to write software for the BBC Micro that will help the unemployed and others to get the benefits to which they are entitled.

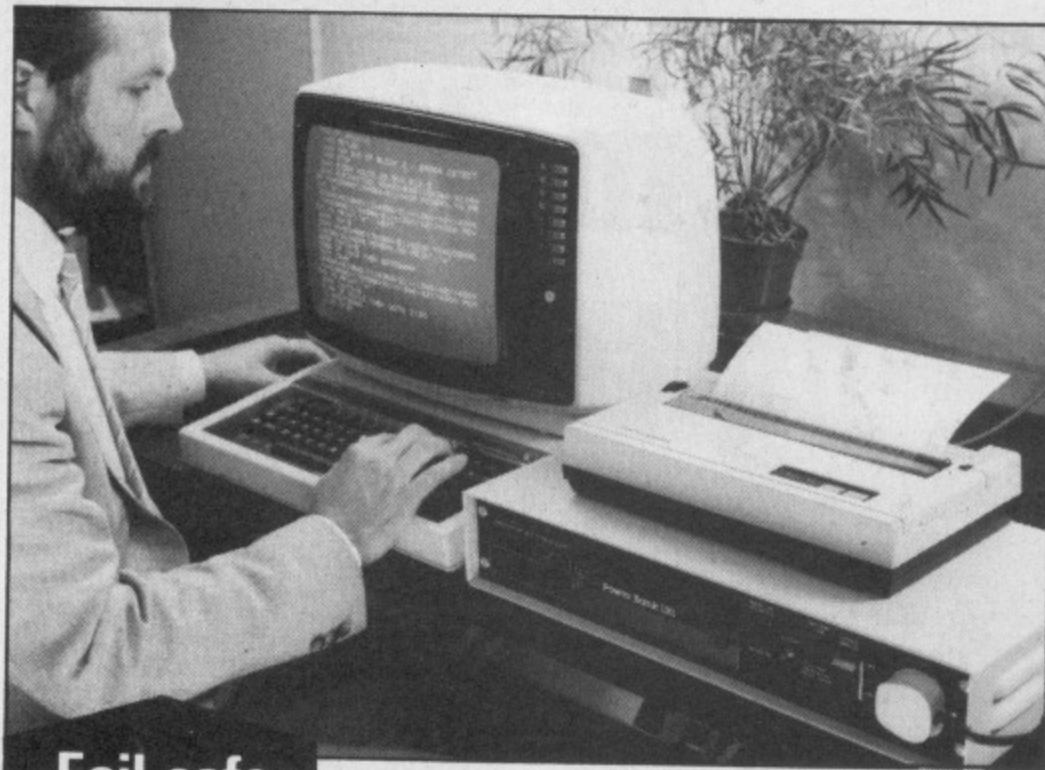
The micro in the activities room at the Probation Service offices in Manchester, where she is a resource person, is currently being used for playing arcade games.

"We want to see the machine used for more serious purposes", she told *The Micro User*. "For instance there is a great need for welfare rights information that can be accessed simply and easily.

"At the moment it is spread throughout dozens of brochures, not all of which are comprehensible to everyone.

"The DHSS and Citizens Advice people have this sort of information on disc, but their programs are either very complicated to use or they don't run on a BBC Micro.

"So if any reader of *The Micro User* can help by taking all the available information and putting in a program for us we'd like to hear from them on 061-226 3515".



Fail-safe power pack

A NEW uninterruptible power supply from Power Equipment can provide a BBC Micro with emergency power for 20 minutes in the event of mains supply failure, allowing time for data to be safely copied to disc.

The 120 VA Power Bank also smooths out data corrupting power spikes and surges to give a steady frequency and voltage at the output.

Installed between the mains and the micro, it contains a bank of sealed-for-life batteries which are continuously recharged from the mains.

During mains failure a battery condition monitor will operate an audible alarm when the charge is becoming too low for effective operation.

Price £495.

SHOW THE CHANCELLOR HOW IT'S DONE

COME Budget day arm-chair economists throughout Britain agree on just one thing — the Chancellor has got it wrong again.

But until now his critics have never been able to test how good a job they could do on balancing the nation's books.

Educational software house Chalksoft is providing BBC Micro users with that chance with one of five new educational titles on disc in its latest catalogue.

Its Yes Chancellor, price £17.50, is a complex simulation game for 11-year-olds upwards. It allows the user to take the Chancellor's place and set the country's level of taxation, borrowing and its budget.

It then works out what

would have happened and leaves the user to sort out the results.

A decision to award civil servants huge pay rises may lead to greater borrowing. This in turn means higher interest payments which have to be offset by raising income tax.

Other sectors become angry at this and demand rises also.

The other four BBC titles are Hotline Quiz, Number 5, Statspak and Centre-Ville.

Hotline Quiz challenges children of primary and middle school age to save the world from nuclear war by correctly answering questions on

nine subjects. Questions can also be set by the teacher. Price: £14.95.

Number 5 is a five program mathematics suite, priced at £14.95, which includes estimating, reading dials, simple algebra and tables.

Also dealing with numbers is Statspak. It enables those learning or teaching statistics to explore the subject and prepare data and charts for display and analysis. Price: £17.50.

Centre-Ville is a French language program for middle and secondary schools, covering subjects such as directions, colours and numbers. Price: £17.50.

PLUTO II GRAPHICS INTERFACE

TO give the BBC Micro user enhanced graphics capability PLB has devised an interface for the Pluto II graphics card manufactured by I/O Research.

The result is the Pluto programmers library for the BBC Micro, written in 6502 machine code, which accesses the more than 100 Pluto commands.

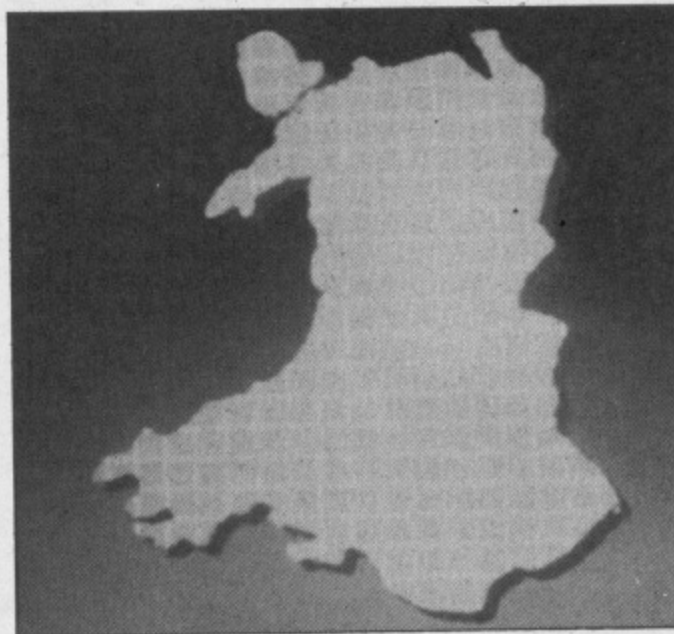
These allow the programmer to invoke most of the commands referred to in the Pluto/Palette manual as user callable functions and Palette commands.

Within the Pluto

firmware these range from simple line drawing to copying complete areas of the screen.

Also included is a screen saving routine and a graphics tablet routine which are the elementary building blocks from which more complex routines may be constructed.

A simple graphics package with many standard routines of line drawing, rubber banding lines, rectangles, colour fills, brushes and others is packaged with the interface and software library at a cost of £250. Pluto II costs £2,925.



Assassin gets the chop

A SOFTWARE house's name for one of its BBC Micro text adventures, Assassin, has itself been killed.

Robico released Assassin in February to magazines for review. Later ICI asked for the name to be withdrawn as it already used Assassin as a trademark.

In a generous gesture ICI agreed to contribute towards the cost of changed advertising and packaging.

Unfortunately Robico's customers have not yet become accustomed to the new name.

"We still get them asking for the Assassin", said the company's Robert O'Leary. "They are quite bewildered when they receive Rick Hanson, the program's new name.

"It is difficult to get it to register that the game is the same in all but name".

And just who is Rick Hanson - a famous assassin from the past?

"He's just the character that the adventure is based on. The name was made up by the programmer", says Robico.

Adventure for Robin Hood

THE adventures of Robin Hood are now featured in *The Touchstones of Rhiannon*, latest game from Adventure International for the BBC Micro.

Based on the TV series *Robin of Sherwood*, it uses full sentence commands.

The player assumes and controls the character of Robin Hood. Maid Marion and friends assist Robin in his task to retrieve the Touchstones of Rhiannon and return them to Rhiannon's Wheel.

Available on cassette price £7.95. Text only.

Electronic mail is attracting teachers

HEAD teachers, school administrators and local education authorities have become such enthusiastic users of The Times Network for Schools electronic mail service that they are being offered their own separate mailboxes at special rates.

Doc aims high

AIMING to repeat the success of its chart topping program 747, Doctor Soft stays in the air with *Phantom Combat* for the BBC Micro.

As well as the usual flight simulator features, the 3D outside view is enhanced by computer drawn and flown delta aircraft outlines permitting formation flying and combat.

Written by a professional pilot and a military flight simulator software engineer, the program has a "simulator inside a simulator" mode where target aircraft are controlled from separate keys.

One or two analog sticks can be used or full key controls. Price: £9.95.

Secondary school members of TTNS can now take up extra electronic mailboxes at a cost of £34 each for the whole academic year.

The offer is also open to new subscribers signing up before the end of this month. From December

mailboxes will cost £34 a term.

For each full-price mailbox, costing £69 a term or £187 a year for unlimited access, TTNS members will be entitled to a second mail-only box primarily intended for communication between head teachers, school administrators and their local education authorities, as well as with other members of the system.

Every local education authority in the UK now has at least one TTNS mailbox, and membership

stands at more than 1,000 schools, universities and colleges.

The supplementary mailboxes now being offered are dedicated to high-speed exchange of messages, including lengthy documents.

A TTNS spokesman told *The Micro User*: "The idea of the extra mailboxes is so that schools can have one devoted to administration and software downloading, allowing the main installation to operate exclusively as a teaching resource".

Putting micro to work

A METHOD of connecting working models to a BBC Micro is provided by three new interfaces from Pilot One.

The controllers plug into the user port of the micro and the software provided allows models to be driven from the keyboard.

Alternatively, a sequence of movements can be programmed.

Buggy Controller has relay outputs to independently control the direc-

tions of two motors. In addition a switch circuit is connected for controlling lights, horns or an electro-magnet. Price £37.50.

Crane Controller connects a model crane to the BBC Micro. It has relay outputs to control the directions of three motors at a time and a switch circuit for controlling lights, horns or an electro-magnet. Price £39.50.

Railway Controller has relay outputs to independently control the direc-

tions of a model railway engine. Two outputs are available for connecting points, uncoupling rails or other track elements.

The engine circuit is fed from a separate power line so that speed can be controlled using a standard train controller.

Track elements can be supplied with the usual set power supply. The software pulses the power to the points to protect the motor drives. Price: £39.50.

Acorn thinks again on overseas sales targets

ACORN has been forced to drastically revise its previously buoyant overseas sales forecasts in the light of international market conditions.

It no longer expects to achieve vast volume sales world wide as happened in the UK.

The company now anticipates that it will sell little more than 30,000 BBC B+ machines abroad during the current year - only a marginal increase on 1984 sales.

"We are not expecting anything as spectacular as what happened in the UK", Owen Maddock, Acorn International's sales manager confided to *The Micro User*. "The

fact of the matter is that we have begun to appreciate that the British are a nation apart because of their interest in electronics. We are not expecting home micro sales to achieve anything like the sort of penetration elsewhere in the near future".

However Acorn predicts that its foreign sales will continue to grow annually - but not dramatically.

"We expect to maintain a slow but steady increase over the next few years", says Owen Maddock.

Australia is currently top of the overseas league for Acorn, accounting for between 25 and 30 per

cent of all international sales. The company's activities down under are confined almost exclusively to the education field.

Second comes Holland where sales are divided equally between home users and education. South Africa runs a good third, followed by New Zealand, Belgium and Italy.

The BBC Micros have also had some impact on the Indian subcontinent where they are being made under licence by a local company. In all some 4,000 machines have been sold out there.

"Potentially this is a vast market", says Owen

Maddock. "But once again we cannot expect to suddenly see huge sales of micros out there".

Acorn has even managed to get a foothold in Russia in the last few weeks with an order for "a few hundred machines".

The deal was handled by 3SL, official distributors for the Eastern block nations. However the company is going out of its way to play down the mini breakthrough.

"Considering we've been in there for two years, it's nothing to shout about", says 3SL spokesman David Springle.

"When sales get to 10,000 we'll be only too pleased to tell everybody".

Log-on to the Irish Man

A BBC Micro is playing a major role in a computer bulletin board system newly set up in Northern Ireland.

Schoolboy Mark Stringer, of Bangor, County Down, is using his micro, modem, Watford DDFS 1.53 and SBBS system software to operate the board.

Called SBBS II-The Irish Man, it operates seven days a week, from 9pm-11pm on ringback and 11pm to 9am direct connect - telephone Bangor 455162.

Baud rates provided are 1200/75 and 300.

Mark, a pupil of Bangor Grammar School, told *The Micro User* he hoped the board would cater for all home users.

Groups

"The bulletin board will have special interest groups for the common types of personal computer", he said.

"It will also have sections devoted to technical help for home computer users, music from pop to classic, graffiti, sales and wants, and will provide an electronic mail facility.

"I also intend to introduce some multi-user games similar to those run on Micronet by the Micronet Mailbox Club".

Econet helps engineers

STUDENTS at Brighton Technical College are using their BBC Micro Econet system in conjunction with a computer numerically controlled machine tool.

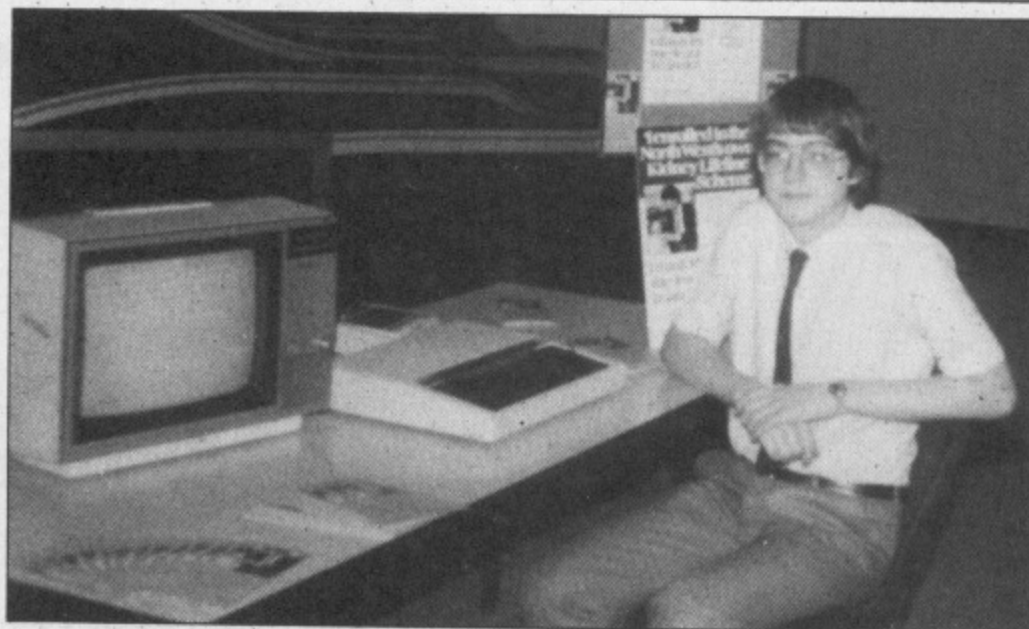
The Colne 5 CNC training lathe has software enabling tool-path emulation colour graphics.

This allows students from the college's mechanical and production engineering department to check a programmed cut before cutting commences.

Using Econet they can use additional software kits to work at separate BBC Micros, sharing access to the lathe.

Standard ISO G-codes are employed, as in full-size machine tools, and the lathe is able to cut mild steel to a high standard.

The complete package for the BBC Micro, from Colne Robotics, includes lathe hardware, manual and software kit, plus a selection of accessories and tools, and costs £2,295.



BBC database for kidney donors

THE success rate of kidney transplants is impressively high and the chances of patients receiving well matched kidneys is greater as more donors come forward.

Now with the help of a BBC Micro this success rate is being increased.

Pioneered in the North West is the world's first Computer Kidney Lifeline, written by Jason Welch, a pupil at Manchester Grammar School.

With the completion and return of a registration form to the Kidney Lifeline Micro at the University of Manchester's Institute of Science and Technology, lives can be saved.

Names and addresses from the forms are keyed into the machine. In the event of the sudden death of an individual the doctor can telephone the computer direct to ascertain whether that particular

person had registered.

If the answer is yes the doctor can then approach the next of kin.

Only hospital doctors have access to the computer, ensuring complete confidentiality of the information about donors contained on the database.

Anyone wanting to register as a potential donor should ring the Freephone Kidney Lifeline on 061-236 0678.

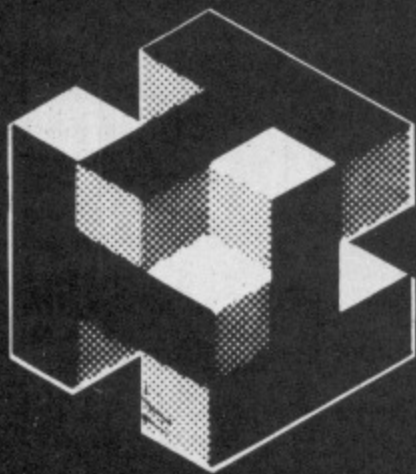
Practicalc II for BBC

THE spreadsheet with word processing and database capabilities, Practicalc II from Practicorp, is now available for the BBC Micro.

It is compatible with the 6502 second processor, most RAM boards and the BBC B+.

Features include 80 column display, when more than 32k of RAM is available, comprehensive context sensitive Help screens, variable column width and offset loading.

Price is £69.95.



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Micro Viewdata

A complete viewdata system

VIEWDATA SOFTWARE FOR THE BBC MICRO

Micro Viewdata allows you to create viewdata frames, store them on disk and display them — no modem or other equipment is needed. *Micro Viewdata* delivers more power for less money than rival packages, is a faithful offline emulation of MICRONET/Prestel and is easy to use. Powerful frame editing features include: cut-and-paste facility, on-screen windows, insert or delete lines, and an UNDO command. Other features include friendly routes editor, 'jotter' file, carousel facility, printer dump, coloured keystrip and extensive tutorial guide. Send for full details. *Tick box no. 1*

Edfax

TELETEXT emulator

Edfax is a simulation of teletext for the BBC micro. You can create colourful pages of information, store them on disk, make an index and search by page number. The whole package is easy to use and is an ideal introduction to the world of videotex. Create your own school magazine using the uncomplicated editor, which provides all of the features of Ceefax and Oracle screens including 'cycle' pages. Complete with an 80-frame sample database providing many ideas, coloured keystrip and full user guide written with the novice user in mind. Over 3000 sold to date! *Tick box no. 2*

LOGOTRON LOGO POWERS THE BBC MICRO

Professor Brian Harvey of the Massachusetts Institute of Technology, author of *Computer Science Logo Style*, wrote recently:

'The truth is that Logo is by far the most powerful programming language available for home computers.'

If you want to understand modern programming methods, artificial intelligence, and robotics, then Logo is the language for you. *Logotron Logo* breaks new ground by being fully extensible at machine code level; it resides on a single 16K ROM; and works with RAM extension boards, second processors, and on the BBC B+. *Tick box no. 3*



SPRITE LOGO MEANS HIGH-SPEED ANIMATION

Sprite Logo uses an advanced Texas Instruments video control chip, which generates up to 32 coloured sprites on the screen at any one time.

SETSPD, SETHEADING, SETCOLOUR, SETSIZE, SETSHAPE, SETPCOLOUR, SETWALK, FREEZE, THAW

These are just a few of the commands you can use to control the movement of the sprites on the screen. *Sprite Logo* offers supercharged turtle graphics, which hold the attention of children and adults alike. Like Logo, *Sprite Logo* was devised in the artificial intelligence laboratory at the Massachusetts Institute of Technology. You only have to see it to want it. Send for a free brochure. *Tick box no. 5*

LOGOTRON LOGO OFFERS NEW EXTENSIONS

This disk includes *Advanced Logo* and *Control Logo* software, five specialised extensions to *Logotron Logo*, five more reasons why *Logotron Logo* has been chosen by education authorities and Logo enthusiasts around the country.

Advanced Logo provides primitive procedures to manipulate property lists, change of the size of the edit buffer, directly manipulate the registers of the 6502 processor, and access the internal clock of the BBC micro.

Control Logo allows direct control of the BBC micro's external ports. Developed at the Walsall Logo Project, *Control Logo* can be used to drive the BBC Buggy, Fischertechnik models, Milton Bradley Robotix kits, and Logo motors. *Tick box no. 4*

LOGO

LOGOTRON

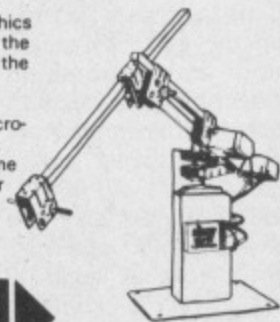
TECHNOLOGY BENCH



How many times have you seen the latest micro computer equipment sitting on a tired looking school desk or the old dining room table? What about the monitor balancing on top of the computer, or the mains cables and multiplugs which you try to avoid tripping over? These are common problems because there isn't a proper home for your equipment. Now there is a professional alternative. The *Whitefield Technology Bench* was designed by technology teachers to hold two people, their equipment and still have room for experimentation. What's more it was designed to sell at under £200 — and it does! Want to know more? *Tick box no. 6*

Complete robot system

A robot arm, plotter, sorting system and graphics board are all projects which can be built with the *Fischertechnik Robot Kit*. The kit contains all the parts to build 10 projects and with a little imagination others can be made. Once built, each model can be controlled from a BBC micro-computer using the Unilab interface supplied. The interface comes with software to run some of the projects and can also be used to power and control other robotic devices. So for an inexpensive introduction into the world of control, try the *Fischertechnik Robot Kit* complete with Unilab interface at £110 (excl. VAT). *Tick box no. 7*



COMMOTION COMPUTER OPERATED MOTION

Low-cost vision system

At a cost of £130 (excl. VAT), the *Snap EV1* vision system is an effective way of capturing pictures and displaying them through a microcomputer. This compact little camera plugs directly into a BBC or Commodore computer user-port and, with the software supplied, allows picture storage, animation, grey scaling, motion detection, picture composition and object recognition. The camera uses an interchangeable Pentax lens. Comprehensive instructions together with disk and tape software complete the package. Interested? Why not ask for more details. *Tick box no. 8*



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Flying start for educational software group

THE new organisation aimed at making educational software more readily available to BBC Micro users has got off to a flying start.

British Educational Software Associates has already signed up 150 "serious stockists" — computer dealers who will stock BESA's core list of 40 programs and will be able to meet orders for another 200 plus titles within 48 hours.

The group's target of 200 retail outlets is likely to be met by the end of the year, according to Craig Thatcher of distributor Proteus, the man in charge of BESA's dealer recruitment.

In common with *The Micro User's* ongoing campaign to get more educational software on to retailers' shelves, BESA intends to encourage dealers to stock more of this type of program and aggressively promote public awareness of its availability.

Founder members of

the group are Applied Systems Knowledge, Bourne Educational Software, Calpac Computer Software, Collins Software, Griffin Software, Hill MacGibbon, Macmillan Software and Widge Software.

"More publishers will be joining us in the new year", says Thatcher.

"There has been an overwhelming response to BESA throughout the industry and we have had contact already with many other BBC Micro educational software producers who want to contribute to our range.

"In particular we shall be focussing on programs that combine education with entertainment. We want to get away from what I call the 'chalk dust stuff' — educational programs so dull and boring they turn youngsters off.

"If we can get the right sort of quality product I believe educational software for the BBC Micro will really take off in the next few months".



A NEW disc drive system for the BBC Micro and B+, the Challenger 3, is twenty times faster than conventional models, claims manufacturer Opus.

This it says is made possible by a combination of a 5.25in double sided 40-80 track switchable disc drive, a double density disc interface and solid state RAM disc.

It provides 256k of dynamic RAM, upgradable to 512k, and is accessed as a second processor.

The disc drive — which may be used in single or double density — has a track to track access time of 3msec and a setting time of 15msec.

The interface uses a 1770 disc controller as featured in the B+. This is capable of supporting up to three disc drives which may be single, double

Speedy drive system

sided, 40 or 80 track, and double or single density. The interface automatically detects which type is being used.

The unit is connected to the BBC's expansion bus by a 34-way ribbon cable and by a power cable to the computer's auxiliary power connector. No tracks need to be cut or jump wires installed.

Software is supplied by a 27128-ROM installed in one of the sideways ROM sockets.

The system costs £250 and a separate RAM disc upgrade to 512kb £50.

A level maths course

COMPUTER assisted learning specialist LCL has produced a third title in its maths series for the BBC Micro and BBC B+.

Called Mega Maths, it is a complete 24-program, self tuition and revision maths course for A level and other mature students.

LCL's earlier titles were Animated Arithmetic, for the very young, and Micro Maths for O level students.

Its latest package includes 105 topics, covered by all A level examination boards, relevant to both pure maths and pure and applied maths.

These include permutations and combinations, remainder theorem, inequalities, logs and partial fractions.

The software was written by a professional graduate programmer in consultation with a fully qualified advisory panel, and was extensively tested in schools, says LCL.

Available on disc or tape, Mega Maths costs £24 and comes with a user manual and a book of model questions and answers taken from actual university papers.

Organised thoughts

AN IDEAS processor program called Scratchpad has been developed for the BBC Micro by Innovative Software.

A cross between a word processor and a spreadsheet, it is designed to help writers marshal their thoughts. Ideas can be rearranged to form a skeleton text and added to later.

Like a spreadsheet the writer can try out different structures for the text using simple commands. The final structure can be printed out as hard copy and spooled to a word processor file.

Scratchpad is disc-based, tube-compatible and comes with a manual. The price is £24.95.

FIFTY COLLECT A HOBBIT

FIFTY Micro User readers who entered the free contest in the July issue are the lucky winners of the new disc-based version of the Hobbit, one of the all-time classic micro games.

Based on the plot of Tolkien's famous book of the same name, the game involves stealing treasure from the evil dragon Smaug with the player in the role of Bilbo Baggins, the gentleman hobbit.

Each character makes his own decisions so that the game is slightly different every time it is played. This adventure has only recently become available on disc for the BBC Micro from Melbourne House.

Contest winners are:

I. Roddick, 8 Nithsdale Place,

Dumfries, L.A. Modge, 33 Southwark Road, Strood, Kent, P.H. Scott, 125 Ramsey Drive, Arnold, Nottingham, D.L. Wright, 9 Rana Court, Braintree, Essex, P. Wise, 3 Spindleberry Close, Welwyn, Herts, R. Barnes, 1 The Paddock, Harston, Cambs, J. Bowen, 37 Cavendish Close, Waterlooville, Portsmouth, K. MacKay, 1 First Avenue, Bearsden, Glasgow, C.F. Neighbour, 139 Victoria Road, Barking, Essex, R.W. Hallows, 20 Trefusis Road, Falmouth, Cornwall.

M. Allerston, 16 Norland Avenue, Anlaby High Road, Hull, J. Walker, 2 Barrett Clough Head, Slaithwaite, Huddersfield, W. Yorks, A. Tattersdill, 9 Forrest Avenue, Essington, Wolverhampton, M.P. Carroll, 2 Mainsforth Drive, Billingham, Cleveland, G. Neal, 35 Eton Road, Ellesmere Port, South Wirral, B. Thorpe, 90 Brown Lane, Heald Green, Stockport, Cheshire, D. Yates, 10 Lon Nant, Myddleton Park, Denbigh, Clwyd, I. Stephenson, 65 Globe Farm Lane, Darby Green, Blackwater, Camberley,

Surrey.

P. Noble, 74 Church Street, Old Glossop, Derbyshire, C.J. French, 11 Stanford Close, Frampton Cotterell, Avon, J. Clouting, 18 Weston Road, London, A. Warm, 41 Randal Drive, Unsworth, Bury, Lancs, T. Stubbs, 18 March Drive, Bury, Lancs, I.J.R.C. Nutt, 46 Preston Road, Lytham St Annes, Lancs, M. Atkins, 5 Baylis Walk, Terry Road, Broadfields, Crawley, W. Sussex, J. Hathaway, 20 Willis Lane, Whiston, Prescot, Merseyside.

P. McKnight, 4 Eavesdale, Skelmersdale, Lancs, M. Fernyhough, 'The Arles', Hadley, Droitwich, Worcester, P.M. Grady, 115 Noak Hill Road, Billericay, Essex, A.T. Leach, 38 Wolsey Way, Chessington, Surrey, M. Heyworth, 175 Dirkhill Road, Bradford, W. Yorks, C. Worrell, 34 Whitehall Road, Thornton Heath, Surrey, W.R. Bayston, 5 Dale Court, Crowther Way, Dale Road, Swanland, North Ferrisby, North Humberside.

W.L. Tough, 31 Longformacus Road, Edinburgh, D.G.

McLeod, Flat 1, 74 Lauriston Road, South Hackney, London, R.W. Woodhead, 13 Springfield Road, Redhill, Nottingham, J.W. Brown, 63 Arnesby Avenue, Sale, Cheshire, P.J. Prescott, 2 Arundel Villas, Lynchborough Road, Passfield, Liphook, Hants, S.P. King, 2 The Homestead, Redenhall Road, Smallfield, Surrey, G. Peach, 13a Lewn Street, Middlewich, Cheshire.

S.G. Pritchard, 55 Middlewich Road, Holmes Chapel, Crewe, M. Norris, 91 Bridle Road, Shirley, Croydon, Surrey, R. Pickering, De Bohun Junior School, Green Road, Southgate, London, S. White, 114 Linby Road, Hucknall, Notts, J.A. Stubbs, 41 Kingston Road, Ashchurch Gardens, Tewksbury, Gloucestershire.

S.H. Buxton, 52 Robey Drive, Eastwood, Notts, S. Crowther, 42 Half Mile Lane, Leeds, C. Hopkins, 106 Colchester Avenue, Penylan, Cardiff, B.W. Knight, 15a West Gardens, Tooting, London, P. Proudman, 23 Keats Gardens, Park View, Kildgrove, Stoke on Trent, Staffs.

Computing beats stardom for Raj

A CHILD actor whose first big break came when he was chosen to play the prince in "Indiana Jones and the Temple of Doom" sought only one reward from the role - a BBC Micro.

Raj Singh, the 14-year-old son of a retired Indian diplomat living in London, opted for his own computer before the remainder of his payment for the part was put away for him.

"I suppose I could have chosen almost anything", he told *The Micro User*, "but I love computers even more than acting."

"So I ended up with my very own Beeb plus a few extras".

Raj was studying one

day a week at the Sylvia Young Theatre School when he was called in for an audition for the Indiana Jones film.

Such was the impression he created that a video was made of him and rushed off to director Steven Spielberg. He loved it and Raj had made his breakthrough.

The next three months saw him at Elstree Studios dividing his time between being on set and receiving private tuition courtesy of the filmmakers.

"Steven Spielberg was wonderful to work with", Raj recalls. "He was just like another kid - not an adult."

"It was an experience I wouldn't have missed for

worlds".

However fame didn't go to Raj's head. After all, he is certainly not the only celebrity in his family. Apart from his diplomat father, his grandfather was a renowned doctor back in India, while his mother was interviewed by Terry Wogan on television after becoming Britain's first Sikh Justice of the Peace.

The schoolboy actor is currently studying for his O levels at Ealing College, where he will not be caught day dreaming of a Hollywood career.

"My future lies in computers", he said. "And I'm just hoping my Beeb holds the key to it all".



Raj Singh... opts for the BBC Micro

Arabs go for gold

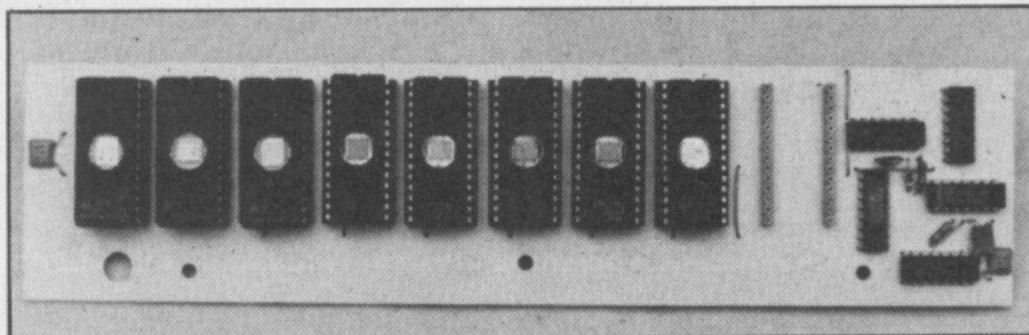
THE latest status symbol for the oil-rich Arab who has everything is a gold-plated computer system based on the BBC Micro.

The original gold micro was specially manufactured as first prize in a competition to celebrate *The Micro User's* second birthday earlier this year.

The system was designed and built by Oak Universal, the Bradford firm which makes the specialised Oak Computer based on the BBC motherboard.

Many enquiries came from the Middle East, where possession of such novelties can give one sheik the edge over his neighbour.

As a result Oak Universal has recently been sending regular shipments of gold micros to Saudi Arabia and the Gulf States.



ROM extension from JP Designs

THREE new products from J.P. Designs are designed to make it easier to develop independent control systems using the BBC Micro.

Beeb-Ram is a sideways RAM/eprom emulator which allows other external micro-processor systems to share the RAM while providing features usually found on sideways RAM units.

The 16k static RAM is located between &8000-BFFF in the system memory map and can be written to directly. This allows machine code programs to be placed in the RAM by the assembler and can be used to develop software for small controller cards.

A slide switch on the top of the unit determines which of the systems has

Control systems applications

access. It is connected to the micro via three connectors which require no soldering. Price: £99.95.

The BBC ROM Extension allows an extra 8 x 28 pin eproms to be used in the sideways ROM area of the micro. No soldering is required to install the unit and all the remaining ROM sockets can still be used when it is in place. Price: £24.95.

The BBC Micro can be used as a development system with a series of cross assemblers from Crossware Products, also available from JP.

Producing target

processor machine code from target source code, they are designed for use in schools and universities as an educational aid and feature standard mnemonics.

It is possible to assemble 64k of object code, disc to disc in 11 minutes and disc to RAM in seven minutes, while still performing error checking.

The target micro-processors catered for are 6800/1/2/3, 6301/3/3x, 6805/6305, Z80, 8085, 808A, 6809, 68000/8.

Price of the 68000/8 Cross Assembler is £56. The rest are £48 each.

View database package

A NEW general purpose database program with a range of utilities has been released for the BBC Micro.

Called Viewstore, the 16k ROM package from Acornsoft enables records and fields of variable size to be held. They are only limited by the memory available and type of filing system used.

Users can access one file at a time, make extensive data entry checks and display information in a spreadsheet type format or in a user-defined layout.

The package includes a utilities disc which enables procedures such as allowing comprehensive reports or labels to be made and subsets of records to be used in reports.

Also in the package is a user guide, reference card and function key card. Price: £59.80.



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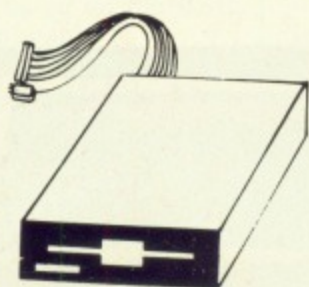
COMPUTERS

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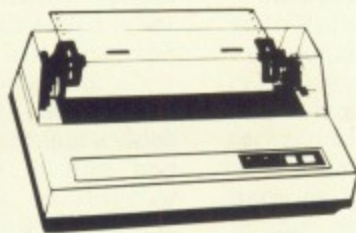
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No more Messy Wires



TCL SPECIAL WORKSTATIONS

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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 O. 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 &AFF 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 "FILENAME" 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.
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INTO YOUR HOME

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FIRMWARE	
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Commstar	£33.00
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Special Offer £130.00	
Price includes Commstar ROM and comprehensive manual.	
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With its deviously 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	£57.00
BBC ROM	£24.00
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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 2001 and we will despatch your goods within 24 hours. Please add the following amounts for Postage and Packing:

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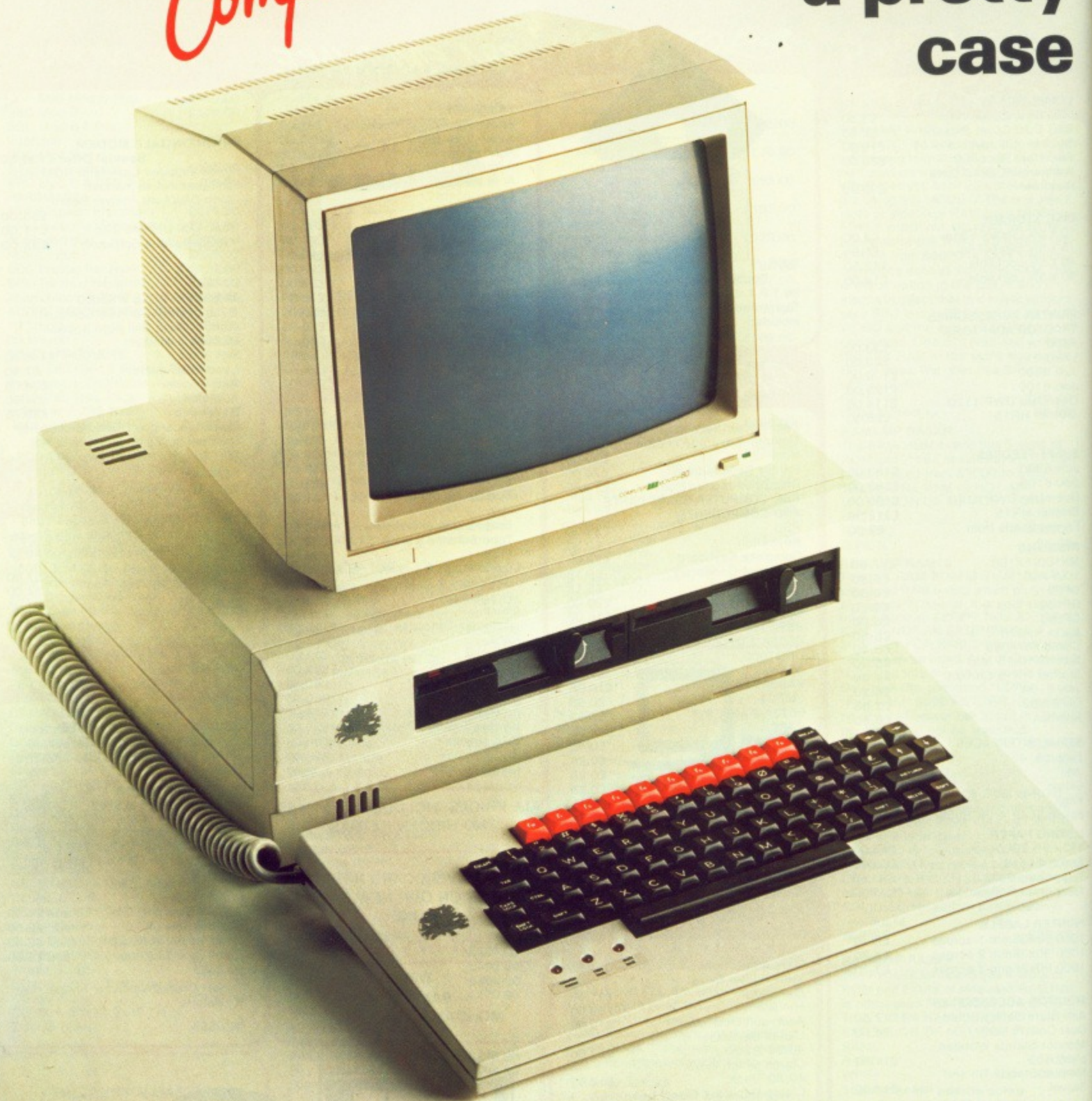
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OAK

Personal Computer

**More than just
a pretty
case**



Oak Universal Ltd, 20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR


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Card No. _____ Credit cards valid if signed by card holder. Address below must be the same as card holder.

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Please allow 28 days for delivery

Telephone orders by credit card please phone 0274 614167

Whether you are already the owner of a BBC or you are thinking of buying your first computer — then the OAK PC is for you. The OAK Personal Computer offers a versatile computer unit which can house a wide range of BBC 'Add ons', the beauty being that you can house as little or as much as you require without having to expand your system externally. The OAK Personal Computer is available as casings for existing owners to upgrade, through to ready built systems offering a wide range of specifications.



Oak Universal Ltd, 20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR

OAK Personal Computers

The OAK Personal Computer is a member of the OAK family of fully compatible computers with over 1,000 software packages already available. So no matter how specialised your application, you can be sure that there's an OAK Personal Computer and the right software to match your precise needs.

Cases Etc.

Keyboard case & ribbon data cable £ 35.00
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OAK Personal Computer Model 1

Keyboard case
Processor case
Keyboard ribbon data cable £ 86.95

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Keyboard case
Processor case
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Accessories for Models 1 and 2

65 watt power supply unit £ 99.00

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BBC B keyboard
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BBC B Plus motherboard
BBC B keyboard
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Z80 2nd processor, CP/M

operating system, Word processor,

Spreadsheet, Graphics, Database,

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Models can be supplied incorporating BBC B internals from £435.00. Telephone for further details. All other specifications are available. All prices shown above are exclusive of VAT and delivery.
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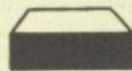
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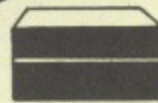
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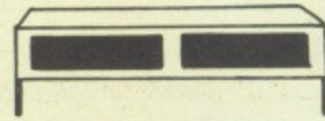
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DISC DRIVE UNITS 400K
TEAC'S advanced technical features and reliability are the main reasons for TEAC being the most popular disc drives for use with the BBC computer.



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Disc Drive Units come complete with:-

- All metal cases colour matched to BBC
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POWER SUPPLY UNIT STAND ALONE

STRONG METAL CASE
MATCHING BBC COLOUR
Powers up to two disc drives including Dual Disc Drive connecting cable. Mains power lead and plug



£45

PRICE INCLUDES VAT, DELIVERY* & PACKAGING.

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SIMULATED PRINT QUALITY ROMAN
Our disc-based software produces a Roman style font which is designed to produce a print out as near as possible to typesetting, using WORDWISE, proportional spacing mode.

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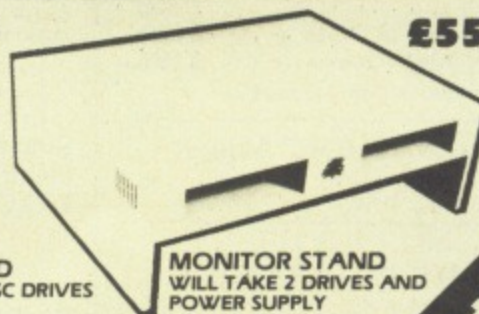


MONITOR STAND
WITH SHELF FOR DISC DRIVES

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ALL MONITOR STANDS STYLED AND COLOUR MATCHED TO BBC STRONG METAL CONSTRUCTION

PRICES INCLUDE VAT, DELIVERY & PACKAGING



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WILL TAKE 2 DRIVES AND
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BY POST:- To purchase any of the items simply fill in the coupon with your requirements. Enclose your Cheque/P.O. or use your Access/Visa card. Please make cheques payable to Universal Communication Co. and post to the address shown. Allow 14 days for delivery

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

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BBC Micro 'B' Only: £289

Price includes FREE
5 games software packages

BBC MICRO 32K + 32K

(extra 32K RAM Card already fitted)

Only: **£348**

BBC B PLUS	£399
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BBC B + DFS + 32K RAM Card	£397
BBC B + 13 ROM Board fitted	£322
BBC B + 32K RAM + 13 ROM Board	£379
BBC B + DFS + 32K RAM + 13 ROM Board all fitted	£429

Complete BBC B ECONET Networking System
now available.

(ROM based software purchased with any of
the above Micros will be fitted FREE of charge if
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Z80 Acorn 2nd Processor	£339

TORCH Z80 Card + Perfect Software	£275
TORCH Z80 Card+Soft. + Disc Pack	£550
TORCH GRADUATE Z80 System	£900

Acorn Bitstick	£325
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Acorn Teletext + Interface	£195

(Securicor carriage on Micros £7)

Dust Cover for BBC Micro

£3.50

VARIOUS PRINTERS

● EPSON RX80 Printer	£209
● EPSON RX80 F/T Printer	£219
● EPSON RX100	£342
● EPSON FX80 Printer	£315
● EPSON FX 100 Printer	£429
● EPSON JX-80 Full Colour Dot Matrix Printer. Prints in 7 Colours. Upto 160 cps	£499
● EPSON Paper Roll Holder	£17
● FX80 tractor attachment	£37
● 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.

Introductory price: **£220** (carr £6)
Tractor Feed Attachment **£20**
Single Sheet Feeder **£49**

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 **£175**

Set of 4 SPARE PENS only **£3.95**

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HITACHI EPROMs for Sideways ROMs

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RAMs (Low power) for ATPL, WATFORD, etc.,
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2 x 6264LP (8K) £7.99

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

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
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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
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1,000 Sheets 15" Fanfold Paper	£9
Teleprinter Roll (Econo paper)	£4

Carriage on 1,000 Sheets **£1.50**

PRINTER LABELS

(On continuous fanfold backing
sheet)

1,000 90x36mm (Single Row)	£5.00
1,000 90x36mm (Twin Row)	£4.90
1,000 90x49mm (Twin Row)	£7.50
1,000 102x36mm (Twin Row)	£6.25

Carriage on 1,000 Labels **£1.00**

All prices exclude VAT

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
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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)	£9

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
RX100/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 (80 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. Friction Feed; Tractor
feed optional extra. SP800 makes available the
facilities of much more sophisticated printers at a
very reasonable price.

Introductory price: **£189** (carr £6)

EPSON HI-80 PLOTTER

The latest addition to the popular range of
EPSON Printers/Plotters. Prints in upto 10
colours. Has many more features. Please write in
for spec sheet.

£345 (£7 carr.)

RX & FX PRINTER INTERFACES

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

RS232 £25 RS232 + 2K Buffer £55
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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.

MICROVITEC

- 1431 - Medium resolution as used on the BBC television computer programme **£185**
- 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**

All Microvitec Monitors are 14" and are supplied complete with cables.

KAGA

- 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**

FIDELITY COLOUR MONITOR

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

Introductory Offer: **£169**

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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 **£66**

LEADS

- BNC Lead for Zenith or Philips **£3**
- RGB lead for KAGA **£3**
- N.B. Carriage on Monitors **£7** (securicor)

CENTRONICS NLQ PRINTER

Centronics, the World famous name in printers, combines with Brother to produce the GLP printer. (Oh, by the way, GLP stands for Great Little Printer - and it certainly is!) The Centronics GLP provides the personal computer user at a low cost, a high quality compact printer with features usually found only in much more costly units.

- Centronics interface
- Lightweight
- NLQ printing
- Bidirectional draft printing
- Superscript
- Subscript
- Underlining
- Emphasized print
- Condensed print
- Double strike print
- Self test
- Friction feed

Introductory price: Only **£129** (carr £5)

Tractor Feeder **£10**

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

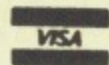
BBC Model B, Watford Electronics' DFS upgrade, WORDWISE ROM, Twin 400k Epson drives in beige, Zenith 12" Hi-resolution monitor (Green or Amber), Brother HR15 daisywheel printer, Gemini software: BEEBCALC spreadsheet, analysis and DATABASE software on disc. 10 x 3M disc, 500 sheets fan-fold paper, 4 way mains trailing socket, manuals, all leads and BBC carrying case.

NEW LOW PRICE

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**CREDIT CARDS
24 HOUR HOT LINES
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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 RX/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)



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)

Nightingale Modem

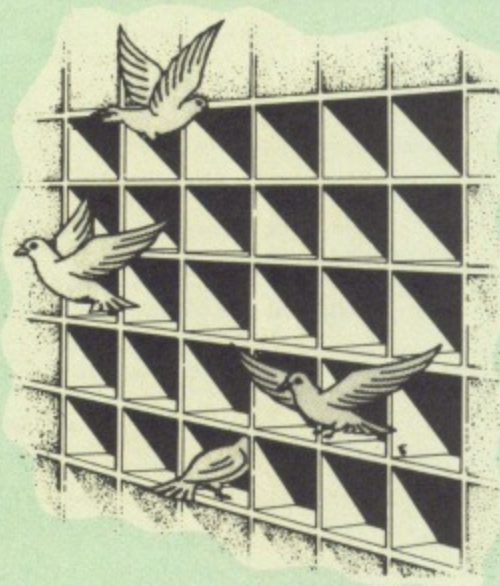
SPECIAL PRICE to our Customers

£119

(Price includes COMMSTAR ROM & comprehensive manuals)

- Nightingale Modem without software **Only £99**
- COMMSTAR ROM package only **£29**
(P&P on modem £2.00)
- 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 **£36**

(Please specify 40T or 80T disc)

DATAGEM

Gemini's 24K ROM based
DATABASE Management System
Special Offer: **£69**

Continued

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 a 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)

Watford ROM/RAM CARD

A must for all serious users

We, at Watford Electronics, have been producing high quality hardware and software products for the BBC for three years now. Having carefully observed the needs of our customers we set our top hardware engineer the task of producing the ultimate ROM board to meet all your ROM/RAM requirements.

After weeks of top secret development we are now able to bring you more details of this, the ultimate in ROM/RAM boards.

- No overheating problems. ● No User Port corruption. ● Full buffering. ● NO SOLDERING. ● Firmly mounted. ● Easy fitting. ● Up to 8 banks of 16k of Dynamic RAM. ● One bank of 16k CMOS Static RAM allowed. ● All RAM has Write protect. ● All CMOS RAM has Read protect. ● CMOS RAM can have battery backup. ● Special RAM write register. ● Can run any BBC ROM. ● FREE utilities disc. ● Compatible with DDFS boards. ● Compatible with our 32k RAM Card. ● Compatible with our Sideways ZIF. ● Large printer buffer (up to 128k) ● High speed disc backup via RAM.

Obviously, so much RAM requires some powerful facilities to use. To show you just how powerful the features our board offers are, and to convince you that the competition if any, is just simply not worth buying, we shall provide some more details on the advanced features offered.

Each socket has write protection to allow all ROM based software to be run. Also, to help during software development, each socket is equipped with a special read protect facility (this allows recovery from ROM crashes). Up to 8 ROMs and 8 banks (each of 16k) of RAM may be used, or one of the ROMs may be configured to give 16k of battery backed CMOS Static RAM.

The RAM socket selection (which is independent of the normal ROM socket) is performed by a special register at &FF30. In normal systems, a "write" to this location would have no effect. We believe that there is available an inferior board in which, for some totally unexplained reason, the User Port (as used by the AMX Mouse, Eprom Programmers, etc.) is used for the selection. Obviously this was not a very sensible move on the part of this manufacturer.

The ROM/RAM card from Watford represents second generation ROM board technology and is a must for all serious users of the BBC Micro.

Please write in for technical details and further prices.

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 RAM **£109**

OPTIONAL EXTRAS:

- 16K Plug-in STATIC RAM **£14**
- Battery for Battery Backup on Static RAM **£2**

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 £59 and the Double Density Unit at £66.

Just compare the features:

Features	Acorn	Watford	
	1.20	Single Density	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	1.53
Games compatibility	Yes	Yes	Yes
Econet file server	Yes	Yes	Most
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.

PRICES

- Complete Disc Interface Kit incl. DFS ROM & fitting instructions **£59**
- Acorn's DFS Kit complete **£60**
- 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 **£12**
- 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 **£66**
- DDFS Manual (no VAT) **£6.95**
- We will exchange your existing Single Density DFS Kit for our DDFS Unit at **£35**

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.

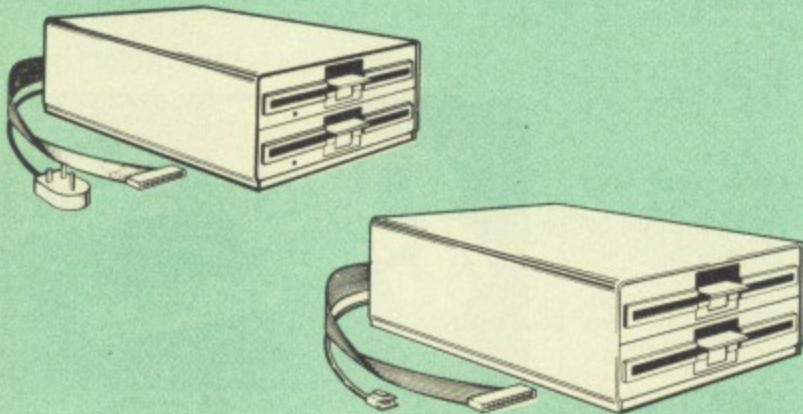
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality Epson and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct 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 £82		CS100 £105	
200K (360K)	CLS 200 £84	CLD200 £162	CS 200 £107	CD200 £172
400K (720K)	CLS 400 £99 £115 CLS400S	CLD 400 £162	CS400 £109 £130 CS 400S	CD400 £175
800K (1.44M)		CLD800 £189 £230 CLD 800S		CD800 £199 £235 CD 800S

● TWIN drive CASE, with Power Supply & Cables **£35**
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-5 1/4" 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 x S/S D/D 40 Track Diskettes **£13**
- 10 x D/S D/D 40 Track Diskettes **£18**
- 10 x S/S D/D 80 Track Diskettes **£22**
- 10 x D/S D/D 80 Track Diskettes **£24**

QUALITY 5 1/4" DISKETTES at KNOCK DOWN PRICES

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 with a life-time guarantee. These are supplied packaged in an attractive plastic library disc box to protect them from damage.

DON'T SETTLE FOR LESS, BUY THE BEST

- 10 x M4 S-S D/D 40 Track Discs **£11**
- 10 x M5 D/S D/D 40 Track Discs **£15**
- 10 x M7 D/S D/D 80 Track Discs **£20**

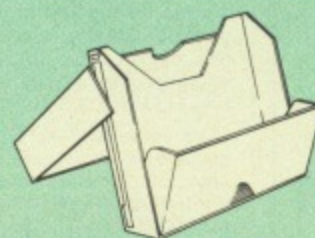
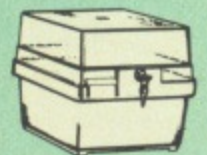
DISC ALBUMS

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 5 1/4" 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.

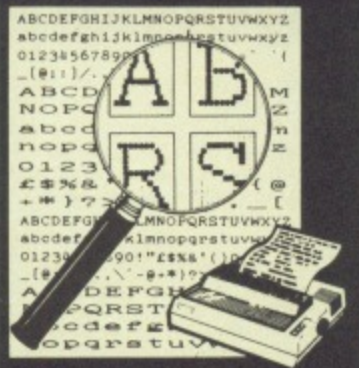
£8

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

EPSON NLQ ROM for the BBC Micro



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 separately 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: £22

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 its 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.)

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

£24

VIEW

VIEW WORDPROCESSOR

We are supplying the new VIEW version 2.1 allowing printing of memory contents etc **£46**

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 £52

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

Only £9

VIEW DRIVERS FOR JUKI & BROTHER PRINTERS

Only £8

VIEW/VIEW SHEET PRINTER DRIVER for SILVER REED

(Officially approved by Silver Reed)

A range of VIEW Printer drivers to complement the Silver Reed range of printers EXP400/500/550 & 770 EB 50 and converted typewriters EX43/44 & 55.

Only: £8

BEEB PRINTER ROM



"Makes Printing Childs Play"

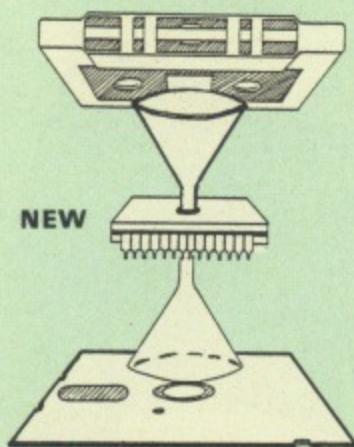
This utility ROM is designed to simplify using all the facilities of your printer. It has many facilities:

- ★ 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:

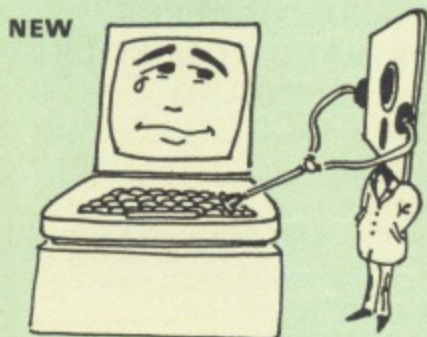
- Fully menu driven for ease of use
- Copes with locked programs
- A very comprehensive built in copying features
- Copies very long adventure games
- Supplied with comprehensive manual

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.

£22.00

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 £18.00

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 referencer 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

NEW ROM-SPELL



ROMSPELL is the new fast Spelling Checker ROM from Watford. Packed with excellent features, ROMSPELL is probably the most advanced spelling checker available for the BBC micro.

Features include:

- 30,000 word dictionary
- One pass check
- Two pass check
- Ambiguous word check
- Basic access to ROMSPELL
- Immediate entry check

ROMSPELL is fantastic value at £23

(Please specify 40 or 80 tracks when ordering)

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.

£24

DISASSEMBLER ROM

Discover the hidden secrets of BASIC and the OPERATING SYSTEM with this easy to use programmers tool.

ONLY £16

Please write in for technical details.

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 £20

DISC EXECUTOR

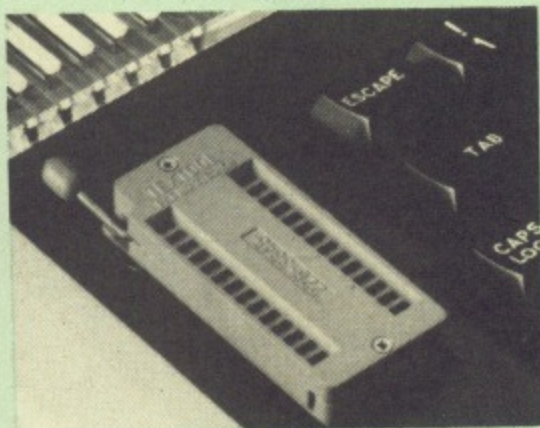
Disc Executor is a sophisticated disc utility for the transfer of your programs from cassette to disc. It copes with 'locked' files and full length adventures (up to &6E blocks long) and programs that load below &E00. Disc Executor is simple to use and provides menus to prompt the user along the way. 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)

CLARE'S SOFTWARE

BROM ROM £29
BROM DISC £23
BETA ACCOUNTS PACK £21

SIDWAYS 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.
- Writes in &8000 to &BFFF region go to RAM.
- Assemble and *LOAD ROMs straight in to RAM.
- Supplied with utilities software disc.

Introductory offer: **£29**

Optional extras

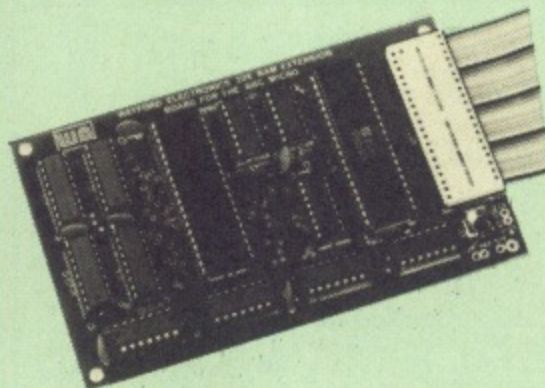
READ and WRITE protect Switches **£2**
BATTERY BACKUP **£2**

LOGOTRON LOGO

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

Only: £55

32K 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.
- In "VIEW", type in letters 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. 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.

Offer price

Only: £60

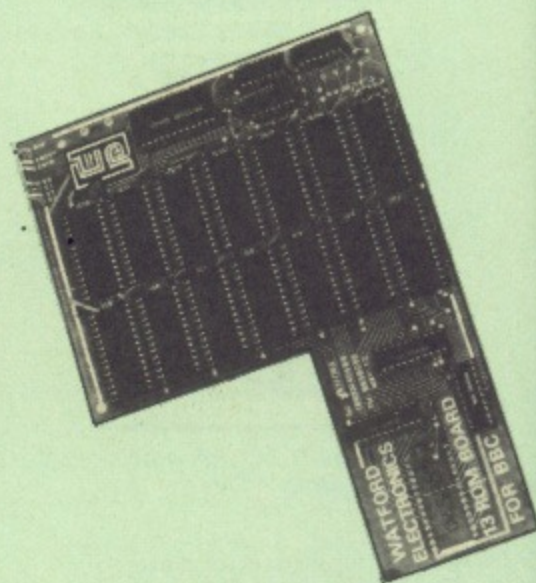
(Price includes a comprehensive manual and the ROM)

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 £86

Mk-3 13 ROM SOCKET EXPANSION BOARD



We are pleased to announce a revised version of our popular 13 ROM SOCKET board, now with even more features.

- 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

SOLDERLESS SIDWAYS 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 permissible, 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 £33

Battery backup fitted **£35**

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£55
CARETAKER Basic Utility	£28
Graphics ROM	£28
Disc Doctor ROM	£28
INTER-SHEET	£48
INTERCHART	£38
TERMI	£27
COMMUNICATOR	£58
SPEECH ROM	£25

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

FREE this month, the superb Word-Aid ROM with every package of Wordwise Plus bought from us **£47**

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Take advantage of the programming language in Wordwise-Plus. Simply load the disc with Shift-Break and have the power of these sophisticated new features instantly at your fingertips.

Features:

- Mail Merger
 - * Can use Data files spooled from Wordwise-Plus.
 - * Can use Data files from most databases.
 - * Powerful Label printing facilities.
 - * Mail merges with names, addresses etc. inserted into a standard letter.
- Address Finder
 - * Search for names.
 - * Search for addresses.
 - * Insert names into text.
 - * Insert addresses into text.
- Print/Preview continuous files.
- Chapter Marker.
- Search and Display.
- Remove embedded commands.
- Text transfer.
- Printer Codes - make embedding commands easier.
- Utilities supplied compressed for speed.
- Utilities supplied annotated for help.
- Supplied on 40/80 format disc.
- Very user friendly.
- Recommended by Computer Concept.

Introductory Offer: **£12**

(Further details available on request SAE, please).

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.

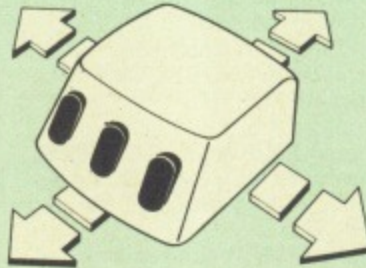
(Please write in for technical details).

ONLY **£25**

PCB NI-CAD Battery for ROM Boards. **£2**

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

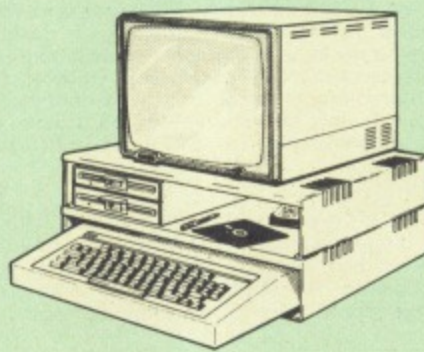
COLOUR ART

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**

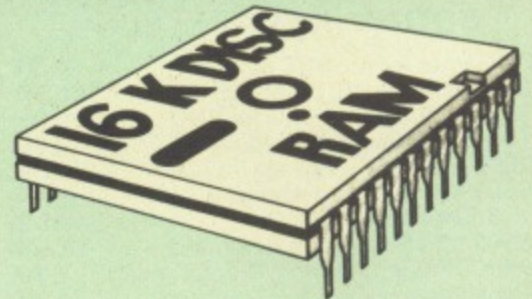
(please specify 40 or 80 track disc when ordering)

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)



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.

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**

Continued

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
100 Programs for BBC Micro	£6.95
6502 Assembly Language Program	£13.95
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 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	£
Assembly Language Programming FOR the BBC Micro	£8.95
Assembly Programming made Easy	£5.95
Basic ROM User Guide	£9.95
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	£6.95
BBC Micro An Expert Guide	£6.95
BBC Micro Assembly Language	£7.95
BBC Micro Book BASIC Sound & Graphics	£7.95
BBC Micro Games Master	£5.95
BBC Micro Graphics and Sound	£6.95
BBC Micro Programs in Basic	£5.95
BBC Micro ROM Book	£9.95
BBC Micro ROM PAGING System Explained	£2.00
BBC Micro Revealed	£6.95
BBC Micro Disc Companion	£7.95
BBC Micro in Education	£6.50
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
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
Disc System for the BBC	£6.95
Discover BBC 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	£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
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
Programming the 6502	£13.95
Programming the BBC micro	£6.95
Programming the Z80	£16.95
Programming with Graphics	£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
Using BBC Basic	£6.95
Wordstar & CP/M made easy	£6.95

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:

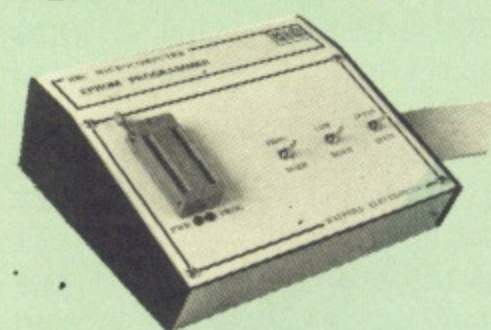
- The adding of pictures or written text to typed documents.
- Unattended recording of scientific data.
- Entry of real images into graphics programs.
- Generation of computer images.
- Slow scan television; sending images via a modem or radio.
- Security.
- Input from any video 1v video source.
- Full 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 integrated 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**

VOLTMACE JOYSTICKS

DELTA-14 JOYSTICK	£12
Adaptor Module	£12
Transfer Software	£7

ANTI GLARE MONITOR SAFETY SCREEN

HEADACHES? TIRED EYES? Don't take pills - Use a Watford Electronics anti-glare filter!

● Made in Britain by a long established glass maker.

Available in 12" & 14" versions - please specify the exact monitor type when ordering.

Special Price: **£13.00** (carr. £2)

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

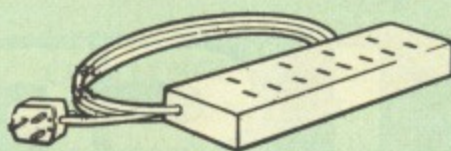
Supply from BBC power supply to standard Disc Drive connector.

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



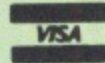
4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug.

£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	£2.25	27128-250nS	£3.25
6116LP-2K	£2.75	6264LP-8K	£4.75
8271	£45	ACORN DNFS	£15
ACORN OS 1.2	£6	ACORN BASIC 2	£16

ACORN LOGO **£60** COMAL **£43**
ISO PASCAL **£60**
SLEUTH ROM **£25** TOOLKIT ROM **£23**
BBC A to B Upgrade Kit **£45**

ROM EXTRACTION TOOL
£2

NEW LAUNCH

DELTA CARD

Delta is the latest in add-ons for the BBC Micro. Mounting internally, this unit provides a new CPU to run your programs at TWICE their original speed (i.e. a massive 4 MHz!). Even better than this, you can run applications programs such as Wordwise Plus, ViewSheet, Pascal, etc. at twice their speed. Whereas a 6502 Second Processor increases the speed of a standard BBC by about 50%, the combination of a BBC and Delta Card runs at twice the speed of a standard BBC! Unlike second processors, full compatibility is achieved with all standard software.

64k of fast RAM is provided on this card to allow for your program, Basic and the Operating System to all be stored in fast RAM, and hence run at maximum speed. Software available for this unique and powerful expansion card includes routines to load the currently selected language into the 16k of fast sideways RAM, alter the banking of the RAM to provide 'shadow' screen memory (as featured in our 32k RAM Card), provide a printer buffer, edit memory, etc.

Special Introductory Price
Only £99 (carr £3)

ALNOOR ARABIC ROM

Now available from stock, ARABIC ROM and Keytops for the BBC Micro. Please write in for further details.

ACORN SPEECH SYNTHESIZER

Speech Chips, Manual and full fitting instructions

Only £19

JOB VACANCY at Watford Electronics

Due to continued expansion at Watford Electronics, there now exists a vacancy for an experienced repair and test engineer to work in our workshops. The work is demanding and you should be capable of working under pressure.

Join the forefront of BBC technology with the hardware specialists for the BBC Micro.

There also exists a vacancy for a technical assistant. Applicants should be familiar with our range of products and have a reasonable command of written English.

Applicants to either jobs should send their CV to:
The Personnel Manager at Watford Electronics.

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.

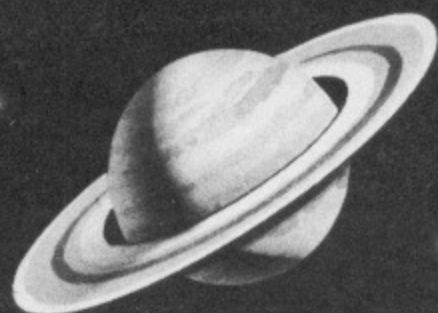
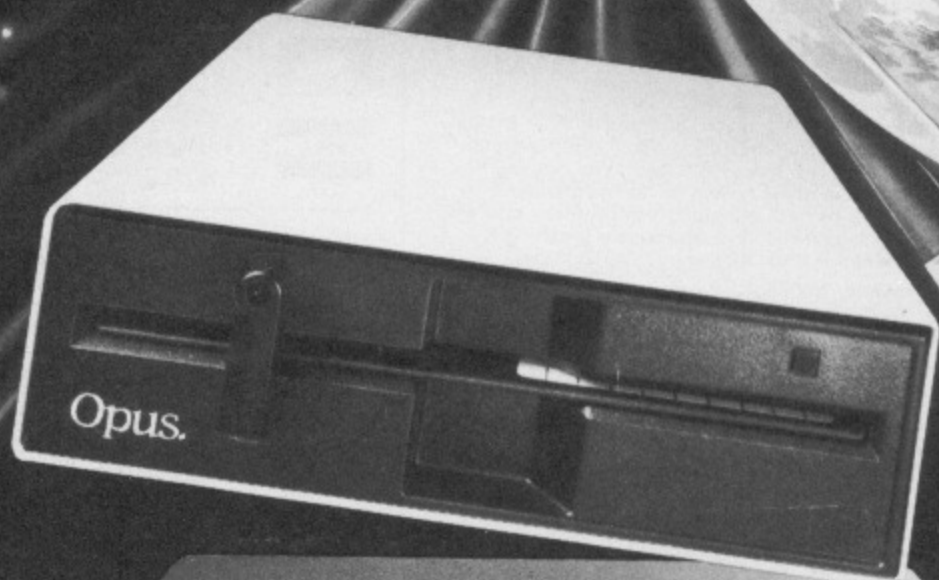
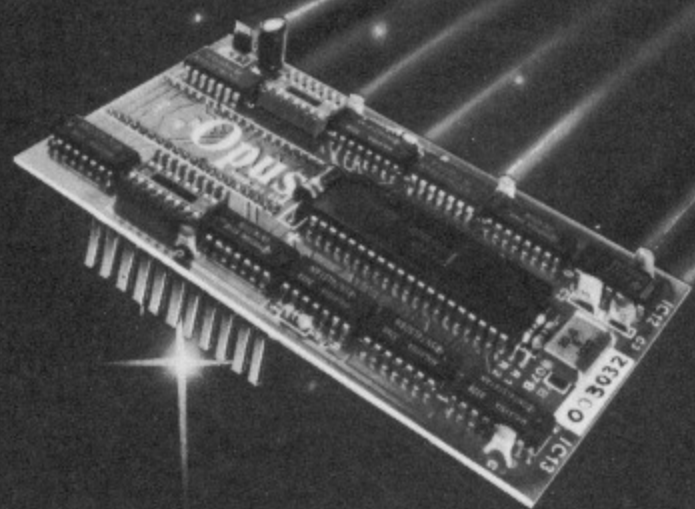
VAT: UK customers please add 15% VAT to the total cost incl. Carriage.

SHOP HOURS: 9.00am to 6.00pm. Monday to Saturday. (Ample Free Car Parking Spaces)

Watford Electronics

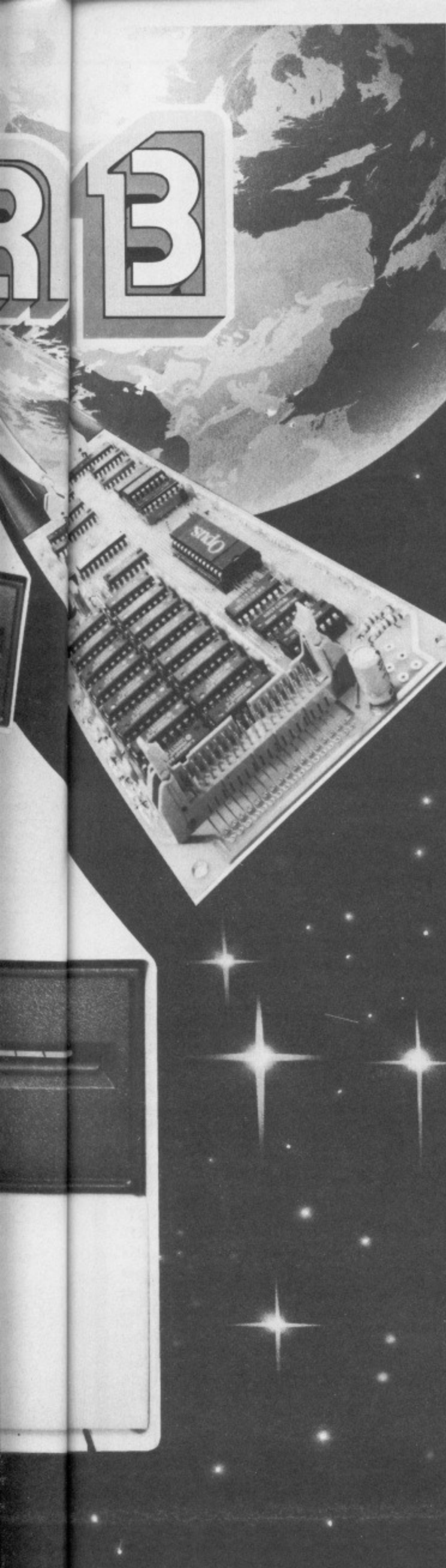
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Fileaid
Lincoln Microsystems

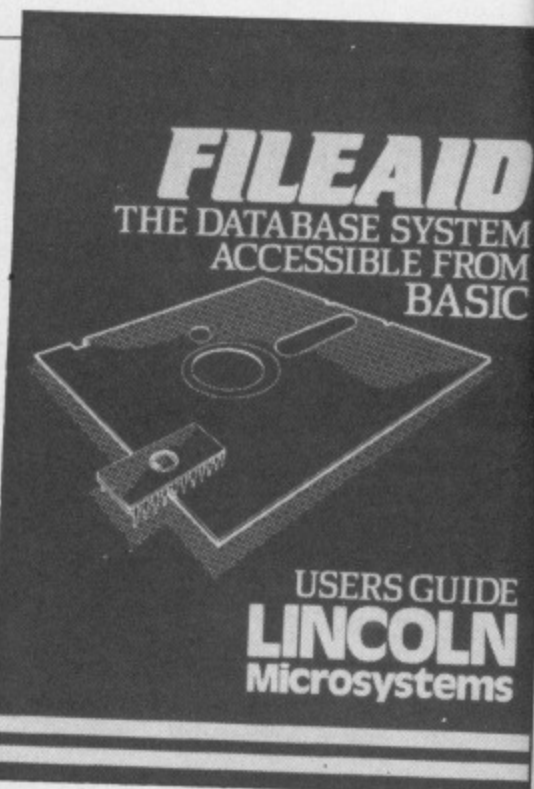
SOFTWARE packages which describe themselves as databases – though they are often little more than simple filing systems – are usually produced as complete, finished programs which have to be used as provided.

Fileaid from Lincoln Microsystems is a database system which is accessible from the user's own Basic program. It provides a range of commands which make it much easier for a programmer to store and access data on disc, so that

users can construct their own specialised applications making use of the commands available.

The system is provided on a ROM together with a disc which provides utility programs to format and verify discs, define files, backup and restore files from tape and to display audit information about how data files have been manipulated.

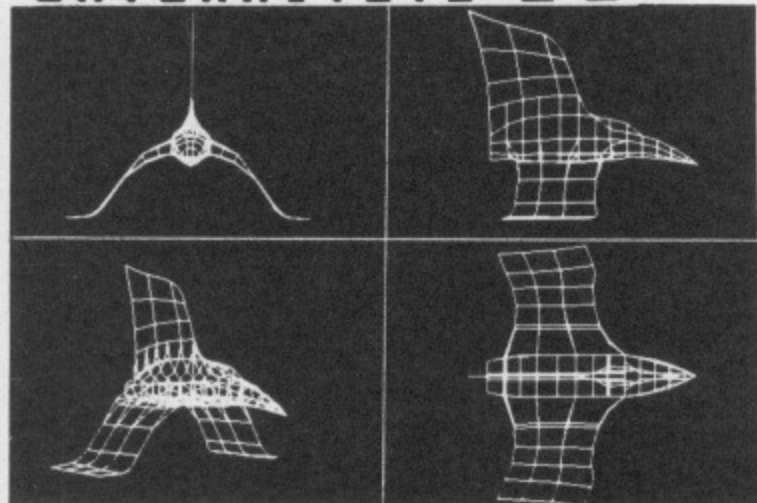
The file definition utility is used when setting up a new file. It asks the user to list the field names and, in the case of string variables, their length. The file name and the number of records are also to be provided and space on the



disc is then reserved for the file.

The first field defined acts as the key field and the records are kept in ascending order relative to this. Each record's key field must be unique. When records are to be retrieved, the data will

INTERACTIVE 3D BBC B OS 1.2



INTERACTIVE 3D is a unique program that actually allows you to create a design directly in a 3D view. And you can zoom, rotate, change viewpoint and perspective during the design process to visualise the effects of changes. A novel technique relates the 2D cursor to the position and movement of points on the full perspective view of the wire-frame model. The perspective view can be used on its own or in conjunction with plan, side and end orthographic views (these can also be shown individually).

All design operations occur directly on the screen under cursor control — there is no need to input any numerical data (but co-ordinates can be output continuously if required). Full editing facilities allow you to create and delete points and lines, move points with attached lines at any time in any direction, and align points automatically. Symmetrical forms can be created by reflections. Models can be saved to tape/disc and reloaded later to continue the design. Screen dump to an Epson FX80 printer is built in. Altogether, nearly 50 operations are included.

This is a powerful, high quality software package written by a professional engineer, and made available at a very low price. It is of immense value in **engineering design, graphic arts, technical drawing, visual displays, co-ordinate geometry, and simply "3D sketching"**.

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*Floppy Wise
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be stored in Basic variables of the same name and type as those in the file definition.

The main commands which can be used from Basic allow the programmer to:

- Read the first or last records in the file.
- Read the next or previous record.
- Replace a record that has just been read (to modify a record).
- Insert, delete and undelete.
- Read a record with a certain key field.

After every command, Fileaid records a return code in a special Basic variable. Its value gives the user information about how successful the command was. For example, if the command were successfully carried out the return code is 0. If, however, we try to retrieve a record which does not exist then the return code is 21 and so on.

The value of the return code can be examined by the user's program so that processing can be altered, or error messages displayed, as appropriate.

Note that although for each file there is only one field – the key field – which can be used to search for a record, more than one file can be accessed in a program. This can allow the user to set up indexes based on other fields, provided that these are also unique, which can be related back to the main file.

For example, if we were dealing with a personnel file then we could record the data using a person's full name as the key. A second file could be set up using national insurance number as the key and recording the name of the person with that number.

Access to an individual's record is now possible by specifying either name or number as, if the specified data – say number – is not found on the main file, the return code can then be used to switch the search to the other file and pick up the related name which is used to search the first file again.

The system comes with a good user guide and a demonstration Basic program with which to experiment. As the guide suggests, it is well worth printing out a program listing so that you can see how the program makes use of the ROM commands.

I think that this system is a very useful idea which should make life much easier for anyone who has to do a lot of programming involving disc file access.

Ken Garrett

IMAGINE my surprise when I opened the box containing **Floppy-Wise** by Software Services and found an eprom with a piece of wire soldered between pins 1 and 28. After checking in the hardware guides I concluded that this was the way to get Mitsubishi eproms to work on the BBC Micro. Well done Software Services!

Floppy-Wise contains a number of disc routines that complement both the DFS and chips such as Disc Doctor. In addition to the usual FORMAT and VERIFY commands there are selective and renaming disc to disc copiers for unprotected files.

*FCOMPARE checks whether a Basic program or datafile has been correctly copied on to disc. A useful little routine – CONVERT – changes a 40 track disc to 80 tracks, keeping the programs on the disc at the same time. Two commands – ASCII and DER-RORS – display data on hex values for Ascii codes and on the disc error numbers.

One of the most useful disc utilities is one which tells you what space is left on a disc and whether it is in one contiguous block or in little bits requiring compacting. *DSPACE provides a simple display with exactly that information for any drive.

As I tend to forget to save programs regularly during development I occasionally find I have lost them due to some silly error on my part. Now with *AUTOSAVE Floppy-Wise saves a copy of my Basic program to disc every four minutes. This is an extremely useful utility to have.

It is with regard to protected discs that Floppy-Wise really comes into its own. Two commands – *PREPARE and *PROTECT – prepare a disc for protection, and protect it after all the files have been saved on it.

But the "pièce de resistance" is *CLONE. This routine provides backup copies of protected discs quickly and simply.

I have been using this for several weeks and have yet to find a disc that has not copied, including three that had proved uncopiable with any previous routine.

I cannot stress strongly enough that to copy for any purpose other than personal backup is illegal, a point clearly made in the Floppy-Wise handbook. In order to use *CLONE all that is required is two disc drives – it will cope with swapping discs in a single drive – and two discs, the source disc being write protected.

The destination disc can be any format. After entering the command, sit back and watch as two passes are made transferring formatting and data to the new disc, a full 40 track disc taking under four minutes.

Finally *ROMS provides a very useful list of ROMs resident in your micro, indicating whether they are enabled or disabled (see Figure I). *ROM ROM number E/D enables or disables the specified ROM.

Fully Tube compatible, Floppy-Wise is an extremely useful ROM with its price in the middle of the range for 8k ROMs. But it might have benefitted from an expanded handbook that explains each routine more fully. I can thoroughly recommend Floppy-Wise to any serious disc user.

Ian Whitmore

ROM FILING SYSTEM		
0	TOOLKIT 1.25	Enabled
1	EXMON II 1.03	Enabled
2	Watford Electronics EPSON	Enabled
3	WORDWISE-PLUS 1.48	Enabled
4	Ultracalc 2	Enabled
5	SLAVE 1.04	Enabled
6	FLOPPY-WISE 2.0	Enabled
7	Vacant	
8	DUMPOUT 3.2g	Enabled
	Natford Electronics Beeb	Enabled
10	DISC DOCTOR 1.08	Enabled
11	PRINTMASTER (Epson) 1.01	Enabled
12	STARBASE 2.00	Enabled
13	DFS, NET (C)ROFF	Enabled
14	BASIC (C)1982 Acorn	Enabled
15	Tape to Disc 'TD' ROM 1.0	Enabled

Figure I

BIOGRAM is a galvanic skin response detector – a lie detector to you and me – which can also help you relax using biofeedback.

This well made package from Synergy Software consists of a small battery driven sensor unit (battery included) which plugs into the BBC Micro's user port, and two small electrodes with Velcro straps to attach to the fingers of the person under test.

The device comes with a comprehensive software package and a 24 page manual which is easy to follow and contains information appropriate to both novice and more professional users.

The programs are written in Basic and employ Mode 1 and Mode 4 graphics, yet their speed of screen display is adequate.

I had the Biogram up and running within minutes once I had taken the screws out of the D-plug for the user port. The socket for this port lies a short way inside the plastic casing on my BBC Micro and the two round-headed screws prevented the pins in the plug from engaging properly.

I wanted the sensor box, with its sensitivity control and on/off switch, to

Well, to tell the truth...

RORY McCLOY reports on the Biogram lie detector

sit beside the micro and have the subject of the test sitting nearby.

Unfortunately the wires from the control box to the electrodes were too short and the box had to sit on the subject's lap if the arms were to be in a relaxed position.

I was able to adjust the sensitivity control so that the electrodes worked on all the people I tested, but for more serious researchers Biogram II, at £10 more, offers a 3-way sensitivity switch.

The electrodes are fully optically isolated from the micro, which is important for electrical safety since micro-shock (meaning a small but potentially serious DC voltage) is a

theoretical possibility if you are going to wire yourself to any electrical device run on mains electricity.

The disc-based software I tested was menu driven with options for:

1. Relaxogram
2. Lie Detector
3. Phobia Reducer
4. Text Builder

There are four relaxation training programs, three of which combine a visual display – of analogue scale with continuous screen plot of changing skin response, each colour coded for degree of relaxation – and a range of sound tones.

The scales and plots are fine but the sound/envelope combinations, with high pitched for tense and low pitched for relaxed, are rather harsh and tend to warble with varying skin responses.

After a while the sound irritated me and did little to help my biofeedback. I was grateful there was a sound-off option.

My 11-year-old son tested the Relaxogram and peace reigned for an hour. When I went to see how he was getting on I found him slumped in front of the computer. A half-open eye indicated he was still with us.

He had managed to reach the light-green level of relaxation second only to the white band, which I can only assume measures grade IV coma.

The fourth Relaxogram option provides a digital display and scores the time taken to relax. This would be useful for class work to compare subjects or performances on separate occasions.

There are surely enough health and fitness freaks around, paying out good money for Yoga and relaxation classes,



The Biogram can also help you relax

From Page 51

as well as professional occupational therapists, who would find this suite of programs excellent value.

The Lie Detector option requires more attention if meaningful results are to be obtained. The manual offers clear and practical advice on the format which verbal interrogations or screen-based questions should take and an indication of how to interpret results as valid or spurious.

Plots of skin response can be saved for future review. Screen based questions – “text frames” – are created using menu option 4. The Lie Detector programs will probably find most use in colleges and psychology units, and this module will do the job of equipment costing many times more – an important bonus in these days of education and research cuts.

The Phobia Reducer can be used in two ways – Wordtest and Reducer. Wordtest displays a selection of words

on the screen for about 15 seconds each, either randomised from up to 100 pre-programmed words or from up to 40 frames of user-defined phrases created with the Text Builder.

The software comes with an interesting selection of 100 words which can be easily modified to suit the user. The skin response is plotted following each word test and the results can be very revealing.

When my two sons tried it the 11-year-old reacted positively to SKID, CUT, BUST and the 13-year-old to WORK, DENTIST, QUICKSAND, GIRLFRIEND and BUST (a different type I suspect).

I felt the Biogram's powers of detection were vindicated when my wife had an unequivocal response to CAR – hers had broken down three times in as

many weeks. Lack of space prevents me from listing my own hangups.

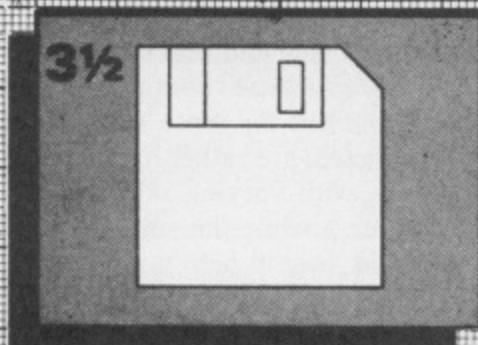
The section of the manual dealing with the second Phobia option, Reducer, explains how to put spiders in glass jars (but not how to catch them) to show your unsuspecting test subject. The advice on how this can be done without inducing apoplexy is sensible and couched with warnings, since tampering with peoples' phobias could cause problems.

Biogram is a professional package and good value for money providing you have a use in mind. It will only be of passing interest if bought as a game.

Synergy Software tell me they are planning to alter the length of the electrode wires and are finding out if anyone else has had problems with the screws in the plug socket.

Results can be very revealing...

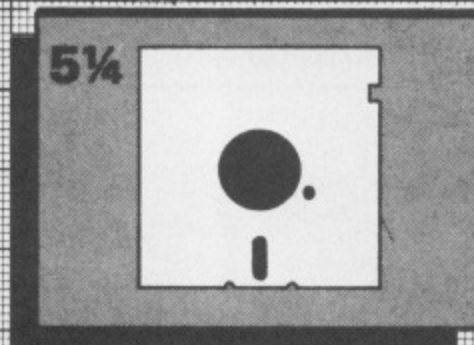
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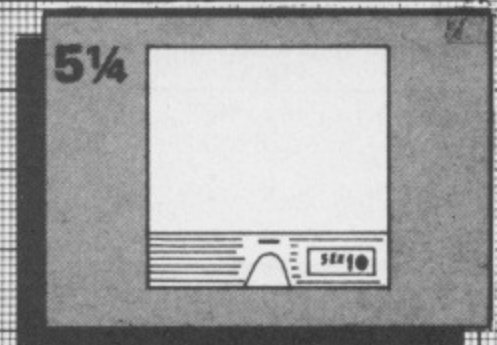
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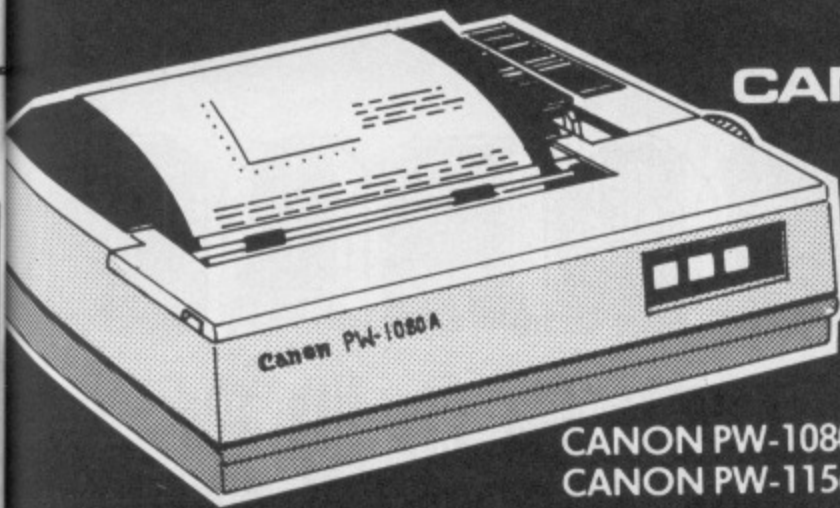
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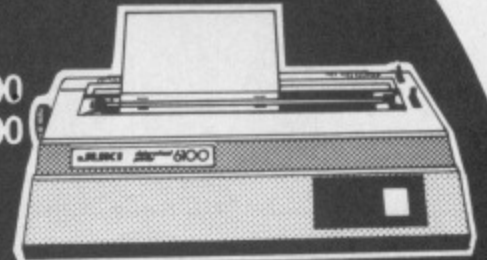
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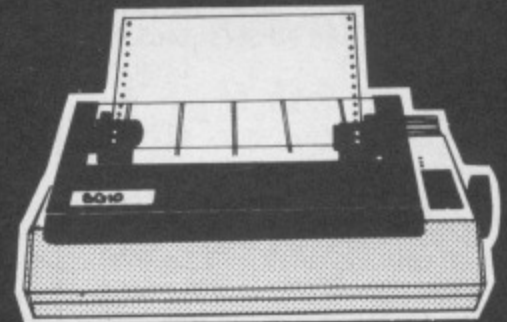
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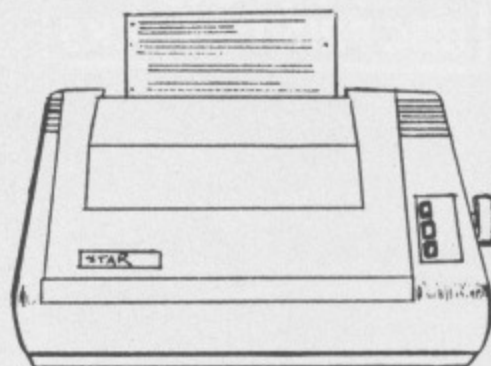
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A NUMBER of 16k utility chips have recently appeared which possess Basic toolkit and editing commands. Most are a Jack of all trades, having Basic, machine code and filing system utilities.

The target of this month's review however, concentrates solely on one aspect – assisting the user to alter and analyse Basic programs.

The Basic Editor 16k ROM version 1.32 is Acornsoft's first utility chip, and as with most other products from this supplier, it is well packaged, well thought out and bug free. Acornsoft's confidence in the latter is expressed in their use of a 16k ROM rather than an eprom.

The package contained the ROM, stick-on label, a function key strip and an A5 format 41 page manual. The manual is clear, easy to use and has many examples and an index.

The Basic Editor is really a language chip acting as a word processor for editing Basic programs. The language command screen is entered with *BE and resembles a view-style screen.

Typing HELP displays the 30 commands available – see Figure I – most of which may be reduced to a single letter. Obviously essential features such as LOAD, SAVE, NEW and OLD are present here.

Operating system star commands may also be used, and exiting to Basic is very simple. The Escape key is used Wordwise fashion to toggle between command mode and edit mode.

If the program is not too long – in excess of around 5½k – I find Mode 0 the most useful for a colour monitor as it gives an 80 column display with a very legible white on blue background.

Editing can be done in Modes 0, 1, 3, 4, 6 and 7, selected by MODE from the command screen and a variety of BACKGROUND or FOREGROUND colours

The Editor's Editor

MIKE MAHON concludes his series on Basic utilities with a look at a newcomer from Acornsoft

may be chosen in modes other than 7.

The edit screen can also be entered by TOP, END or a line number followed by a Return. A program may be loaded within or before entering the editor or may be created there.

In editing mode the cursor keys in conjunction with Shift or Ctrl are used to scroll or jump through the program forwards or backwards and along the line in true word processing style.

Jumping to the start, TOP or END of the program requires the appropriate command or function key. Edit mode also enables many of the function keys to duplicate commands, as shown in Figure II, although additional features are also present there.

Another word processor-like feature is the use of Tab to move in selected increments along the line.

Text, that is program statements, at the cursor position may also be altered by overtyping, added to or deleted – Delete or Shift+Delete – or the case swapped.

In addition, if the blinking of the

cursor becomes annoying it may be switched off by depressing the Copy key or quickened by subsequent presses.

Extra blank lines of program ready for text entry are readily created by pressing Return.

If necessary, the program is automatically renumbered to accommodate the extra lines.

Pressing the Return key is easy to do by accident, and unfortunately there is no similar single command to remove the lines unless UNDO immediately.

Extra lines can also be added at the top or end of the program respectively with the commands IT or IE or appropriate function keys.

Another editing function which is tedious without a Basic utility aid is joining or separating multistatement lines. The Basic Editor performs this easily by the user locating the cursor over the desired change and pressing the appropriate function keys.

Splitting statements is quite intelligent – that is, the sense is not broken up in the middle – and renumbering is carried out

The Basic Editor
Program size: 2
Bytes free: 25342
Screen Mode: 7

APPEND p	IE	OLD
BACK c	INFO	OVERTYPE
CHANGE s1 s2	INSERT	QCHANGE s1 s2
END	IT	RENUMBER n1 n2
EDIT s	LOAD p	RUN
EXIT	LABEL	SAVE p
FIND s	MODE n	SCROLL
FORE c	NEW	TOP
GOTO	NOSCROLL	TAB n
HELP	NUMBER	n

Where: p is a program;
s, s1, s2 are strings;
n, n1, n2 are numbers;
c is a colour (N, R, G, Y, B, M, C, W).

Figure I: Help screen – available direct commands

Key	fkey	Shift+f key	Ctrl+f key
f0	Execute	New	Mark
f1	Insert/overtype	Old	Goto
f2	Top	Undo	Split statement
f3	End	Swap case	Join statements
f4	Renumber	Extend statement	Repeat
f5	Continue	Mode	Scroll on
f6	Delete to end of line	Label	Scroll off
f7	Top of screen	Number	Background
f8	Insert at end	Insert at top	Foreground
f9	Exit	–	–

Figure II: Function key commands – edit mode

Command	Action
R	Remove line commands and marks.
D	Delete statement.
DD DD	Delete block.
DDE	Delete to end.
DDT	Delete to top.
M	Move line to mark.
ME	Move to end.
MT	Move to top.
MM MM	Move block to mark.
MM MME	Move block to end.
MM MMT	Move block to top.
A	Mark destination above.
B	Mark destination below.
C	Copy statement.
CE	Copy to end.
CT	Copy to top.
CCCC	Copy block to mark.
CCCCE	Copy block to end.
CCCCT	Copy block to top.
f0	Mark for quick find.

All the above command letters are entered with the Ctrl key depressed.

Figure III: Line and block editing commands

when required.

Facilities are also available (APPEND) to join two or more Basic programs together without the need for the SPOOL commands and a quick look in the User Guide.

The editor will renumber the new program if necessary, reset to Mode 7 if it is large, or display an error message and restore the original if the new program will not fit into memory.

Full or semi-partial renumbering can also be carried out in edit or command mode.

A prime requirement of any Basic programmer's aid is to locate and/or alter any or all occurrences of particular strings within a program. From the Basic Editor command screen these functions are carried out by EDIT, FIND and (Q)CHANGE. They all work with strings of any type, in quotes, Basic keywords, symbols, numerics and so on.

EDIT word\$ will display the program around each occurrence of word\$ ready for editing. Pressing f5 (CONTINUE) moves on to the next occurrence. FIND Fred is similar but simply displays all the lines in which the search string Fred occurs. Unfortunately there is no option to print out the finds.

Finally, CHANGE Spectrum BBC, or QCHANGE Spectrum BBC will globally or selectively alter

occurrences of the string Spectrum into the string BBC.

To make this Basic editing facility seem even more miraculous, try the Biblical example given in the manual which concerns the strings water and wine. One limitation, however, with these commands is the lack of a wildcard facility.

When a program is displayed in edit mode it is given as the List 0 option with a space between the line number and text. A mark (.) may be inserted here at one line of text using Ctrl+f0 such that it may be returned to instantly in edit mode with Ctrl+f1 or from command mode with GOTO.

A whole series of line commands – see Figure III – can similarly be placed at the beginning of a line, overwriting the line number, in order to mark lines or blocks of text which are to be deleted, moved or copied within a program.

The options are fairly extensive, as seen from the list in Figure III, and the method is much easier than that used in most other Basic toolkits because the program can be scrolled around in front of your eyes and marked for editing.

An example is shown in Figure IV. To carry out the marked delete, move or copy the user simply presses the EXECUTE key (f0). All marks and line commands may be removed by pressing Ctrl+R, although they are not stored as part of the program and do not need to

```

100 REM ROMAN NUMERALS
110 REM Mike Mahon
120
130 VDU3:#MOTOR 0
135 #FX4,1
140 #KEY10 OLD!M RUN!M
145 #FX11,0
150 MODE7
160 ON ERROR RUN
170 DIM roman$(4,10)
180 PROCdata
190 PROCtitle
200 END
499
DD DEFPROCdata
510 DATA 0,I,II,III,IV,V,VI,VII,VI
II,IX
520 DATA 0,X,XX,XXX,XL,L,LX,LXX,LX
XX,XC
530 DATA 0,C,CC,CCC,CD,D,DC,DCC,DC
CC,CM
540 DATA 0,M,MM,MMM,0,0,0,0,0
550 FOR row%=1 TO 4:FOR col%= 0 TO
9:READ roman$(row%,col%):NEXT:
NEXT
DD ENDPROC
599
600 DEFPROCdecinput
605 okay$="1234567890":maxlen=4
610 CLS:PROCreturn:PRINT TAB(2,5)"
Enter Decimal number ";PROCc
heckinput:dec=VAL(string$)
620 IF dec <1 OR dec>3999 OR dec<>
INT(dec) THEN PROCinvalid:PROC
decinput
630 PROCdecanalyse
640 PRINT TAB(8,8)"Roman numeral
";romnum$
650 PROCpause:PROCdecinput
660 ENDPROC
699

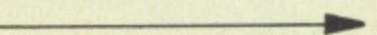
```

Figure IV: Example edit

be removed before running.

The Basic Editor also has a feature which, some might say, encourages unstructured programming. For example when using GOTO or GOSUB in the early part of a program the destination line numbers may not be known and a label name, beginning with @, may be used instead and subsequently marked on the appropriate line when that stage of a program is reached.

The command NUMBER simply



Basic Utilities

From Page 57

converts these labels to line numbers and LABEL reconverts them back again.

Entering and leaving the Basic Editor is straightforward using *BASIC, EXIT or RUN. The latter is especially useful as it exits the editor, performs OLD and RUNs the program.

If the editor is re-entered – *BE – then the default colours, mode and marks are lost. Further information on colours, searches, Tab values and so on may be gained from INFO, which reveals the type of display shown in Figure V.

The Editor also has a set of 38 enhanced error messages to assist the programmer. Some examples include "Lines too long to be joined", "Destination missing", "Only colours N, R, G, Y, B, M, C, W are valid" and so on.

It is compatible with Basic 1 and 2, and most important, is one of the few Basic utilities to be fully 6502 second processor compatible.

Simplicity and ease of use are the

hallmarks of the Basic Editor. It is very intelligent and all its functions are superbly implemented.

It is without doubt the best editing utility currently available for BBC Basic and I cannot see how its style could be beaten in the future.

It has many of the Basic toolkit functions for partial renumbering, moving lines or blocks, inserting, deleting, finding and replacing – both

globally and selectively – and a merge function.

At just around £30 for a 16k chip it therefore represents reasonably good value for money. It is not, however, a complete Basic toolkit in that functions for displaying full memory usage, cross referencing, variable dump, packing, print formatting, verify or repairing bad programs are not included.

Therefore most programmers will require another good Basic utility chip such as Toolkit (Beebugsoft), Caretaker (Computer Concepts), Slave (A & F) or Probe (Altra) to be co-resident, some of which also have their own, though somewhat inferior, Basic editors. We've met most of these in this series.

Even so, despite the latter comment, well done Acornsoft for setting the standard with yet another excellent quality product.

By the way, in addition to describing the standard of this chip, the title of this article is to remind me that now the review is done, HE wants it back. Our editor always had a good eye for a nice bit of software.

```

Scroll on
Overtime mode
White on blue

Program name: ROMANS
Last search: numeral

Tab Value: 5      No. of lines: 113
First line: 100  Last line: 2410
Current line: 200 Marked line: 150

Pending commands:
DD 500 DD560
    
```

Figure V: A typical INFO screen

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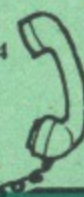
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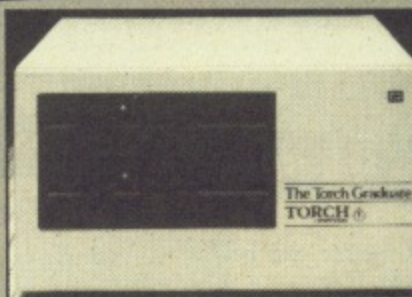
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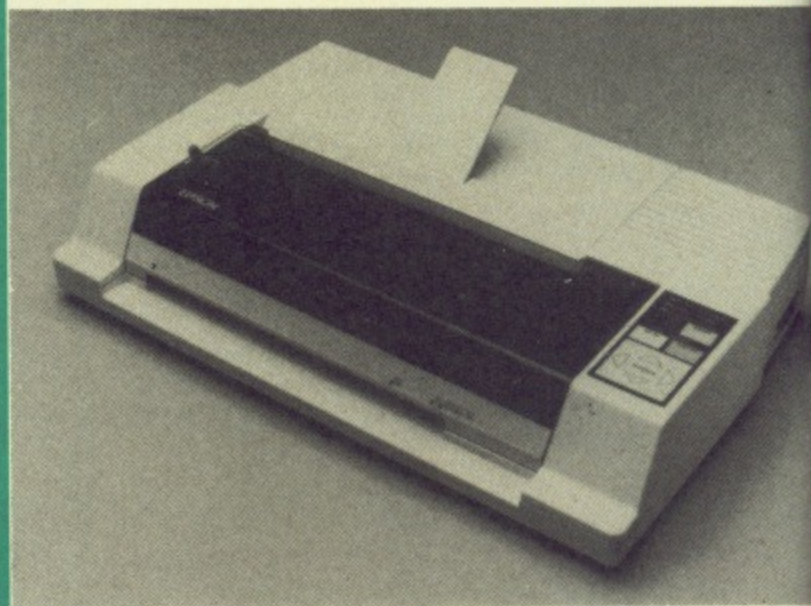
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PRINTER SHARER/BUFFER

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	£190 (a)	1431 AP Std Res	£205 (a)
1451 Med Res	£240 (a)	1451 AP Med Res	£280 (a)
1441 Hi Res	£389 (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	£240 (a)	VISION III Plus	£325 (a)
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SUPERVISION III Plus £275 (a)

MITSUBISHI 14" RGB Med RES IBM & BBC Compatible £229 (a)

SANYO CD3125NB 14" RGB Std Res £159 (a)

MONOCHROME MONITORS:

SANYO DM8112CX Hi Res 12" Green Screen	£95 (a)
KAGA KX1201G Hi Res 12" Etched Green Screen	£99 (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	£13.50 (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)

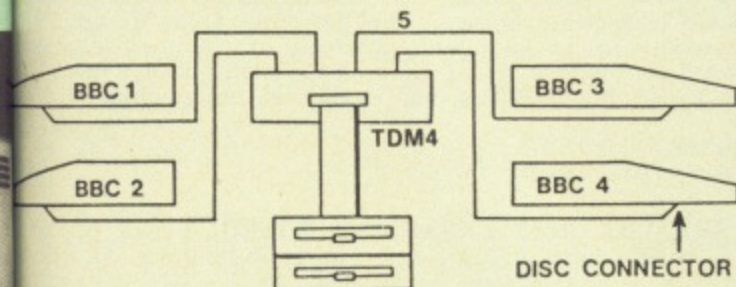
TOUCHTEC-501

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)

LOCKABLE CASES

40 Discs £14 (c) 70 Discs £15 (c) 113710 Discs £16 (c)

DISC DRIVES

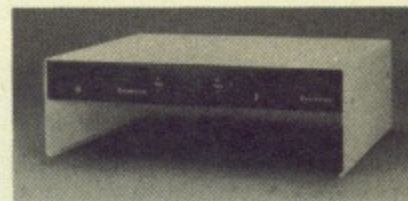
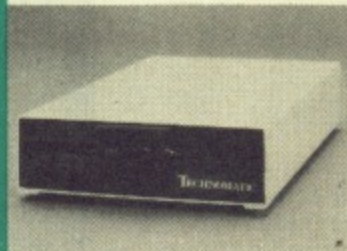
TECHNOMATIC drives are fitted with high quality slimline Japanese mechanisms and represent the state of the art in drive technology. The drives are built to the highest standards and are tested to their full performance capability before packaging.

Single drives are available with or without integral mains power supply. The dual drive power supplies are switch mode type and are generously rated to ensure minimum heat generation even over long periods of operation. All drives with integral power supply are fitted with a mains indicator.

The drives are housed in attractively designed metal casings painted in hard wearing BBC matching paint. The dual drives can be supplied in stacked version or with built-in plinths. The plinth version cases are of sturdy construction to carry any monitor and provide a simple method of having a compact computer installation.

The 80T drives are supplied with the 40/80 track switching modules at no extra charge. The 40/80 track switches are conveniently positioned in the front on dual drives to enable easy switching between the tracks.

All drives are supplied with all the necessary cables, manual and a formatting disc. The mains powered drives are also fitted with a 13A mains plug suitably fused. The drives are ready to be fitted to the computer. All drives are capable of operating in single or double density modes.



Single Drives:

1 x 100K 40T SS : TS100 £79 (b)

1 x 400K 80/40T DS : TS400 £85 (b)

With integral psu:

PS100 £99 (b)

PS400 £105 (b)

Dual Drives: (with integral psu)

Stacked Versions:

PD200 2 x 100K 40T SS £190 (a)

PD800 2 x 400K 80/40T DS £229 (a)

Plinth Versions:

PD200P £205 (a)

PD800P £249 (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 x 400K 80T DS £99 (b) TD35 2 x 400K 80T DS £175 (b)

Separate cased power supply £20 (c)

3M FLOPPY DISCS

Authorised Distributor
Data Recording Products



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80 T SS DD £22 (d)	80 T DS DD £24 (d)
3 1/2" DISCS	
80 T SS DD £30 (d)	
80 T DS DD £38 (d)	

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)

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305 Edgware Road

London W2

Tel: 01-723 0233

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(b) £2.50

(c) £1.50

(d) £1.00.

COMMUNICATIONS

MODEMS

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 £60 (c) Mains Adaptor £8 (d) BBC Data Lead £8 (d)

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** £129 (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, SKI 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. £25 (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.

COMMSTAR An ideal communications Rom. Extremely easy to use, yet very versatile. It features both a Prestel mode as well as a Terminal mode, thus offering very good value for money. In Prestel mode, all normal Prestel features are available including, downloading of software, saving and retrieving of pages on disc, page tag, revealing of hidden text etc. Its terminal mode is ideal for bulletin boards etc. Any type of file, (not just ASCII) may be sent using XModem protocols. Even includes an elapsed time clock. £27 (d)

TERMULATOR Acorn's Communication Rom. £29 (b)

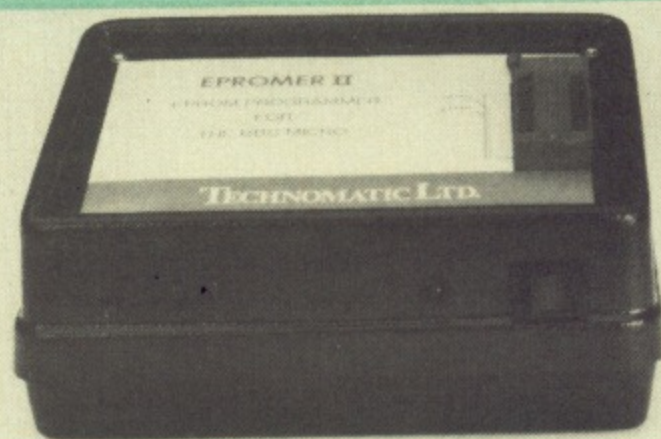
COMMUNICATOR This is a full 80 col VT100 terminal emulation program on 16K eprom. It is a more advanced program than TERMI and features easy to follow screen menus. The rate at which data is sent or received is easily set up with rates up to 19200 Baud with 80 column text. Allows files to be transmitted from disc, or a copy of incoming data to be sent to a file or to a printer. (Communicator is not suitable for PRESTEL). £57 (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 cassette (easily transferred to disc) — no ROMs needed. £29 (c)



EPROMER II



A sophisticated eprom programmer that handles the full range of popular single rail eproms (incl 27256) and allows the user full control of programming process.

Its powerful menu driven software makes the programming of eproms simple, efficient and eliminates the need to have fiddly switches for selecting 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 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 algorithm. High speed programming enables 27128 to be programmed in just 10 mins. Normal programming skips addresses with FF data to increase programming speed. Automatic verification on completion of programming.
 - * User can select any section of the eprom from a single byte to its full address range to Blank Check/Read/Program/Verify enabling program development/changes very simple.
 - * Full screen editor with HEX/ASCII input.
 - * Full tape/disc filing facility. Data input from keyboard, Tape/Disc/Eprom.
 - * 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.
- 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 safety interlock to avoid accidental exposure to the harmful UV rays. It can handle up to 5 eproms at a time with an average erasing time of about 20 minutes. £47

UV1B as above but without the timer. £29

ROM/RAM EXPANSION SYSTEMS

ARIES B-32 BOARD: Features 32K of RAM and a 16K ROM socket. Release can be configured as 20K or 16K as shadow RAM and 12K or 16K as sideways RAM. New commands include comprehensive sideways RAM/ROM/RAM management system, simplified direct access to screen RAM and the ability to move/swap the contents of any area of memory. The ROM/RAM management system allows RAM allocation, list ROMs, sideways RAM, disable ROMs, and extend any buffer including program buffer. £47

AIRES B32 RAM BOARD
ARIES B12 ROM BOARD

ATPL SIDEWISE ROM EXPANSION BOARD A well constructed expansion board, simple to install and requires no soldering. All buses buffered. It allows full sideways rom expansion to 16 ROMs. One socket has been split into two 8K sockets to allow the use of 8K CMOS RAM. Battery backup option allows data retention in the RAM when the computer is switched off. Several link selectable options including write protect for ROM. ATPL Board £39 (d) Battery Backup Kit £18 (d).

RAMROM-15 The advanced sideways ROM/RAM expansion system. It is an external unit, using high quality construction, attractively packaged in a BBC coloured metal case, allowing easy access to all the sockets. No soldering is required. Allows 11/12 additional sideways ROMs to be added with an option of up to 16K sideways RAM. All commonly available ROMs can be used i.e. 4801/6116/6264 or xx128. Battery back-up fitted as standard. For development work and further expansion, most of the processor signals are available. Supplied with utility disc and full instruction manual. £47

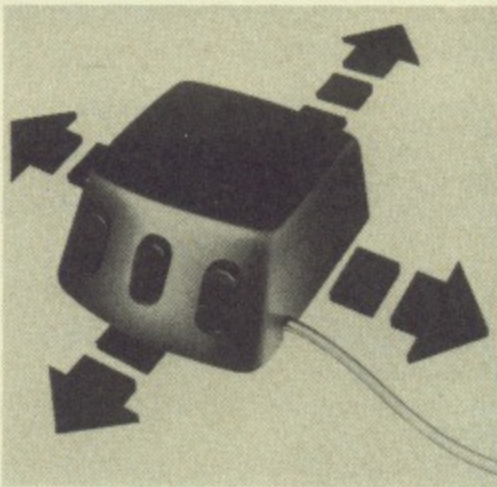
RB2 TRACKER BALL

A precision built tracker ball. Software allows RB2 to function, instead of cursor keys, for word processing, CAD/CAM etc. Software includes a graphics/CAD package.

RB-2 (with 'microdraw'). £52 (b)
RB-2I (with 'icon artmaster'). £60 (b)

AMX MOUSE

This sophisticated mouse has many advanced features such as Icons, Windows etc. The supplied 'AMX ART' is a superb, yet simple-to-use CAD package allowing the creation of amazing graphical designs. A screendump for drawings is included. It can also be used with Wordwise/View to replace the cursor keys. Supplied complete with CAD Package, ROM and full instruction manual.



AMX DESK An organisational program, including memo-pad, telephone/address book, diary, alarm, calculator etc. On Disc. £22 (d)

AMX PAINTPOT £13 (d)

AMX UTILITIES Provides new drawing facilities including Zoom, colour sketch and more. On Disc. £13 (d)

ACORN TELETEXT ADAPTOR £192 (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. £282 (a)

DATABASE MANAGEMENT SYSTEMS

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. £52 (d)

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. £79 (c)
Please ask for leaflet.

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. £69 (d)

CLARES BETABASE £21.50 (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.

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 £310 (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. £335 (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. £180 (a)

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. £220 (a)

BSTAM A telecommunication facility used for transmitting any size CP/M file. £165 (b)

Other packages available include CIS-COBOL, INFOSTAR, DMS +, FMS, SAGE, ATITUTORIALS, MACRO-80 etc. Please telephone with your requirements.

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(c) £1.50
(d) £1.00.

ROMs/SOFTWARE

WORD-PROCESSORS

- VIEW** Acorn's version V2.1 word processor rom. £48 (c)
- VIEW VERSION V3.0** Also compatible with BBC + Complete with Printer Driver Generator. £78 (c)
- HI VIEW** Disc based version of VIEW word processor for use with the 6502 2nd processor. Allows 47K of user memory. £52 (c)
- VIEW INDEX** Disc based program to create an index from VIEW text files. Ideal for anyone concerned with writing extensive reports or books. £13 (d)
- WORDWISE** £34 (d)
- 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. £49 (d)
- SPELLCHECK-I** £15 (d)
- SPELLCHECK II** A ROM based fast machine code program that works with both VIEW and WORDWISE. Vocabulary disc supplied with 6000 words can be expanded to well over 17,000 words on 100K drive. Fully compatible with 6502 second processor. £24.50 (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. £48 (d)
- ULTRACALC 2** This enhanced version of the original BBC Publications popular spreadsheet ROM includes many new features including full compatibility with the 6502 2nd processor running as HiCalc allowing 44K of user memory, operate in any mode, greater flexibility in printer control, spooling as ASCII file etc. All these features are in addition to the existing powerful features such as handling of labels and numbers as values. Column width control and features normally found in well designed spreadsheets. £52 (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. £49 (c)
- INTERCHART** Graphics Package for the Intersheet. £38 (d)

LANGUAGES

- META-ASSEMBLER.** Both an Editor and Macro-assembler. Meta can assemble 65xx, 68xx/63xx incl. 00, 01, 02, 03, 05, 6809, 65816, 8048 series 8080/8085, Z8, Z80.
Free upgrades coming soon include 68000, 8088/8086 Z8000.
Features include: Macros and IF/ELSE/ENDIF conditional assembly (nestable), Global/Selective Search, error detection, Complex expressions, two parts assembly. Code may be sent to disc; sideways RAM, user/printer port, RS423 etc.
META-ASSEMBLER includes 16K Eprom, disc and comprehensive manual. £59 (c)
- 6502 DEVELOPMENT PACKAGE** A Macro-Assembler with utilities for use with the 6402 2nd Processor. Enables the serious programmer to develop large programs in assembly language. £43.35 (d)
- 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. £60 (c)
- ACORN LOGO** A full implementation of the Logo language from Acornsoft. Supplied as two ROMs with a tutorial course and technical manual. £60 (b)
- 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. £52 (b)
- BCPL CALCULATIONS PACKAGE** Supplied on disc, it supports floating point, fixed point and fast integer calculations. It includes the BCPL calculation files, example files and a comprehensive user guide. £17.30 (b)
- BCPL STAND ALONE GENERATOR** Utilities in this package enable the programs developed using the BCPL ROM to be converted so that they can be run on any BBC micro whether it has a BCPL ROM or not. Stand alone programs for other 6502 based systems can also be developed. £43 (d)
- ACORN LISP Rom** £43 (d); **FORTH** £43 (d); **COMAL** £43 (d)
- MICROTEXT** The authorising system from the National Physical Laboratory. Disc £53 (b) Cassette £43 (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. £41 (d)
- OXFORD PASCAL** A fast, compact P-Code compiler, that fully utilises BBC Graphics and sound, contains a powerful editor, and produces 'standalone' software. £43 (c)

UTILITIES

- ACCELERATOR** From Computer Concepts — Finally, a comprehensive compiler that will compile existing BBC Basic programs, simply, and in many cases, without alteration. Compiles to either intermediate code or machine code. Supplied with two Roms, manual, utility disc etc. £56
- SPEECH ROM** From Computer Concepts — allows infinite speech with Acorn speech system using simple * commands. Pitch and emphasis can be altered — even singing is possible! £29
- SPEECH PROCESSOR ROM** £12
- DISC DOCTOR** Computer Concept's popular disc utility ROM which adds 20 commands to the DFS system. £26
- GRAPHICS ROM** £24
- PRINTMASTER** The ROM that features the most versatile screen dumps for the Epson MX/RX/FX80 and KAGA PRINTERS. Includes mode magnification, character definition, enlarged text, etc. — in short — the ROM does it all! £27
- BROM** The new utility ROM from Clares — a Toolkit ROM that gives you full screen editing. Many extra functions are included. £28
- REPLICA II** 40 & 80 Track Versions available. £9.75
- EXMON-II** Advanced M/C Monitor. £22
- TOOLKIT** Adds 27 new commands to BBC Basic. £21
- SLEUTH** Basic Debugger £21
- HELP ROM** based comprehensive on screen HELP facility to aid and speed up programming. £19
- DUMPMASER** Disc based dumps for many printers. £9
- HERSEY CHARACTER** Font generator £11.00
- BILLBOARD** A useful program that enables your BBC to produce superlarge 'Billboard' type characters i.e. a continuous horizontal scroll of super-large characters. £15
- DISCMASER** Disc Utility. £15
- BEEBUG SUPERPLOT** Cass £7.50 (d) **BEEBUG DESIGN** £15
- MUROM** Music Development ROM. £17

When ordering software on disc please specify track format (40/80)

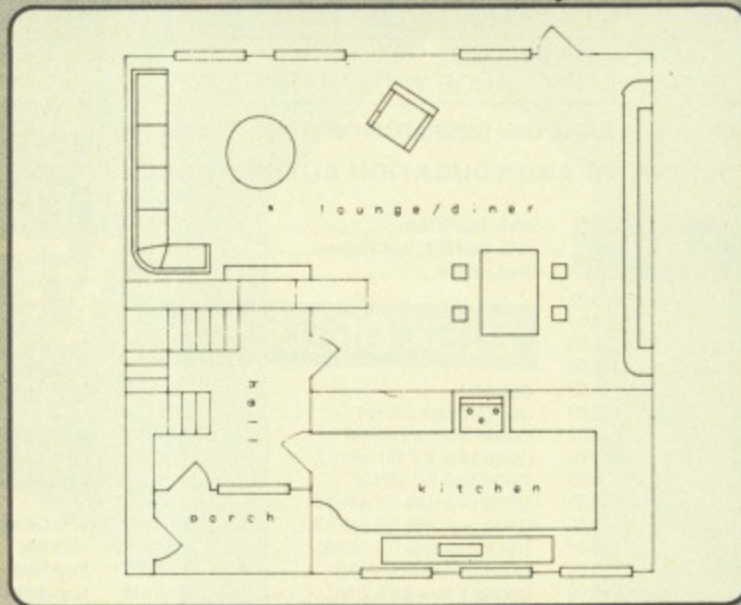
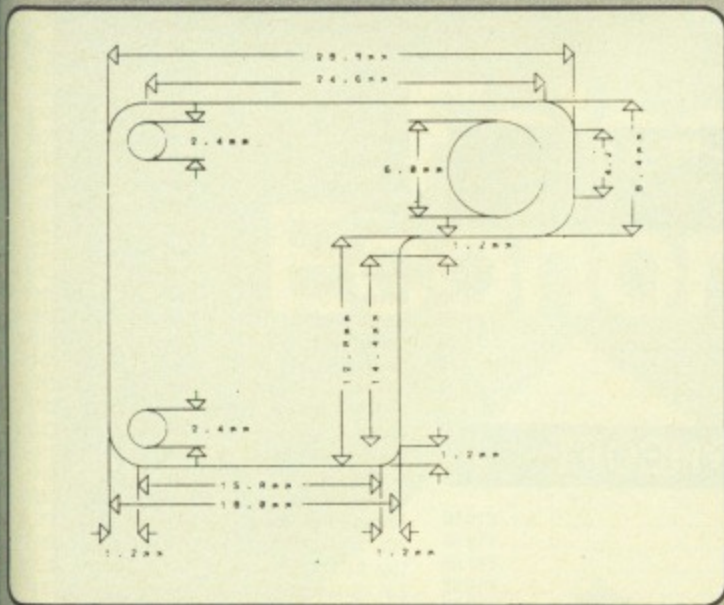
BOOKS

(No VAT, p&p £1.50 per book)

- CPU/Assembly Language Books**
- | | |
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| 6502 Applications..... | £12.50 |
| 6502 Assy Lang Prog..... | £19.95 |
| 6502 M/C for Beginners..... | £ 5.95 |
| 6502 Advanced Programming..... | £11.95 |
| 6502 Programming..... | £13.95 |
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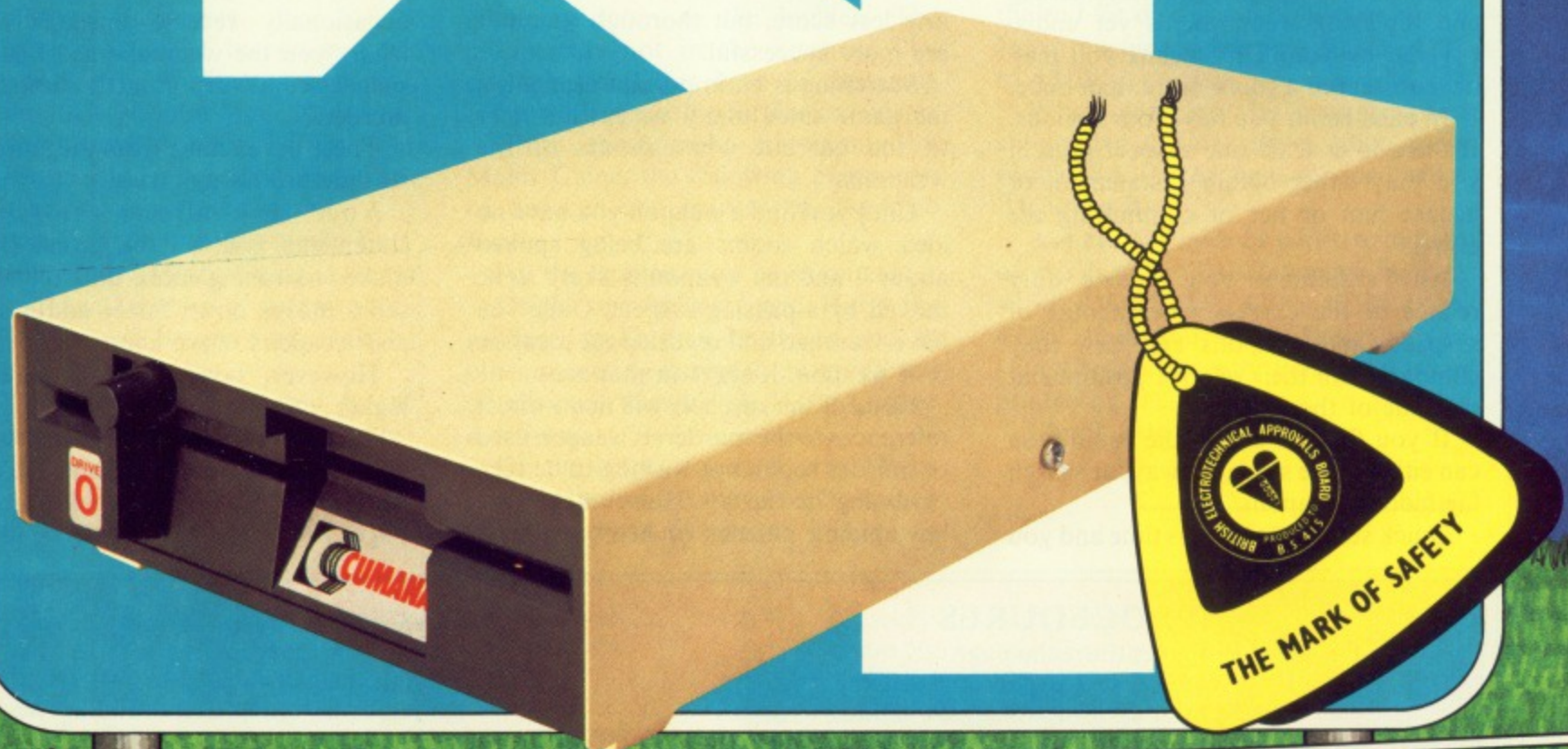
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WHODUNNIT?

CECIL Effingham, rich landowner and Earl of Thaxford, has been found murdered at his home, Thaxford Manor. The murder occurred at around 10.30pm. You have been sent for to try to solve the crime and bring the murderer to justice.

There you have the scenario for **Whodunnit?** an investigation game that combines logic and deduction.

You may move freely about the manor obtaining statements and searching for clues – murder weapons. To try to put you off the scent, the murderer will occasionally tell lies while all the other suspects you question will always tell the truth.

The murder was committed in one of the 10 rooms of Thaxford Manor. You have 10 suspects and 10 possible murder weapons to deal with.

Whodunnit? is a real time game. While you are trying to solve the crime, suspects will be moving around taking and replacing weapons, as yet undiscovered by you. This means you may have to search a room more than once.

In each room you have four options. If there is at least one suspect present you may either obtain a statement or accuse him or her of committing the crime.

Any statement you receive only relates to the current whereabouts of suspects and weapons and how they compare with their relative positions at the time of the murder.

If you find no one in the room, you can either leave straight away, or search for hidden weapons.

Quick searches take less time and you



lose less score, but thorough searches are more successful.

Searching is an important element in the game since many statements refer to the current whereabouts of the weapons.

Until you find a weapon you have no idea which rooms are being spoken about – and the weapon is likely to be moved by a passing suspect. Once you have searched and revealed the location of a weapon, it stays in that room.

None of the suspects will make direct references to the murderer, weapon used or murder room, not wishing to be seen “grassing” to the law. However they are law-abiding citizens at heart and you

occasionally receive unsigned notes telling you the whereabouts of either a suspect or a weapon at the time of the murder.

These never come from the murderer, so they are always true.

Your rank affects the type of statements you will be given. It also makes searching more difficult – your score moves down faster and suspects and weapons move about more often.

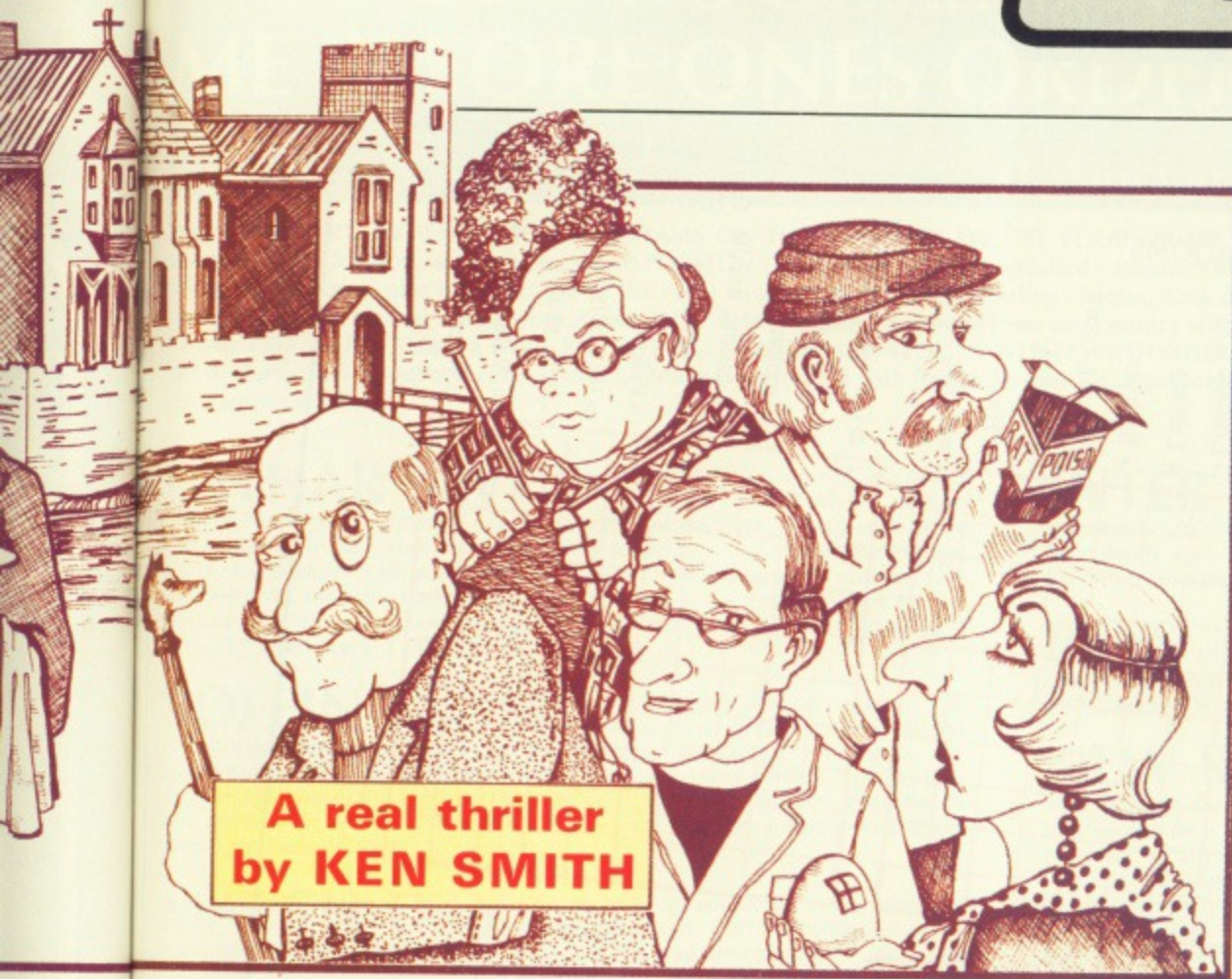
However, bonuses are greater the higher your rank.

Of the five ranks, the lowest, detective constable, allows you to solve the crime without the need of the logic sheet – see Page 70 – although it may be used to

PROCEDURES

- M** Produces the menu page.
- F** Accusations are made and tested.
- S** Randomly swaps suspects and/or weapons to new rooms.
- H** Move to a new room.
- G** Indicates the room you are currently in.
- Q** Questioning a suspect.
- K** Searching a room for hidden clues.
- B** Main score adjustments related to time.
- S** Minor score adjustments resulting from statements being made.
- J** Produces the plan of the Manor.
- D(c,x,y,z\$)** Produces double-height writing in any colour anywhere on the screen. c = colour. x = horizontal coordinate. y = vertical coordinate. z\$ = string to be written.
- C** Continues the program when spacebar is pressed.
- Y** Game summary.
- I** The heart of the program. This is the initialisation procedure which sets all the

- r** Randomises the locations for PROC1.
- R** Produces the random numbers for PROCr.
- P(c,y,z\$)** Similar to PROCD(c,x,y,z\$) but generates the sentences for the suspects' statements such that they do not truncate words when they reach the edge of the screen.
- A(R%)** Checks the plan of the Manor to see which rooms are adjoining the room you are in or the rooms which were adjoining the suspect's previous location.
- N(I%,P%)** The largest and most complicated procedure of the program is designed to bring together all the string variables in the data and turn them into meaningful, logical and – for the most part – true sentences.
- L** Produces at random intervals a note with



**A real thriller
by KEN SMITH**

The cellar may be eliminated from statement 4.

The silk scarf was adjoining the kitchen (room 7). On the plan of the manor we see that rooms 6 (dining room); 8 (hall) and 9 (the cellar) adjoin the kitchen. On the weapon/room grid, therefore, we can cross all the other rooms for the silk scarf except rooms 6, 8 and 9.

Similarly on the weapon/room grid, we can cross that the pillow was not in the kitchen.

Finally, statement 7. Having already searched the lounge and found the duelling pistol, we now know that was where it was at the time of the murder. So on the weapon/room grid we tick duelling pistol/lounge and cross all other references to either.

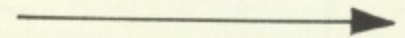
Statement 8 tells us that we won't get another sentence out of Major Caine...

Two final points about the program itself. A downloader has been tagged on the end for disc users. If you don't have a disc machine, delete lines 50, and 4270 to 4310.

When entering the program and eliminating typing errors, disc users should SAVE the new version before RUNNING it.

A space " " must be added to the end of the last DATA statement in lines 4160, 4170, 4180, 4200, 4210, 4220, 4230, 4240 and 4250. These help to stop words accidentally joining up when printed on the screen.

Happy detective work...



help jot down statements.

By rank five, Chief Inspector, you will receive very few direct statements. Here the logic sheet is vital, so now a word about how to use it.

Firstly, assume every statement to be true. It helps in the long run.

Here is a situation from a game: You are in the study. Major Caine is there and you request a series of statements - usually eight will be given on rank 1. Here is what he says:

The Earl wasn't murdered by a woman. Harry the gardener was in this room. The paperweight was in the same room as me. The Earl wasn't murdered in the cellar. The silk scarf was in an

adjoining room to the kitchen. The pillow was not in the kitchen. The duelling pistol has been in the same room all the time. No further comment.

From these eight statements by Major Caine, the following points can be deduced and marked on the logic sheet:

All the women may be eliminated.

On the suspect/room grid, Harry the gardener/study may be ticked and all other suspects relating to the study can be crossed, likewise all Harry's other locations.

On the suspect/weapon grid, Major Caine/paperweight may be ticked, then as for Harry/study above.

information concerning the whereabouts of either a suspect or weapon at the time of the murder.

b Produces a sound to indicate failure.

f Produces a simple fanfare to indicate success.

MAIN VARIABLES

D% Detective rank.

H% High score.

I% Person you are currently questioning.

J% Chooses which adjoining room a statement will be made about.

K% The killer.

L% Killer's lie variable.

M% Murder room.

P% Your current position.

S% The score.

V% Ascertain which rooms are adjoining which.

W% Murder weapon.

X% Suspect you are accusing.

Y% Room you accuse the suspect of committing the crime in.

Z% Murder weapon the suspect used.

e% Former room of the suspect being questioned.

f% Weapon in the same room as e%.

g% Suspect formerly in a randomly chosen room (r%).

h% Weapon formerly in a randomly chosen room (r%).

r% Randomly chosen room.

s% Suspect formerly in your current location.

w% Weapon formerly in your current location.

q% Checks to see if you are searching a room for the second time, or more.

m% n% Markers to check for the past and current location of suspects and/or weapons which have been detected.

o% Checks how many people occupy the room you are in.

From Page 69

Whodunnit? LOGIC SHEET

SUSPECTS

- 0 Dr Adams
- 1 Gregg the butler
- 2 Major Caine
- 3 Harry the gardener
- 4 Reverend Jones
- 5 Felicity the maid
- 6 Mrs Dwight
- 7 Beatrice the nanny
- 8 Lady Effingham
- 9 Isabel the cook

WEAPONS

- 0 Carving knife
- 1 Chain saw
- 2 Duelling pistol
- 3 Knitting needle
- 4 Paperweight
- 5 Pillow
- 6 Rat poison
- 7 Silk scarf
- 8 Walking stick
- 9 Wrench

Elements Eliminated.

- 0 Dr Adams
- 1 Gregg
- 2 Major Caine
- 3 Harry
- 4 Reverend Jones
- 5 Felicity
- 6 Mrs Dwight
- 7 Beatrice
- 8 Lady Effingham
- 9 Isabel

- Carving knife
- Chain saw
- Duelling pistol
- Knitting needle
- Paperweight
- Pillow
- Rat poison
- Silk scarf
- Walking stick
- Wrench

- Bathroom
- Bedroom
- Study
- Lounge
- Library
- Ballroom
- Dining room
- Kitchen
- Hall
- Cellar

Cecil Effingham was murdered by _____
 in the _____ using the _____
 Detective rank _____ Score _____

ROOMS

- 0 Bathroom
- 1 Bedroom
- 2 Study
- 3 Lounge
- 4 Library
- 5 Ballroom
- 6 Dining room
- 7 Kitchen
- 8 Hall
- 9 Cellar

WEAPONS

- 0 Carving knife
- 1 Chain saw
- 2 Duelling pistol
- 3 Knitting needle
- 4 Paperweight
- 5 Pillow
- 6 Rat poison
- 7 Silk scarf
- 8 Walking stick
- 9 Wrench

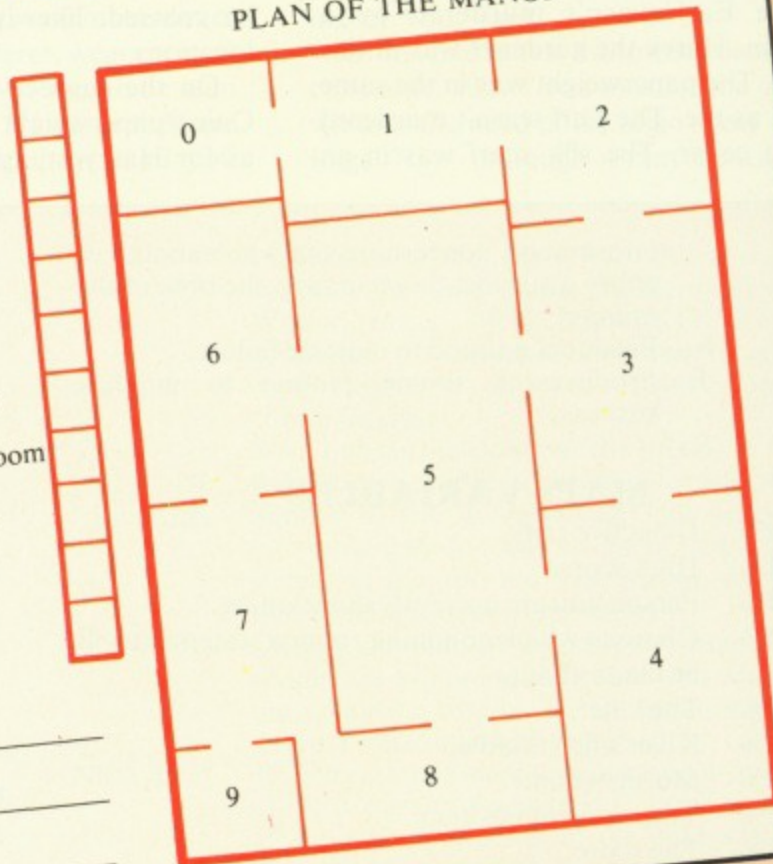
NOTES

The murderer *occasionally* lies.
 Adjoining rooms are those linked by doorways.

Each suspect and each weapon was in a *different* room at the time of the murder.

Statements only relate to the *current* whereabouts of weapons and suspects. Until found, weapons may be moved about the Manor as the suspects move around. Once found they remain in that same room.

PLAN OF THE MANOR



Full listing starts
on Page 161

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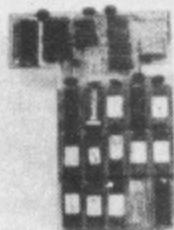
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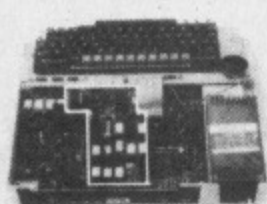
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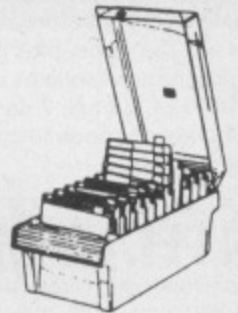
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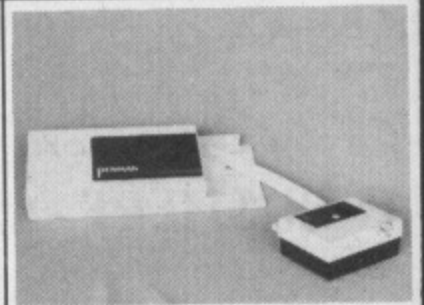
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A NUMBER of readers are curious as to how I design a mini adventure. Often they are modifications of classic puzzles, some of which were invented by either Henry Dudeney or Sam Lloyd over 100 years ago.

These two published scores of problems that were later shown to have a deeper mathematical significance. An example is if $N > 2$, then all the squares of an $N \times N$ chessboard can be visited by a chess queen in $2 \times N - 2$ moves.

It was not until 1955 that it was proved that, providing $N > 5$, then the queen's tour can also be cyclic - that is, she can begin and finish in the same square.

Dudeney first presented a version of this puzzle in contemporary terms circa 1880 by asking his English readers to ram all 49 boats in a 7×7 array in just $2 \times 7 - 2 = 12$ straight lines (see Figure I).

Sam Lloyd went one better by asking his American readers to cover the 8×8 branch in $2 \times 8 - 2 = 14$ queen moves. Lloyd was the first to solve this version and considered it one of his best efforts.

A number of adventures require the player to move correctly around mazes using only the eight compass directions. There is an 8×8 chequerboard puzzle in Castle Blackstar and the spider web in Quondam (last month) both of which require understanding before the correct moves can be worked out.

I have updated Dudeney's classic to just picking up all the objects in an $N \times N$ array (see Program I). Usually I just

Taking the classical route to a mini adventure

By ALICE

give the listing without any explanation - just "All you have to do is make it STOP".

This lack of background makes the puzzle doubly difficult - you have to "read" the program to work out the

question - but many adventure puzzles are only baffling because the player fails to recognise what is required.

In order to test my program, first solve the well known $N=3$ case. That is, picking up nine objects in a 3×3 array in the following $2 \times 3 - 2 = 4$ moves:

- 1: E,3
- 2: NW,3
- 3: S,3
- 4: NE,2

The prize goes to the first who can stop the program when $N=5$ and $N=7$ AND then decode the unique time and place given in Figure II. Caveat - I won't be there.

I have not set Sam Lloyd's $N=8$ case in 14 moves because it is much too difficult. It took him months to get just one solution which is:

- 1: E,7
- 2: N,7
- 3: SW,5
- 4: E,4
- 5: NW,5
- 6: S,4
- 7: NE,4
- 8: W,3
- 9: SE,4
- 10: N,4
- 11: SW,6
- 12: E,6
- 13: NW,6
- 14: S,7

There are other cyclic tours in 14 moves but I know of no other that uses only queen moves.

```

10 DIM B(10,10)
20 INPUT "SIDE = ",N
30 REPEAT
40 FOR Y=1 TO N:REM DROP N*N OBJECTS
50 FOR X=1 TO N
60 B(Y,X) = 1
70 NEXT X
80 NEXT Y
90 X=1 :REM START BOTT
ON LEFT
100 Y=1
110 OBJ=0
120 FOR M=1 TO 2*N-2:REM NO. OF MOVES
130 PRINT M;
140 INPUT "DIRECTION,DISTANCE ",D$,D
150 FOR S=1 TO D
160 IF INSTR(D$,"N")>0 THEN Y=Y+1
170 IF INSTR(D$,"S")>0 THEN Y=Y-1
180 IF INSTR(D$,"E")>0 THEN X=X+1
190 IF INSTR(D$,"W")>0 THEN X=X-1
200 IF B(Y,X)=1 THEN OBJ=OBJ+1
210 B(Y,X)=0
220 NEXT S
230 NEXT M
240 PRINT"YOU GOT ";OBJ;" OBJECTS IN ";2*N-2;" MOVES"
250 UNTIL OBJ=N*N AND (N<6 OR(X=1 AND Y=1))
260 PRINT"YOU DID IT!";END
    
```

Program I: Picking up all the objects in an $N \times N$ array

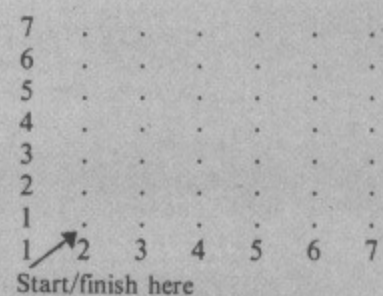


Figure I: Visit all squares in "queen" moves

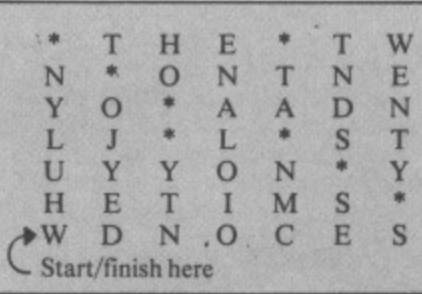


Figure II: Decode the time and place

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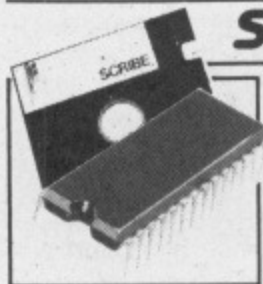
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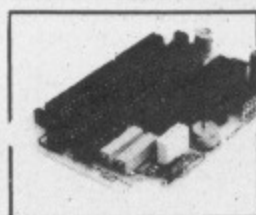
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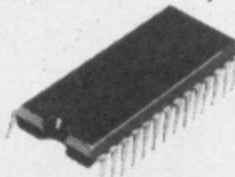
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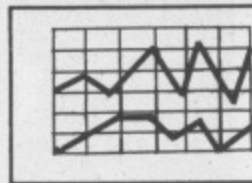
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Yo, ho, ho with the Vikings

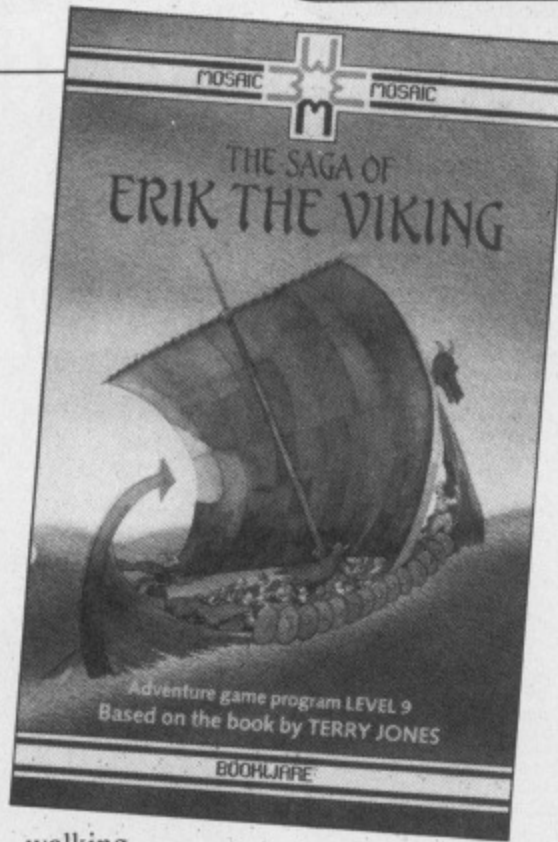
ERIK the Viking (Mosaic Bookware) leapt ashore and turned to his trusty, lusty crew. "Bjorn - Burn", he said, "Peer - Pillage". Oh no", groaned Ragnar Forkbeard. "I've got a headache".

Since this game is implemented by Level 9 you'll find even worse jokes than that. Half the crew munch buttered fish, so I thought a visit to the viking loo, clutching some silver, would be essential - it is but don't spend a penny since the loo is "just scenery" and the nearest bog is in Ireland.

The nice gimmick of this game is that many of the places that you can visit actually did exist around AD 900 and you have to explore a great deal of the North Sea and the North Atlantic in your search for Erik's kidnapped family.

In order to search the high seas you need help to launch your ship. After that you're better off on your own because the crew are as useless as old Oakenshield in the Hobbit.

They also sing of gold, fall asleep, look worried, mutter darkly, tell you to "Hurry up" but do nothing useful. They finally tear the sail by tugging it once too often and you have to make all repairs. If only the planks were made for



walking . . .

The last Mosaic Bookware I reviewed was *The Pen and the Dark*, where you got the whole story. Here you only get extracts from the book by Terry Jones (of Monty Python) but this is enough to give an idea how to solve some of the puzzles.

If you get stuck you can get the usual Level 9 hint sheet. I'm not too keen on graphical adventures - they always cut into the text - but these pictures are about the best I've seen and must appeal to the younger player.

Older, more experienced Level 9 fans will probably enjoy mapping the rather desolate ocean and then making recognisable landfalls, one of them in the South of England - near Hindover Hill?

There is just a touch of déjà vu at the final riddle: "What does a rich man want that a poor man has?"

The castle is tricky, but fair

CASTLE Blackstar (CDS Software) has a twisty maze almost immediately.

I collected five objects from elsewhere, **SAVED**, dived into the maze, mapped it (this requires persistence in order to move in some directions) got to the witch's gingerbread house and in nice time to be killed *flagrante delicto* taking her broomstick - but aren't adventurers supposed to be sticky fingered?

Resurrected with rien so **RESTORE** - and everything including locked doors, had disappeared. Such "features" always intrigue me.

Another funny was that I didn't need a lamp, so I mapped a lot of the game - this is quite tricky since the castle is three dimensional and some routes are on top of others - without having to solve a single puzzle.

A bit lonely though. I felt rather like the loser in a game of Sardines. Or was it **BO**, since the only sign of life was a dwarf who ran off whenever I got near? Answer: I had the wrong version.

So when I got the amended copy it was interesting to know where I could go if only I could light the lamp, open the doors, cross the flaming (literally) lake and avoid the many ingenious, and

French adventurers have their problems

ERIK doesn't quite make it to France, but I did recently. They are still way behind with "chez cultivée" adventures, probably because the syntax of French is so complex, what with feminine fenêtres (windows) and nonsensical reflexive verbs.

In order to find out what something is we say EXAMINE, but they have to say "Que'est que c'est que ça veut dire?" which translates as "What is it that this (object) is trying to say?" As the object is often inanimate it usually says very

little. Possibly a broken tape recorder makes some sense.

Je geste? Pas de tout. Par exemple (from TILT August 1985): "Je suis au bord du volcan in Forest at World's End et bloqué - Au secours".

Solution: "Il faut accrocher la corde (TIE ROPE) avant d'y descendre (CLIMB DOWN ROPE). Au fond du cratère se trouve un coffre, qu'il est tout a fait conseille d'emporter avec soi (GET CHEST) et de remonter (CLIMB UP ROPE)".



From Page 75

now operational traps.

Although slightly dated, this is a well planned medium-to-hard game with plenty of text, good atmosphere and about 20 tricky but fair puzzles.

Good value for the money.

Get that vampire in a spin

LAC Dracula, last month's problem, was a simple program that shows how to calculate bearings and distance from a fixed point, the centre of the lake. In the original the vampire could run at exactly four times the speed of the rower

and the solution is to row in a spiral until you are 500 feet from the centre and the vampire is on the opposite (furthest) shore.

You then have to cover only 1500 feet while Dracula has to run $PI \times 2000$ feet – that is, over four times further.

I modified this so that V moves, at most, 10 degrees per move, simplified the bearings you can choose, complicated the starting point and where you can make a safe landing, and threw in the Black Hole for those foolish or curious enough to row immediately south. (In line 10, by the way, 40 should have been 140.)

A solution is SE, SW, SE, SW (doglegs to partly avoid the Black Hole) then S until you are 82 feet south of the centre on a bearing of 180. You can now rest (type R) until the vampire has galloped round to your new bearing.

Now move N, NW, NE, NW, NE, NW, NE and the vampire moves to bearing 160, so row like a bat out of hell on a bearing of not less than 30,

otherwise you can't land safely because the shore is too muddy.

Duneroamin, our ongoing adventure first mentioned in *The Micro User* in March 1985, was first published as Exploring Mount Neverest 100 years ago by Dudeney from an idea by H.F. Heath. It was then modified into a circumnavigation puzzle by Martin Gardner and programmed by me.

Despite its age, this classic was not solved until I prodded Steven Chmiel, who then produced the same answer as Heath and myself. Therefore it appears that there are only two solutions.

Actually working it out is far more interesting than typing in the 111 moves without understanding. However, should you want to do just that, send an SAE for the moves.

As a bonus, I will also append the name of the person who made that obscure quote, read by millions, that nobody – except me – seems to remember. It's in Chapter II as I recall, but my memory is not very good...

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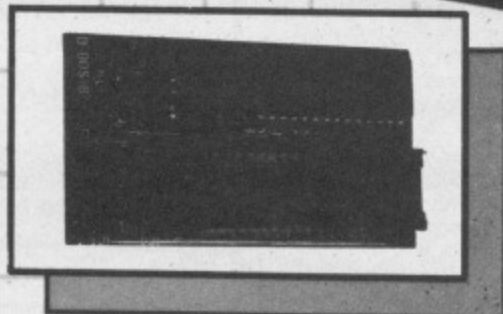
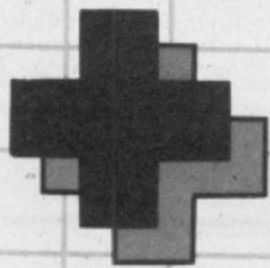
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Graphics come pretty basic

IN **Lode Runner**, from Software Projects, it's time once again for all of you macho types to get your galactic commando uniforms on and right some wrongs.

The evil Bungelings have stolen a fortune in gold bullion and stashed it in an underground hideaway.

You alone can retrieve this stolen treasure and return it to its rightful owners.

To describe the graphics used in this ladders-and-levels game as crude would be a compliment.

On a background of red brickwork and white ladders, three blue stick men chase one white stick man.

I would expect better graphics than this in a game listed in a

magazine.

You guide the white stick man around the screen collecting the gold ingots.

The little chap appears to be quite a sturdy character, for he can leap from a ladder or drop from a horizontal rope and still survive, irrespective of how far he has fallen.

The control available are up/down, left-right, and dig. Dig can be used to trap enemy guards or even as a means of escape.

Should the bad guys be closing in on both sides, just whip out your laser drill pistol and blast a hole in the floor. You can then leap to safety in true James Bond style.

When you have collected all

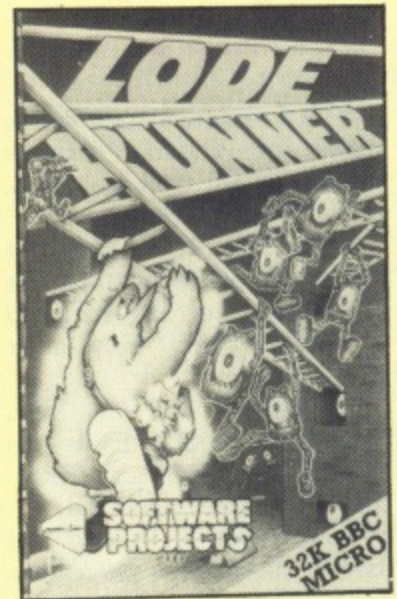
the ingots, a new ladder will appear and this is your exit to the next level.

There are 40 of these levels stored in memory, with a further 120 stored on side two of the cassette.

Should these be insufficient, you can use the game's in-built screen editor to create your own. These can be saved to tape and re-loaded at a later date.

The animation of the characters is smoothly done and they exhibit quite a large range of movements — though this shouldn't have provided too many problems owing to their small size. You could have probably got the same effect writing the game in Basic.

If you are looking for a



ladders-and-levels game which allows you to create your own screens, have a good look round before committing yourself to this one.

Jon Revis

CAMBRIDGE Micro Software have added two computer-assisted language-learning modules to their library. They come together on a single 80-track disc, are available in French (as **Quelle tête!** and **Jeu de ménages**) or German (as **Kopfjäger** and **Umziehen**), and are intended for children in their first or second year of language-learning.

The first module is based on identikit pictures. Using highlight selection, you match facial features and adjectives, both chosen from a list in French or German, as the case may be.

The computer draws the

results until the face is complete, and composes simple descriptive sentences at the bottom of the screen, emphasising any changes in articles and the position and agreement of the adjectives.

In the second module, where the aim is to provide practice in spelling and the use of prepositions, the screen shows the plan of a house and you're asked to arrange various items of furniture in different rooms.

The items appear on the plan

when you type in responses to questions in French or German about where to put them.

Both modules are excellently documented, nicely presented on screen with adequate graphics, and generally well-programmed with some interesting touches.

For example, in the second module up to three spelling mistakes are accepted before the computer fails to understand a response. It then presents what it thinks you meant, and asks for

confirmation.

With no authoring facility provided, teachers may find the vocabulary content of under fifty words per module a serious limitation, but the fact that faces and houses can be saved on disc and dumped to a printer, opens up a number of possibilities for classroom use, such as guessing or detective games.

The price of £18.34 per pack is no bargain for two comparatively small programs. But you'll be paying for a high educational quality and an imaginative use of the micro.

Gabriel Jacobs

Two for tots makes a brave start

THE two programs **Griddle** and **Matchplay** prove to be a fairly creditable debut from Clockwork Computing, providing quite valuable practice in early matching and recognition.

Griddle is the less successful of the two, although the idea itself is original and imaginative.

There is a picture which is hidden behind a number of blocks, ranging from four to 36, depending on the level selected.

The blocks can be revealed by

correctly answering questions on Shapes, Numbers or Numerals and Numerals.

Although quite attractive, colour is not used sufficiently to hold the attention for long.

Matchplay is altogether a far better program, very simple in content and containing three linked parts: Match, Garden and River.

Match gives practice in recognising the relationship between six animal and two human

shapes. The child merely has to recognise similar shapes, even though the colours might not be the same.

These shapes then reappear in a delightful little game called Garden. Here the child decides where in a picture each character belongs.

There is better use of colour here, and I found the program was much more successful for that reason.

In River, there is a scene with

some constant features. Others appear in a certain place for a little while before disappearing again.

When they have all been shown briefly, one reappears at a time, moving around on the picture when the Spacebar is pressed. The child has to press Return when the character is in its correct position.

To sum up, these are fair first programs from Clockwork.

Phil Tayler

They're better by the quartet

THE first venture into the games market from Capital Programs is a four-in-one package called, aptly, **Four Games**.

In the first, *Picket Line*, the object is to get up to 10 pickets to the picket line. Someone had to cash in on it sooner or later...

Starting off with four lives, you have to guide your strikers through the hedges and fences, collecting money and food.

Your stock of money and food is shown as a percentage and if you let either drop to zero, you lose a life.

After four screens similar in objective, you finally have to collect as much falling coal as you can from a passing NCB freight train.

Once you have completed the final screen your stiker goes on the picket line and you start all over again.

The second game, *The Lost Cavern*, is a ladders-and-levels game looking rather similar to *Blogger*.

As in most of these games,

you have to find a route round the screen to collect a number of items, in this case gold pots.

You also have to negotiate a number of obstacles such as disintegrating floorboards, spinning cogs, and lava-flows, avoiding demons and other meanies as you do.

When all the gold pots on one level have been collected, a flashing beacon appears and you must jump on to it to move to the next level.

The third game, *Caterpillar*, is an old favourite. You have to guide the beast round the garden getting points for eating cabbages and flowers.

These also add to the length of the caterpillar, making the task more difficult.

You must avoid spiders, bushes and the garden wall, for these will kill you, as will turning back on yourself.

There is not much you can say about the last game, *Pontoon*. It's a pleasant graphic reproduction of the popular gambling game. You start with

£500 and play the computer, which acts as the bank.

The end comes when you are broke and I'm absolutely convinced that the computer cheats.

Most occasions when I bet a small amount I got good, easy-to-win hands. But if I got greedy and tried gambling a large amount, the computer inevitably won.

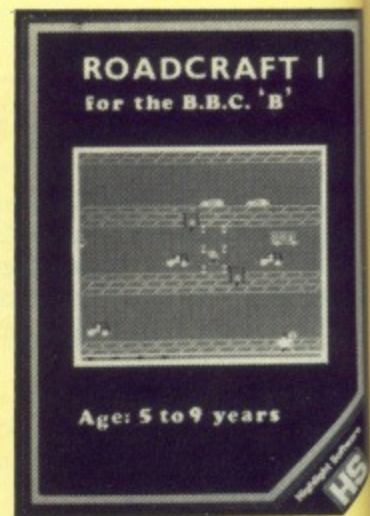
The games, in isolation, would be nothing to write home about, but together, at a few pence under £8, they make quite a good value-for-money package.

The graphics on the first two games are very good, and on the last two are acceptable.

It's true that you only get what you pay for, and a little more time should have been spent tidying up the instruction screens.

Minor irritations such as spelling mistakes – there was one in the instruction screen of each game – marred what would have been a first-rate package.

David Andrews



Safety aid

THE object of *Roadcraft I* from Highlight Software is to guide Roger Roadcraft across a busy system of roads, but thank goodness it isn't another *Frogger* lookalike.

The intention is far more serious – that of introducing young children to road safety. The child using the program has to guide him using the cursor keys, and has to avoid various pitfalls which are the sort he might meet outside.

Equally, there are aids to safety available such as zebra crossings, pelican crossings and a very friendly policeman.

Points are awarded at the bottom of the screen but they soon become superfluous, the animated discussion of the children being far more relevant and important.

The program is quite well error trapped and has a few rather gruesome touches – the child who tries to cross from between parked cars freezes on the screen and the cursor keys become inoperative. This results in the child waiting for Roger to be struck down, with no possibility of him moving back onto the pavement.

Obviously this is a deliberate ploy, as is the fact that a child can ignore a crossing, as long as another safe place is selected.

Rather worrying however, is one little problem which the programmers perhaps didn't envisage. If a child halts while crossing the zebra – yes, I know they wouldn't, but children do silly things in real life – a car driving along will hit the child.

Phil Taylor

Trainer for the lathe operator

HAVE you every wanted to "drive" a lathe without fear of accidents? **CNC** (Computer Numerical Control) **Lathe Simulator**, from Micro Electronics Educational Development Centre, gives you that chance.

Much of the modern metal cutting machinery being installed in industry is computer controlled and is programmed using a simple language, rather akin to *Turtle Graphics*.

It instructs the machine and cutting tool/s to perform various movements and operations. Just as flight simulators take the place of expensive training aircraft, this program allows industry and educational establishments to train new operators without tying up expensive machinery.

Using this package, it is possible to develop a program the effects of which can be viewed at each stage, using a

screen simulation of the various tool movements, before transferring it to a CNC lathe.

The benefits are: no waste metal, much quicker program debugging, much quicker learning, and no chance of damaging an expensive lathe.

The graphics have limited reality, but are good enough to give an accurate indication of the student's success as a programmer.

And, although the instruction set is not as comprehensive as that found on an industrial machine, it is sufficiently large to merit the title *CNC Lathe Simulator*.

The programming syntax is based upon that used by the *Emco Compact 5 CNC lathe* and it is possible, using connections detailed in the program manual, to transfer a program to one of these lathes and see it in action.

However, you have to be

careful, because success on the screen does not ensure success on the lathe.

Some factors cannot be programmed using this simulation: for example, there is no instruction for spindle speed or tool height.

Five different tools can be called up, including a threading tool, and various cutting actions can be followed, such as circular movements, as well as different feed rates.

The package comes with two excellent manuals, function key cards, comprehensive on-screen instructions and built-in error checking.

It does not pretend to take the place of a CNC lathe, but it does rightly claim to act as a foolproof, and much cheaper, early-training resource.

All I need now is a few thousand pounds for a CNC lathe.

John Daddy

Biological journey has internal perils

MICROBA is a biology adventure game from Resource Facilities. It is introduced by variously-coloured text which explains that the player can wander through the human blood, respiratory, urinary and digestive systems.

The aim is to search for questions and attempt to answer them correctly. For each correct answer the adventurer is awarded five points and a warning states that three of the questions must be correctly answered or the game ceases.

To get into the high-score table, players must have found at least 30 questions and scored at least 20 points.

The journey begins in the mouth, where the adventurer decides whether to be swallowed

or inhaled.

Swallowing leads to a route through the oesophagus to the stomach, where it is possible to either carry on or be absorbed.

If the player carries on travelling in the gut, he or she moves through the duodenum, where questions on the pancreas are also asked.

Next is the ileum with its villi, the appendix and its associated bacteria and the caecum where a question on symbiosis is posed. Finally the colon, rectum and anus complete this routeway.

By choosing to be "absorbed"

from the gut into the bloodstream, the journey leads through the hepatic portal vein to the liver and from there either through the hepatic vein to the heart or in the bile from the gall bladder to the duodenum and the rest of the gut.

The second major route through the body is via inhalation from the mouth through the trachea, a bronchus, bronchioles and then alveoli where the player can pass into the bloodstream to the heart or be exhaled.

The third route is to be

exhaled, but since this scores no marks successful players need to choose the first two routes.

All correct answers invoke a "very good" response, but unfortunately since there is only one correct answer an incorrect input from the player can crash the program.

It is possible for users to alter the acceptable answers, but perhaps by providing a printed list, in random order, of correct answers, mis-spellings might be prevented.

Microba might be of most interest to teachers and students of CSE and "O" Level biology and human biology courses. However, because it is not "crash proof" some supervision will be essential.

Peter Hillman

Great graphics, fun game

ACCORDING to **Bug Eyes**, a new release from Icon Software, things are looking pretty desperate . . .

The enemy spacecraft is closing in on Earth, the one civilised planet standing between the Bug Eyes and Galactic rule.

The call goes out for Agent Starman. Only he can board the alien spacecraft, penetrate the 10 well-guarded levels and destroy the master generator to save the Earth.

Sounds fun and it certainly is.

You control Agent Starman and it's up to you to complete the

ten screens. The screens themselves are in the Manic Miner vein, though you don't have to jump - only move left and right.

The game is in Mode 1 and consequently the graphics are truly astounding.

The sprite definitions such as the chubby Starman - complete with paunch - the various bright-eyed nasties and the lifts going up and down are quite beautiful. I'm impressed.

This is combined with smooth animation to provide an almost cartoon-like effect.

Enough of graphics. The

sound is adequate, consisting mainly of blips, zips and thuds as our hero runs and falls about the screen.

Yet another nice touch is the choice of playing keys at the beginning. Although, with only two keys you can't go far wrong.

The screens are imaginatively named with such gems as Squidged Flat, where you must complete the screen before a rather heavy column falls to the ground.

The quicker you finish a screen, the more points you score, so it pays to keep your



wits about you.

To sum it all up, it's a fun game to suit all ages with plenty of amusing cartoon-like graphics. A winner.

Phil Tudor

Less than Logo

PICTURE Logic is a modified form of an earlier product from Addison Wesley - Logo Challenge.

For those unfamiliar with Logo Challenge, I should explain that Picture Logic is a turtle graphics package implemented in Basic.

Picture Logic comes well-packaged in a plastic "video style" case, which contains a user manual, a tutorial, and program disc. It is also available on cassette for BBC Micro and Electron.

Also included on the disc is

software for dumping graphics to several popular printers.

The introduction to the tutorial explains that it is divided into exercises and challenges, the latter being intended to be of an open-ended nature.

I say "intended", because the challenges are often very specific with detailed "give-away" hints and suggestions as to how the challenge is to be attained.

An example of what I mean is:

"Challenge 14 - Draw a house by using a square and a triangle. Think! Try typing SQUARE TRIANGLE why does this not give a house?"

"How can you put in extra commands to make the house like the one in the picture? Hint: You will need to move the pen between SQUARE and TRIANGLE".

It is true there is still some thinking left for the user to do,

but how open is it?

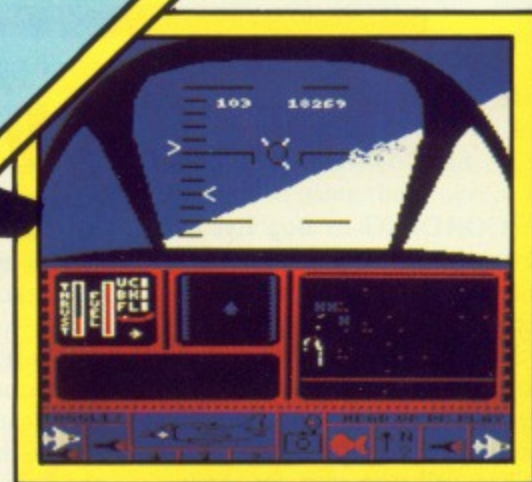
It is possible to use a limited number of variables, but unfortunately it is not possible to alter the value of those variables within repeat loops or in tail recursion.

In summary, I see this package as an expensive, inferior Logo surrogate, which I cannot recommend. I am sure that schools can more profitably put £32.10 plus VAT towards the cost of any of the four full Logos now available for the BBC Micro.

Derek Radburn

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Galactic gardening

IN *Microcosm* from Firebird, you are a maintenance engineer stranded out in deep space on board a ship carrying a priceless cargo of Terran plant life.

Your task is to repair the ladders and keep the plants alive for as long as possible.

Collecting single parts of the maintenance ladders from one of six dispatch points, you must take them to the base of any ladder.

You can only hold one piece of ladder at any one time and it will take a few goes before the ladder you're building is finished.

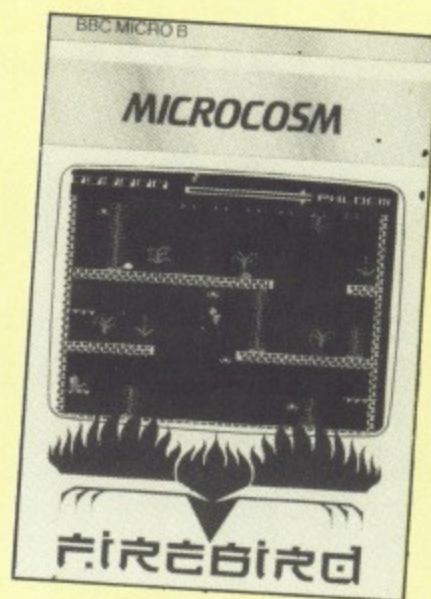
Next to your score at the top of the screen is the Phloem indicator which displays the health of the plants. With every

passing second the Phloem bar decreases. When it gets very low, a beep will sound and this tells you that the plants have started to wilt.

To revive them you must drop your laser back-pack on one of two vacant ledges, then go down to the bottom of the ledge and collect the nutrient-blaster back-pack, which looks like a small watering-can.

With this you can go up to the wilting plants and shoot at them until the Phloem bar rises to a satisfactory level. Then you can swop back to your laser pack and continue rebuilding the ladders.

Hovering around the screen all the time are the mutant insects called Aphids which look



like floating faces. These can easily be bumped off with a cool blast from your laser pack.

In later levels you will encounter two more enemies – spiders and beetles.

These generally make a

nuisance of themselves by coming down from the top of the screen just at the wrong moment. Both are indestructible so they must be avoided.

Other hazards to avoid are the acid drops which fall randomly from the top of the screen. If you touch one you lose a life. These, too, are indestructible.

There is no joystick option, but the keys are easy to use. While the graphics are only average, the sound is quite good.

Freeze-frame is available at any time, so you do get time to catch your breath.

The game is not too difficult and I feel it will prove popular with the younger generation of game addicts. And, at the price of just £2.50, they won't have to raid their piggy-banks to buy it.

Simon Rubins

Original arcade

ARCADE games probably exist that simulate almost every situation that you are likely to encounter in the wild outdoors, and the general feeling is that ideas must be running out.

Well, here's something different. *April Showers*, from Bevan Technology, is the most original game I've encountered in a long time.

You take on the role of a little white cloud sporting a pair of eyes that would have done Marty Feldman proud.

As you float across an almost clear blue sky, your objective is to help a seedling grow to strong "planthood".

To keep the plant healthy you have to water it. Stunning, eh?

This is initially a simple matter, as all you have to do is hover above it and "rain" on it the contents of your water closet, or whatever it is that clouds hold their supplies in.

Naturally, as the plant grows your reserve dwindles and should you "over-water" the little darling, you get a timely warning.

Ignore this at your peril –



because you will disappear in a puff of vapour, to materialise one life down.

Where's the enemy, you ask?

Wait till you encounter the free-floating umbrellas whose sole aim in life is to rob you of your valuable cargo. Every time one touches you, your water content reduces.

The graphics are quite nice, the keys are acceptable, but there are none of the freeze, define keys, or sound off options that should be standard by now in all modern arcade games.

Original it is, addictive, I'm afraid, it isn't – perhaps I'm too old for it.

David Andrews

Lunar let down

THERE have been many variations on the well-known theme of Lunar Lander and its follower Lunar Rescue. *Mayday*, from Bevan Technology, is another addition to the list.

You are the pilot of a Gofarit and your task is to land it on a lunar landscape, retrieve some medical supplies and take off.

There are two landing pads on the surface and you can pick either, though one pad is smaller and is more difficult to get to.

However, landing on this has its advantages in that you score twice as many points.

The actual landing process, although tricky, is only half the battle. It's getting down there that's the difficult bit.

The atmosphere just above the planet's surface is a mass of galactic debris, constantly moving in both directions.

The only way to get down is to use your skill and daring in order to find a way through.

You have keys to control your movement left and right and one to thrust, effectively slowing you down.

When you have landed and



collected the supplies, you have to make your way back up to the mothership.

As soon as you take off, all the asteroids change into alien spacecraft. Different . . .

These follow exactly the same path as the asteroids did on your descent, but they wouldn't be alien spacecraft if they didn't use you for target practice would they?

Although the original appealed to me when it first came out, this version got a bit tiresome after a short while. The problem was that there was nothing special enough about it to hold my attention.

Andy Davies

WORDWISE is probably the most popular word processing software for the BBC Micro. One of its useful features is the ability to program the user defined keys with commands which are used frequently, such as long, complicated printer functions.

Unfortunately most printers, such as the Epsoms, have far more useful functions than there are red keys on the computer, the upshot of which is that you have to resort to the printer manual for the less common ones.

Now, at last, help is at hand. This program will let you use the Shift and Ctrl function keys in addition to the normal ones, effectively giving you 22 extra function keys.

You only get another 22 since Wordwise uses the Shift and Ctrl arrow keys itself. You can't have everything.

In addition Wordwise-Plus uses the Shift function keys for its segments so the program expects you to hold down Shift Lock as well to access the definitions in the Shift keys.

The only real restriction is that unlike the normal keys you can't program them while you're using Wordwise but must do this separately using this program.

The program produces a machine code file containing both the key definitions and the software to put them into your text.

It is fully compatible with the SAFE program which was in the December 1984 *Micro User*, though this is no longer needed if you're using Wordwise-Plus.

All errors you might make, such as Bad commands and the like are trapped and when typing the program in you should add a line to PROCreport:

```
IF ERR(>)17 THEN REPORT: PRINT" at  
line ";ERL:END
```

The extra line can be removed once you have corrected all typing errors.

The program needs PAGE to be at &1900 or higher, as it already will be on a disc machine.

However, if you run it with PAGE set lower it will move itself up to the right place before running.

This is necessary because the machine code which the program produces lives between &1500 and &18FF.

The program will work with tapes as well as discs though you'll have to accept a reduction in the maximum text length.

When you run the program a menu is

More function keys at your fingertips

PETER GAUNT describes how to use the Shift and Ctrl keys to get the most from your word processor

displayed which gives you the option of loading any old definitions which you might have produced, listing the definitions in memory or saving the definitions which you have typed in.

You can also enter star commands – useful if you're using tapes since you may need to use *CAT to find a blank space on the tape.

To enter new definitions or to change old ones which you have loaded using option 1, you should choose option 2.

The computer will switch into Mode 6 and display a list of the definitions in the Shift function keys. The Copy key is shown as key 11.

Escape will toggle between displaying the definitions in the Shift keys and those in the Ctrl keys while Tab will return you to the menu.

If your TV or monitor does not like the colours which are used in this section, then you should change the values of *fore%* and *back%* which are defined towards the beginning of the program.

To enter a definition into, say, Shift f3, you should press Shift f3 when the list of Shift-key definitions is displayed.

Then simply type the exact sequence of keys which you would use to enter the command directly into Wordwise.

For instance if you want the key to hold the command for justify on, you should type:

f-key1 (green) jo f-key2 (white)

You can type any valid Wordwise key into your definition except Escape, Delete and the Shift or Ctrl f-keys.

Some keys, such as Return, cannot be displayed on the VDU and in these cases symbols are used with the background and foreground colours reversed. Type a few in to see the effect.

When you have your definition how you want it, hitting the function key you are re-defining will enter it into the list. If you decide you don't want to enter the definition after all, hit Escape.

You can enter up to 31 characters into any one key. The restriction is due

to the size of the BBC Micro's keyboard buffer and if you try to enter more than this the micro will beep and refuse to accept any more.

When you want to save your definitions to disc or tape, hit Tab to return to the menu and choose option 3.

Type in a filename and hit Return.

If you're using disc, a check will be made to see if a file of that name already exists and if it does you'll be asked for confirmation.

To use the definitions in Wordwise *RUN file-name from Wordwise's menu. You can also include *RUN file-name in any !BOOT file which you might use to auto-boot your Wordwise discs.

If you're using tapes you should enter *FX180,25 and then: *WORDWISE before running the code (answer N to Old text?). This raises the value of

```
10 REM ** Wordwise function key ut  
ility **  
20 REM (C) The Micro User 1985  
30 REM By Pete Gaunt  
40 REM This program must run with  
PAGE set to &1900 or higher. If run w  
ith  
50 REM PAGE too low it automatical  
ly relocates itself.  
60 REM Enables use of SHIFT and CT  
RL function keys to store strings in  
70 REM addition to usual SHIFT-CTR  
L keys. Shift defs. are accessed by h  
olding  
80 REM down Shift Lock AND Shift.  
90 REM Creates a machine code file  
(user names it) which lives at &1500  
100 REM Enter *RUN filename from Wo  
rdwise menu to run code. Don't do thi  
s  
110 REM again without first hitting  
BREAK.  
120 REM If used on tape machines en  
ter *FX180,25 then *WORDWISE before  
130 REM *RUNning code.
```


OSHW up to &1900.

When you enter the FX command you should make sure that you have no document in memory or you will lose it.

You will now find when you're entering text that you have definitions in the Shift and Ctrl function keys.

Don't forget that you must also hold Shift Lock down to get at the definitions in the Shift keys.

You can use the ordinary function keys - with *KEY - as normal.

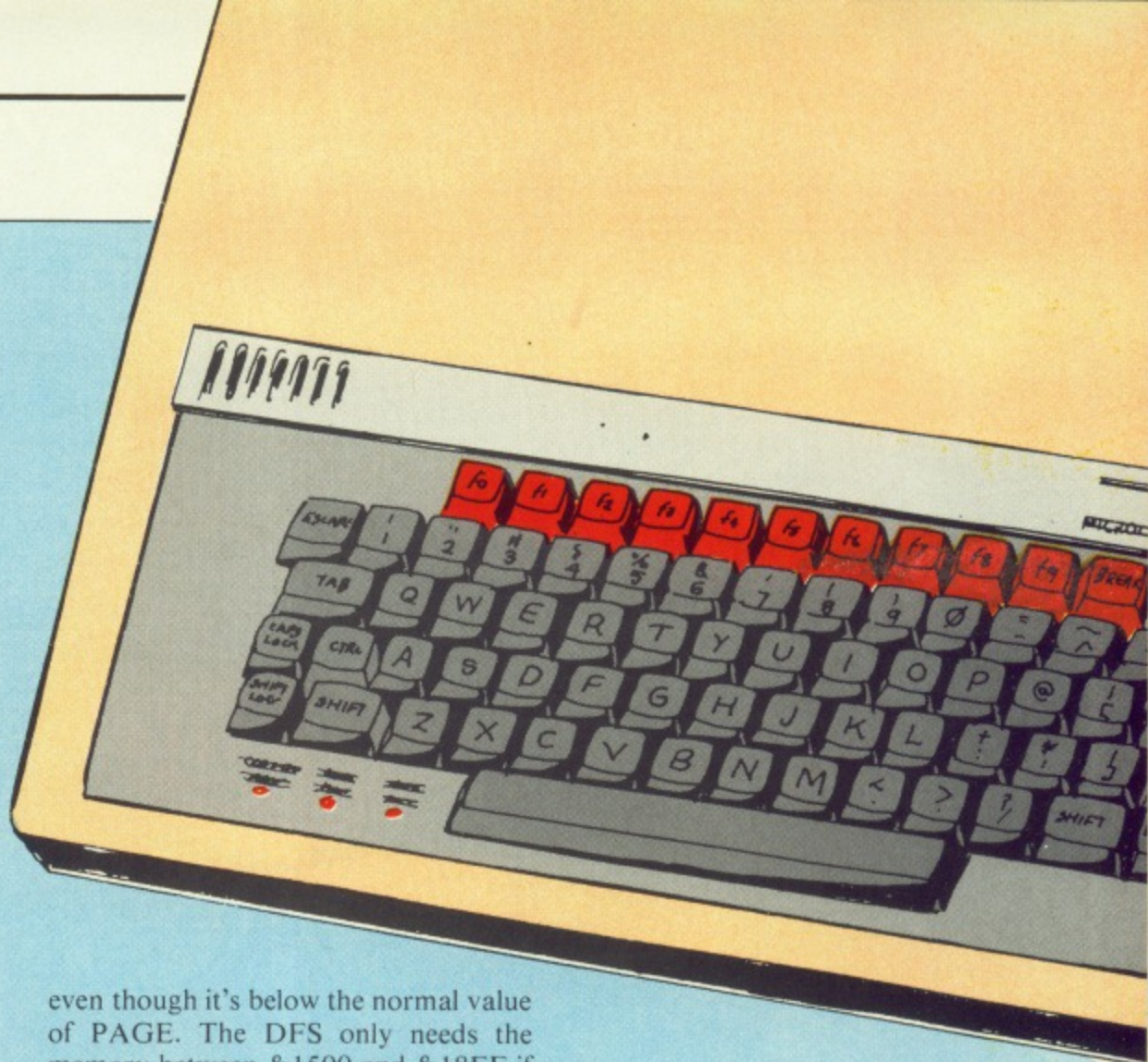
You'll have room for all those nice printer functions like emphasised and italics, in addition to things like setting up standard pages for different typefaces and paper sizes. Wonderful isn't it?

The code is disabled if you hit Break. Also, if you hit Break while using tapes you may well lose your text.

You must not re-run the file containing your definitions, or run another containing different definitions, without first pressing Break. The computer will get very confused if you do.

The program has two main sections, the first of which is in Basic and is used to enter your definitions. When you choose option 3 an assembler routine is called which produces the machine code actually used with Wordwise.

The code lives at &1500 which is a safe address to use on a disc machine



even though it's below the normal value of PAGE. The DFS only needs the memory between &1500 and &18FF if it has three or more files open.

If you're using Wordwise-Plus take care that any programs in the segments don't have more than two files open at a time.

The code uses the "insert character into buffer" vector. Every key press you make is first checked to see if it is a Shift or Ctrl function key.

If it is, then the relevant definition is

pushed into the BBC's keyboard buffer.

If you press a Shift f-key a further check is made to see if Shift Lock is also pressed.

I've been using this routine for some time now and have found it a real boon.

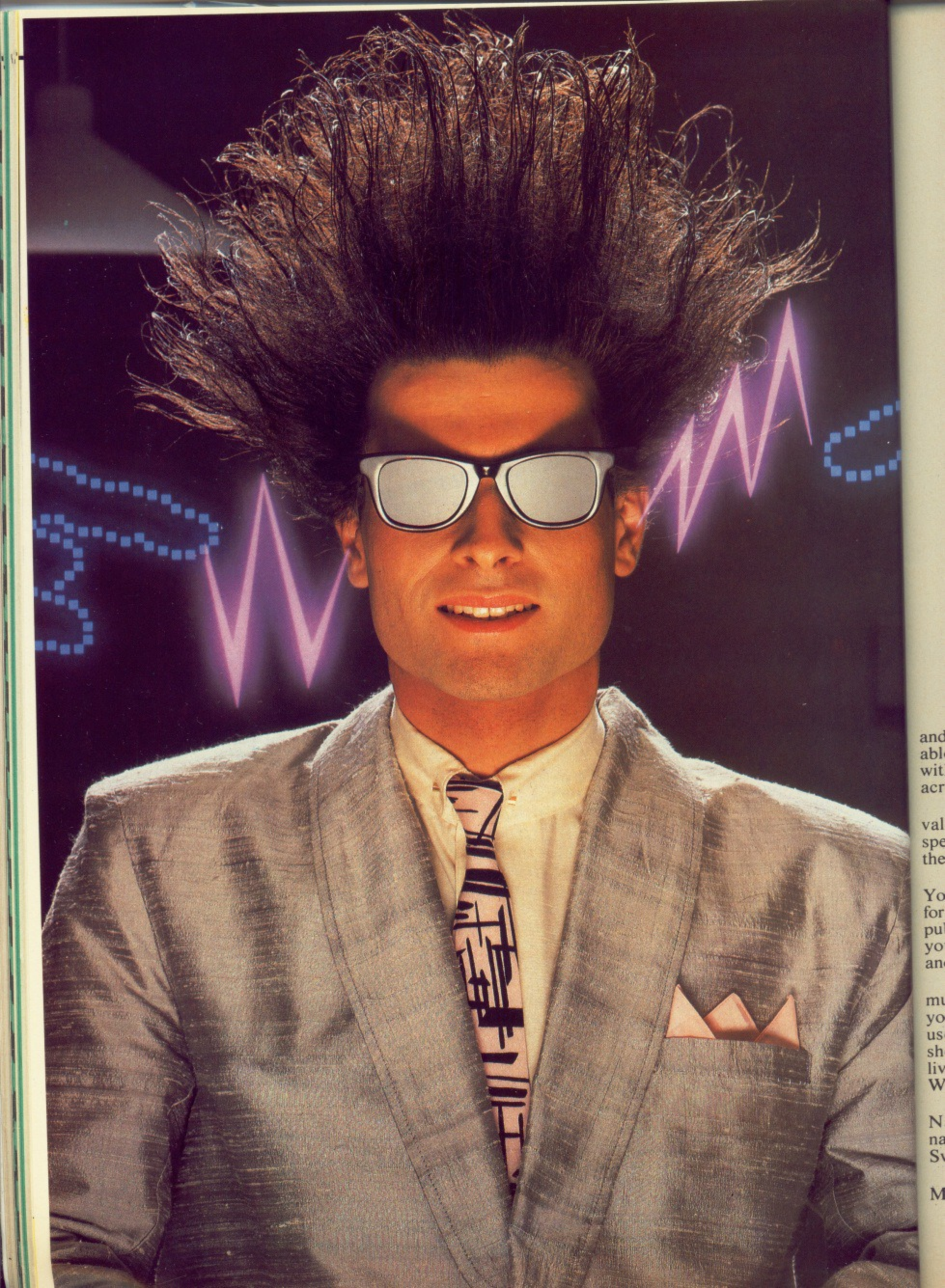
I have a number of different sets of key definitions which I use for different purposes - there still aren't enough keys for every occasion.

```
140 REM Compatible with SAFE ("Micro User", December 1984)
150 REM Code is disabled by BREAK.
160 REM -----
170 REM Global variables: shift%, total%, max%, code, init, lock$ & key$ array
180 MODE7
190 HIMEM=&6000:REM HIMEM for Mode 6
200 IF PAGE<&1900 THEN PROCmove prog(PAGE,&1900):END
210 code=&1500
220 total%=0:max%=693
230 back%=1:fore%=6
240 PROCinit
250 ON ERROR:PROCreport:PROCmenu
260 PROCmenu
270 END
280 DEFPROCmenu
290 LOCAL Q%
300 VDU22,7
310 REPEAT
320 PROCwindow(0):CLS
```

```
330 shift%=TRUE
340 *FX220,27
350 PRINT'CHR$131"Wordwise function key utility"
360 PRINT'CHR$134SPC(3)"1. Load definitions"TAB(3)CHR$134"2. List/alter definitions"TAB(3)CHR$134"3. Save definitions"TAB(3)CHR$134"* OS command"CHR$133"Choose option";
370 Q%=FNget-48
380 IF Q%=1 PROCread_defs:PROClack
390 IF Q%=2 PROCget_new_defs
400 IF Q%=3 AND total%>0:PROCassemble_code(code):PROCsave_code(code) ELSE IF Q%=3:PROCwindow(2):PRINTCHR$7CHR$131"No definitions"CHR$134"Hit a key";Q%=GET
410 UNTIL FALSE
420 ENDPROC
430 DEFPROCread_defs
440 LOCAL Q$,f$,N%,pointer%,char%,byte%
450 PROCwindow(2)
460 PRINTCHR$131"Load"
470 IF total%>0 PRINT'CHR$7CHR$134"
```

```
Definitions already in store"CHR$134"Overwrite?";Q%=GET$:PRINTQ$:IF INSTR("Yy",Q%)=0 THEN ENDPROC
480 PRINT'CHR$131;:INPUTLINE"what file name? "f$
490 IF FNfiling_system<>4:CLS:PRINT'CHR$133"Please play "CHR$134f$"
500 PROCoscli("LOAD "+f$+" "+STR$c code)
510 REM Table of pointers to definitions starts at "code".
520 REM Each pointer is 2 bytes. Each definition ends in &FF
530 *FX200,1
540 CLS:PRINT'CHR$131"Interpreting definitions...";
550 FOR N%=0 TO 27
560 pointer%=(code+N%*2) AND &FFFF
570 key$(N%)=""
580 char%=0
590 REPEAT
600 byte%=pointer%+char%
610 IF byte%<255 key$(N%)=key$(N%)
```

Turn to Page 172



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Milton Keynes. Depson Business Systems, 65 Aylesbury Street, Bletchley. Tel: 0908 367446.
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Cambridge. Cambridge Computer Store, 4 Emmanuel Street. Tel: 0223 358264.
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Peterborough. Logic Sales, Unit 6 Midgate Parade, Tel: 0733 49696.
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Whitehaven. PD Hendren, 15 King Street. Tel: 0946 2063.
Workington. Technology Store, 12 Finkle Street. Tel: 0900 66972.
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Derby. First Byte Computers, 10 Main Centre, London Road. Tel: 0332 365280.

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Exeter. Open Channel, Central Station, Queen Street. Tel: 0392 218187.
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Plymouth. Syntax, 76 Cornwall Street. Tel: 0752 28705.
Plymouth. Computer Base, 21 Market Avenue. Tel: 0752 672128.
Plymouth. Boots, 2-6 New George Street. Tel: 0752 266271.
Seaton. Curtis Computer Services, Seaton Computer Shop, 51c Harbour Road. Tel: 0297 22347.
Tiverton. Actron Microcomputers, 37 Bampton Street. Tel: 0884 252854.

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Hornchurch. Comptel Computer Systems, 112a North Street. Tel: 0402 446741.
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Romford. Software Plus, 72 North Street. Tel: 70 65271.
Southend-on-Sea. Computerama, 88 London Road. Tel: 0702 335443.
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Gloucester. Boots, 38-46 Eastgate Street. Tel: 0452 423501.

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Fareham. Electronique, 36-38 West Street. Tel: 0329 230670.
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Portsmouth. Micro Choice, 159 Havant Road, Drayton. Tel: 0705 327591.
Portsmouth. RDS Electrical (Portsmouth) Ltd, 157-161 Kingston Road. Tel: 0705 812478.
Portsmouth. Boots, 194/204 Commercial Road. Tel: 0705 825248.
Southampton. Boots, 23-29 Above Bar Street. Tel: 0703 333983.
Waterloo. GB Microland, 7 Queens Parade, London Rd. Tel: 0705 259911.

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Telford. Telford Electronics, 38 Mall 4. Tel: 0952 504911.

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Stoke on Trent. Boots, 3-5 Market Square, Hanley. Tel: 0782 23271.

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Ipswich. Computer Magic, 24 Crown Street. Tel: 0473 50965.

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Croydon. Boots, The Mall, 12-18 Whitgift Centre. Tel: 01-688 6021.
Epsom. The Micro Workshop, 12 Station Approach. Tel: 0372 721533.
Guildford. Guildford Computer Centre, 5 The Quadrant, Bridge Street. Tel: 0483 578848.
Wallington. Surrey Micro Systems, 53 Woodcote Road. Tel: 01-647 5636.
Woking. Harpers, 71-73 Commercial Way. Tel: 0486 225657.

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Newcastle-upon-Tyne. RE Computing, Parkview House, Front Street, 4 Lane Ends. Tel: 091 2701740.
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MU11

MEMORY MAP		
Pointer within the Analyser	Contents	Notes
		Start of ROM (&8000) Top of RAM (&7FFF)
M%	Screen display (Mode 7)	
	References storage area	Original value of HIMEM (&7C00)
	v	
	v	
F%	^	Start of free storage area (variable position)
	^	
R%+13	Reference details	Start of references
R% (Q%+256)	Program name	
Q%+252	Program length	
Q%+248	No of statements	
Q%+244	No of pgrm lines	First line no
Q%+240	Last line no.	
Q%+236	First line-no.	Start of program details
Q%+232	Line numbers etc	
Q%+228	Procedures	
Q%+224	Functions	
Q%+220	Variables - "z"	
	"B" to "y"	
Q%+8	Variables - "A"	
Q%+4	Resident integers	
HIMEM, Q%	System variables	Start of references catalogue (TOP+&800)
	BASIC stack	
	v	
	v	
	^	
	^	
TOP, LOMEM	Program variables	Start of Basic storage area
	^	
	^	
PAGE	Analysis Program	Start of program

Figure 1: Memory used by the analyser

HAVING given some background information last month, I'll continue by describing the main body of the Basic Analyser program. This will read in any Basic program, stored on disc or cassette, line by line, check the syntax of the program statement by statement and build up in the free memory a table of variable names and references.

The process of syntax checking and table building can be applied to either the whole program or to that part between given start and end line numbers.

On running the program you are prompted for three inputs, each of which is terminated by pressing Return.

- The file name of the program to be analysed.
- The starting line number for the analysis or simply Return to specify the start of the program.
- The finishing line number for the analysis, or just Return to specify the end of the program.

Having got these essential details, it will analyse the program as requested. The ability to start and end the analysis

Part II of the Basic Analyser program by MICHAEL STALLYBRASS

in the middle of a program enables the syntax of even the longest to be checked, without running out of workspace, by using a couple of passes.

Because of the need to keep a reasonable amount of workspace available for the reference table, I have split the program into two parts, with the first part chaining the second.

The first part, given as this month's listing, performs the analysis and syntax checking. The second part, to be listed next month, is used to print or display all, or part, of the information built up in the reference table.

Thus by using this month's listing you can check the syntax of any program, but you will have to wait till next month - or write your own Part2 - to print out the completed cross reference tables.

It takes about four minutes for Part 1 to analyse itself completely, but takes

Analysis and syntax checking

rather longer for Part2 of the analyser to print out the complete results.

The analyser program fits itself into whatever memory is available between PAGE and HIMEM. It will work with any version OS, and any version of Basic, on both the BBC Micro and the Electron, though the size of program that can be analysed using an Electron is limited, as Mode 7 is not available.

The way that the program uses the available memory is shown in Figure I. Note that when run HIMEM is altered by the program to protect the references table.

Part of the memory used up by the program immediately above the new value of HIMEM is used as a catalogue, similar to that used by the Basic interpreter for finding variables.

However, beside the catalogue entries for each possible initial variable letter, FNs and PROCs, the analyser's catalogue has three extra entries, for references to system variables (HIMEM and so on) the resident integers (@%-Z%), and for line number references as in GOTO.

The remainder of the memory set aside by the program is used to contain lists of names and line numbers, and, associated with each primary entry, secondary lists of references pinpointing each program line in which a reference occurs and its context.

Each of the primary entry lists is pointed to by a non-zero catalogue value. A zero catalogue value indicates that there is no associated list for that type of entry. Details of the structure of these lists are given in Figures II to V.

The normal Basic workspace is in the gap that is left between TOP and the new value of HIMEM. I have found that a gap of &800, as set in line 130, has always been sufficient, but that reducing it much can cause a "No room" error.

However it is possible that a program with heavily bracketed expressions

could still cause a "No room" error, even with this gap. If this happens simply increase the gap size a bit until the problem goes.

The analysis program – see Program I – can be considered in a number of logical blocks. The first simply initialises the analysis. Some initial constants are set and the analyser catalogue is created

and cleared. It obtains the file name of the program to be analysed, opens the file, checks that the file is a Basic program, and then obtains the limits for the analysis.

A list of all the significant program variables is given in Table I. In choosing

Offset	0	1	2	3	4	5
Contents	next primary entry		start of secondary references		type of ref.	name		

Figure II: Variable names, and primary entry storage

Offset	0	1	2	3	4
Contents	next secondary reference		line number of reference		context code

Figure III: Variable names, secondary reference storage

Offset	0	1	2	3	4	5	6	7
Contents	next primary entry		start of secondary references		line number (or other code) referred to			

Figure IV: Line number references, primary entry storage

Offset	0	1	2	3
Contents	next secondary reference		line number of reference	

Figure V: Line number references, secondary reference storage

From Page 91

names for FNs and PROCs I have given any which deal with a specific Basic keyword that keyword, in upper case, as its name. For example, PROC PRINT deals with PRINT statements. All other names are made up using lower case letters only.

The main program loop is in lines 250 to 260, which reads in the program line by line and checks for the end of the program by a call to FNline, lines 290-370, and then, if required, analyses the line statement by statement by calling PROCstmt, lines 490-550, until the end of the line is reached, as checked for by FNend, lines 390-430.

The program is read a line at a time into the line buffer *B%* from the filing system in use. If your system uses a cassette recorder and your recorder does not have motor control you will probably have to give some assistance by starting and stopping the recorder whenever the cassette motor light on the keyboard goes on and off. Otherwise you may find that the recorder plays the program back faster than the computer can analyse it.

The analysis of each line is then done sequentially, character by character, with the current character being pointed to by *P%*, and its value held in *C%*.

The current character can be incremented by three procedures, defined in lines 2610-2630, PROC@ (which gets the next character, skipping any spaces), PROC@i (which gets the next character, even if it is a space), and PROC@c (which gets the next non-space character, but only if the current character is a space).

The first lines of this block are concerned with checking for the ends of a statement or line. FNend is called whenever the end of a statement should have been reached. It checks for the end of the line, or else for a valid statement terminator, as indicated by *I%*.

If *I%* is zero, no terminator is necessary, otherwise one is expected. IF *I%=1*, it can only be a colon, but if *I%=2* it can also be the token for ELSE following an IF statement. FNmore and FNmore0 (lines 450-470) are used to check if there is still more to be processed within a statement.

The real meat of the program starts at line 490 with PROCstmt, which actually initiates the analysis of a statement.

In BBC Basic, a statement can be one

of only five types. It can be either:

- An assignment statement, say $x=1$
- A System Procedure - CLS
- A function return - =1
- An assembler statement (within [] brackets)
- An operating system command, say *FX4

In PROCstmt the first check is for an assembler statement, where *A%* is used as a flag to indicate that the assembler is being used. If it is, the statement is dealt with by a call to PROCass (lines 1340-1400). Otherwise, if the statement

is not an operating system command (when the rest of the line is ignored), a function return, or a system procedure (dealt with in PROCtoken, lines 1450-1720), it must be a variable assignment, and is dealt with accordingly by lines 550 to 590.

Note that LET and the assignment of new values to the system variables HIMEM, LOMEM, PAGE, PTR# and TIME are all taken to be system procedures - see Table V in the last article - and so a re-entry point to the assignment code is provided by PROC_LET in line 570.

Name	Use
A%	Assembler in use flag
B%	Pointer to input buffer area
C%	Current character being scanned
D%	Number of statements in current line
E%	Input channel number
F%	Pointer to free storage
G%	Constant (&FFFF)
H%	Constant (&FFFF0000)
I%	Statement separator required flag
J%	Local loop variable
K%	Constant (&10000)
L%	Length of current line
M%	Pointer to top of workspace
N%	Current line number
O%	Line number being referred to
P%	Pointer to current character in line
Q%	Pointer to start of catalogue area
R%	Pointer to start of variable workspace
S%	Catalogue entry offset
T%	Expression or variable type
U%	Context
V%	Number of primary references
W%	Number of secondary references
X%, Y%, Z%	Working variables in reference additions
b%	Line to be analysed flag
b1%	First line number in analysis range
b2%	Last line number in analysis range
v%	Value of current numerical constant
vd%	Length of VDU queue
a\$, q\$, z\$	Working variables in building up current name.
n\$	Current name to be added to reference table.

Table I: Main variables

Code	Meaning
-ve	Error
0	FN value - numeric or string
2	Integer
3	Integer array
4	Real
5	Real array
8	String
9	String array

Table II: Variable type codes

The expression evaluator can be entered at one of three levels. At each level of entry the context is specified by *U%* – see Table III for an explanation of the values used.

The outer level of entry, FNexp1 (630-640), is used when any expression is valid, which can consist of variables, functions and constants, joined by operators such as +, MOD, AND.

The next level of entry, FNval (lines 730-790) is used when a single value – a single variable, function or constant – rather than an expression is expected. The inner level of entry, FNvar (lines 760-790) is used when only a variable name is valid.

In evaluating an expression, its type is determined, and stored in *T%* – see Table II for an explanation of the different possible values of *T%*. Thus some cross checking of expression types is possible. However when a FN is accessed the type is not known so the cross check cannot be complete.

In this part of the program these functions can be recursive, that is they can call themselves as whenever a bracketed expression is encountered the outermost level of all, FNexp0 (line 610), is called.

Calls to PROCind and FNargs can also cause recursion. Because of this possibility some key variables are declared as LOCAL in various places to ensure that any recursion alter the variables' expected value.

FNexp0 in turn calls FNexp1 and then checks for the closing bracket. FNexp1 calls the next level, FNexp2 (lines 660-680) and then deals with the logical operators AND, EOR, and OR, if present.

FNexp2 in turn calls the next level, FNexp3 (lines 700-710), and then deals with the logical comparison operators =, >, <, >=, and <=, if present. FNexp3 in turn calls FNval, and then deals with the arithmetic operators +, -, *, /, DIV, MOD, and ^, if present.

Note that this arrangement has somewhat simplified the rules of operator precedence (for an explanation of the rules, see the BBC User Guide page 145). For a full expression evaluator, FNexp1, which deals with operator groups 6 and 7, would have to be split in two to allow for the rules of precedence, and FNexp3, which deals with operator groups 4, 3, and 2, would have to be split into three.

The next level, FNval, should not have any binary operators left to be

Bit(s) set	Meaning	
7	A variable is being set on left of =, in DIM, LOCAL and so on	
6	A variable is being used with an indirection operator	
5	A variable is being used as an array subscript	
4	A variable is being used as a Function argument	
3,2,1,0	Details of the calling context:	
Value	Bit 7 set	Bit 7 clear
0	Assignment (... =)	Assignment (= ...)
1	PROC/FN argument	PROC parameter
2	LOCAL	Value returned by FN
3	DIM	Used in an IF expression
4	DIM (byte array)	Used in an UNTIL expression
5	FOR variable	Initial value of FOR variable
6	NEXT variable	Final value of FOR variable
7	Not used	STEP value in FOR loop
8	Not used	Channel number
9	INPUT value	PRINT value
10	INPUT# value	PRINT# or BPUT# value
11	READ value	CALL parameter
12	Not used	ON expression
13	Not used	GOTO or GOSUB line number
14	Assembler label	Assembler label
15	Not used	Assembler operand

Table III: Variable and function reference context codes

Number range	Context
&00000 to &0FFFF	GOTO
&10000 to &1FFFF	GOTOSUB
&20000 to &2FFFF	RESTORE
&30000 to &3FFFF	DATA
&40000 to &4FFFF	ERROR
&50000 to &5FFFF	TRACE

If the least significant four nybbles equal &FFFF then there is no line number identifiably referred to. Otherwise, the least significant four nybbles of the number give the line number referred to.

Table IV: Line number reference context codes

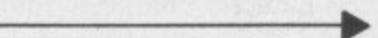
dealt with, except for the indirection operators, which act as a modifier to a variable name.

It checks first for a quoted string, then for unary plus and minus signs. Then, if the character is a bracket, goes back to FNexp0. If instead it is a valid function token, this is dealt with by FNfn (lines 900-960). Otherwise it must either be a constant, dealt with by one of FNstr (lines 1300-1320), FNhex (line 1230), or FNnum (lines 1250-1280), or else it must be a variable, in which case the program code falls through into FNvar.

The analysis of any presumed variable is done by FNvar. It checks for unary indirection operators and if necessary calls PROCind (line 880) to deal with them.

It then obtains the variable name by calling FNnam (lines 810-860), checks for binary indirection and deals with it if necessary by a second call to PROCind, and finally adds an entry to the reference table by a call to PROCref (lines 2750-2770).

FNnam not only gets the complete name, but also sets the variable type (*T%*) and the catalogue entry position (*S%*). If an array is found it also analyses the subscripts and adds an appropriate suffix to the name, by a call to FNargs (lines 1070-1120). It cannot, however, complete the reference table entry, because of the possibility of binary indirection – a following ! or ? – with a corresponding alteration to the



From Page 93

context code.

FNfn (lines 900-960) deals with all function tokens found in an expression. Any user defined functions, indicated by the FN token, are passed on to FNfn_procnam (lines 1140-1170) for complete analysis. Of the remaining tokens those associated with the system variables are passed to FNsysvar (lines 1190-1210).

If the token is one connected with random access filing, BGET# and so on, the channel number is checked by PROCchannel (lines 2480-2500). All remaining system functions that cannot have parameters are then filtered out (line 920). This leaves some functions which require special checking: RND, which can, but need not have a parameter; TOP, which is the TO token with a following P;USR, where I wanted to specifically identify the address called; and STR\$, which can have a tilde preceding its parameter.

The remainder dealt with in line 950, consists of all the other functions that take one parameter, checked by FNval, or more than one parameter, checked by FNargs.

FNargs is called whenever there is a bracketed list of FN/PROC arguments or array subscripts to be dealt with. It returns a string which indicates the number and type of any expressions within the brackets, using # for a numerical expression, \$ for a string one and * for a FN of unknown type. As the function can be called when a DEF FN/PROC is encountered, and in these circumstances there may only be variable names, it selectively calls FNvar or FNexpl, according to the context code, for each argument or subscript.

FNfn_procnam is similar to FNnam, but it obtains the name of a FN or PROC. It also completes the addition to the reference table by a call to PROCr before returning zero to indicate unknown expression type for a FN. FNsysvar, called whenever there is a reference to a system variable, also completes the addition to the reference table.

FNhex is called to decode any constant that starts with an ampersand, &. Other numerical constants are decoded by FNnum. FNnum is complicated by the possibility of an exponent in the constant. If the first non-numeric character found is an E, then a check must be made for following

digits before the E can be accepted as a part of the number, and the pointer P% may have to be repositioned as a result. This check is done in line 1280.

For both types of numerical constant its value is obtained and held in v%, for subsequent use in VDU statement checking.

String constants, that is those enclosed in double-quotes, are dealt with by FNstring. This function is slightly complicated by the need to deal with pairs of double quotes, which are used to represent a single double quote within the constant string, hence the recursive call in line 1320.

The first check in dealing with assembler statements (lines 1340-1430) is for a closing square bracket, which ends the use of the assembler. Next the presence of an assembler label is checked for – signalled by a “.” – and if necessary dealt with. If the end of the statement has not been reached, all characters are then skipped until a space, backslash, or end of statement is found. If a space is found it is assumed that an assembler operand follows, and this is evaluated by FNassv (lines 1420-1430).

PROCtoken deals with all the system procedure calls. The majority are dealt with by a call to one of the specific token PROCs, with capital letter names, and the remainder are dealt with in line 1710 if they take no parameters, or in line 1720 with a call to PROCparams (line 2580) if they do take parameters.

The specific token PROCs (lines 1740-2460) are in the main clear in their operation. As they simply follow the syntactical rules governing each keyword, as outlined last month, I have not dealt with them in detail. Any apparent quirks are necessitated by the syntactical peculiarities as highlighted in last month's article.

PROCchannel (line 2480) is called whenever a # must be the next character, say after BPUT. It falls through into PROCchannel0 (line 2490), which is called whenever a # has been found, as after PRINT.

The most obscure function of this group is probably FNformat (line 2520), which works its way, by means of recursion, through all formatting elements allowed in INPUT or PRINT statements, until it reaches a non-formatting item, end of statement or variable name. Control is then passed back to the calling routine, to process this next variable.

PROCgo and FNlineno (lines 2550-

2560) together deal with any encoded line numbers, converting them back to a normal integer number before making a reference table entry. Alternatively a non-encoded reference may be found, in which case a dummy line-number is used (&FFFF), to highlight any references that will not be correctly dealt with by RENUMBER commands – see Table IV.

PROCparams and PROCvlist (lines 2580-2590) respectively deal with any lists of expressions or lists of variables that may be found.

PROCsyntax (lines 2650-2700) is called whenever a syntax error is detected. The type of error is indicated, and the complete line is printed out, without being detokenised, but with all tokens and control characters being replaced by a block character. The character where the error was detected is indicated by an upward arrow under the text of the line, and by the preceding line of the display.

PROCe or PROCer (lines 2720-2730) are only called when a fatal error is detected.

The last section of the program is perhaps the most difficult to follow. Because it is the most heavily used part of the program, it has been written for speed rather than for clarity.

PROCref (lines 2750-2770) deals with all name entries. It searches through a primary chain of entries, whose start is pointed to by S%, until it finds the required name, or has passed where it should have been in strict Ascii alphabetical sequence, Z coming before a.

If the name is not found a new entry is stitched into the chain at this point by a call to PROCadd. Once the entry exists the required reference is stitched into the beginning of the secondary chain.

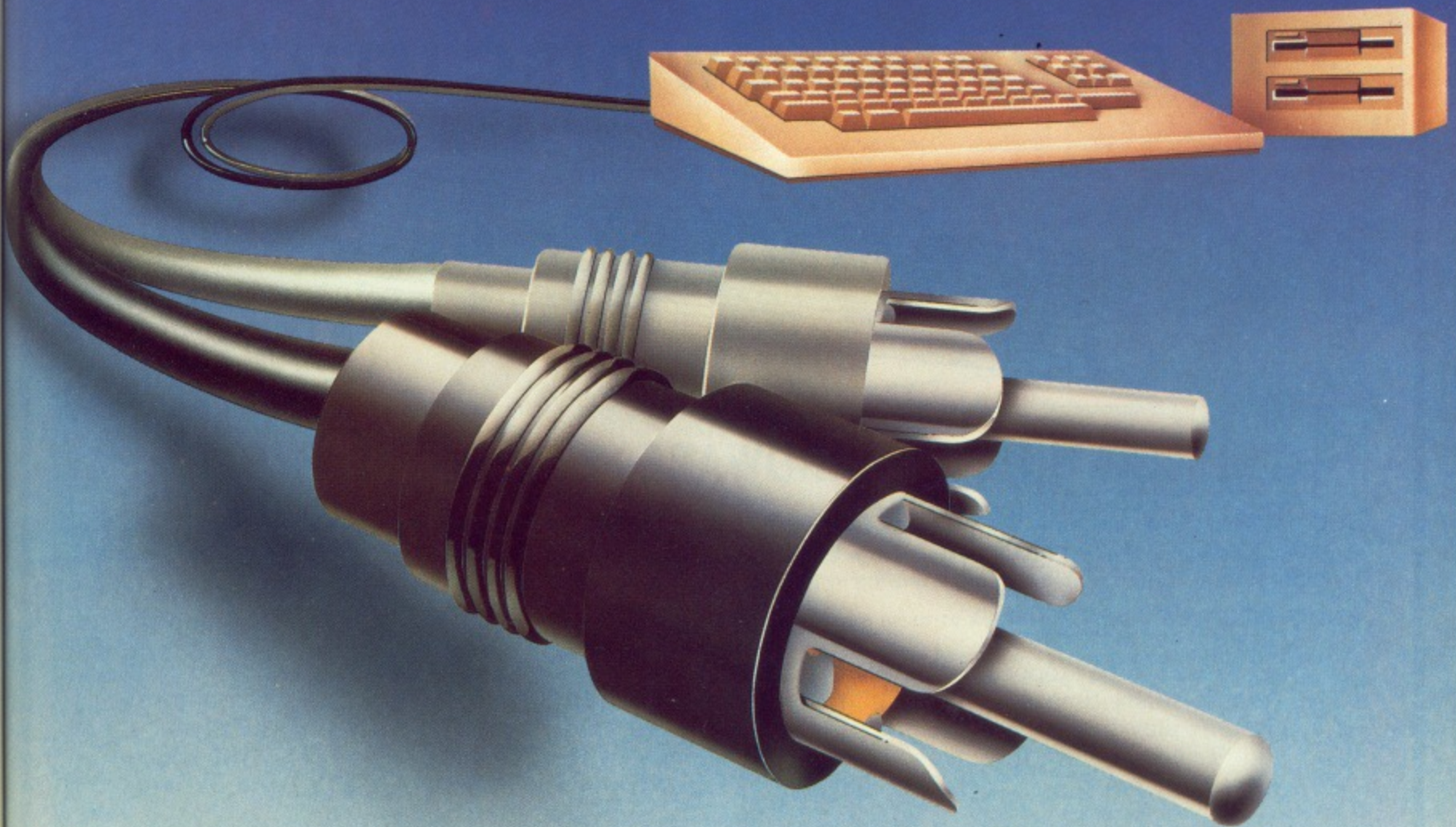
This means that the secondary chain, if followed, is in reverse order of occurrence of the references within the program. But it also means that there is no time-consuming following of the chain to find the end before adding in the reference.

PROClineref and PROClinedd work in a similar way for line number references.

● Next month, we'll give a complete description and listing of Part 2, the program which prints out the results of the completed analysis.

Full listing starts
on Page 154

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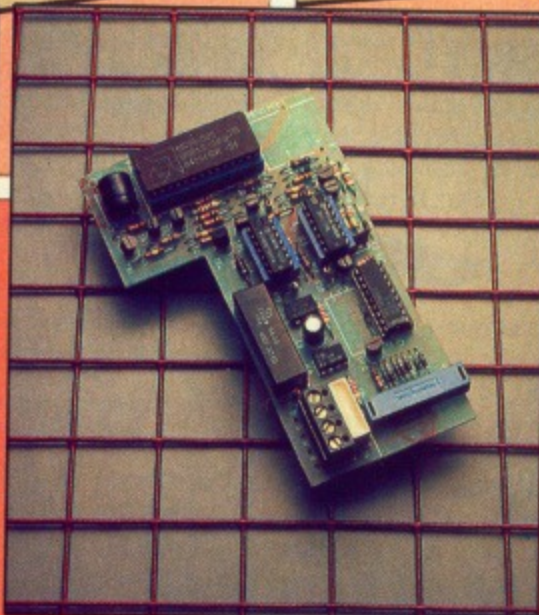
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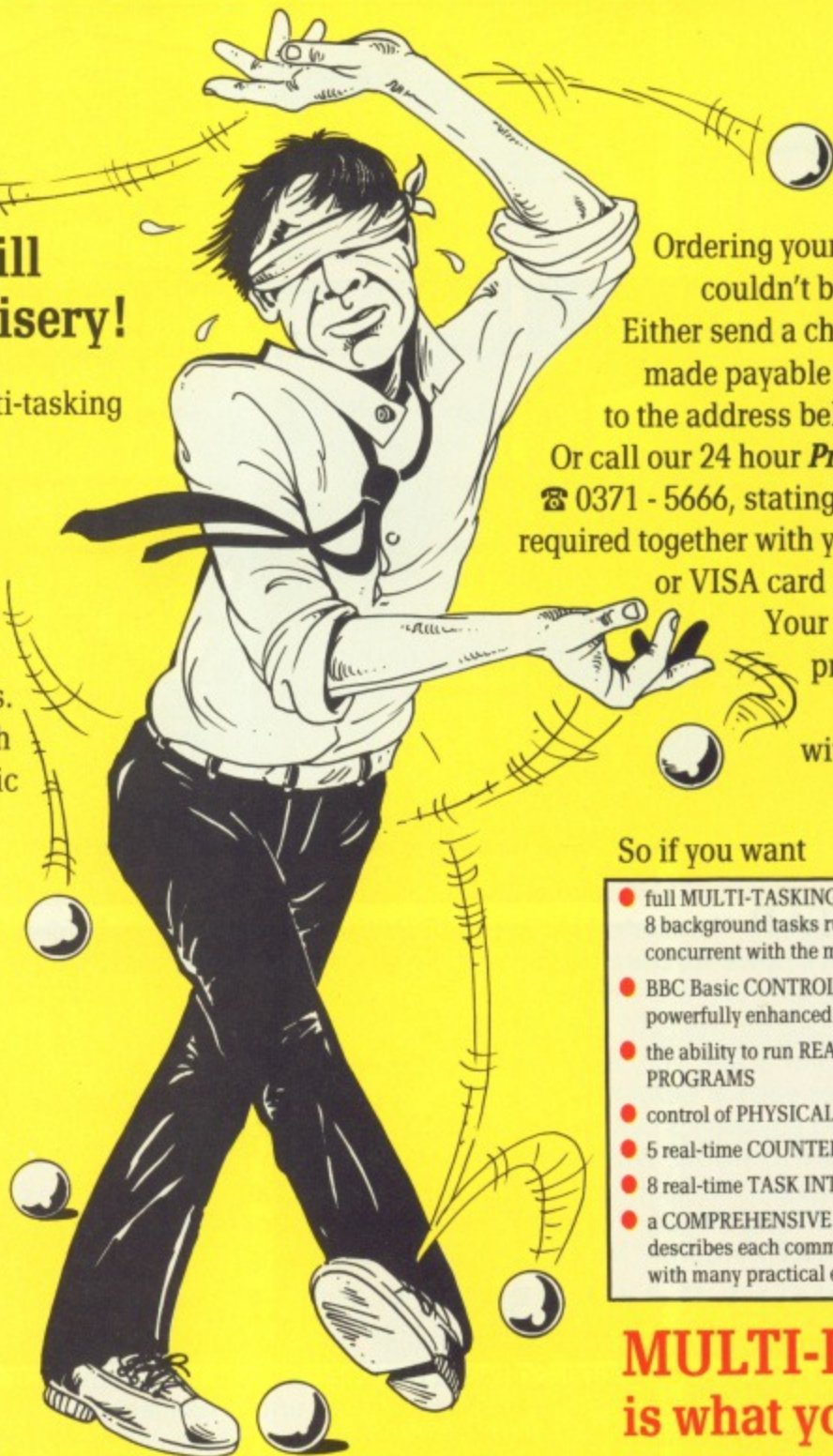
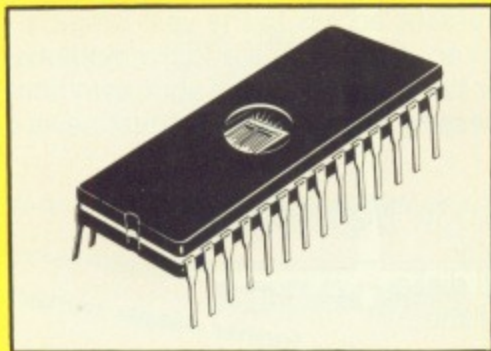
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MIKE COOK

comes up with the answers to readers' technical questions

I want to connect four motors . . .

I HAVE a BBC B and would like to connect four motors with encoders to it.

I want to connect one motor at a time learning how to run it before running any more, but being able to expand with the minimum of fuss.

The controller I have needs an interface to run it with a voltage from 0-15 with a maximum impedance of 50k. Can you help? - *T. Leaman, Portsmouth.*

● I am not sure from your letter what you want. If I understand correctly, you already have a motor controller which takes a varying voltage input. This is then converted into a varying motor speed. So what you need

is a way of getting a varying voltage out of your computer under program control.

The D/A converter (*Micro User*, October and November 1984, sold as Body Build pack 17) will provide a varying voltage. However it is only 0 to 2 volts. This would need to be amplified.

As the impedance requirement is so high, you could do this with a simple transistor or op-amp (see circuit below).

As to expansion the D/A uses all 8 bits of the User Port giving an output in 256 steps, so you would need a User Port expansion board (*Micro User*, August 1984 Body Build pack 15 & 16).

This board will allow you to control four more D/A converters and so more motors.

The light that stays on

I WOULD be grateful for your advice on a problem I am having with my BBC Micro.

I connected it to TV monitor and cassette player, switched on, noticed the BBC title appear as usual, but was surprised to see the 32k characters only disappear after about 15 seconds.

I paid no attention to it and attempted to load a program. I was unsuccessful, using two tape recorders which have worked before.

I tried a number of tapes but none worked.

I then noticed that the motor light was on. I cleared the computer using Break.

When I did, the light went out and the relay indicated switching.

Once the Break button was released the motor light came on again.

Each time I depressed Break, so the light went out and came back on on release.

Being new at this game I thought that I might have

triggered - goodness knows how - the motor to remain on.

I read the User Guide from cover to cover, found instructions hex's and so on - which mean nothing to me - to switch off the motor, but nothing worked.

I fear a fault requiring repair under guarantee, but wish confirmation of this.

Can you give me any advice on how to clear this problem and, if you consider it to be an electronic fault, advise me where the nearest "authorised" BBC repair facility to Liverpool/Formby is located?

PS: I disconnected TV/recorder and all leads from the computer - the light remains on, so it is within and not without. - *R.F. Willsher, Liverpool.*

● If your computer has a DFS fitted you need to type *TAPE after each reset or power up to allow you to use the cassette recorder.

The cassette motor should not be on and if it is you need it repaired.

Unfortunately I do not know the whereabouts of a service centre. If you enquire at the place where you bought it they should tell you.

Chip is a block

AS an enthusiastic owner of the BBC-B, I would like to ask your advice about the following problem.

It seemed to me that next to the perfectly-working sideways ROM-RAM board (ISS4) from ATPL the speech upgrade kit from Acorn doesn't feel happy.

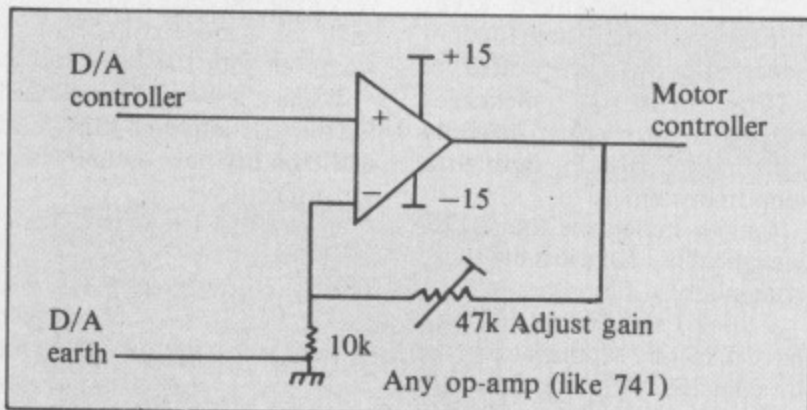
Putting on the machine, a tone is heard and that is all!

Most of the time the normal start-text has disappeared and the keyboard seems disabled.

Even a hard Break has no influence on the take-over of the speech processor.

Touching the pitch-control VR2 sometimes stops the sound, brings back the start-text and the control over the keyboard for only a couple of seconds.

In my opinion it is a matter of capacitive influence and an extra



Five ROMs I cannot use . . .

I HAVE just bought a UDM DDFS and after it was fitted found that the computer hung up after varying periods while trying to load a program.

It stopped loading according to the screen but the cassette motor kept running.

It also gave messages such as STR\$, RETURN, BAIC, BAD ADDRESS, and so on - many spelt wrongly.

On investigation it was found to be due to the Viglen ROM cartridge set I had in place.

Viglen, UDM and Microware were unaware of the incompatibility when asked.

Is it possible to fit a different piece of equipment to the cartridge where it fits into the

ROM socket, so it will not cause these problems?

I now have five ROMs I cannot use. - *Mrs A.E. Oakes, Hitchin, Herts.*

● It is not that there is any incompatibility inherent between the two devices - it is simply a matter of bus loading.

You see, whenever you add anything to extend the length of the address and data bus the signals on them changes.

Imagine them as long corridors. There will be a certain echo in them. If you add on more corridors, the nature of the echoes changes.

Eventually the echoes combine and mix so you can't understand what is going on. It is

exactly the same with electrical signals. They suffer from reflections at impedance discontinuities that can interfere with the signals.

As there is a "bit of slack" in most computers you can get away with one or two devices extending the bus, but a time will come when it will collapse.

This will vary from machine to machine, so you might find this combination might not cause other machines to fail.

Some people have reported successful cures by replacing the 6502 processor with the faster 6502C, but I remain to be convinced why that works.

I am afraid there is no simple solution - sorry.

From Page 99

capacitor might be needed anywhere.

Connecting the Edgcard socket by the lead makes things worse. — *E.L. Steens, Waalwijk.*

● First take all your extra chips out — this might be the trouble. I have heard that Disc Doctor in particular is prone to stopping Acorn products from working.

It is probably one of these chips using the space the speech system needs and not any influence of the board itself.

The effect of VR2 could be due to you stopping the oscillator temporarily and in effect electrically removing the speech system.

Loading problems . .

I OWN a BBC Model B 1.2 OS and am having problems with loading (300 baud I think).

Not all games fail to load — just the ones that use 300 baud rate.

The first few sections work

POWER FOR THE ROBOT

I WISH to incorporate my BBC Micro into a robot floor polisher, as I do not want to have a mains or command lead going to or from the computer.

I intend to power the BBC directly from a set of lead acid cells — 1 x 12v at 50ah, 3 x 2v at 40ah.

However each cell provides about 1 volt extra — for example a 2v battery actually gives 3v.

I know the following items:

I need a +12v, +5v, -5v.

There are six leads which make themselves obvious to me — 3 x 0v, 1 x +12v, 1 x +5v, 1 x -5v.

What I don't know:

Is there an equivalent for a 7805 & 7812 which will handle 3 amps?

How do I get -5v regulated at the required number of amps for a BBC Micro?

Are those six leads the only power connections? For example are there any hidden leads under the PCB or which are internally connected? — *D.N.*

fine, but is it after the instructions and music that problems occur.

The final program is not "picked up" and my BBC Micro carries on as though the tape was blank.

My Acorn data recorder is not faulty and neither are the tapes or leads.

I have tried the tapes (all originals) along with recorder and leads on a friend's BBC Micro and also at school, where they load first time.

I think the problem could be in the cassette and RS423 circuit, although that is only a guess. — *Philip McCabe, Hindley, Wigan.*

● This sounds like you are the victim of incompatibility between protected software and the new serial ULA logic chip.

Acorn have changed the design of this slightly (for some reason). The result is that it is much more fussy about the tones it receives.

Some protected software used the tolerance of the earlier system to pull some protection tricks. This is now not recognised by the new system.

I have come across the

Croll-Stark, Edinburgh.

● There are seven power leads going to the main board. All the black ones are 0v and all the red ones are +5v. On my machine the other wire is purple — it might be different on yours — and carries -5v. This is located at the left hand side of the board.

You do not need +12v to power the computer, but you will need it if a disc drive is to be driven as well.

The -5v will draw about 50mA and is only required for the audio amplifier — bleeps — and the RS432.

If you do not want these features then it can be left disconnected.

It is best being derived from a separate Ni-Cad rechargeable battery. There are no other power leads.

Voltage regulators you could use: LM323K-STEEL +5v at 3A. UA78H05SC +5v at 5A. UA78H12SC +12v at 5A.

problem with some Pace software.

The remedy is to send the software back, saying that you have this new ULA and could they supply it in a compatible form.

Lost lines

I FIND as I make progress with my programming skills some very quirky behaviour from my BBC Micro with its Cumana 40 track disc drive.

It will not print a numeric variable in position TAB(0), it always prints this in about position TAB(6). As I use my computer a lot for columns of figures I have to use STR\$(X) if I want to print in this position.

I sometimes find when programming that I lose the last line that I entered. I now always check the listing for this fault before running the program.

I have experienced great difficulty when writing random access programs. I very often get "Type mismatch" messages even when the program has been running successfully through a loop many times.

I have sometimes found that inexplicably I have lost the entire contents of a file.

I think I should explain that I have diligently set the file pointer to coincide with the field and record lengths and am cognisant of the differing byte lengths of real, integer and string variables. *W.J. Hicks, London SE.*

● The TAB will move the printing position along. If this position has already been passed then TAB is ignored. Basic reserves six characters in front of a decimal point for a number so you are already past this point TABing from 0 to 6.

As you say, you can use a string or you can change the format of the numbers by using the variable @%. This is documented in the User Guide.

Losing the last line happens when using AUTO line numbering and you press Escape

without pressing Return. Always press Return before Escape.

Your "Type mismatch" error is almost certainly a result of your programming and nothing to do with the disc drive. Although exactly what is hard to tell.

Stay serial

I HAVE the use of a Star printer which has a serial interface. Is it possible to easily modify it to a parallel interface for use with the BBC Micro? — *G. Burford, Amersham.*

● You can't easily modify a serial printer for parallel operation, but why not use the BBC Micro's serial output? You will find details on page 406 of the User Guide.

Backup copies

I HAVE not had my BBC Micro very long but have had to send it back for a loose connection or whatever with the RGB socket.

While it is away, I have asked for the disc interface to be fitted and then my next outlay will be for a disc drive.

I have just received some back numbers of *The Micro User* and on page 28 of the September 1983 issue mention is made of taking backup copies of the disc as a wise precaution.

In order to protect one's programs by taking copies, is a dual disc drive necessary, or can this be achieved with one disc drive, as a dual is almost twice as much as a single drive? — *W.P. Coles, Newton Abbot, Devon.*

● You can take backup copies using a single disc. The computer will prompt you when to change discs, with the messages to insert the source disc and insert the destination disc.

With a single system it is best to make a copy of just the program rather than the whole disc as it is quicker.

Making a backup of the whole disc will involve about five disc swaps.

IF you have a technical query for this page, send it to 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, which this month starts on Page 175.

Creative Sound on the BBC Micro-computer Model B

By David Ellis and Chris Jordan
Acornsoft Publications

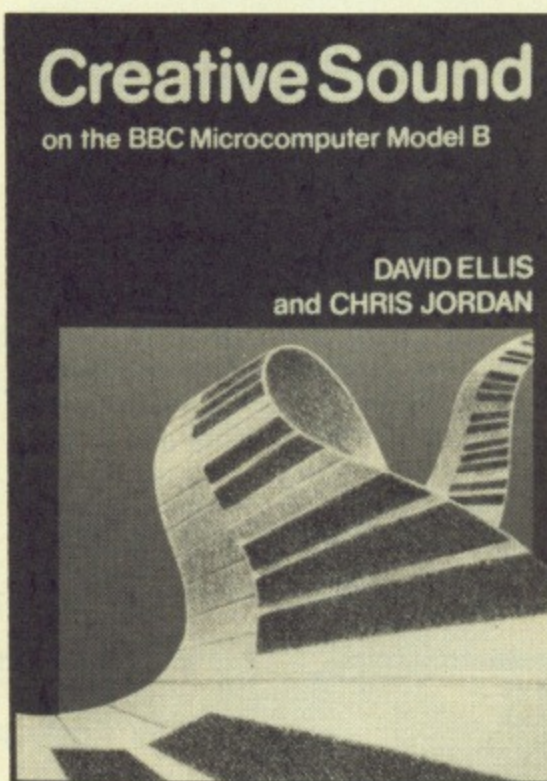
Delve into the depths of sound synthesis

IF weight of printed matter is anything to go by, music on the BBC Micro has never been healthier. We're currently being showered with publications on the subject.

So far this year there have been at least four major (thick) and several minor (thinner) books, and countless columns in magazines.

Most of these publications contain something different, though not necessarily anything terribly inspiring. But unless you're a fanatic, there seems little point in collecting them all, since any new ideas are inevitably surrounded by a mass of material duplicated who knows how many times elsewhere.

Creative Sound, however, is something of an exception. It does not always break new ground, and some of its program listings are pretty basic in their objectives, but for the most part the



but to go further than other books on the subject. And they do.

They use the SOUND and ENVELOPE statements as the building blocks for creating far more interesting things – pre-set and programmable synthesisers, multi-oscillators, real time multi-track recorders, compositional and sound effects devices, tune generators and so on.

There are pages and pages crammed with imaginative, and occasionally brilliant, routines leading up to a chapter entitled "Composer's Assistant". Here all the strands are brought together to form a valuable mini-manual of aids to musical creation.

A final chapter on teaching music, ear training and testing musical ability is less innovative, but equally competent.

Once above the level of SOUND and ENVELOPE statements, there are two basic ways of entering note information on a computer. One is to use a Music Composition Language (MCL), and the other is real time input via a synthesiser keyboard, or via the micro's keyboard pretending to be one.

The authors of Creative Sound look carefully at both methods and provide program listings for both.

But throughout the book they work towards persuading you that, despite being superficially more difficult and



treated cogently and with humour. And the cake is spiced with unusual demonstration routines, even one for producing a crude musical scale by flapping the micro's cassette relay – *MOTOR 0/1 – at different speeds.

The core of the book, however, is an exploration of what can and cannot be done with the 76489 sound chip, and a guide to creative experimentation, with the emphasis on producing the unexpected as much as the expected.

The exploration begins with an overview of the dreaded SOUND and ENVELOPE statements. One of the book's authors, Chris Jordan, is the man who originally designed them – and also, incidentally, Ample, the music programming language used on the Acorn 500 synthesiser (*The Micro User*, August 1985) so we might have expected an authoritative and detailed examination of them.

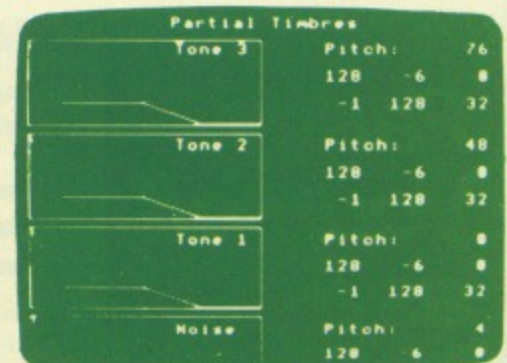
But no. So much has already been written about them that the authors rightly decided to give that one a miss, and concentrate on putting them into their proper musical context. In other words, to start one rung up the ladder,

book is targeted at a sector of the market not previously fully catered for.

Primarily it is intended for those with some musical knowledge who want to delve into the very depths of sound synthesis on the BBC Micro, to know why and how things are happening, rather than being content with just hearing the results.

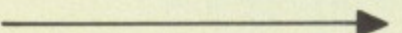
On the whole, therefore, it is not a book for the faint-hearted, but it makes fascinating reading if that sort of thing turns you on, even in a dilettante way.

The opening chapters deal with the history and the physics of digitised sound. Waveforms, Fourier-synthesis and harmonic theory are not everybody's cup of tea, but here they are



less interactive, MCL is the real answer.

By the time they've finished it is hard to disagree with them about the



From Page 101

superiority of MCL, and if they are right this has wide implications for the future of computerised music.

But whatever the future, following the arguments, and trying out the demonstration listings, teaches you a great deal about the *present* mechanics of note input.

The book contains more than 30 listings, from graphic displays of all kinds to musical games and composition aids. None falls below the high standard set by the surrounding text, and some transcend it.

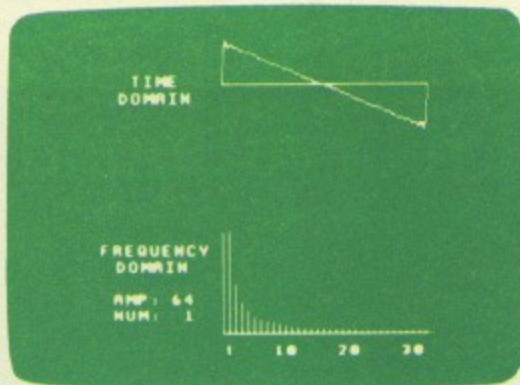
An efficient compiler, for instance, will run your own data, or the wide range of data provided entered in an original, relatively simple and very flexible format.

A sound demonstrator and an envelope demonstrator, which allow you to test interactively the effects of parameter changes, take all the grind out of the SOUND and ENVELOPE statements at one fell swoop, and in fact

are just about the best examples of their kind that I've seen.

Even more impressive is a clever graphic envelope display, which plots out the shape of an envelope as it is sounded, making the ENVELOPE statement suddenly come alive.

Many music editors will do such



things, but generally rather mundanely. And none that I know are specifically designed, as these routines are, to give an insight into how sound is made, or to allow – and encourage – you to experiment with new methods of

handling musical data. It is clear that the best of the program listings could successfully have been marketed independently as a musical toolkit at more than the price of the book, £9.95.

No doubt for this reason, and to save laborious typing and unavoidable debugging, Acornsoft has made them all available on cassette (£5) and two 40 track discs (£8 the pair). The extra expense is well worth it.

One final point – and something which rarely gets a mention in book reviews – is that Creative Sound's 320 densely-packed pages are printed in a clear typeface, with examples, graphs and listings offset in brown for easy reference. Not an unimportant consideration, given that this is the kind of publication which will tend to be read and re-read many times over.

In all then, a nicely produced, readable, informative, challenging and above all creative book. It is certain to become one of the standard works on BBC Micro music.

Gabriel Jacobs

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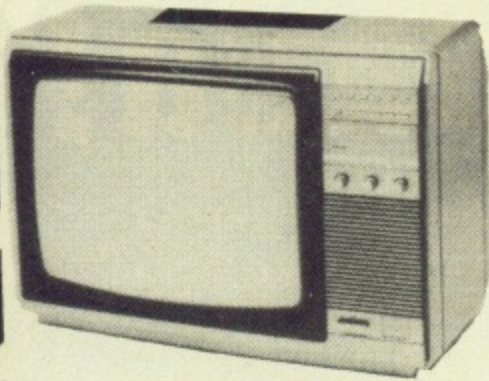
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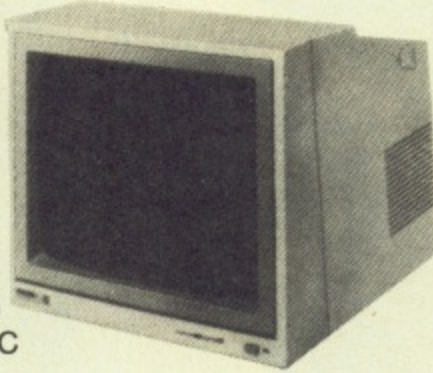
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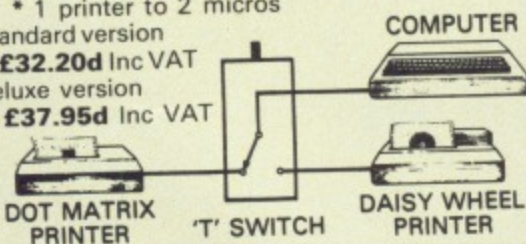
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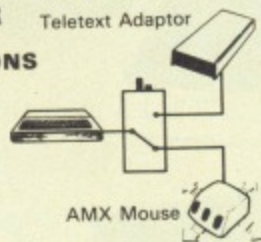
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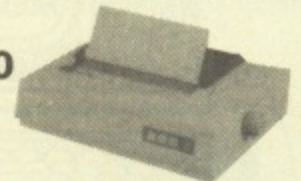
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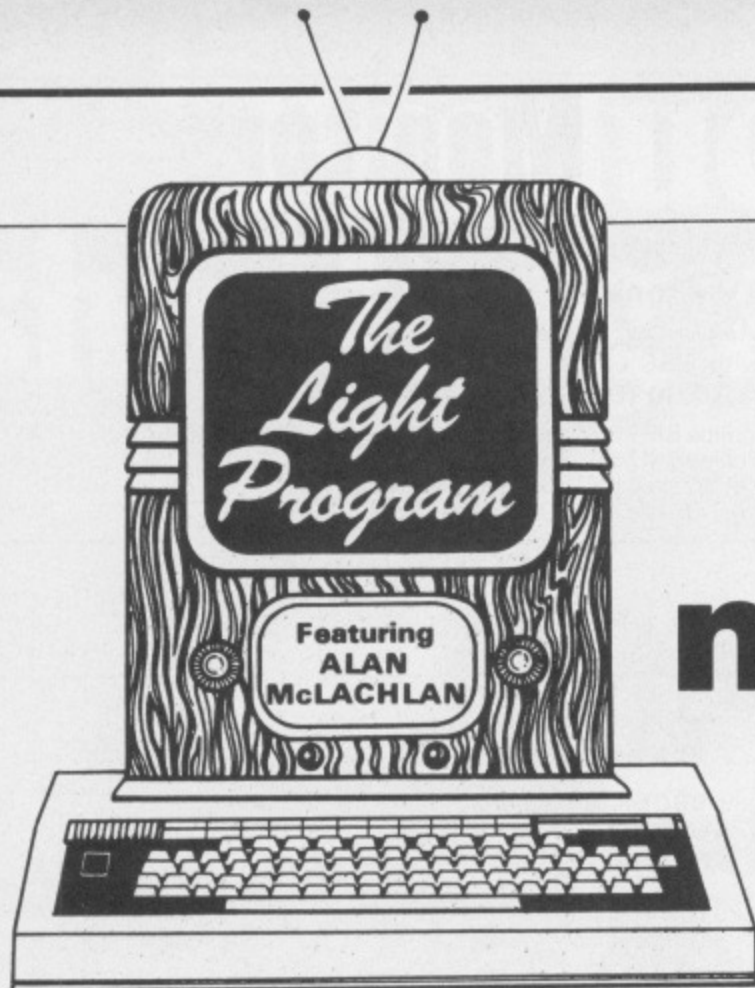
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Expanding my horizons

First part of ALAN McLACHLAN's
venture into writing a more
ambitious games program

MY expeditions over the last months into the world of the games programmer has generated an enormous amount of interest from our readers.

It seems that whether you're young or old, an absolute novice or reasonably proficient, there are many of you who want to have a go at writing at least one simple game in your computing career.

Smiley Hunt was simple in concept and format – it had to be for me to write it. Now I've decided to use the same basic ideas in another mega-production, expanding them slightly to introduce some different, perhaps more interesting, routines.

The principle of the X,Y coordinate grid we'll retain from the last game, but this time, so that we can incorporate some interesting graphics on-screen, we're going to create a variation called Sub Hunt.

The idea is to have a boat dropping depth charges to try to destroy submarines hidden from view beneath the sea's surface. We will move the boat left and right keeping track of the movement in a variable for its X coordinate. This is something we didn't do in Smiley Hunt, and will involve moving a graphics character across the screen.

The depth for the charge we will input from the keyboard, just as we did with the Y coordinate in Smiley Hunt.

Right, let's get started. Once again the first thing to do is make a list of tasks that we want the program to carry out.

I wrote them down on paper initially, but to save time I've moved on from that and given each a line number, and a

procedure name that describes what it does.

Two REPEAT ... UNTIL loops have been added to control the game. The first creates a loop allowing you to play any number of games until a state of 0 or FALSE exists.

As everything is -1 or TRUE until we say it isn't, the game will go on until we choose to stop it, or in other words the condition is FALSE.

The second loop brings each game to an end when certain conditions are met. These conditions can be altered if you so desire. In this version the end comes when either you have destroyed five submarines, or used up 30 mines.

Listing I is, in fact, the whole game in a nutshell. Granted the meat is missing,

but all we have to do now is write each procedure to carry out the task required of it.

We're going to have a full title screen this time and this is the first procedure called at line 30 after we have set the Mode at line 20.

DEFPROCtitle consists simply of two FOR ... NEXT loops to print out two rows of asterisks, and two PRINT statements to put the title on the screen.

After "Al's" is printed, the words "Sub Hunt" are put into the string BS. The MID\$ command at line 290 then strips off each letter, one at a time, and prints it across the screen in a random colour accompanied by a simple scale of music. The notes for the scale are held in the DATA in line 1640.

We also make use of two short delays and these are defined in DEFPROCdelay.

Type in Listings II, III and IV then enter the dummy line 35:

35 GOTO 35

Run the program and if you have typed the procedure in correctly you should see a title screen displaying "Al's Sub Hunt" between two rows of asterisks.

The screen should clear to black after a short delay, at which point you can press Escape. List the program and if all's well we can add the next procedure.

Called by line 40, DEFPROCinit initialises all the items that only need to be set up once in our game. It was here in setting up a two-dimensional array to hold the grid, as last time, that I encountered problems.

```

10 REM Sub hunt
20 MODE2
30 PROCtitle
40 PROCinit
50 REPEAT
60 PROCstartup
70 PROCscene
80 PROCsubs
90 REPEAT
100 PROCmove_boat
110 PROCinput
120 PROCbomb
130 PROCcheck
140 UNTIL subs>4 OR mines>29
150 PROCfinished
160 PROCresults
170 UNTIL FALSE

```

Listing I


```

180 REM*****
190 DEFPROCtitle
200 VDU23;8202;0;0;0;
210 CLS
220 COLOUR1:FOR x=2 TO 16:PRINTTAB(
x,8);"*"
230 NEXT x
240 FOR x=2 TO 16:PRINTTAB(x,21);"*"
250 NEXT x
260 COLOUR 3:PRINTTAB(8,12);"AI's"
270 A$="Sub Hunt"
280 FOR x= 1 TO LEN(A$)
290 B$=MID$(A$,x,1):COLOUR RND(3):P
RINTTAB(2*x,16);B$:READ pitch:SOUND 1
,-15,pitch,10
300 PROCdelay(.7)
310 NEXT x
320 PROCdelay(3):CLS
330 ENDPROC
    
```

Listing II

```

1630 REM*****MUSIC DATA*****
1640 DATA 53,61,69,73,81,89,97,101
    
```

Listing III

```

1460 REM*****
1470 DEFPROCdelay(number)
1480 FOR delay=1 TO number*1000
1490 NEXT delay
1500 ENDPROC
    
```

Listing IV

As I developed the program I quickly ran out of memory, because of the extra facilities I was adding.

The main culprit was the array which uses five bytes of memory to store each array element. As I tried to dimension a grid measuring 21x19 this accounted for nearly 2k of memory. This was in addition to the 2.75k used by the DFS, and left me with very little spare memory to play with.

I know the simple solution would have been to download the program to &E00 but I asked the lads if there was another way that would avoid this - I've never been very lucky with downloaders.

The unanimous decision - by virtue of it being the only suggestion - was to simply reserve 399 one-byte locations. This uses much less memory.

For example, in the normal course of

		X		
		0	1	2
Y	0	3	6	1
	1	5	9	2
	2	0	4	8

Figure I: A two dimensional array

things, a 2x2 numeric array using DIM A(2,2) stores its information in 45 memory locations. This is calculated by allowing for three elements in each dimension (0-2), and five bytes per item, giving the sum 3x3x5.

In case the 3 is getting to you, Figure I shows the elements in a 2x2 array. The numbers in the boxes are random and are of no significance.

If you wanted to know the contents of A(1,1) you would simply use the statement:

```
PRINT A(1,1)
```

to obtain the result, in this case 9.

For the purposes of my game, which only uses small numbers, we don't need such an expensive reserve of memory - one byte per number will be sufficient. This is because there's nothing going over 255, the maximum number a byte can hold.

Instead of using an array therefore, we can simply reserve nine memory locations using DIM A 3x3 as in Figure II.

I've used the same numbers as Figure I to show how they are stored sequentially in memory. However, we still need to simulate a grid, and it is not too difficult to imagine the groups of three boxes stacked under each other to form, more or less, the same arrangement as in Figure I.

Finding the contents of the same box, though, is a little more complicated. It needs a calculation based on the start address, A.

To this we must add three times the

3	6	1	5	9	2	0	4	8
---	---	---	---	---	---	---	---	---

Figure II: Simulating an array in memory

number of Y coordinates - there are three bytes in each level - plus the number of boxes along the X coordinate.

The query operator returns the contents of the box and the whole statement reads:

```
?(A+3*Y+X)
```

which translates as "the contents of the box, Y rows down, X boxes in".

You can compare the two sets of figures and see how all the numbers in the other boxes follow the plan.

In the program itself I needed to write a function DEF FNsea(x,y) to read the contents of a box, and a procedure DEFPROCputsea(x,y,n) to insert something in a box.

As these are going to be used a lot right from the start, you might as well type them in now.

```

1560 REM*****
1570 DEF FNsea(x,y)
1580 =?(sea+20*y+x)
    
```

Listing V

```

1590 REM*****
1600 DEFPROCputsea(x,y,n)
1610 =(sea+20*y+x)=n
1620 ENDPROC
    
```

Listing VI

While we're at it, let's type in another procedure that we'll be using quite soon and seeing a lot of. This is DEFPROCwindow and you came across it in Smiley Hunt and therefore it should need no explanation.

```

1390 REM*****
1400 DEFPROCwindow(w,sx,sy,fc,bc,
,A$)
1410 COLOUR fc:COLOUR bc
1420 IF w=1 THEN VDU28,0,10,19,0
1430 IF w=2 THEN VDU28,0,31,19,11
1440 PRINTTAB(sx,sy);A$;
1450 ENDPROC
    
```

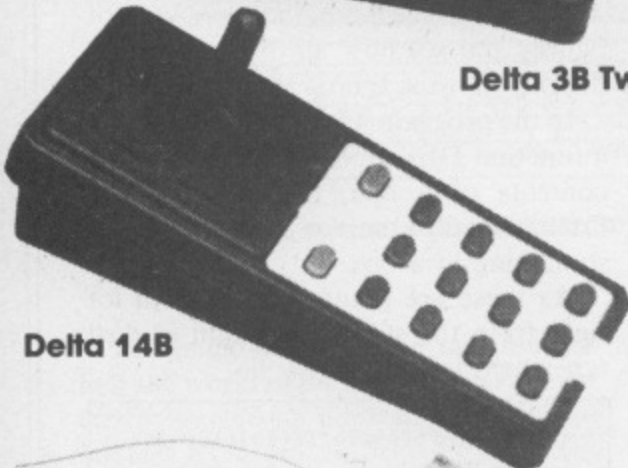
Listing VII

Right, back to DEFPROCinit, where we left off. We can now reserve memory

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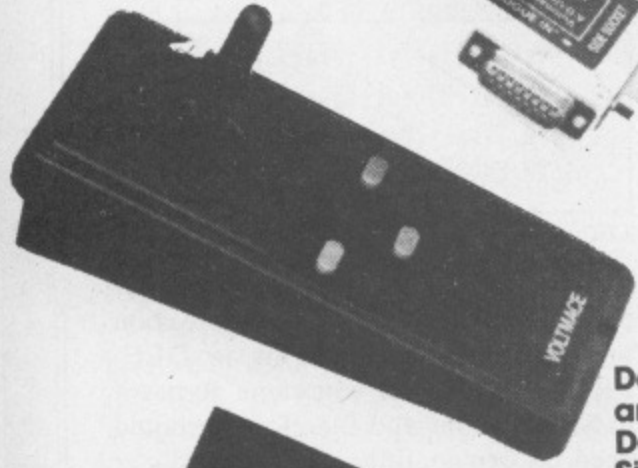
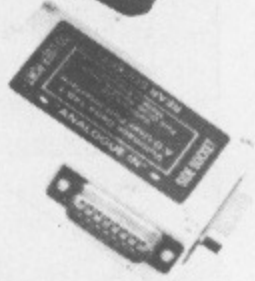


Delta 3B Twin

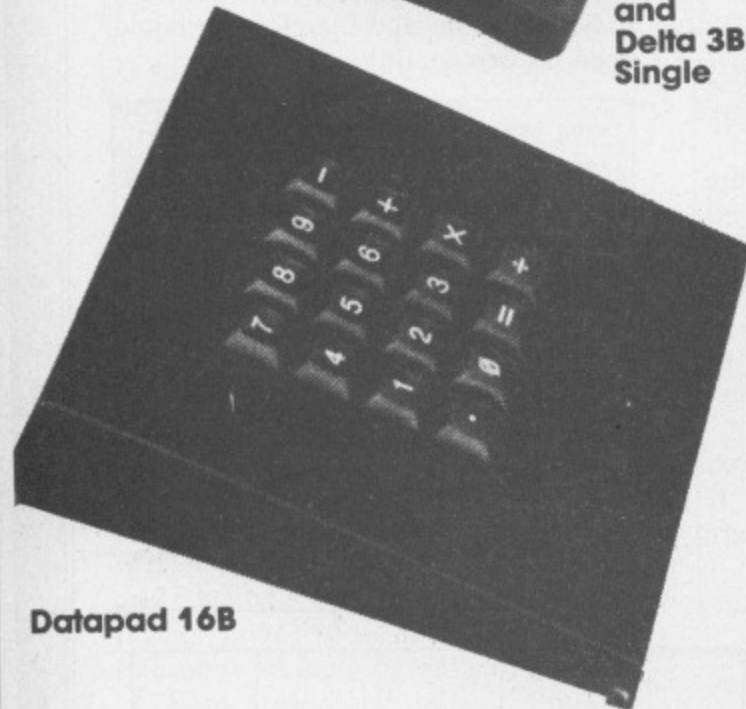


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Datapad 16B

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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.



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From Page 107

for the grid using line 360. Line 370 switches off the cursor and in lines 380 to 420 I have defined some graphics characters to use in the screen display.

These are the front and back of the ship (224) and (225) joined together in line 430 as *boat\$*, the depth charge (226), the submarine (227), and the explosion (228).

```

340 REM*****
350 DEFPROCinit
360 DIM sea 19*21
370 VDU23;8202;0;0;0;
380 VDU23,224,0,0,0,0,0,7,255,127
390 VDU23,225,0,0,0,0,208,240,255,2
52
400 VDU23,226,0,0,0,24,24,0,0,0
410 VDU23,227,0,0,16,24,126,255,126
,0
420 VDU23,228,17,128,4,88,0,34,40,1
32
430 boat$=CHR$(224)+CHR$(225)
440 ENDPROC
    
```

Listing VIII

Within the first REPEAT... UNTIL loop DEFPROCstartup is called at line 60. This contains the variables that need to be set at the start of each new game, *mines* – the number of depth charges used – *subs* – the number of submarines hit – *oldboatx* – the start X coordinate of the ship.

```

450 REM*****
460 DEFPROCstartup
470 mines=0:subs=0
480 oldboatx=10
490 ENDPROC
    
```

Listing IX

We're now ready to actually put something on the screen. DEFPROCscene does this and is called at line 70.

We'll use the same procedure we used in Smiley Hunt to create windows and print characters on the screen – DEFPROCwindow.

I've also used the BBC Micro's MOVE and PLOT85 commands to draw and fill two triangles to simulate a coastline.

In Smiley Hunt we used the numbers 0-9 to indicate the 10 Y coordinates of the grid. Here we need more than 10, so to keep them to single characters, we are

going to use the letters a-r rather than numbers. This will avoid having to print two characters side by side.

Line 580 uses a FOR... NEXT loop to print these letters down the left-hand side of the screen. It does this by adding 97 to the variable *numy* and printing the resultant Ascii character.

The first time through the loop *numy* is equal to 0, therefore we print CHR\$(97) which is a lower case "a". The next time through *numy* is 1, *numy* + 97 = 98, CHR\$(98) is "b", and so on to the letter "r".

We must initialise the grid so that every location contains a zero, using the FOR... NEXT loops at line 590 and the first call to PROCputsea at line 600.

A couple of prompts on the screen will remind us at the start how to play the game, but the idea is that they won't be seen again.

```

500 REM*****
510 DEFPROCscene
520 PROCwindow(1,0,0,0,134,CHR$12)
530 PROCwindow(2,0,0,0,132,CHR$12)
540 PROCwindow(1,oldboatx,10,0,134,
boat$)
550 GCOL0,2:MOVE 0,672:MOVE 0,772:P
LOT 85,260,672
560 MOVE 1279,672:MOVE 1279,720:PLO
T 85,1140,672
570 PROCwindow(2,0,0,7,132,"")
580 FOR numy=0 TO 17:PRINTTAB(0,num
y);CHR$(numy+97);:NEXT numy
590 FOR locx=4 TO 18:FOR locy=0 TO
17
600 PROCputsea(locx,locy,0)
610 NEXT locy:NEXT locx
620 PROCwindow(1,0,2,1,134,"Z or X
then Return")
630 ENDPROC
    
```

Listing X

Now we're ready to have a look at what's on the screen. Delete line 35 and enter dummy line 75.

75 GOTO 75

Run the program. If you've done everything right so far, your screen should correspond exactly with Figure III. If it doesn't, you would be well advised to check your typing very carefully for mistakes before you go any further.

Line 80 calls the next subroutine at line 540. This, DEFPROCsubs, hides

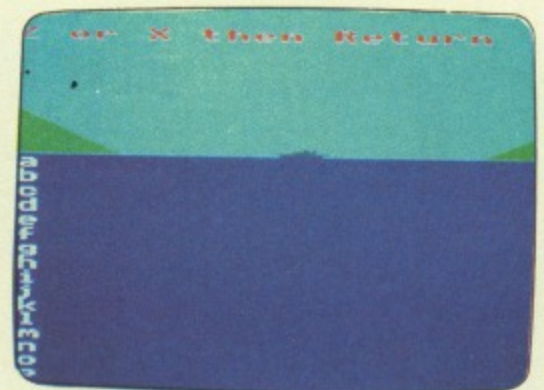


Figure III

the submarine in exactly the same way that we hid the Smileys last time. A single FOR... NEXT loop selects 20 random numbers for both X and Y coordinates, then places a number 1 in one of your micro's reserved memory location using PROCputsea.

Line 680 checks memory using FNsea and sends the program back to the random number generator should a memory location already have a 1 in it. This ensures that there are always 20 separate submarines hidden away.

```

640 REM*****
650 DEFPROCsubs
660 FOR tally= 1 TO 20
670 subx=RND(13)+3:suby=RND(17)
680 IF FNsea(subx,suby)=1 THEN GOTO
670
690 PROCputsea(subx,suby,1)
700 NEXT tally
710 ENDPROC
    
```

Listing XI

Now add line 695:

```

695 PROCwindow(2,subx,suby,7,132,"+")
remove line 75 and add dummy line 85:
85 GOTO 85
    
```

You will be able to see the locations of the submarines highlighted by the + sign, and these can be left until later as they will be extremely useful for testing out the detection routines.

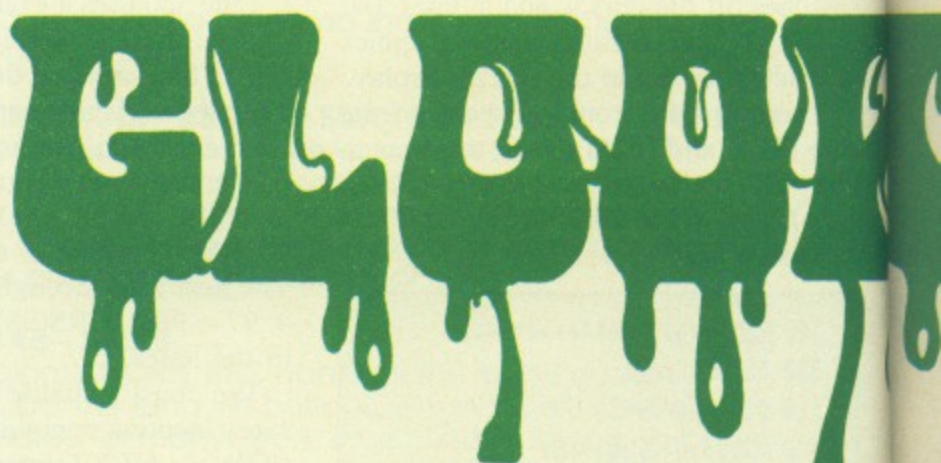
This is an ideal place to break for this month – it should give you time to ensure everything is working all right in time for next month's episode.

If it isn't, don't be afraid of dropping me a line at *The Micro User*. But remember, if you want a personal reply – and this applies to anyone else writing in to us, for whatever the reason – you must enclose a SAE. We may not be able to solve your problem every time, but at least we'll admit an honourable, reluctant, defeat.

Get your own back on that grotty green gloop with DAVID PILLING's . . .

MAIN VARIABLES

- S%()** Array with one element for each character position on the screen. The value of each element enables the program to keep track of what occupies the corresponding screen position. The values used are as follows:
S%() = 0; an empty position
S%() = 129; gloop
S%() = 128; a piece of wall
S%() = 131; the guzzler
S%() = *n* with $n > 0$ and $n < 128$; node number *n*.
- X%,Y%** *x* and *y* coordinates of the guzzler.
- F%** Fuel level.
- U%,V%** Point to two byte arrays which are used to store the *x* and *y* coordinates of each node. For instance the *x* coordinate of node *N%* is *N%?U%*.
- S%** Score.
- HI%** High score.
- GU%** Number of guzzlers.
- SC%** Number of mazes cleared.
- G%** Controls the speed with which the gloop spreads.
- N%** Number of active nodes.
- M%** Usually the number of an individual node.
- US,DS,LS,RS** Print a guzzler going up, down, left or right.



GREEN gloop, it is generally acknowledged, is treacherous stuff. Make contact with a microscopic speck of it and before you can say, "It'll come off with a drop of meths", the walls, the floors, you, and half of Western Europe will all have been permanently marked.

In the Super Green Gloop Gulper Game you get the chance to take revenge on all the primeval green sticky gloop you have ever encountered in your life.

Thanks to the miracles of modern microcomputing, a small quantity of green gloop has been trapped in a disused Pac Man maze, along with the only known way of disposing of gloop — the gloop guzzler.

In the game the gloop spreads out

PROCEDURES

- char** Defines characters and envelopes. Constructs various strings. Zeros the score and high score.
- start** Sets variables to their values at the start of the game. Increments high score if necessary.
- screen** Draws the maze on the screen using the information in the data statements in lines 850 to 970. **S%()** is filled in with the appropriate values at the same time. The centre of the maze is filled with gloop and the necessary nodes are created with **PROCnew** in line 790 using the data statements in lines 980 and 990.
- guzzler** Moves the guzzler, depending on which of the cursor keys is pressed.
- FNFUEL** Displays the decreasing fuel supply and prints out the low fuel warning. Returns TRUE if no fuel left or all the gloop has been eaten.
- d(T%)** Produces a delay of $T\% + 1$ centiseconds.
- gloop** Spreads the gloop by getting the coordinates of a node and calling **PROCnew** on the surrounding positions.
- new(A%,B%)** Creates a node at position *A%,B%*.
- rem(M%)** Destroys node number *M%*.
- rgm(M%)** Used when the guzzler has just eaten a node. Does the same things as **PROCrem**, but at the end control drops into the procedure below.
- gap** When the guzzler moves into gloop new nodes must be created on the sides of the gap formed. Here **PROCngw** is used to do this.
- ngw(A%,B%)** Creates a new node at *A%, B%* like **PROCnew**.
- game** Prints the scores at the end of the game. Handles high scores and decrementing number of guzzlers.
- gloopwin** The gloop has won. Fills the screen with gloop.
- guzzlerwin** The guzzler won, print suitable message.
- initializeuser** Tells you what the game is about.

y green

GLOOP

trying to fill the maze. You must try to clear it all up by deftly steering your gloop guzzler through it.

However your guzzler is constantly using fuel, so you have only a short amount of time in which to do this.

You are given three guzzlers with which to try and beat the high score. If you fail to clear a maze with the fuel provided you lose one of them.

Points are awarded for the quantity of gloop devoured. As the game progresses from one maze to the next the speed at which the gloop spreads increases.

The guzzler is steered around the maze by pressing the appropriate cursor key. However you may change the INKEY numbers in lines 1020 to 1050 so that control is provided by different keys.

Winning at this game calls for a certain amount of strategy, in addition to speed at pressing the right keys. If you let the gloop break up into lots of small patches you will never win. Instead, try to contain it in one big patch.

Long runs through continuous areas of gloop are also recommended.

The problem the game presents from a programming point of view is the spreading of the gloop. This is achieved by using the idea of nodes – a character position on the screen that has just been filled in green.

The program keeps a list of the x and y coordinates of such nodes. When it is desired to spread the gloop a node is taken at random from this list and the four character positions around it are inspected.

If these contain the guzzler, walls or gloop, nothing is done. However if a

position is empty a new node is created there. Finally the original node is destroyed.

The position occupied on the screen remains filled in with green. The nodes, therefore, do not represent all the gloop, rather they keep track of its spreading edge.

When the guzzler has moved through some gloop new nodes must be created on either side of its path.

Also if the guzzler eats a node this must have its coordinates removed from the list.

The program can tell if all the gloop has been eaten by looking to see when the number of nodes is zero.

The use of byte arrays – and therefore the use of the ? operator – means that it is probably wise to save this program after you have typed it in and before you run it for the first time.



Gloop Gulp listing

```

10 REM GREEN GLOOP GULPER
20 REM (c) The Micro User
30 MODE7
40 VDU23;8202;0;0;0;
50 DIMSX(19,31)
60 DIMUX100,VX100
70 PROCchar
80 PROCinitializeuser
90 PROCstart
100 MODE2
110 REPEAT
120 PROCscreen
130 REPEAT
  
```

Turn to Page 168

when it comes to
upgrading the BBC micro
it's got to be a tough choice



this is it



OAK

Since we launched the OAK computer range six months ago, it has proved to be the only choice when introducing the BBC micro into a hard working environment. Its success in this field has made it the market leader widely used in schools, universities, medical and chemical research, communications, security, defence and engineering. In fact anywhere that strength and reliability are required.

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OAK

QUALITY PRODUCTS

Because of the outward looking design, the BBC Micro Computer has become one of the worlds leading computers. Its popularity is derived from its flexibility as a powerful home computer through to a personal computer widely used in science, education, commerce and industry. This flexibility has been enhanced by the vast range of add-ons that have become available - unfortunately these in themselves have created the micro's major weakness - in many cases they are self-contained units whose cases and cables require a lot of extra space in order to site the computer. This detracts from the overall value of the system.

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Models can be supplied incorporating BBC B internals from £499.00. Telephone for further details.

All prices shown above are exclusive of VAT and delivery.

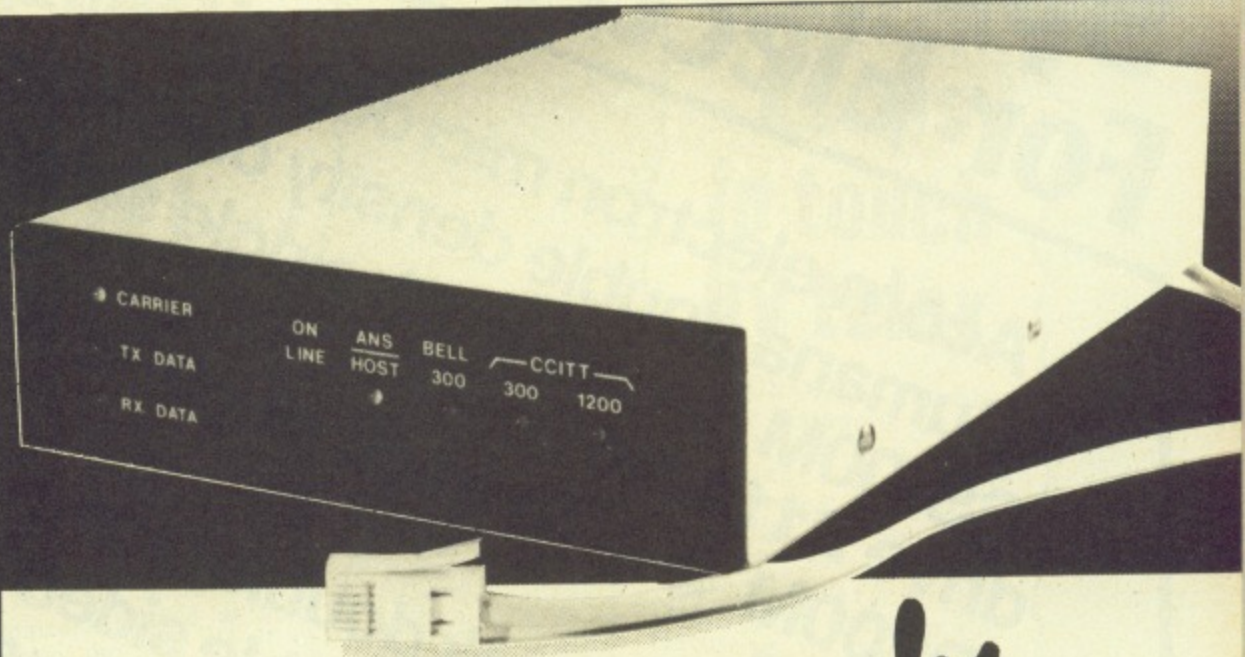
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*Disk interface requires Acorn plus 1 expansion unit

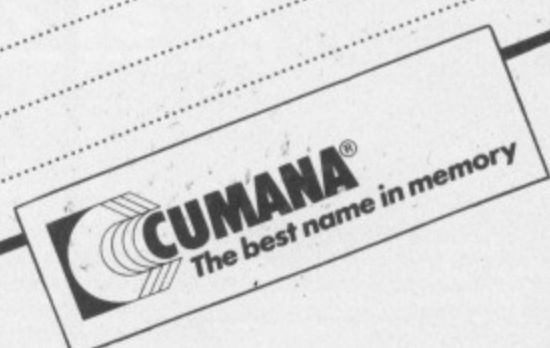


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NEWSLETTER

MESSAGES THAT ARRIVE BEFORE THEY ARE SENT...

BELIEVE it or not – but MicroLink's subscribers in Australia can have a Telemessage delivered in England before they actually send it!

This feat of telecomputing wizardry is made possible by the speed of MicroLink's electronic mail service and the ten hour time difference between the UK and Australia's east coast.

Say, for instance, MicroLink subscriber Ned Kelly is waiting for his morning billy to boil in Sydney when he remembers with horror that it's the birthday of Liza Doolittle, the sheila he met on holiday in Earls Court, and he hasn't sent a card.

It's 5.30am Tuesday – which is 7.30 Monday evening at MicroLink's nerve centre, and half an hour before the deadline for guaranteed next day delivery of Telemessages.

Ned hastily scribbles out a few affectionate words and soon has the greeting safely transmitted to MicroLink, from where it is passed on to Liza's local delivery office.

In common with her fellow market flower sellers, Liza gets her mail very early... so Ned's birthday greeting arrives on a colourful Telemessage card at 5.15 Tuesday morning – half an hour before he transmitted it to MicroLink.

Even better news for Ned – because Australia is on the International PacketSwitch-Stream network he is able to shoot his message across 10,500 miles for the equivalent of about 15p. The MicroLink Telemessage itself costs him £1.95, plus 65p for the fancy greeting card.

So Ned's long distance romance with Liza is saved for less than £2.

System speeds up

SENDING a telex message overseas via MicroLink is now easier and faster.

Previously when a system user was asked "Tlx, Key plus or Code?" he had to access an alphabetical list of countries and read through it to get the appropriate code

number of the country he was sending to.

Now he can just type in the name of the country, telex number, and the answer back code where appropriate, and press Return before typing in the text of the message he wants to send.

Church keeps in touch by telex

A MICROLINK member with a mission is Colonel K.A. Christian, who until his retirement was head of telegraph and data systems at British Telecom headquarters.

As secretary to the Deanery of Clare in the Diocese of Bury St. Edmunds and Ipswich he uses his Tandy Model 1 and Miracle Modem as often as possible to communicate by electronic mail and telex with other church officials.

And he is also a member of the Church Computer User Group, whose patron is the Archbishop of York and whose aim is to spread the gospel of high tech among church administrators.

A prime target for a telecomputing baptism is his Rural Dean, the Rev Andrew Haig, who has a Commodore 64 but hasn't yet got a modem.

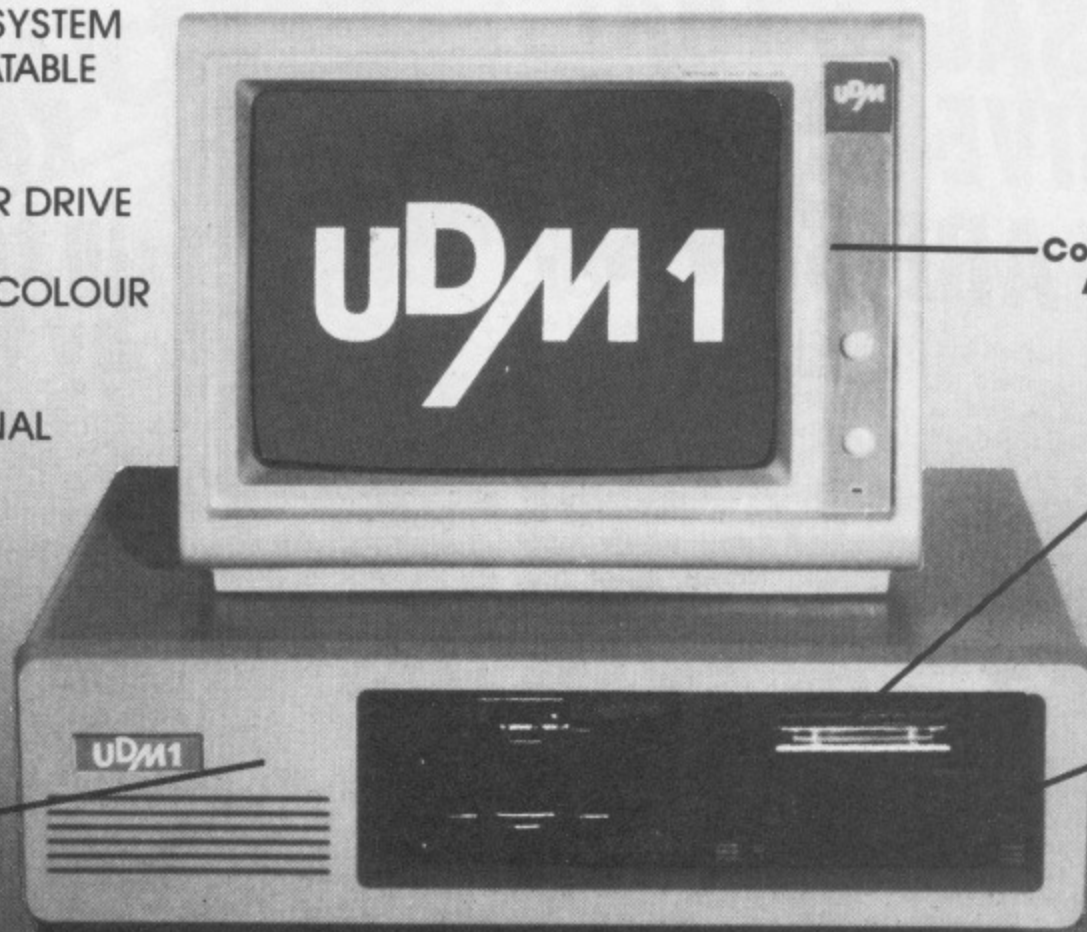
"I'm hoping he'll obtain one very soon", says Col. Christian. "I can contact our Deanery Treasurer's Apple II via Prestel and I can use MicroLink's telex facility to communicate with the Diocesan Registrar.

"What would really please me is for them all to be linked by the electronic mail service so we could show how telecomputing can help church administrators function more efficiently".

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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 MicroLink 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 as 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

MU 11

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 _____

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MicroLink
Database Publications
Europa House
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Name

Position

Company

Address

Postcode Daytime telephone

Commencement of Service

Please indicate month of commencement

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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)

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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 account number

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.

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.

If you think the front looks good — you should see the back.



Once again Mushroom has answered a special need of all BBC computer users with their new WORKSTATION — no more untidy wiring, no more pulled plugs, transforms your system into a handsome console unit.

Features include:—

- ADVANCED CABLE MANAGEMENT
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Mushroom

COMPUTERS LIMITED

Another Mushroom product from Broadway Electronics.
Patents pending.

Making a clean sweep of it - sideways

SIDEWAYS offers an alternative to the conventional methods of clearing the screen, CLS and CLG. It is different because it clears the screen from left to right, an effect more pleasing to the eye than either CLS or CLG.

Sideways will work in any graphics mode, that is, 0, 1, 2, 4, or 5, but does not operate across the Tube as it writes to screen memory directly.

This is how it works. The screen can be visualised as a number of vertical columns, one byte wide. There are 80 of these columns per line in 20k modes and 40 in 10k modes. Each individual

CHRISTOPHER FEWSTER offers an alternative to the CLS and CLG commands

column is cleared from top to bottom.

The program clears each column so fast that they appear to vanish instantaneously and this, combined with a short delay at the end of each column, gives the impression of a smooth

sideways clear. The details are given in the notes on program structures.

To use the routine, call PROCassemble, set the computer into a graphics mode and then type CALL clear.

PROGRAM STRUCTURE

- | | |
|---|---|
| <p>50-100 Draw a random pattern on screen and then clear sideways.</p> <p>150-160 Define workspace used by the routine:
 <i>M%,M%+1</i> hold address of the top of the current column.
 <i>T%,T%+1</i> hold address of the next block to be cleared.
 <i>L%,L%+1</i> hold the number of bytes per line (&280 for 20k modes, &140 for 10k modes).
 <i>I%</i> holds the number of the current column.
 <i>C%</i> holds the number of columns on the screen. (80 for 20k modes, 40 for 10k modes).</p> <p>210 Checks to see if current screen mode is text only. Returns if this is the case.</p> <p>230-280 Set initial values held in <i>M%,M%+1</i></p> | <p>300 Transfers value in <i>M%,M%+1</i> to <i>T%,T%+1</i>.</p> <p>310-380 Work down column clearing it.</p> <p>330-350 Clear a block of 8 bytes located at <i>T%,T%+1</i>.</p> <p>360-370 Move down a line by adding the value of <i>L%,L%+1</i> to <i>T%</i> and <i>C%</i>.</p> <p>380 Repeats until all 32 lines in the column are clear.</p> <p>390-400 Set <i>M%,M%+1</i> to the start of the next column by adding 8 to its values.</p> <p>410 Waits until start of next video scan to avoid flicker.</p> <p>420 Repeats until all columns are cleared - until <i>?I%=?C%</i>.</p> <p>430 Returns from routine.</p> |
|---|---|

```

10 REM ***** SIDEWAYS CLEAR *****
20 REM Christopher Fewster 1985
30 REM (c) The Micro User
40 PROCassemble
50 MODE2
60 FOR I%=1 TO 200
70 GCOL0,RND(7)
80 DRAW RND(1280),RND(1024)
90 NEXT
100 CALL clear
110 END
120 REM *****
130 DEFPROCassemble
140 DIM CODE% 120
150 M%=&70:T%=&72:L%=&74
160 I%=&76:C%=&77
170 FOR PASS=0 TO 3 STEP 3
180 P%=CODE%
190 COPT PASS
200 .clear
210 LDA#361:BNE ok:RTS
220 .ok
230 LDA#0:STA M%:STA I%
240 LDA#&30:STA M%+1
250 LDA#&80:STA L%:LDA#2:STA L%+1
260 LDA#&50:STA C%:LDA#356:BEQ L1
270 CLC:LSR L%:LSR L%+1:LSR C%
280 LDA M%+1:ADC#40:STA M%+1
290 .L1
300 LDA M%:STA T%:LDA M%+1:STA T%+
310 LDX#0
320 .L2
330 LDY#7:LDA#0
340 .L3
350 STA(T%),Y:DEY:BPL L3
360 CLC:LDA T%:ADC L%:STA T%
370 LDA T%+1:ADC L%+1:STA T%+1
380 INX:CPX#32:BCC L2
390 CLC:LDA M%:ADC#8:STA M%
400 LDA M%+1:ADC#0:STA M%+1
410 LDA#19:JSR&FFF4
420 LDX I%:INX:STX I%:CPX C%:BCC L
430 RTS
440 J
450 NEXT
460 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 199.

New From CUMANA... Disk Drive Super Value Starter Pack

If you're a BBC or Electron user, you can now upgrade your micro Drive Starter Pack.

For only £205.20 – or look for the special price at your local dealer – 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.



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MODES

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Treat yourself to some new modes

says IAN ROBERTSON

THE BBC Micro has eight different screen modes – 0 to 7. However, with the utility listed here you'll be able to use another three.

Two of them permit 16 colours and only require 8 or 10k of RAM. The other is an 8k, four colour mode.

For those of you who don't want to know how the program works have no fear, I'm not going to explain it. Suffice it to say that it fits in less than one page of memory (256 bytes) and is non-relocatable.

The new modes are called up with the *CODE command followed by a

number between 8 and 10 – the three new modes. For example, to enter Mode 9 you would enter:

*CODE 9

If an invalid mode is selected an error will be produced. The three new modes are as follows:

MODE	Dimensions	Colours	RAM size
8	10*32	16	10k
9	10*25	16	8k
10	20*25	4	8k

The value of HIMEM for the new

modes must be set up correctly. So before you select the mode with *CODE you should enter one of the existing modes which uses the same amount of screen RAM.

Thus the two 8k modes are called from Mode 6 and the other from Mode 5.

Since these new modes are foreign to the operating system weird things happen when text windows are defined.

So long as you don't try anything too clever, though, you should find plenty of ways to amaze friends and impress your family with your three new modes.

```

10 REM Modes 8,9 and 10
20 REM By Ian Robertson
30 REM (c) The Micro User
40 CD%=&900
50 ?&200=CD%MOD256
60 ?&201=CD%DIV256
70 FORT%=@T02STEP2
80 P% = CD%
90 [:OPT TX
100 PHP:PHA:TXA:PHA:TYA:PHA
110 CMP#0:BEQ SKIP
120 .error
130 BRK
140 OPT FNequb(255):OPT FNequs("Stu
pid! Please use *CODE <Value 8-10>")
150 BRK:.SKIP
160 CPX#8:BEQ mode8

```

```

170 CPX#9:BEQ mode9
180 CPX#10:BEQ mode10
190 JMP error
200 .mode8
210 LDA#22:JSR&FFEE:LDA#5:JSR&FFEE
220 LDA#154:LDA#224:JSR&FFF4
230 .SKIP2
240 LDA#15:STA&360:LDA#1:STA&361:LD
A#32:STA&34F:LDA#55:STA&363:LDA#AA:
STA&362:LDA#9:STA&30A
250 JMP RESET
260 .mode9
270 LDA#22:JSR&FFEE:LD#6:JSR&FFEE
280 LDA#154:LDA#128:JSR&FFF4
290 JMP SKIP2
300 .mode10
310 LDA#22:JSR&FFEE:LDA#6:JSR&FFEE

```

```

320 LDA#154:LDA#132:JSR&FFF4
330 LDA#3:STA&360:LDA#2:STA&361:LDA
#16:STA&34F:LDA#55:STA&363:LDA#AA:S
TA&362:LDA#19:STA&30A
340 .RESET:LDA#20:JSR&FFEE:PLA:TAY:
PLA:TAX:PLA:PLP:RTS:]
350 NEXT
360 END
370 DEFFNequs(string$)
380 $P%=string$
390 P%=P%+LEN(string$)
400 =TX
410 DEFFNequb(byte%)
420 ?P%=byte%
430 P%=P%+1
440 =TX

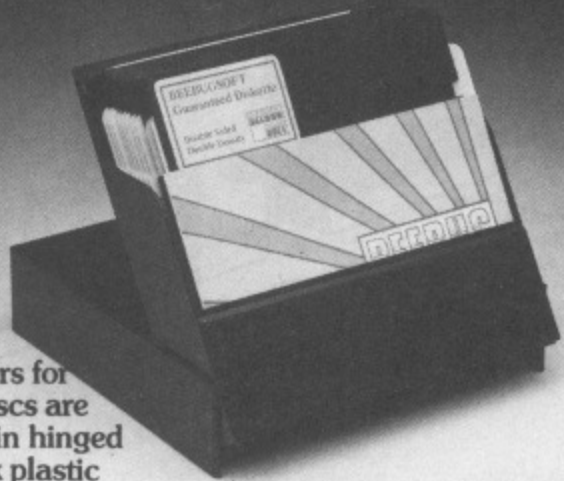
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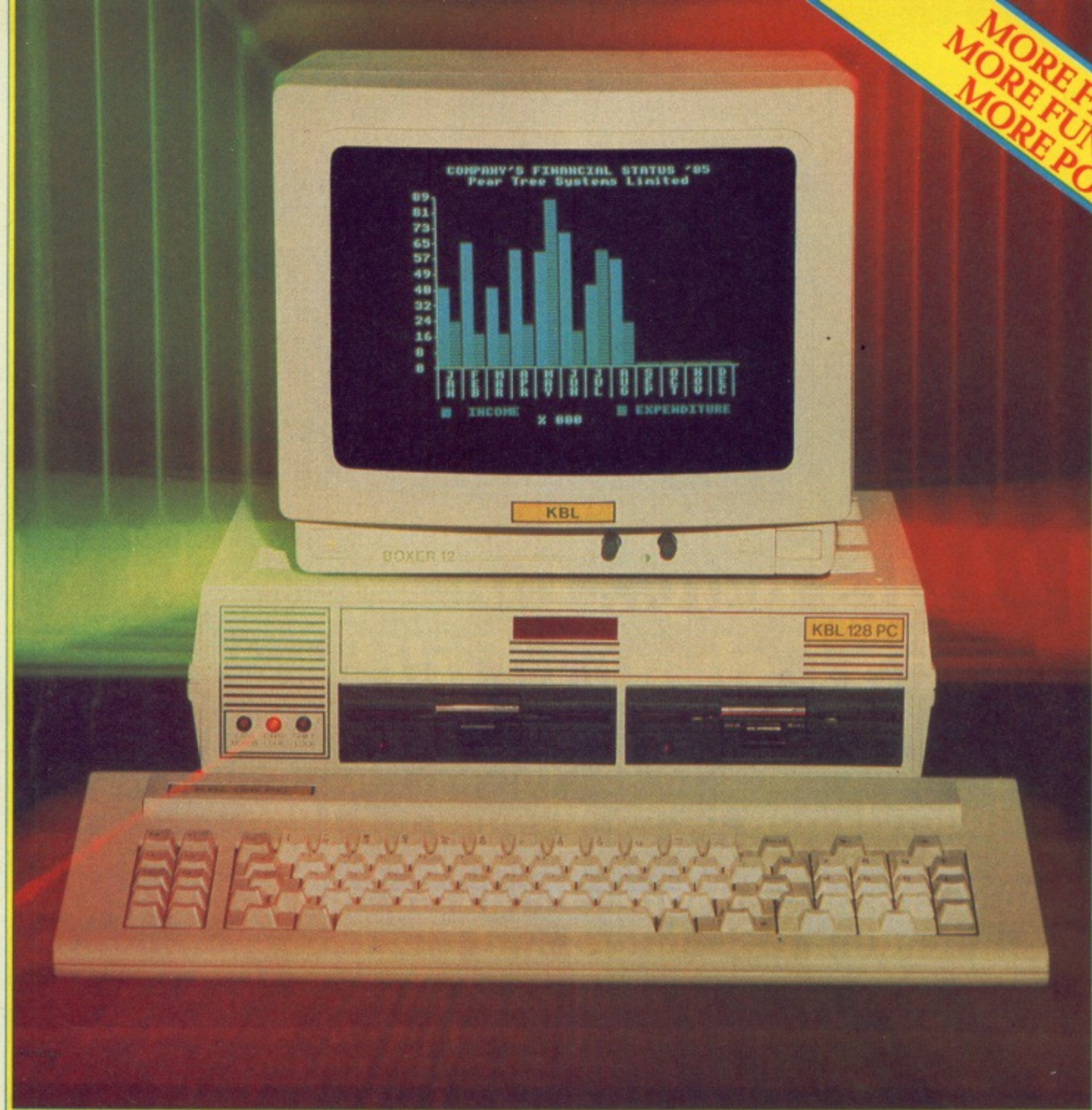
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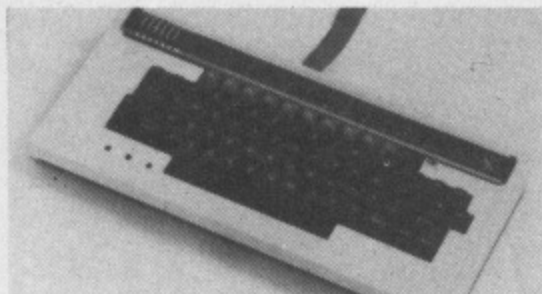


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The new compact MICROTEST BCASE has taken over 18 months to develop by our R & D section. We feel (probably with some bias) that

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The BCK detached Low Profile Keyboard case is also made of steel and houses the existing BBC Computer keyboard. Inc. 600mm. cable.

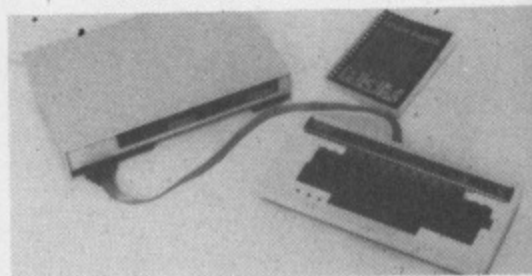
The BCNK detached Low Profile Keyboard has a separate numeric pad for those of you that need fast and efficient numeric input. Inc. 600mm. cable and numeric pad. (A basic knowledge of soldering is required to fit the numeric keyboard and standard to this case option).

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80 Watt Switched Mode PSU inc switch, cable loom, etc £99.95

Carriage £4.00 for keyboards, £4.00 for CPU case or £6.00 for keyboard & CPU case. Units are priced individually so that users could run a detached keyboard from an existing BBC computer, please state when ordering. We will install your components into our case for £20.00 (including carriage, packing and insurance back to you). PLEASE PHONE US FOR A RETURNS NUMBER BEFORE DESPATCHING ANY ITEMS OF EQUIPMENT TO US FOR FITTING.

Please send SAE for spec. sheet



DisCat

DisCat creates disc labels and catalogues the files on all your discs, creating a wealth of information which can be accessed by DisCat's own built in database whenever you need to find a file or reference.

DisCat is easy to use and makes printing labels for your discs the simplest of tasks. Create labels for your whole collection of discs or just for one.

Additional information shows you the size of the disc (40 or 80 track, single or double density) and the amount of space used. Each disc is tagged with a volume number for easy identification. There is room for a comment on the label plus the data catalogued and the number of files present on the disc.

As each disc is catalogued you are given the opportunity not only to add comments to the disc label but to also make comments beside each file held on the disc. DisCat's built in database provides full database facilities allowing the resulting information to be searched for any filename or reference.

DisCat uses standard sized labels and comes with 50 labels to get you going. Plus a comprehensive manual.

```

Title: $DisCat $ Vol: v123
No. of files 12 :Cataloged 20/05/85
-----
# 18007 # CatList # CatLab # Doyel # DisCat
# DiscMan # Dandy1 # D10 # Menu # DSystem
# ViewCat # ViewCat
# Disc size 0400 Sectors, 01AS used.
-----
Comment: Disc Catalogue Utility
          Published by
          MICROTEST
  
```

Compatible with BBC B & B+ but must be an Acorn DFS

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Microtest DairyFile

If you have a BBC Micro and keep a dairy herd we are sure that you would like to run DairyFile.

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All old data is preserved - comparisons with previous years are easily made, for up to 200 lactating cows.

Please state 40 or 80 track and printer details when ordering DairyFile. (No printer needed for demo disc).
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Disc Menu ROM

Designed to save time and alleviate problems for the overworked user who needs to run programs from disc in a hurry. No need to worry about 31 files on a disc and trying to find the file required; hidden amongst other data files with similar names.

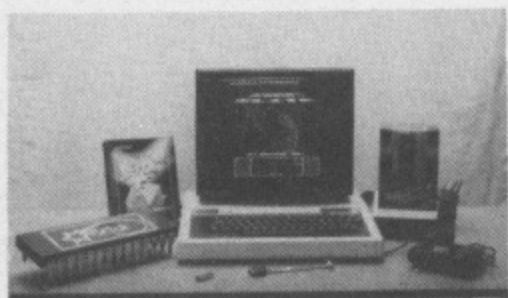
By simply pressing a number key in the range 0-3 and the BREAK KEY, the computer will 'auto menu' the drive number selected. Something that used to take a couple of minutes can now be done in as little as five seconds.

Also included in the ROM are many useful utilities, including:

CONCEAL	REPAIR	KILL	ROMS
CLOSE	EX	LEX	FORM
FREE	MAP	VERIFY	LCAT
REVIVE	DEAD	HIDE	EXCLUDE
REVEAL	MENU		

Also included is REPAIR, an intelligent verify utility. So even if your disc does crash 'Menu ROM' can now try to repair it losing only a minimum of data.

A total of 17 EXTRA commands, at the very affordable price of **£12.95** INC VAT. P&P **£1.00**.



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It's here, the New Issue 2+ Starstick ROM & Quickshot Joystick

Picture shows Starstick ROM, Patchlead and Quickshot Joystick (along with Acornsoft's Elite Package - by kind permission of Acornsoft)

This new release of the very popular Starstick & Quickshot programmable joystick offers new possibilities. Over 30 extra commands which include: *Elite, *Replica, *Sneaky, *Plonk, *Adval, *Prop, *Kill, *Revive, *Reset, *Repeat, *Map, *Ksave, *Kload, *Cursor and *Stick. Fully help driven format with 20 page manual including full fitting instructions.

Not only is the package fully programmable, but it's response time is also user variable. Thus giving YOU the ability to tailor the joystick to YOUR requirements, as only YOU can.

The new issue software is fully compatible with Disc versions of Acornsoft's 'Elite', Acornsoft's 'Aviator' and Clares 'Replica'. It features relocatable workspace to enable it to work with many of the few games it would not work with before. As in the previous issue, the Starstick ROM is fully 'TUBE' compatible.

Specifically designed with the Disc user in mind, the software is not affected by any

combination of the BREAK, SHIFT, or CONTROL keys.

The self centring, rapid action Joystick plugs into the user port and is managed by the Starstick ROM. The ROM monitors O.S. calls and patches the joystick into games programs. The Starstick functions with most games and even those that are not designed to function with joysticks. IT IS VERY IMPORTANT HOWEVER THAT THE GAMES USE LEGAL OPERATING SYSTEM CALLS AS MOST DO.

The New prices are:
Starstick ROM (version 2+) and Quickshot II £29.50
Starstick ROM (version 2+) and Patch lead £25.30
Starstick ROM (version 2+) £19.55
Starstick ROM Reprogramming Charge £5.50
PLEASE INCLUDE £1.00 for CARRIAGE and packing.

The Patch lead option allows you to plug any ATARI/SPECTRUM Style joystick into the BBC computer with the STARSTICK ROM.

Also included in the package is a powerful ROM Manager to enable you to 'KILL' (temporarily) any ROMs that might cause you problems.

All commands in MICROTEST ROMs can be prefixed by 'M' should any other ROM try to intercept the same command name.

IF the word spreadsheet turns you off, or the idea of playing with columns of figures doesn't immediately grab you, think again — these things have been known to become thoroughly addictive.

They can also be invaluable, and for many purposes, paper and pencil are no substitute.

While yesterday's prototypes were rather crude and user-hostile, today's spreadsheet is a whole new ball game. Inter-Sheet, from Computer Concepts, is one such package.

All spreadsheets follow the same general principles. Your screen becomes a "window" on to a very large "sheet" of many rows and columns of "boxes" into which you can put numbers, formulae or text.

You can make the contents of the boxes as simple as the equivalent of "put the result of adding together these two boxes into this third box", or lengthy mathematical statements containing functions such as sine, logarithms, pi and so on.

Inter-Sheet comes on two ROMs, the first containing the spreadsheet, the second containing link facilities — more about these in a minute.

Included also are introductory and reference manuals, a quick reference card, chip-fitting instructions and a function key strip.

The package operates via a main menu from which you can access

Calculating comparisons

KATHERINE CRANFORD reviews the latest spreadsheet for the BBC Micro

external options such as spooling or printer commands. The Escape key switches you between worksheet and menu modes.

Worksheet formatting, such as box editing, justification, insertion or deletion of rows and columns and so on are all done using the function keys.

Other options are carried out using a slash command, such as /C for Copy. And all BBC star commands are accessible from the main menu.

One of the crucial aspects of a spreadsheet is the extent of its replication facility. This is one of Inter-Sheet's fortes, particularly the facility to copy in two dimensions. This is the ability to copy the contents — formulae, numbers or text — of a block of boxes to another block in the worksheet.

The program automatically assumes relative references are required, which means box references are appropriately

adjusted rather than retaining a static reference to the original box.

This, depending on what you're doing, can be a real bonus. But if it ain't what you want you have to spell the instruction out in each formula.

Still, you can't have your cake and eat it, I suppose.

As for speed, if that's what you're interested in, Inter is probably the fastest spreadsheet for the BBC Micro, and in fact as fast as anything available for bigger machines. But, there again, the slowest of the three packages tested for comparison purposes has a few nice extras not implemented on Inter — see Figures I to III.

Among the features Inter provides are all the usual mathematical functions, PI, LN, LOG, RAD, SQR, and so on. Similarly you'll find the standard SUM, IF, MAXIMUM, MINIMUM, plus

	Inter-Sheet	Ultracalc 2	Viewsheet
Price	£56.35	£79.50	£59.80
Published by	Computer Concepts	BBC Publications	Acornsoft
Worksheet size	256 × 64	256 × 63	256 × 256
Usable with 2nd processor	No (Yes, if disc-based)	Yes	Yes
Notable features	Excellent communications facilities. 2-dimensional replication. Very fast replication and re-calculation. Multiple sheets in memory possible. Linked program Inter-Graph available for producing graphs from worksheet data.	2-dimensional replication. Price (it's more!). Label values and wildcards. Command macros, Additional functions e.g. NPV, HTN(x), and LOOKUP repeat. Additional formatting commands, including inter-column gap, and individual box colouring, e.g. all minus figures can be red	Size. Primitive bar charts and windows possible. Serious limitation: replication can only be done by row or by column.

Figure 1: Major features and notable differences between Inter-Sheet and its ROM based rivals

	Inter-Sheet	Ultracalc 2	Viewsheet
Comms./links	Yes*	Yes	Yes
2-dimensional replication	Yes*	Yes*	No
Multiple sheets in memory	Yes*	No	No
All standard editing/formatting facilities	Yes	Yes	Yes
Extra editing/formatting features	No	Yes*	No
All standard (maths etc.) functions	Yes	Yes	Yes
Extra functions, (e.g. NPV)	No	Yes*	No
"Windowing"/fixing parts of the screen	Yes	Yes	Yes
Protection of boxes	Yes	Yes	Yes
System star commands	Yes	Yes	Yes
Documentation	Overall good	Pompous, but has excellent worked examples	Comprehensive

Figure 11: At-a-glance table of features. An asterisk indicates a particularly good implementation of the facility

From Page 131

LOOKUP, which returns 1 or 0 depending on whether a value is found in a range.

The package has not been specifically configured for financial applications, however. There are no functions which take care of percentage calculations, net present value (NPV), and the like.

And while it is relatively straightforward to concoct your own formulae for these, I suspect that most users would rather have them ready made. There is also no MOVE command, so this has to be done the long-winded way, copying, then deleting the old boxes.

Other options include the facility to change the worksheet colours – back and foreground, but not that of individual boxes – and to swap between three different modes, 40, 80 or 105 columns, from within the worksheet. The amount of memory available for your worksheet does drop dramatically in 105 column mode.

Printer codes can be set up from a submenu, with no need to resort to *FX commands. And the whole, or just parts, of the worksheet can be printed out either as data or as formulae.

Parameters such as the mode you are currently using, column widths, cursor

position and so on are saved along with the worksheet. A LOCK command allows rows, columns or individual boxes to be protected against accidental erasure or alteration.

There is no windowing facility as such, but the Hold option makes a very acceptable alternative, allowing the user to fix a part or parts of the screen in a very straightforward way. A minor but useful addition would have been a top-of-page header/titles facility.

Boxes containing text and those containing numeric data can be freely mixed, and text boxes are allowed to come within the scope of formulae without interfering with the end results.

Likewise, if boxes or rows are deleted, where a formula elsewhere in the spreadsheet has a reference to the deleted boxes, this does not upset the beast as long as the deleted boxes are above, not below, the formulae.

But where Inter scores supremely is on the communications side. With the basic ROM you can Export and Import or spool data, either as formulae or results, all from the main menu. (You would use Export rather than spooling to an Ascii file where you intended the file to be used by another ROM Link package.)

This makes for immensely easy data

transfer between packages or machines – essential for the serious user – without being plagued by such things as the niceties of floating point number reversed bytes. Conversely, so long as you follow a few simple rules, using a worksheet prepared under another package becomes possible.

The other ROM that comes with the package provides a number of additional facilities, but principally the ability to have up to 16 worksheets in memory at any one time and to talk directly to other ROM Link packages.

While keeping track of 16 worksheets simultaneously may not be your idea of fun, these facilities clearly can be a very useful shortcut for swapping chunks of figures around between, say, just two or three worksheets.

Both ROMs are therefore required to use the package to the full, and you really need either a sideways RAM or ROM board if you don't want to keep your keyboard permanently unscrewed and sponge and chip tweezers constantly on hand.

But if you can only make room for the basic spreadsheet ROM this is more than adequate for most purposes.

The package is not designed for use with a second 6502 processor, but a disc version is available – for an extra £5 –

	Inter-Sheet	Ultracalc 2	Viewsheet
Speed (i) Re-calculation (inc. screen refresh):	1.4	3.5	2.4
(ii) 2-dimensional replication:	5.9	80.1	N/A (Can only be done by row or column)

Carried out on a 24 x 24 matrix containing formulae for creating "times tables". Speeds were constant whether the table was a 1, 13 or 240 times table. 40 col/Mode 7. Time in seconds.

Figure III: Benchmarks

relocated on the 6502 which allows up to 42k storage, although the ROM must still be present and it excludes use of the ROM Link.

The documentation is slim, but nice. The introductory booklet in particular is readable and clear, with plenty of gentle advice for the novice spreadsheet user.

One big criticism however is that there are no worked examples. It is also just slightly less than comprehensive,

for instance with regard to the error messages section, but then I've never yet come across any documentation that covered every eventuality.

A real breakthrough would be a spreadsheet for the BBC Micro that allowed you to perform database-type functions on your worksheet such as SELECTing. The next best thing would be a complementary companion program for doing this. With Inter-Sheet

the foundations for it seem to have been laid. One companion package already available is Inter-Graph, intended to produce charts and graphs from Inter-Sheet data. And when Inter-Base, the database, sees the light of day the suite will really come into its own.

As it stands it's a solid, friendly spreadsheet, incorporating a sophisticated link/communications facility at a goodish price, £56.35

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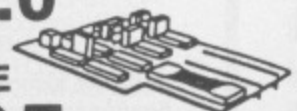
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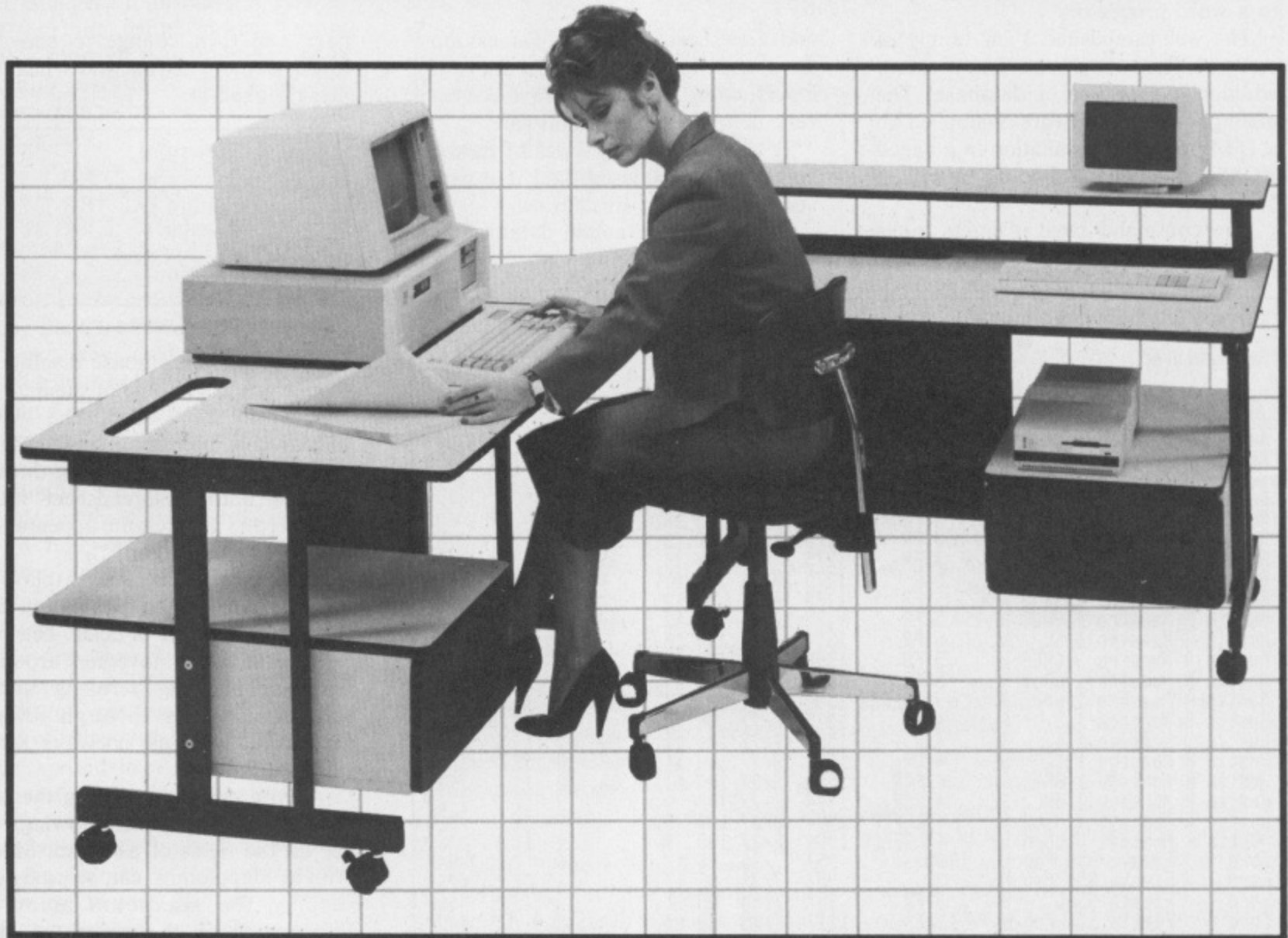
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VIEWSTO

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This makes learning each program easier and it is less likely that mistakes will be made. Also you'll be able to transfer data from one program to another, for example from a spreadsheet to a word processor.

The well-established View family of software from Acornsoft has a recent addition, ViewStore, a database. The main part of the software is supplied on a 16k eeprom for installation in a paged ROM socket. It is called up by typing *STORE.

The command page it enters looks very like those of its close relatives View

JIM NOTMAN welcomes a happy addition to the View family

and Viewsheet. Fortunately an example database is supplied as an easy introduction to what at first seems a very complex piece of software.

It also gives many ideas of how the software can be used, and is a useful starting point for this review.

To load the example database you enter LOAD CARS. The top of the

page will then change to show how much memory is free and which file is being looked at.

```
Viewstore
Bytes free 23580
Editing D.CARS
Format F.CARS
Screen Mode 7
=>
```

Figure 1: Command page

To enter the database display press the Escape key. Some of the data from CARS will be loaded. The way it's displayed is interesting, appearing very much as if you were looking through a window onto a spreadsheet with its typical rows and column appearance, as you'll see from Figure II.

Each horizontal line displays one record of the file and within each record there are a number of fields. The cursor keys permit easy movement around the database allowing scrolling upwards and downwards through different records as well as sideways through different fields.

As you reach the edge of the screen the window moves over allowing you to see all the fields of a record. Mode 0, with its 80 columns, can be used here to display the maximum amount of information on the screen, as only a small part of the database needs to be loaded into memory at any time.

L Space 20 Indexed by entry
New cars: Specification and price

Manufacturer	Model	Typ	Drs	Extras	Cap	Boot	Sp	Acc	Mpg	SI	Tank	Price
Austin R	Mini City E	S	2		998	5	82	17.2	40	12	7.5	3298
Austin R	Mini Mayfair	S	2	R	998	5	82	17.2	40	12	7.5	3883
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Austin R	Metro City X	H	3		998	7/46	88	16.5	39	12	7.8	4041
Austin R	Metro 1.0L	H	3	FR	998	7/46	88	16.5	39	12	7.8	4429
Austin R	Metro 1.0HLE	H	3	FR	998	7/46	85	18.6	39	12	7.8	4699
Austin R	Metro 1.3L	H	3	FR	1275	7/46	97	13.0	36	12	7.8	4669
Austin R	Metro 1.3Auto	H	3	FR	1275	7/46	91	16.1	33	12	7.8	5429
Austin R	Maestro 1.3	H	5	R	1275	10/21	97	12.0		12	11.9	4899
Austin R	Maestro 1.3L	H	5	FR	1275	10/21	96	12.5		12	11.9	5419
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Austin R	Maestro 1.6Aut	H	5	FR	1598	10/21	98	13.6		12	11.9	6498
Austin R	Maestro 1.6UP	H	5	LSEFCR	1598	10/21	103	11.9	31	12	11.9	6995
Austin R	Montego 1.3	S	4	R	1275	18/27	96	13.0		12	11.7	5469
Austin R	Montego 1.6	S	4	R	1598	18/27	106	11.1	30	12	11.7	5864
Austin R	Montego 1.6L	S	4	CR	1598	18/27	106	11.1	30	12	11.7	6394
Austin R	Montego 1.6HL	S	4	FCR	1598	18/27	106	11.1	30	12	11.7	7119
Austin R	Montego 2.0HL	S	4	FCR	1994	18/27	108	9.8		12	11.7	7465
Austin R	Montego 2.0HLS	S	4	LEFCR	1994	18/27	108	9.8		12	11.7	7885
Austin R	Montego Vanden	S	4	LSEFCR	1994	18/27	108	9.8		12	11.7	8569
Ford	Fiesta 950 Pop	H	3		957	7/35	85	17.0		6	7.5	3847
Ford	Fiesta 950 Pop	H	3		957	7/35	85	17.0		6	7.5	4268
Ford	Fiesta 950L	H	3	FR	957	7/35	85	17.0		6	7.5	4668
Ford	Fiesta 1.1 Pop	H	3		1117	7/35	88	14.9		6	7.5	4490
Ford	Fiesta 1.1L	H	3	FR	1117	7/35	88	14.9		6	7.5	4890

Figure 2: Spreadsheet display

L Space 1519						L Space 1519					
Decimal places						Record format					
Field name	Mid	T	S	D	Low limit..High limit	I	Key	Index name	Prompt		
Manufacturer	8	a	y				R	2 MANUF			
Model	14	a	y				R	5 MODEL			
Type	3									S=Saloon, E=Estate, H=Hatchback, C=Coupe, O=Open	
Drs	3	n								Number of doors	
Extras	6									B=Rear belts, C=Cassette, E=Elec wind, L=Cent Lock, R=Radio, T r	
Cap	4	n			500 7000					Engine capacity in cc	
Boot	5	a								Boot capacity in cubic feet (second figure if given is wat f	
Sp	3	n					y	3 SPEED		Top speed in mph	
Acc	4	n								Acceleration: time for 0-60mph in seconds	
Mpg	3	n					y	3 Mpg		Fuel consumption in miles per gallon, measured in 'What tests	
SI	3	n								Service interval, in thousands of miles	
Tank	5	n								Fuel tank capacity in gallons	
Price	5	n					y	5 Price		List price in £	
At	8	d								Date of price list from which price taken	
Stock	0	n								Quantity of model in stock	

Figure 4: Record format spreadsheet

MORE

The active field – that is the one you're editing – is shown by reverse video in Modes 0 to 6. As the cursor moves between fields the third line of the screen changes. It displays a prompt which you can define in the Record format – more of which anon. This is especially useful if much of the information is to be coded to minimise storage space.

This spreadsheet method of display allows a large amount of information to be displayed in a very small area. A field may contain more information than is displayed on the spreadsheet. Moving the cursor to the appropriate field, then pressing the Ctrl key and the right and left cursor keys, will allow scrolling within the field. In Figure II for example, the active field shows *Austin R* but scrolling this field will show that the *R* is followed by the letters *over*.

A number of different options are available by pressing different function keys. A function key strip containing the commands is provided.

If you find a spreadsheet display too confusing, you can press the change display function key to reveal the alternative card display shown in Figure III. As you can see, this is far more typical of other database displays.

The spreadsheet formats can be examined at any time simply by pressing the relevant function keys. In a wheels-within-wheels manner you determine the format of the spreadsheet display by making use of a record format spreadsheet as shown in Figure IV. This controller is actually three 80 column screens and as you can see these

L Space 20 Indexed by entry
New cars: Specification and price

Manufacturer
Manufacturer **Austin R**
Model Mini City E
Type S
Drs 2
Extras
Cap 998 SI 12
Boot 5 Tank 7.5
Sp 82 Price 3298
Acc 17.2 At 3.9.84
Mpg 40 Stock

Manufacturer Austin R
Model Mini Mayfair
Type S
Drs 2
Extras R
Cap 998 SI 12
Boot 5 Tank 7.5
Sp 82 Price 3883
Acc 17.2 At 3.9.84
Mpg 40 Stock

Figure III: Alternative card display

contain a large amount of information. As with the main spreadsheet a prompt is always displayed on the third line of the screen giving any relevant information.

Each field is given a name to be printed at the top of the spreadsheet you're designing. The width of each field is given, even 0 if the field is not to be displayed and the data type specified as numeric, alphanumeric, date and so on. If decimal numbers are to be used, the number of decimal places can also be specified.

A valuable aid to input error checking is the ability to give maximum and minimum values, or a list of the only values acceptable, for all types of variables.

Indexes can be defined. These are extra files which enable you to find data more quickly. For instance, you could keep an index of the model name of the cars in their alphabetical order.

The key field shows that only the first five letters of the field are stored in the index file for this purpose. Once the main record format card is designed the card layout (Figure V) can be planned.

When a database is newly defined all the field names and the length of their screen input is placed in a continuous stream at the top of the screen. To place the field names where you want them simply move the cursor over the field name, press the Copy key then move the cursor to where the field name should go and press the Copy key again.

The database header (Figure VI) controls other functions. A title can be defined for the top of the input sheets. Display refers to whether the database should first go to the spreadsheet or card display.

Record size dictates how much space on disc should be made available for each record. This can be done in two ways, either making each record a fixed length or saving some extra space as well as that used when the record is first typed in.

Capacity refers to the number of records to be held in memory. This will

L Space 1519

Record format

Value list

Value list.....

S,E,H,C,O

o, f= seat, S=Sunr f

(without folded)

at Car seats

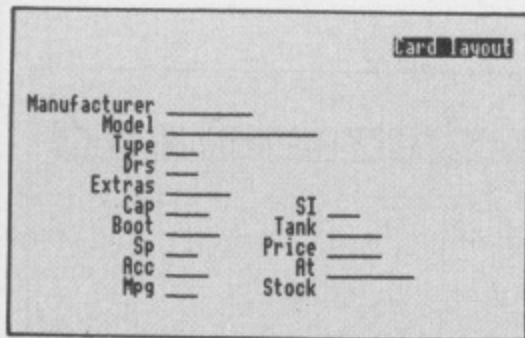


Figure V: Planning a card layout

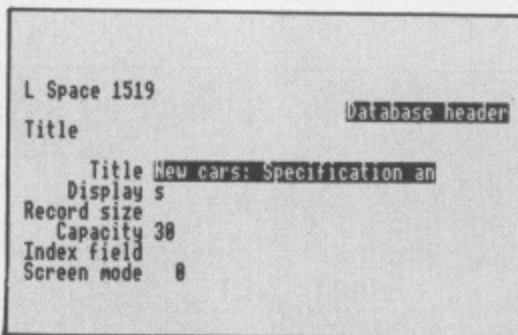


Figure VI: Database header

From Page 137

depend on the size of individual records and the amount of free space.

The order the records are displayed in will depend on the index field. If none is specified the input order is the default. The screen mode for display of the data is the last piece of information.

A major limitation on many of the other databases I've seen for the BBC Micro is that not only can they be awkward to set up but that it is difficult, if not impossible, to change the format once it has been defined.

Not here! The database format can be easily changed at any time. Commands for saving and loading the format files separately make it possible to have a number of different format files for each database.

Not all the software is on eprom. A number of utilities are supplied on the demonstration disc, all called from the command page of ViewStore.

They are:

SORT allows for complex sorting of particular values in one field, or range of values, or logical comparisons over a number of fields. For example, selecting a car from a particular manufacturer with a top speed over 100 mph OR a price less than £6,000 AND a petrol consumption better than 38 mpg. The results can be displayed on screen or printer. This can take some time especially with a large database and complex sort.

SETUP sets up the database.

SELECT writes selected records to a new file.

REPORT produces listings of the database. A pre-defined format file may control this. This utility is able to use simple arithmetic on the numerical fields. For example adding up all the price fields to give a total value.

MACRO produces text macros for use in View.

LINK extracts numbers from the database to place into a file that can be used by Viewsheet.

LABEL prints labels using the data. This is especially handy for name and

address databases.

INDEX creates new index files.

CONVERT can select and sort records to be included in a new database.

These utilities can be programmed using EXEC files. This is very useful if sorts and reports are to be repeated often.

Only one complaint here. There are a different number of responses depending on whether data is to be viewed on the screen or sent to the printer. I found it helpful to set *FX5,0 as printer "drain" to stop wasting paper before enabling the printer with *FX5,1 or *FX5,2 when I had sorted out the details to my own satisfaction. Figure

1 Jan 1985		Page 1	
Model	Stock	Selling price	Value (exc VAT)
Mini City E	2	3298	5736
Metro City	3	3659	9545
Metro 1.0HLE	2	4699	8172
Maestro 1.6HLS	3	6049	15780
Montego Vanden	4	8569	29805
Maestro 1.6Aut	1	6498	5650
Montego 2.0HLS	2	7885	13713
Montego 2.0HL	3	7465	19474
Montego 1.6HL	1	7119	6190
Montego 1.6L	2	6394	11120
Montego 1.3	6	5469	28534
Metro 1.3Auto	1	5429	4721
Maestro 1.6VP	2	6995	12165
Metro City X	1	4041	3514
Maestro 1.3L	2	5419	9424
Maestro 1.3	5	4899	21300
Vehicles: 40		Value:	204844
Fiesta 1.1L	2	4890	8504
Fiesta 950 Pop	1	3847	3345
Fiesta 1.1 Pop	2	4490	7809
Fiesta 950L	3	4668	12177
Vehicles: 8		Value:	31836
Total vehicles: 48		Total value:	236680
Average value/model:		11834	
Average value/vehicle:		4931	

Figure VII: Example printout

VII shows an example printout using SELECT and REPORT.

IMPORT is a Basic program designed to enable data from other databases to be converted into a ViewStore format file.

ViewStore is not necessarily the fastest database. To be able to find records quickly it is dependent on index files. The more that are open the faster it is to find that particular field, but as each index will need to be updated with every record input the response time is slowed. It is possible to add extra index fields after the records have been input.

As it is not possible to implement this sort of database on cassette the ease of use and the capacity of the database are dependent on the DFS (or Econet) and amount of disc storage available.

With a 40 track single sided disc unit you'll be very much more limited than if you have a double sided 80 track disc drive. If you can manage to afford a Winchester hard disc you'll have nothing to worry about.

If you only have the 0.90 DFS then I'd upgrade to the 1.20 DFS (part of the DNFS) as it's up to twice as fast. The ADFS on a Winchester is that much faster again. ViewStore is not just compatible with the 6502 second processor but is also speeded up by it.

Dire warnings appear in the documentation about pressing the Break key while in the display mode. They should be heeded as it is all too easy to corrupt the database. This is a major area of vulnerability.

At least it teaches you good database management technique - always ensuring that there is at least one backup copy! It's a pity a utility was not provided to try to recover from these problems.

The 122 page manual is well written and in conjunction with the example files makes the package easy to learn.

No matter what you read in the media about the BBC Micro, as long as high quality pieces of software like this continue to be written for it, it is far from dead.

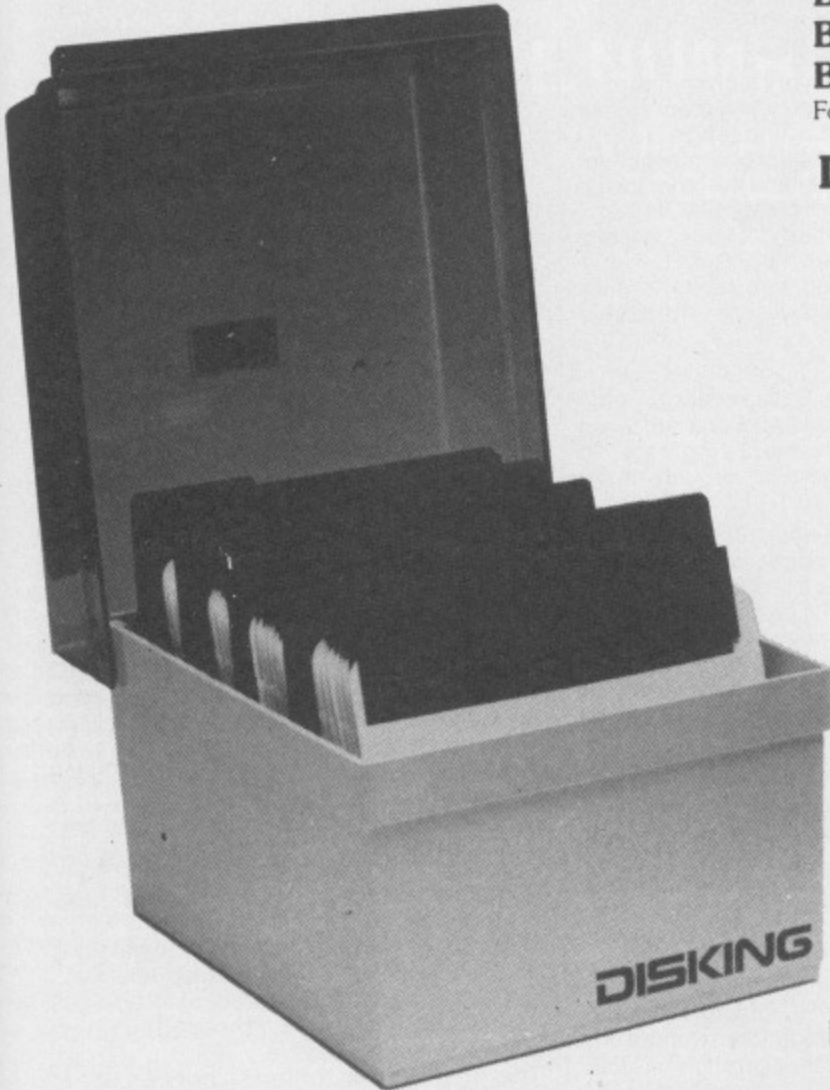
VIEWSTORE is now available with the rest of the View family - View and Viewsheet - at a specially reduced price direct from The Micro User.

Full details of this special offer are given on Page 191.

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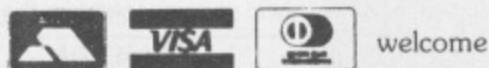
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- ★ TRANSFER—Records from one file to another.
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- ★ INVOICE COMMENTS
- ★ ACCOUNT HOLDERS details inserted automatically
- ★ MAILING LIST generated automatically
- ★ LEDGER SHEET printed automatically
- ★ VAT sales returns prepared
- ★ TRANSACTION FILE generated
- ★ Beta-Base compatible

This program was written for our own use and is used to prepare hundreds of invoices per week. It has no unnecessary questions or keys to press and extensive but easy edit options, we have made life as easy as possible for ourselves so why not take advantage of our efforts.

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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?

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BROM

21

EXTRA COMMANDS

THE NUMBER ONE

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BROM  £34.50 ^{40 80.} _{3"} £27.50

BROM is the first toolkit ROM to provide 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.

Closely related to the EDITOR is the EXTENDED ERROR HANDLING which will trap errors in a program and enter the EDITOR at the line generating the error, not only that but it will also position the cursor as near to the statement causing the error as possible, no more wading through multi statement lines trying to identify the error.

Commands unique to BROM are:

ROMON & ROMOFF which enable you to turn on/off sideways ROMs so that they stay off even after CTRL/BREAK, very useful for avoiding clashes especially for users with second processors. This also works with the DFS and reverts to PAGE & EOO 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.

Another group of commands provide FIND and 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 genuinely 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 On-Screen BASIC Editor I have ever used; it is far superior to BEEBUG softs Toolkit."



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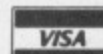
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FOLLOWING the article I wrote about interfacing stepping motors — *Body Building*, May 1984 — I have had many requests to follow it up with one about the technique of controlling small DC motors. So here we go.

If you take a look at the date on the cover you will see that Christmas is on its way. The high street stores will be planning their animated models of Dickensian characters for Santa's grotto. These models need controlling as well as making and a computer is the ideal device to generate complex and changing sequences.

The great advantage of stepping motors is the fine and precise control which can be achieved with a computer. However this is not without cost. The main disadvantage of stepping motors is the low speed and limited torque of the cheaper motors. I know you can get high-speed, powerful stepping motors, but these do tend to be heavy and expensive.

DC motors on the other hand offer a good "power to weight" ratio and are reasonably priced. They come in many different sizes and there should be one to suit any application you have in mind.

As the running speed of DC motors is too fast for many applications, a wide range of gear boxes is available which can be used to tailor the speed. These gear boxes can either be bolted on or may be integral to the motor housing. The main advantage of using a gear box to reduce the speed is that the torque of the motor increases as the speed is reduced. Another means of controlling speed is to use electronics, as we shall see later.

In essence, controlling a motor with a computer is no different from controlling any other binary device. You need a

Power up Santa's grotto with a stepping motor

logic output which will switch a motor.

We looked at control in the *Body Building*, August 1983 article and saw how we could switch a device on and off with software. To recap briefly, one line of the user port is used and is manipulated by software. To avoid changing the state of any other user port line we use the logic operators AND (to

our line we use:

$\&FE60 = \&FE60 \text{ AND } \&F7$

For a more detailed explanation of what is going on please refer to the earlier article.

The circuit in Figure I shows the simplest control arrangement. When the user port line is high, current flows through the base of the transistor, turning it on and starting the motor. As the transistor is current driven, the motor supply is not limited to the 5 volts of the computer supply.

The majority of motors run off 12 volts and this is easily handled with most transistors. Note however that the zero volt line of the motor supply and the zero volt (or earth) line of the computer have to be connected together or "commoned". This is something that beginners often neglect to do.

The only other component is the diode which is there to soak up any back EMF. As the motor is inductive a reverse voltage (or back EMF) is generated every time it is turned off, the

By MIKE COOK

clear a line to logic 0) and OR (to set it to logic 1).

For example, suppose the line we wished to change was line 3, we would write one in the third bit of a byte (8 bits) in order to create a mask. (Remember that the lowest bit is labelled zero.) The mask to set that bit is therefore $\&0B$. So to turn a device on simply execute:

$\&FE60 = \&FE60 \text{ OR } \&0B$

To clear the line the mask needs to be inverted. That is, we must write a 0 in the line bit position and ones everywhere else. Thus the mask is $\&F7$, so to clear

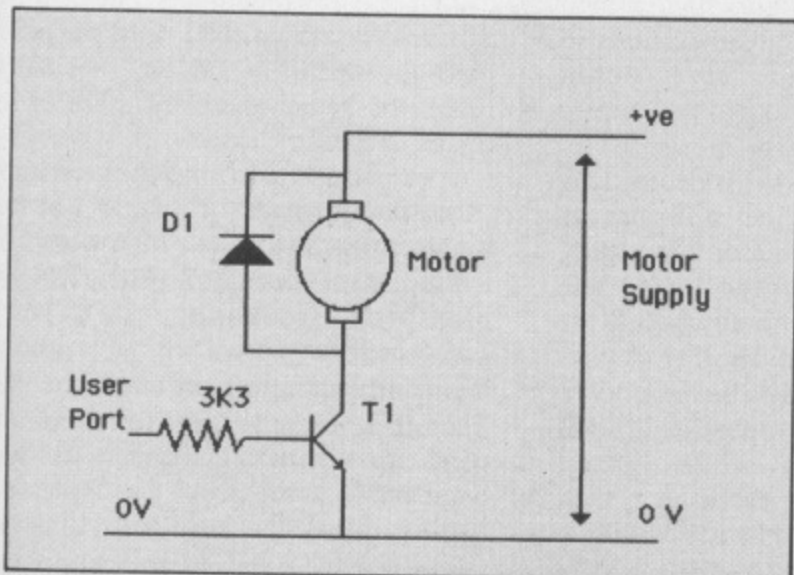


Figure I: The simplest control arrangement

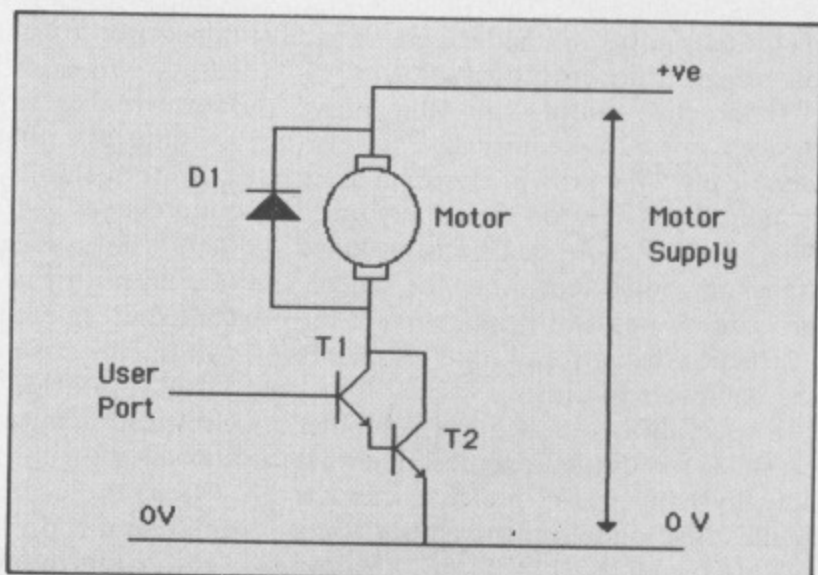


Figure II: Using a Darlington driver

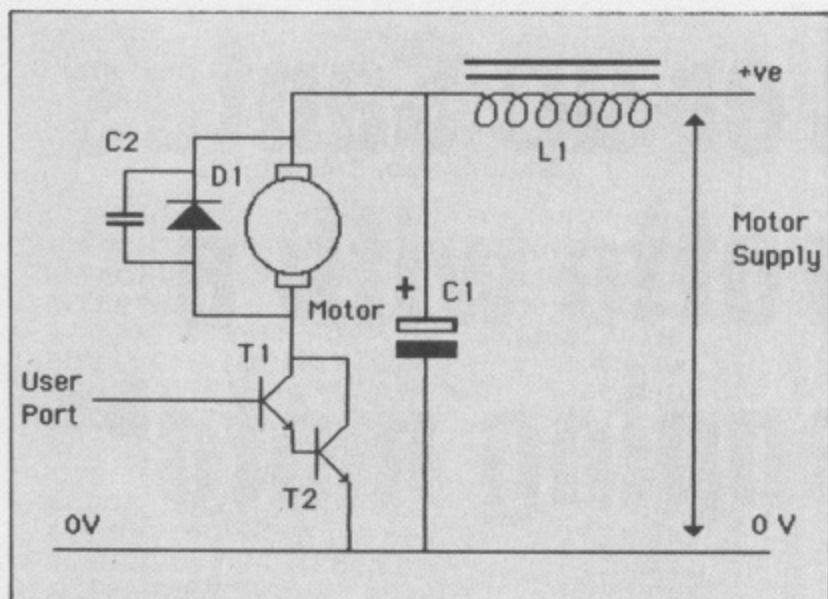


Figure III: Suppressing supply spikes

From Page 143

diode conducts and shorts out this voltage to prevent it doing any harm.

Well if it were as simple as that there would be no need for an entire article about it.

The first complication comes with the fact that power transistors do not usually have a high gain. This can be solved by using two transistors in a Darlington driver or super alpha pair as shown in Figure II. This arrangement of connecting two transistors essentially leaves you with a three terminal device which can be treated like a transistor, except that the gain is the product of the two individual transistors. As alpha was the name originally given to a transistor's gain, we get super alpha pair as a name.

If you make T1 a low current high gain transistor and T2 a power transistor you can switch larger loads. Note that you can also dispense with the resistor, as the two base junctions drop about 1.4 volts across them and the VIA on the user port can stand having a logic one dragged down to this voltage.

In practice motors are often noisy devices, not only acoustically but also electrically. One form of electrical noise is induction spikes on the supply lines. The effect of these can be to produce transitory logic ones on the micro-processor's bus and hence corrupt the instruction being received. This causes the computer to crash.

I have always thought "a computer crash" is too dramatic to describe what actually happens - I prefer to call it a "sulk". The only known remedy for a sulking computer is the Break key and

most likely it will sulk again when the motor is switched on. The solution is to isolate the supply to the motor from that to the computer and try to suppress the noise.

Figure III shows the standard method of supply suppression. C1 is a large electrolytic capacitor used to smooth out supply variations. C2 is a small ceramic capacitor to short out high frequency noise from the motor and L1 is a choke.

A choke is simply an inductor which can be made by winding a length of wire round a resistor. Inductors have a high impedance to high frequency signals so rapid spikes do not get through. However they have a low impedance to DC and pass that to the motor.

With certain noisy motors this suppression will not be sufficient as there is always that common connection of the earth line between motor and computer. In order to totally isolate the two supplies we need another device. Total isolation may be achieved electrically with an opto-isolator as shown in Figure IV.

Here the computer turns on a light emitting diode which is coupled with a light sensitive transistor. As light is

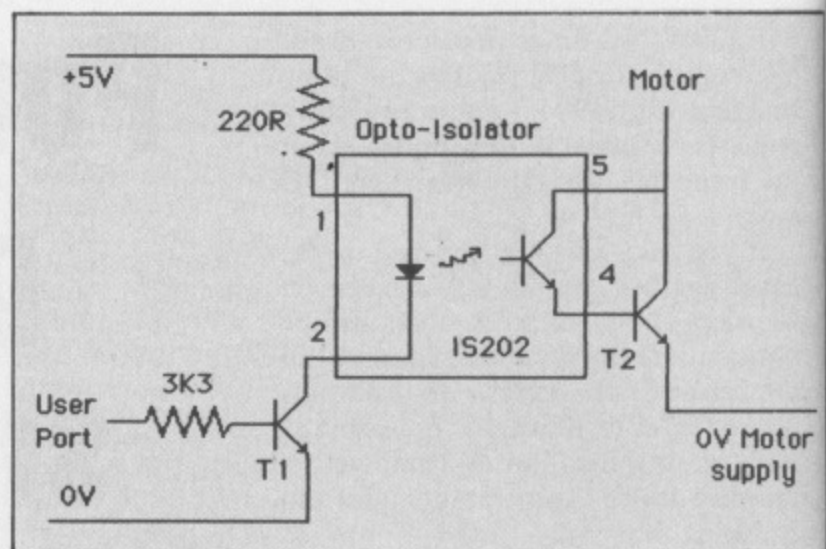


Figure IV: Isolating the circuit

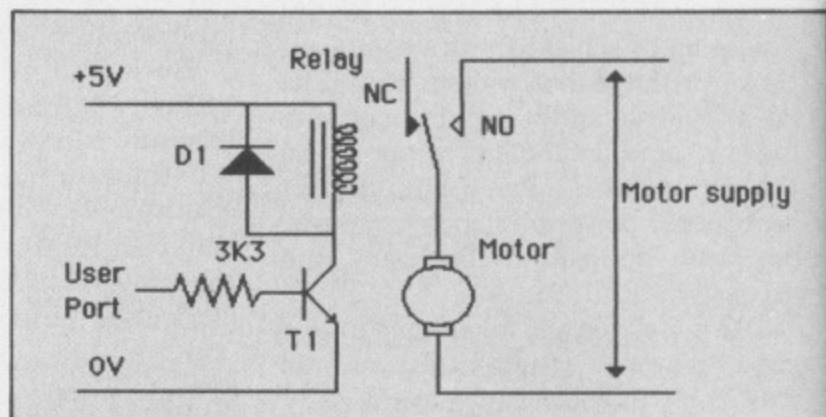


Figure V: Isolation via a relay

making the connection, the need for a common earth between the motor and computer is eliminated.

There are opto-isolators which can be driven directly from the output of the user port but they are quite expensive and so the best arrangement is to use a driving transistor as illustrated.

Another way to isolate the motor is by using a mechanical relay as shown in Figure V. D1 is required to soak up the back EMF of the relay coil which can be driven from the 5 volt supply available from the user port socket. A relay will usually have two contacts, one of which is normally closed (NC) and the other, normally open (NO). Here "normally" refers to the un-energised state of the relay.

It can be useful to have these contacts as we can arrange for a logic 1 or 0 at the user port to turn our motor on. This is important because, whenever you press the Break key, the VIA is initialised so that all its lines become inputs and all inputs act like logic ones. Therefore, if you arrange for a motor to come on with a logic one it will also come on when the Break key is pressed.

Now relays can have more than one set of contacts and we can use a two

pole (two sets of contacts) to make the motor change direction. All you need do to make a motor reverse is to reverse the direction of current flowing through it. This is shown in Figure VI. Note that the motor will always be on but you can control this with another relay.

Figure VII shows two single pole relays which control both the direction and state of the motor. This circuit has a great advantage which is not immediately apparent: If the two relays are in the same state, the motor is, in effect, shorted out. This produces regenerative braking when the motor is turned off.

You see, when a running motor is turned off, it does not immediately stop: the inertia in the motor keeps it spinning. A spinning motor acts as a generator and starts to produce electricity, but this electricity is of the opposite polarity needed to drive the motor in its original direction. So, if we feed the electricity generated by the motor back into the motor, it will try and drive it in the opposite direction. The net result is that the motor stops very quickly. I think you can work out why the motor will not actually go backwards.

So the circuit in Figure VII not only provides directional control but also has a built-in regenerative brake.

What about controlling the speed of a motor? Well one technique is to vary the voltage supply. However, this doesn't give you very good control at low speeds. Computer control would be tricky because you would need a digital to analogue (D/A) converter and a high current amplifier. Not only that but you would eat up many lines on the user port for the D/A converter.

The electronic solution is to use a chopper! Consider Figure VIII. The waveform shown in A spends most of its time at zero volts and occasionally pulses up to 5 volts. Therefore, on average, there is not much drive in it. On the other hand waveform B spends most of its time at 5 volts and so there is a lot more power in it.

If these waveforms are used to drive a DC motor then the speed is proportional to the length of time the waveform spends at the positive supply. By changing the pulse width supplied to a motor we can change its speed. Note that the speed of the pulses is not important, only the length of time they spend high and low. (In fact the speed of the waveform must be faster than the

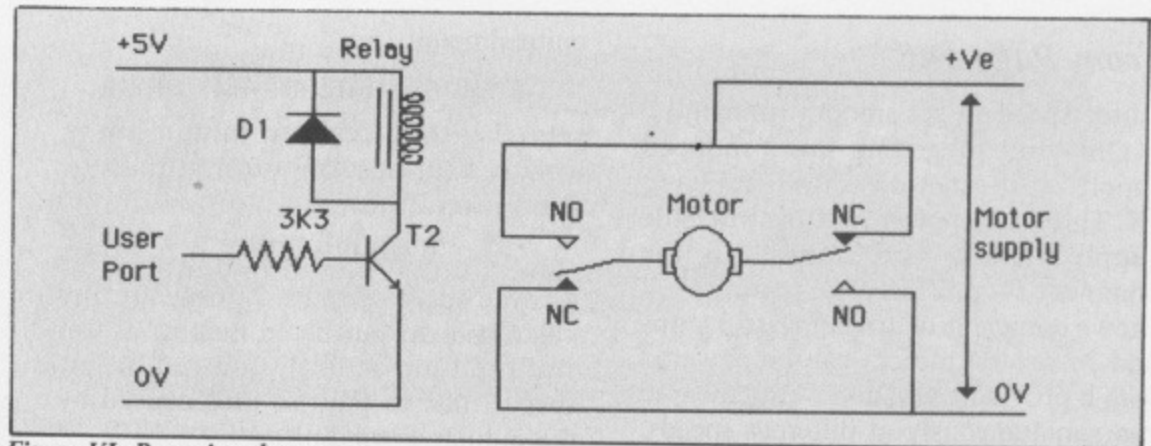


Figure VI: Reversing the motor

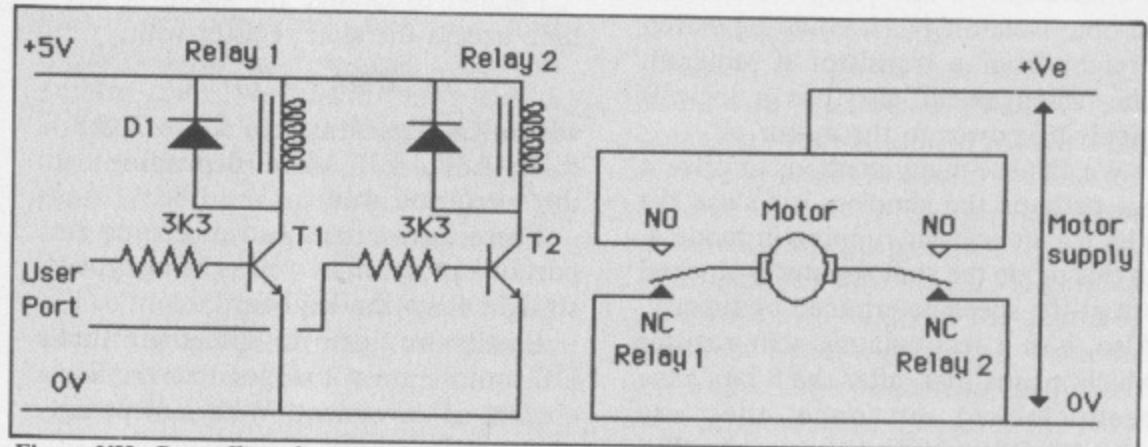


Figure VII: Controlling the state and direction of the motor

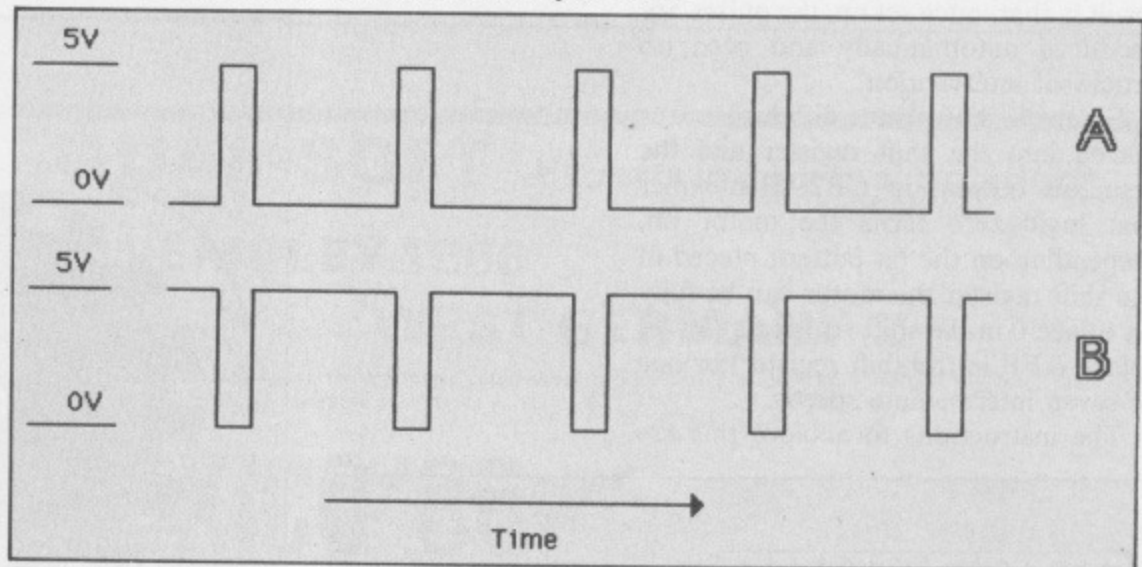


Figure VIII: Controlling speed by pulse width

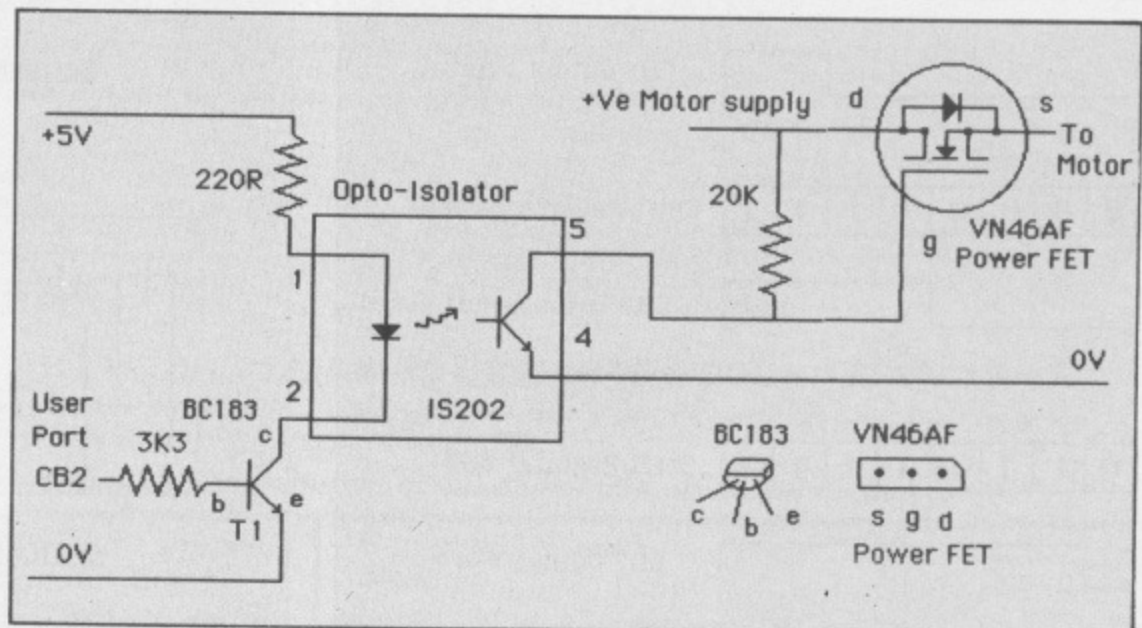


Figure IX: Creating a chopped power supply

rom Page 145

motor speed to get smooth running.)

One way of getting this "chopped apply" to the motor is shown in Figure X. This uses a power FET to switch the apply rapidly in response to the computer's control. The power FET shown is capable of driving up to 3 amps and so several motors can be powered with it providing you don't want them to run simultaneously at different speeds.

I have shown this being driven from an opto-isolator, but it could be driven straight from a transistor if required. This arrangement also has a logic 0 supplying power to the motor.

We can use many methods to drive it but perhaps the simplest is to use the VIA's shift register running in mode 4. In this mode the shift register is clocked out at the speed determined by timer 2. Also, it is a recirculating shift register which means that, after the 8 bits have been clocked out once, they are automatically clocked out again. The result is that, once set up, the pulses are produced automatically and need no processor intervention.

Figure X shows three different values placed into the shift register and the resultant output on CB2. Remember that logic zero turns the motor on. Depending on the bit pattern placed in the shift register the motor can be fully on (place 0 in the shift register) fully off (place &FF in the shift register) or one of seven intermediate speeds.

The instructions to achieve this are

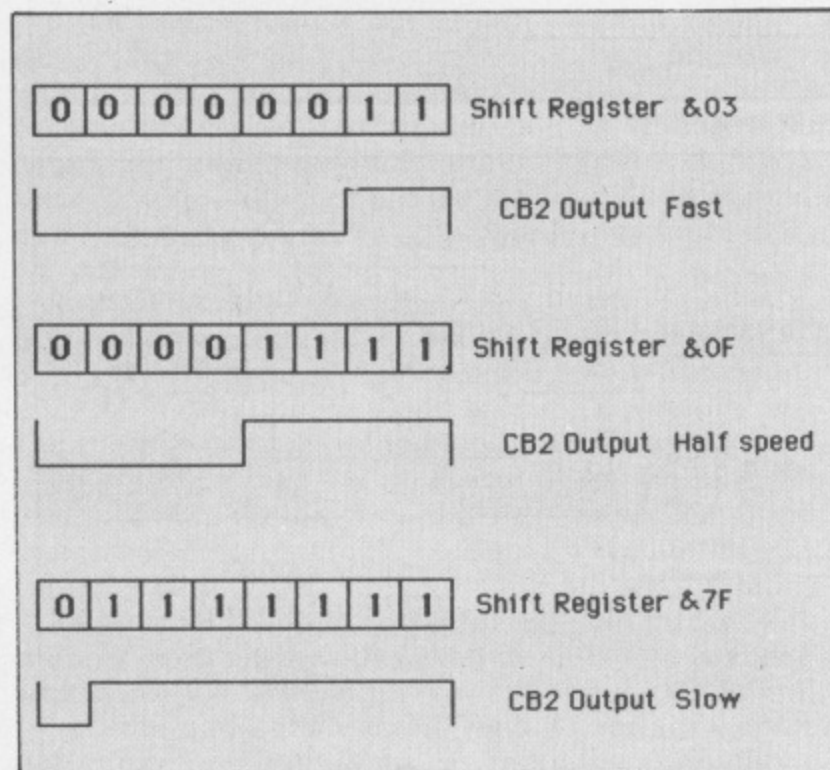


Figure X: The effects of the shift register on CB2

quite simple:

`?&FE6B = (?&FE6B AND &E3) OR &10`

sets the shift register into mode 4 without changing any other settings of the register. Then:

`?&FE68 = &7F`

sets the speed of timer 2. Virtually any value will do but if the number is too small the motor might not run at low speeds, due to the rise time caused by the inductive windings.

Finally, to change the speed at any time access the shift register with:

`?&FE6A = &XX`

where XX can be 0, &1, &3, &7, &F, &1F, &3F, &7F, &FF depending on the speed you want.

These instructions can of course be part of a program as well as being typed straight from the keyboard.

Finally we come to something that DC motors are not so good at: the fine control of movement. With a stepping motor it is simple, a fixed number of

pulses producing a precise amount of movement.

With a DC motor you can try to control it by turning it on for a fixed time and calibrating the movement, but this will not work very well. What you really need is some form of feedback. A sensor which tells the computer how far the motor has moved.

The technique used on the Edinburgh Turtle and other applications features in Figure XI. This shows an optical switch monitoring the movement with a slotted disc. The software has to count the pulses produced and that is a measure of how far the motor has turned. This is rather like a stepping motor in reverse.

Alternatively any model shop will have a range of model servo-motors which are a geared DC motor with a potentiometer attached to the shaft. This can be read by the analogue input port to feed-back the shaft position. They are designed to receive pulses from a controller but they can be easily opened and rewired so as to access the

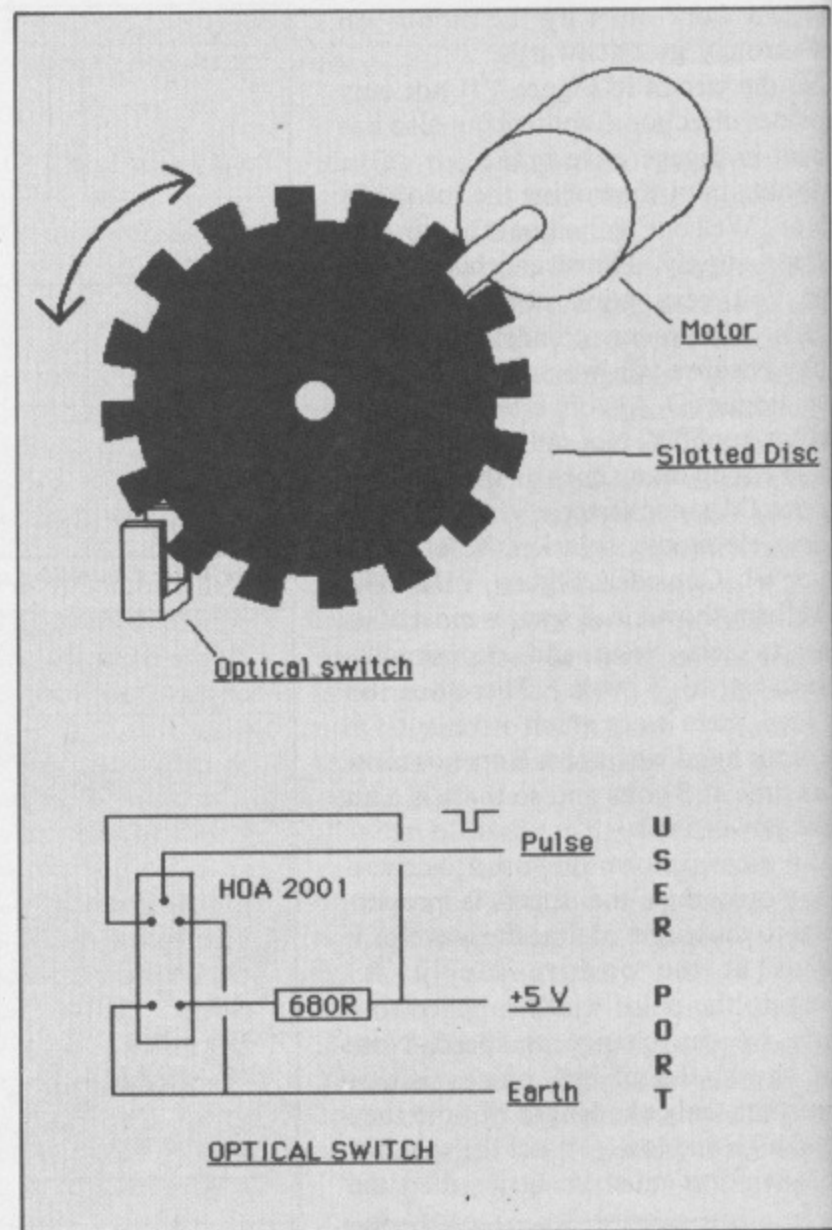


Figure XI: Monitoring movement via an optical switch

motor and feedback pot.

Most computer control will be of the step type. That is, the control algorithm will be *keep on going until you reach where you need to be*. This can produce overshoot and a condition known as hunting. There are many complex mathematical formulas describing the workings of feedback servo-mechanisms to get a correctly damped system. However you can approximate to these by arranging for the motor to slow down when it is close to its final position.

Well that's a brief tour of motor control. Let's look at what's on offer this month. As many people's requirements will be different, I have tried to offer as many different packages as possible. However please note that individual components cannot be supplied. For full prices see the order form on Page 174. The motors on offer all work off 12 volts and draw between 165 to 230 mA depending upon the loading.

The motors with separate gearboxes need the drive cog fitting on with super

'What you really need is some form of feedback'

glue. They are very quiet and start quickly. They have a basic torque of 5mNm (milli Newton meters) with a starting torque of 30mNm. (Remember the torque is increased with reducing gears.) The basic speed is 3,000 RPM and you can work out the gear ratio from this.

The motors with integral gear boxes also have a built-in spark suppressor and represent a good, general-purpose motor. The control packs have all the components necessary to build some of

the circuits shown here.

Finally, if you haven't already got them, you will need Pack 1 (the transition board) and Pack 2 (the connecting cable) to access the lines on the user port, or some cheaper equivalent arrangement.

So there you have it: All the parts to make your own buggy or the animated marvel of Santa's grotto or whatever you want. The possibilities are limited only by your own imagination. Now where have I heard that before?

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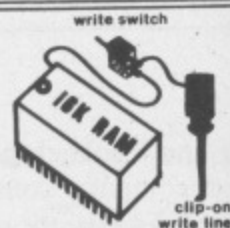
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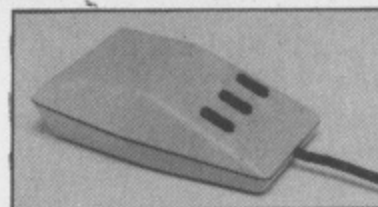
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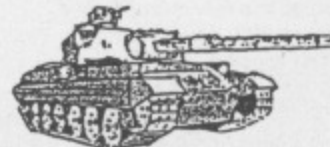


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HAVE you ever wanted to disable a paged ROM in your BBC Micro because one of its star commands exists in another ROM? Well here's a program that will allow you to do just that.

When an operating system command – prefixed with a star – is not recognised by the OS it is passed to the paged ROMs and then to the current filing system.

The command is first offered to the ROM in socket &F then to ROM &E, &D and so on. If no ROM recognises the command the OS passes it to the currently active filing system, such as the DFS.

If you have two ROMs which have the same command(s) – say in sockets &C and &2 – the one in socket &C will always be offered the command before ROM &2. This is because socket &C has the higher priority.

To get round this problem you can either remove the ROM or disable it.

This program allows you to deactivate any ROM and ensure, if you wish, that the ROM stays deactivated even after Break is pressed. You can, therefore, use any of the * commands available in ROM &2 without removing ROM &C. If you want to use the routines in ROM &C you can reactivate the ROM and it will accept commands as usual.

When the BBC Micro is turned on, and after Break, the OS checks each paged ROM socket and builds up a table of the ROMs present in locations &2A1 to &2B0. A zero in location &2A1 + N shows there is no ROM in socket N.

For instance, to turn off ROM &C all you have to do is put a zero in location &2A1 + &C (&2AD). If you now do a *HELP you will see that the ROM is no longer present.

To turn off ROM number N – where N is in the range 0 to &F – you must put zero in location &2A1 + N and press Break. The ROM will now return because the OS builds a new table.

This program allows you to put a

Now you see it, now you don't

Disable your paged ROM with this utility from RICHARD BEESTON

zero in locations &2A1 to &2B0 by pressing the keys 0 to 9 and A to F – corresponding to the ROM socket numbers. For instance, pressing C will toggle ROM &C on and off.

If a ROM is on when key N is pressed the program copies the value from location &2A1 + N to location &90 + N and then puts a zero in location &2A1 + N to disable it. Thereby the ROM is turned off and the ROM type is saved for putting the ROM back on again.

If the ROM is off the program copies the value from location &90 + N to location &2A1 + N and puts a zero in location &90 + N. Thereby the ROM is turned on again.

When you are satisfied with each ROMs status press Return. You will now be asked if the ROMs are to be reactivated on Break. If you press Y the ROMs you turned off are reactivated on Break. If you press N the ROMs that you turned off will not be reactivated on Break or even Ctrl+Break.

To reactivate the ROMs you can either turn your BBC Micro off and then on again, or you can re-run the program and toggle the ROMs back on again. Alternatively, you could disable the Break intercept routine with *FX 247,0, which puts a zero into location &287.

The Break intercept code is used to control the ROMs which are turned off when Break is pressed. Disabling the routine with *FX 247,0 allows the OS to generate the ROM table in its usual way.

The routine is assembled at &6FED, but is executed from location &7000. This is because of a short routine just

before the main section which is responsible for copying the Break intercept code to &A80.

Changing to any mode other than 7 will destroy the program at &7000. Once the relevant ROMs have been deactivated you won't need the routine, so it will be safe to use any screen mode.

You can relocate the code by changing the value of P% in line 140 to the address you require minus &13. Lines 2330 and 2340 should also be changed so that the correct start address is printed once the program is assembled.

If a DFS is present and you disable it Page will be set to &E00 when Break is pressed, thus changing your BBC Micro into a tape-based system.

It is interesting to see that many software houses have given their star commands prefixes to avoid clashes with other ROMs. But the problem is that they're all using Z for the prefix!

Disabler listing

```

10 REM Now you see it,
20 REM now you don't.
30 REM (c) The Micro User
40 REM
50 REM By R Beeston
60 REM
70 MODE7:PRINT'.....' Assembling .
.....
80 OSWRCH=&FFEE
90 OSBYTE=&FFF4
100 OSRDRM=&FFB9
110 OSNEWL=&FFE7
120 OSRDCH=&FFE0
130 FORXZ=0TO2STEP2
140 PZ=&6FED
150 COPTXZ
160 .START
170 LDA #&00
180 STA &39F
    
```

MEMORY USAGE

&90-&9F	Copy of the ROM table.
&F6	Address pointer into a paged ROM.
&287-&289	The Break intercept code which consists of a jump (JMP - &4C) followed by an address – low byte then high. This is called when the Break key is pressed.
&2A1-&2B0	OS paged ROM table.
&380-&383	Temporary workspace.
&A80-&AA0	Code executed on Break.

From Page 149

190	LDX #&00	730	INX	1260	JMP LOOP9	178
200 .LLOP	LDA BREAK,X	740	BNE LOOP12	1270 .INP2		179
210	STA &A00,X	750 .FFIN		1280	JSR OSRDCH	180
220	INX	760	LDX &383	1290	BCC OK4	181
230	CPX #EBREAK-BREAK	770	LDA #&00	1300	RTS	182
240	BNE LLOP	780	STA &F7	1310 .TITLEROM:]PROCstr (CHR\$&0F+CHR		183
250	RTS	790	LDA #&09	\$132+CHR\$157+CHR\$141+CHR\$131+"		184
260 .ROMS		800	STA &F6	Roms in your machine. "+CHR\$13		185
270 .OK1	LDA &39F	810 .LOOP7	STY &381	2+CHR\$157+CHR\$141+CHR\$131+" Rom		186
280	AND #1	820	JSR OSRDRM	s in your machine. "+CHR\$&0A+C		187
290	CMP #0	830	LDY &381	HR\$&0A+CHR\$&0A+CHR\$&0D+CHR\$&00):[OPT		188
300	BNE OK3	840	CMP #&0D	XZ		189
310	LDA #0	850	BEQ LAST	1320 .OK4		190
320	LDX #0	860	CMP #&00	1330	CMP #&0D	191
330 .LOOP10	STA &90,X	870	BEQ LAST	1340	BNE OK5	192
340	INX	880	CMP #31	1350	LDA #&00	193
350	CPX #&10	890	BCS OK13	1360	JMP YN	194
360	BNE LOOP10	900	LDA #&20	1370 .OK5		195
370 .OK3		910 .OK13		1380	CMP #48	196
380	LDX #&00	920	JSR OSWRCH	1390	BCS OK6	197
390 .LOOP5	LDA TITLEROM,X	930	INC &F6	1400	JMP INP2	198
400	BEQ OK2	940	JMP LOOP7	1410 .OK6	CMP #71	199
410	JSR OSWRCH	950 .LAST	JSR OSNEWL	1420	BCC OK7	200
420	INX	960	INC &380	1430	JMP INP2	201
430	BNE LOOP5	970	INX	1440 .OK7	CMP #58	202
440	RTS	980	INX	1450	BCC OK8	
450 .OK2	LDY #&00	990	LDA &380	1460	CMP #65	
460	LDX #&00	1000	CMP #71	1470	BCS OK9	
470	LDA #48	1010	BEQ INP	1480	JMP INP2	
480 .LOOP6	JSR OSWRCH	1020	CMP #58	1490 .OK8		
490	STA &380	1030	BEQ LOOP14	1500	SEC	
500	LDA #&20	1040	JMP LOOP6	1510	SBC #48	
510	JSR OSWRCH	1050 .LOOP14		1520 .STORE	TAX	
520	TYA	1060	LDA #65	1530	LDA &2A1,X	
530	TAX	1070	JMP LOOP6	1540	BEQ OK11	
540	LDA &90,X	1080 .SOCKETEMPTY:]PROCstr(" Soc		1550	STA &90,X	
550	BEQ NOROM2	ket empty."+CHR\$&0D+CHR\$&00):[OPT XZ		1560	LDA #&00	
560	STX &383	1090 .NOROM		1570	STA &2A1,X	
570	LDX #&00	1100	STX &382	1580	JMP OK3	
580 .LOOP11	LDA ROMOFF,X	1110	LDX #&00	1590 .OK11		
590	BEQ FFIN	1120 .LOOP8	LDA SOCKETEMPTY,X	1600	LDA &90,X	
600	JSR OSWRCH	1130	BEQ LASTY	1610	STA &2A1,X	
610	INX	1140	JSR OSWRCH	1620	LDA #&00	
620	BNE LOOP11	1150	INX	1630	STA &90,X	
630 .ROMOFF:]PROCstr("Off "+CHR\$&0		1160	JMP LOOP8	1640	JMP OK3	
0):[OPT XZ		1170 .LASTY	LDX &382	1650 .OK9		
640 .ROMON:]PROCstr("On "+CHR\$&00		1180	JMP LAST	1660	SEC	
):[OPT XZ		1190 .INSTRUCTION:]PROCstr(CHR\$&0A+		1670	SBC #55	
650 .NOROM2		CHR\$130+"Which rom do you want to tog		1680	JMP STORE	
660	LDA &2A1,X	gle ?"+CHR\$&0D+CHR\$&0A+CHR\$130+"		1690 .YN		
670	BEQ NOROM	Return to finish."+CHR\$&0A+CHR\$&0D		1700	LDA #1	
680	STX &383	+CHR\$&00):[OPT XZ		1710	STA &39F	
690	LDX #&00	1200 .INP		1720	LDX #&00	
700 .LOOP12	LDA ROMON,X	1210	LDX #&00	1730 .LOOP13	LDA RE,X	
710	BEQ FFIN	1220 .LOOP9	LDA INSTRUCTION,X	1740	BEQ DON	
720	JSR OSWRCH	1230	BEQ INP2	1750	JSR OSWRCH	
		1240	JSR OSWRCH	1760	INX	
		1250	INX	1770	BNE LOOP13	

1780 .DON	JSR OSRDCH	2030	JMP BRKVECT	2220	LDA #&3
1790	BCC OK12	2040 .RE: J: B\$=CHR\$10+CHR\$10+CHR\$10+C		2230	STA &39F
1800	LDA #&00	HR\$10+CHR\$10+CHR\$10+CHR\$10+CHR\$10+CHR		2240	RTS
1810	RTS	\$10+CHR\$10+CHR\$10+CHR\$129+" Reactivat		2250 .ROFF	LDA #&00
1820 .OK12	CMP #89	e on break (Y/N) ?"+CHR\$10+CHR\$10+CH		2260	STA &2A1,X
1830	BEQ Y	R\$10+CHR\$10+CHR\$10+CHR\$10+CHR\$10+CHR\$		2270	LDA #&00
1840	CMP #78	10+CHR\$10+CHR\$10+CHR\$10+CHR\$10+CHR\$10		2280	BEQ FRED
1850	BEQ N	+CHR\$&0D+CHR\$&00		2290 .EBREAK	
1860	JMP DON	2050 PROCstr(B\$):[OPT XZ		2300]	
1870 .Y	LDA &39F	2060 .BRKVECT LDA #&4C		2310 NEXT	
1880	AND #1	2070	STA &287	2320 CALL START	
1890	STA &39F	2080	LDA #&80	2330 PRINT""To run type 'CALL &700	
1900	LDA #&00	2090	STA &288	0'"'"Dr press f0.'"'"	
1910	STA &287	2100	LDA #&A	2340 *KEY 0 CALL &7000!M	
1920	RTS	2110	STA &289	2350 END	
1930 .N	LDA &39F	2120	LDA #&0	2360 REM	
1940	AND #2	2130	RTS	2370 DEFPROCstr(A\$)	
1950	BEQ OK14	2140 .BREAK	BCC CONTINUE	2380 \$PZ=A\$:PZ=PZ+(LEN(A\$))	
1960	LDA #&00	2150	RTS	2390 ENDPROC	
1970	JMP BRKVECT	2160 .CONTINUE LDX #&00			
1980 .OK14	LDA &39F	2170 .LOOP15 LDA &90,X			
1990	CLC	2180	BNE ROFF		
2000	ADC #2	2190 .FRED	INX		
2010	STA &39F	2200	CPX #&10		
2020	LDA #&00	2210	BNE LOOP15		

This listing is included in this month's cassette tape offer. See order form on Page 199.

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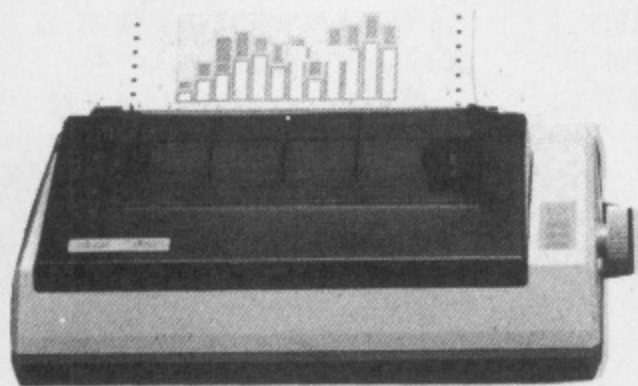
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Basic Analyser

From Page 94

```

10 :
20 REM *****
30 :
40 REM BASIC ANALYSER V.3 (Pt.1)
50 :
60 REM By Mike Stallybrass
70 REM
80 REM (C) The Micro User
90 :
100 REM *****
110 :
120 ON ERROR : ON ERROR OFF : PRINT
TAB(0,15) : REPORT : PRINT " at line
"; ERL : CLOSE #0 : STOP
130 MODE7 : VDU23,1,0;0;0;0 : MZ=H
IMEM : HIMEM=TOP+&800 : QZ=HIMEM : RZ
=QZ+256 : FZ=RZ+13
140 FOR SZ=0 TO 248 STEP 4 : SZ!QZ=
0 : NEXT : QZ!236=-1 : QZ!252=2
150 DIM BZ 256 : AZ=0 : DZ=0 : GZ=&
FFFF : HZ=&FFFFFF0000 : KZ=&10000 : VZ=
0 : WZ=0 : QZ=&607
160 FOR JZ=1 TO 2 : PRINT CHR$129 C
HR$157 CHR$141 CHR$135 TAB(10) "B A S
I C Analyser" : NEXT : PRINT CHR
$133+"Program " :
170 INPUT PGM$ : $RZ=LEFT$(PGM$,12)
: EZ=OPENIN $RZ
180 IF EZ=0 : PROCER("Unable to fin
d file") : ELSE IF EDF #EZ : PROCER("
No data in file")
190 CZ=BGET #EZ : IF CZ<>13 : PROCe
r("Requested File not BASIC")
200 PRINT TAB(9,3) CHR$134 $RZ ' CH
R$133 "First line for analysis " : I
NPUT YZ : IF YZ<1 : YZ=0
210 PRINT TAB(25,4) : CHR$134 YZ 'CH
R$133 "Last line " : INPUT XZ : IF X
Z<1 : XZ=&7FFF
220 PRINT TAB(11,5) : CHR$134 XZ '
CHR$133 "Current Line" CHR$131 TAB(23
) CHR$133 "Pgm length" CHR$131 "&"
CHR$133 "Lines analysed" CHR$134 TAB(
23) CHR$133 "Statements" CHR$134
230 PRINT CHR$133 "Variables found"
CHR$134 TAB(23) CHR$133 "References"
CHR$134 ' CHR$133 "Workspace used "
CHR$134 "&" TAB(23) CHR$133 "Space f
ree" CHR$134 "&"
240 :
250 REPEAT : IF FNline : PZ=0 : IX=
0 : PROC@c : IF NOT FNend : REPEAT :
PROCstat : UNTIL FNend
260 UNTIL NZ<0
270 GOTO 2900
280 :
290 DEF FNline

```

```

300 IF DZ : QZ!248=QZ!248+DZ : DZ=0
310 CZ=BGET#EZ : IF CZ>127 : CLOSE#
EZ : NZ=-1 : =0
320 NZ=256+CZ+BGET#EZ : LZ=BGET#EZ-
4 : IF LZ<1 : PROCER("Invalid line le
ngth")
330 FOR JZ=0 TO LZ : JZ?BZ=BGET#EZ
: NEXT
340 IF LZ?BZ=13 : QZ!252=QZ!252+LZ+
4 : CZ=?BZ : ELSE PROCER("Missing end
of line")
350 PRINT TAB(18,7) : NZ TAB(18,9) Q
Z!244 TAB(35,9) QZ!248 TAB(18,10) VZ
TAB(35,10) WZ TAB(36,7) ~QZ!252 TAB(1
9,11) FZ-QZ TAB(36,11) MZ-FZ " " TAB(
0,13) CHR$129 CHR$157
360 bZ=0 : IF NZ)=YZ AND NZ<=XZ : b
Z=1 : QZ!240=NZ : QZ!244=QZ!244+1 : I
F QZ!236<0 : QZ!236=NZ
370 =bZ
380 :
390 DEF FNend : IF PZ)=LZ : =TRUE :
ELSE IF IX>1 : IF CZ=&80 : PROC_ELSE
: =FNend
400 IF CZ=58 : REPEAT : PROC@c : UNT
IL CZ<>58 : ELSE IF IX>0 : PROCsyntax
("Missing : ") : =FNend
410 DZ=DZ+1 : IF PZ)=LZ : =TRUE : E
LSE IF IX=1 : =FALSE : ELSE IF IX=2 :
IF CZ=&80 : PROC_ELSE : =FNend
420 IF IX=0 : IX=1
430 =FALSE
440 :
450 DEF FNmore : PROC@c
460 DEF FNmore0 : PROC@c
470 IF CZ=58 OR CZ=&80 OR PZ)=LZ :
=FALSE : ELSE =TRUE
480 :
490 DEF PROCstat
500 IF CZ=91 : AZ=1 : PROC@c
510 IF AZ : PROCass : ENDPROC
520 IF CZ=42 : PZ=LZ : ENDPROC
530 IF CZ=61 : PROC@c : TZ=FNexpl(2)
: ENDPROC
540 IF CZ>&CE : PROCtoken : ENDPROC
550 TZ=FNvar(128)
560 :
570 DEF PROC_LET : IF CZ>&CE AND CZ
<&D4 : TZ=FNsysvar : ELSE TZ=FNvar(12
8)
580 IF CZ=ASC"=" : PROC@c : ELSE PRO
Csyntax("Missing = in assignment") :
ENDPROC
590 IF (TZ OR FNexpl(0))<10 : ENDPR
OC : ELSE PROCsyntax("Mismatch of typ
es in assignment") : ENDPROC
600 :
610 DEF FNexp0 : PROC@c : TZ=FNexpl(
UX) : PROC@c : IF CZ=41 : PROC@c : =TZ

```

```

: ELSE PROCsyntax("Missing ") : =-1
620 :
630 DEF FNexp1(UZ) : TZ=FNexp2 : IF
CZ=&80 OR CZ=&82 OR CZ=&84 : PROC@c :
TZ=TZ OR FNexpl(UZ)
640 IF TZ(10) : =TZ : ELSE PROCsynta
x("Mismatch of types in expression")
: =-1
650 :
660 DEF FNexp2 : TZ=FNexp3 : IF CZ<
60 OR CZ>62 : =TZ
670 PROC@c : IF CZ=61 OR CZ=62 : PR
OC@c : ELSE PROC@c
680 IF (TZ OR FNexp3)<10 : =2 : ELS
E PROCsyntax("Mismatch of types in co
mparison") : =-1
690 :
700 DEF FNexp3 : TZ=FNval(UZ) : PRO
C@c : IF CZ=42 OR CZ=43 OR CZ=45 OR C
Z=47 OR CZ=94 OR CZ=&81 OR CZ=&83 : P
ROC@c : TZ=TZ OR FNexp3
710 =TZ
720 :
730 DEF FNval(UZ) : vZ=-1 : PROC@c
: IF CZ=34 : =FNstring : ELSE IF CZ=4
3 OR CZ=45 : PROC@c
740 IF CZ=40 : =FNexp0 : ELSE IF CZ
>&80 AND CZ<&C6 : =FNfn : ELSE IF CZ=
38 : =FNhex : ELSE IF CZ=46 OR CZ>47
AND CZ<58 : =FNnum
750 :
760 DEF FNvar(UZ)
770 PROC@c : IF CZ=33 OR CZ=63 : PR
OC@c : =2 : ELSE IF CZ=36 : PROC@c :
=0
780 n$=FNnam : IF CZ=33 OR CZ=63 :
PROC@c : IF TZ AND 9 : PROCsyntax("I
nvalid first indirection operand")
790 PROCref : =TZ
800 :
810 DEF FNnam : a$="" : IF CZ<64 OR
CZ>90 AND CZ<95 OR CZ>122 : PROCsynt
ax("Variable name missing") : SZ=0 :
TZ=-1 : ="#
820 REPEAT : a$=a$+CHR$CZ : PROC@c
: UNTIL CZ<48 OR CZ>57 AND CZ<65 OR C
Z>90 AND CZ<95 OR CZ>122
830 IF CZ=36 : a$=a$+"$" : PROC@c :
TZ=0 : ELSE IF CZ=37 : a$=a$+"X" : P
ROC@c : TZ=2 : ELSE TZ=4
840 IF CZ=40 : q$=FNargs(UZ OR 32)
: a$=a$+q$ : TZ=TZ+1 : IF INSTR(q$,"$
") : PROCsyntax("Illegal array subscr
ipt")
850 SZ=4*(ASC a$-63) : IF SZ>100 : S
Z=SZ-16 : ELSE IF MID$(a$,2)="X" : SZ
=4 : ELSE IF SZ=4 : PROCsyntax("Inval

```


TURBOBALL

Now add "go faster" goodies to your TRAK-BALL

The ATARI TRAK-BALL has a superb resolution when used with the BBC Micro's user port, but, in common with all trackerball and mouse devices, is slow when moving from one side of the screen to the other. With menu driven programs this can be annoying, but now with TURBOBALL you can zap at incredible speed to anywhere on the screen, while still retaining the same resolution when required. TURBOBALL also provides two extra button switches making the ATARI TRAK-BALL compatible with other 3 switch mouse and trackerball devices. In addition we have provided X HOLD and Y HOLD buttons which make vertical and horizontal alignment a dream.

- Two auxiliary switches
- X and Y freeze facility
- Fully adjustable "fast" speed
- Special deal on SPLASH! art program
- Simple clip fitting - no alteration to your TRAK-BALL



TURBOBALL Interface £29.95



ATARI TRACK-BALL £19.95



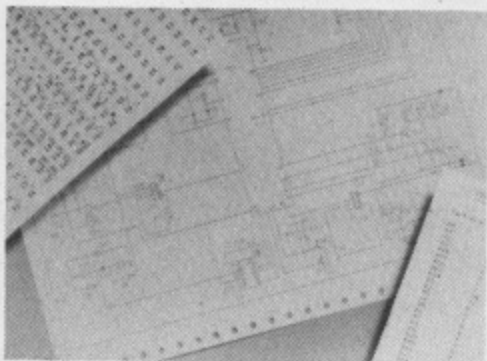
SPLASH! £13.95

(on disc only, specify 40T or 80T)

Please note the **ATARI TRAK-BALL** will not run from the BBC Micro without an interface. We also sell a simple interface at £13.00, which is suitable for use with our **CIRKWIK Schematic Drawing Program**, but not with **SPLASH!**

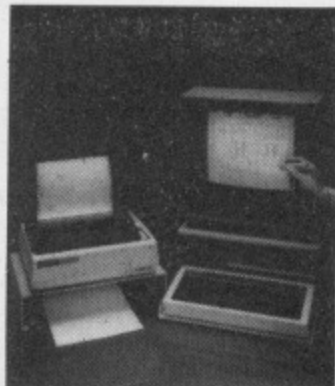
SPECIAL OFFER ATARI TRAK-BALL
TURBOBALL INTERFACE all 3 for **£56.00** (inc VAT)
SPLASH! software

CIRKWIK Schematic drawing on the BBC micro



A lightpen or trackerball driven CAD package orientated to the production of schematic drawings, such as circuit diagrams, flow charts, power systems, pipework diagrams, fluid logic diagrams and many similar engineering applications.

- Lightpen or trackerball driven
- Virtual screen 8x 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 drawing
- Total symbol library unlimited in size
- Create your own symbols on a highly magnified scale
- Many electronic symbols already included in the package



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Kingsclere Road, Overton,
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- Responds to different colours and screen intensities without adjustment of TV or monitor.
- Red LED readout showing that data is available.
- Switch for program control (allows pen to approach the screen without erroneous data capture)
- All features are Program accessible



SPECIAL CHRISTMAS OFFER!

BEEBPEN drawing program FREE with lightpen
Lightpen and Beebpen software only £25.00

PRICES

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CIRKWIK lightpen only	disc £19.95
CIRKWIK trackerball/lightpen	disc £24.95
CIRKWIK Grafpad/lightpen	disc £24.95

Lightpen software

DEFINE Sprite Animator/Editor	disc £11.95
DEFINE Sprite Animator/Editor	cassette £9.95
BEEBPEN Colour Drawing Program	cassette £11.95
TELETEXT Display Creator	cassette £9.95

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DATAPEN Lightpen with BEEBPEN program	£25.00
MARCONI Trackerball (with Micro-Draw)	£59.50
MARCONI Trackerball (with ICON software)	£69.50
ATARI TRAK-BALL	£19.95
TURBOBALL Interface	£29.95
MOUSE/TRACKERBALL Interball	£13.00

ALL PRICES INC. VAT

Postage: Trackerball £2.50 Interface or software £1.00 MAX £2.50

From Page 154

```

id @ in name"
860 =a$
870 :
880 DEF PROCind : LOCALS%,TX,n$: P
ROCEi : UX=UX OR 64 : IF FNval(UX)<8
: ENDPROC : ELSE PROCsyntax("Invalid
indirection address") : ENDPROC
890 :
900 DEF FNfn : IF CX=&A4 : =FNfn pr
ocnam(16) : ELSE IF CX>&8E AND CX<&94
: =FNsvsvar
910 IF CX=&9A OR CX=&A2 OR CX=&C5 :
PROCchannel : =2
920 IF CX=&9C OR CX=&9E OR CX=&9F O
R CX=&A3 OR CX=&A5 OR CX=&AF OR CX=&B
1 OR CX=&B9 OR CX=&BC : PROC@ : =2 :
ELSE IF CX=&BE : PROC@ : =8
930 UX=UX OR 16 : IF CX=&B3 : =FN_R
ND : ELSE IF CX=&B8 : =FN_TOP : ELSE
IF CX=&BA : =FN_USR : ELSE IF CX=&C3
: =FN_STR
940 LOCALt% : IF CX>&B0t%&ELSE IF
CX=&A0t%&ELSE t%=2
950 IF CX=&A7 OR CX=&B0 OR CX=&C0 O
R CX=&C1 OR CX=&C2 OR CX=&C4 : q$=FNn
args(UX) : ELSE PROC@ : TX=FNval(UX)
960 =t%
970 :
980 DEF FN_RND : PROC@i : IF CX<>40
: PROC@c : =2 : ELSE IF FNval(UX)<8
: =2 : ELSE PROCsyntax("Invalid RND p
arameter") : =-1
990 :
1000 DEF FN_STR : PROC@ : IF CX=&7E
: PROC@
1010 IF FNval(UX)<8 : =8 : ELSE PROC
syntax("Invalid STR$ parameter") : =-
1
1020 :
1030 DEF FN_TOP : PROC@i : IF CX=80
: PROC@ : =2 : ELSE PROCsyntax("TO in
error") : =-1
1040 :
1050 DEF FN_USR : PROC@ : IF FNval(1
4 OR UX AND 240)<8 : PROClineref(&700
00 OR v% AND &FFFF) : =2 : ELSE PROCs
yntax("Invalid USR call address") : =
-1
1060 :
1070 DEF FNargs(UX) : LOCALS%,TX,a$,
z$
1080 z$="(" : REPEAT : PROC@i : IF U
X=129 : TX=FNvar(UX) : ELSE TX=FNexpl
(UX)
1090 IF 8 AND TX : z$=z$+"$" : ELSE
IF TX : z$=z$+"#" : ELSE z$=z$+"*"
1100 PROC@c : IF CX=44 : z$=z$+","
1110 UNTIL PX>=LX OR CX<>44 : IF CX=
41 : PROC@ : ELSE PROCsyntax("Missing
)")
1120 =z$+"")
1130 :
1140 DEF FNfn_procnam(u%) : n$="" :
IF CX=&A4 : SZ=224 : ELSE SZ=228
1150 PROC@i : IF CX<48 OR CX>57 AND
CX<64 OR CX>90 AND CX<95 OR CX>122 :
PROCsyntax("FN/PROC name missing") :
=-1
1160 REPEAT : n$=n$+CHR$CX : PROC@i
: UNTIL CX<48 OR CX>57 AND CX<64 OR C
X>90 AND CX<95 OR CX>122 : PROC@c : I
F CX=40 : n$=n$+FNargs(UX OR u%)
1170 PROCref : =0
1180 :
1190 DEF FNsvsvar : c%=CX-&8E : IF c
X>5cX=cX-&40 : UX=&80
1200 IF c%=1 : PROCchannel : n$="PTR
#" : ELSE PROC@ : IF c%=2 : n$="PAGE"
: ELSE IF c%=3 : n$="TIME" : ELSE IF
c%=4 : n$="LOMEM" : ELSE n$="HINEM"
1210 SZ=0 : PROCref : =2
1220 :
1230 DEF FNhex : h$="" : REPEAT : h$
=h$+CHR$CX : PROC@i : UNTIL CX<48 OR
CX>57 AND CX<65 OR CX>70 : PROC@c : v
X=VALh$ : =2
1240 :
1250 DEF FNnum : vX=VAL($ (PX+BX)) :
TX=2 : REPEAT : PROC@i : IF CX=46 : T
X=4
1260 UNTIL CX<46 OR CX=47 OR CX>57
1270 IF CX<>69 : PROC@c : =TX
1280 jX=PX : REPEAT : PROC@i : UNTIL
CX<43 OR CX=45 OR CX=47 OR CX>57 : I
F PX<>jX+1 : PROC@c : =4 : ELSE PX=jX
: PROC@c : =TX
1290 :
1300 DEF FNstring : REPEAT : PROC@i
: UNTIL CX=34 OR PX>=LX
1310 IF PX>=LX : PROCsyntax("Missing
") : =-1
1320 PROC@i : IF CX<>34 : PROC@c : =
8 : ELSE =FNstring
1330 :
1340 DEF PROCass : IF CX=93 : AZ=0 :
IX=0 : PROC@ : ENDPROC
1350 IF CX=46 : PROC@i : IF FNvar(14
2)>7 : PROCsyntax("Illegal assembler
label") : ENDPROC
1360 IF CX=58 OR PX>=LX : ENDPROC
1370 IF CX=92 : REPEAT : PROC@i : UN
TIL CX=58 OR PX>=LX : ENDPROC
1380 REPEAT : PROC@i : UNTIL CX=58 O
R CX=92 OR CX=32 OR PX>=LX : IF CX=58
OR PX>=LX : ENDPROC : ELSE IF CX=32
: TX=FNassv
1390 IF FNmore@ : REPEAT : UNTIL NOT
FNmore
1400 ENDPROC
1410 :
1420 DEF FNassv : PROC@ : IF CX=40 O
R CX=35 : PROC@
1430 =FNexpl(15)
1440 :
1450 DEF PROCtoken
1460 IF CX<&D4 : PROC_LET : ENDPROC
1470 IF CX=&D5 : PROC_BPUT : ENDPROC
1480 IF CX=&D6 : PROC_CALL : ENDPROC
1490 IF CX=&D9 : PROCchannel : ENDPR
OC
1500 IF CX=&DC : PROC_DATA : ENDPROC
1510 IF CX=&DD : PROC_DEF : ENDPROC
1520 IF CX=&DE : PROC_DIM : ENDPROC
1530 IF CX=&E3 : PROC_FOR : ENDPROC
1540 IF CX=&E4 : PROC@ : PROCgo(1) :
ENDPROC
1550 IF CX=&E5 : PROC@ : PROCgo(0) :
ENDPROC
1560 IF CX=&E7 : PROC_IF : ENDPROC
1570 IF CX=&E8 : PROC_INPUT : ENDPRO
C
1580 IF CX=&E9 : PROC@ : PROC_LET :
ENDPROC
1590 IF CX=&EA : PROCvlist(130) : EN
DPROC
1600 IF CX=&ED : PROC_NEXT : ENDPROC
1610 IF CX=&EE : PROC_ON : ENDPROC
1620 IF CX=&EF : PROC_VDU : ENDPROC
1630 IF CX=&F1 : PROC_PRINT : ENDPRO
C
1640 IF CX=&F2 : UX=1 : TX=FNfn_proc
nam(0) : ENDPROC
1650 IF CX=&F3 : PROCvlist(139) : EN
DPROC
1660 IF CX=&F4 : PX=LX : ENDPROC
1670 IF CX=&F5 : PROC_REPEAT : ENDPR
OC
1680 IF CX=&F7 : PROC_RESTORE : ENDP
ROC
1690 IF CX=&FC : PROC_TRACE : ENDPRO
C
1700 IF CX=&FD : PROC_UNTIL : ENDPRO
C
1710 IF CX=&DB OR CX=&DA OR CX=&DB O
R CX=&E0 OR CX=&E1 OR CX=&F5 OR CX=&F
6 OR CX=&F8 OR CX=&F9 OR CX=&FA : PRO
C@ : ENDPROC
1720 PROCparams(1) : ENDPROC
1730 :
1740 DEF PROC_BPUT : PROCchannel : I
F CX<>44 : PROCsyntax("Missing ,") :
ELSE PROC@ : IF FNval(10)>7 : PROCsyn
tax("Illegal BPUT parameter")

```


GREAT NEWS!

REVOLUTIONARY NEW PRODUCT.

Fileaid extends BASIC data handling

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.

The BASIC program may operate in any MODE and access as many files as required.

FILEAID is supplied as a EPROM, a diskette and a 77 page manual.

The EPROM contains the extra BASIC commands for accessing indexed files. The diskette contains five utilities for creating and maintaining your database system. The manual is a comprehensive guide to using FILEAID and contains an example of a telephone directory.

The program required for the telephone directory system is supplied on the utilities disc.

FILEAID is extremely easy to use yet very powerful. First tell FILEAID about the file using the file definition utility. Simply give it the names of the BASIC variables, their length and the maximum number of records that you want the file to hold. FILEAID then creates a file large enough for the definition you have described.

To write a record give the relevant command and FILEAID takes the contents of the appropriate variables and writes them to disc. When you read that record it returns the values to their BASIC variables. You can access the file randomly or sequentially and FILEAID takes care of the problem of keeping the index up-to-date.

FILEAID has been written so that it uses every bit of storage you can spare. The more storage available for FILEAID the faster it will work. It dynamically manages the available storage to optimize performance.

To give FILEAID more storage just set PAGE to a higher value. An EPROM command is available to help you do this.

- 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

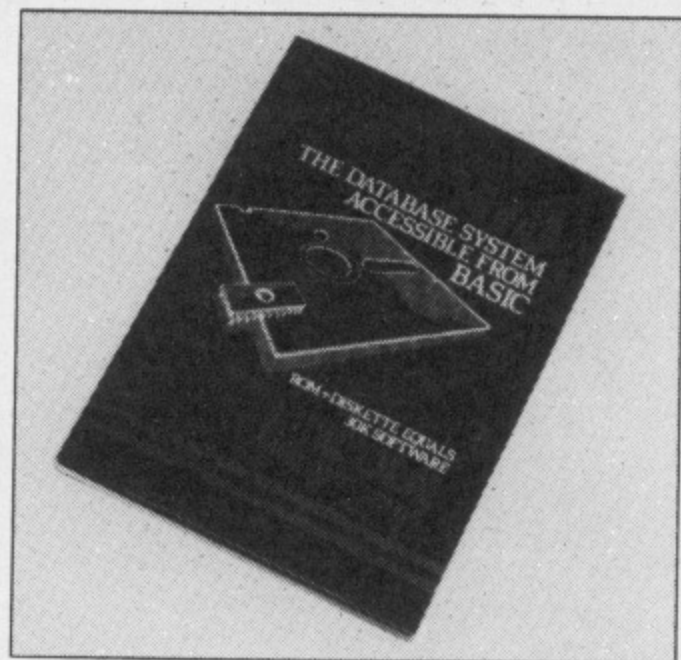
● Unlimited Number of Files per Program

● BACKUP/
RESTORE Utilities

● Maximum Records per File 65,000 (depending on Disc Space)

● Maximum Record Size 4096 Bytes

● Maximum of 196 Fields (BASIC Vari-



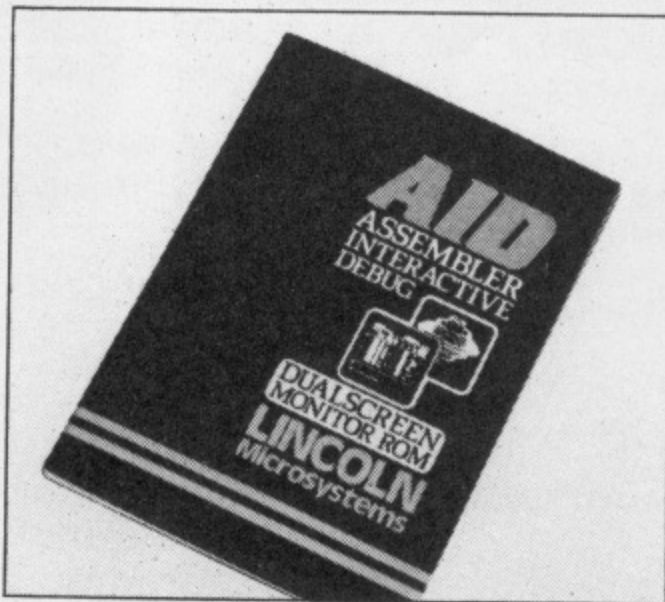
YOU'LL LOVE THE CONCEPT!

- ables) per Record
- File AUDIT/
INFORMATION Functions
- Comprehensive 77 page Manual detailing Concepts/Facilities/Examples

- Free telephone/address directory system

£35.00
PRICE INCLUDES P & P
OVERSEAS ADD
£3.00 P & P (AIR)

Machine code graphics...NO PROBLEM!



This is not just another m/c monitor. AID offers features far in advance of other monitors.

One unique facility is it's ability to leave the program screen display unaffected when displaying AID information. Using this original DUALSCREEN concept m/c graphics programming becomes fun.

£28.00
PRICE INCLUDES P & P
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"This dual screen feature is a cracker" Acorn User. March 1985.

LINCOLN Microsystems P.O. BOX 74,
Bradford,
West Yorkshire. BD6 3RN



From Page 156

```

1750 ENDPROC
1760 :
1770 DEF PROC CALL : PROC@ : IF FNexp1(14)>7 : PROCsyntax("Invalid CALL address") : ENDPROC
1780 PROClineref(&60000 OR v% AND &FFF) : IF CX=44 : PROCvlist(11)
1790 ENDPROC
1800 :
1810 DEF PROC DATA : IF D%=1 : PROClineref(&3FFFF) : P%=L% : ENDPROC : ELSE PROCsyntax("DATA not at start of line") : ENDPROC
1820 :
1830 DEF PROC DEF : IF D%<>1 : PROCsyntax("DEF not at start of line") : ENDPROC
1840 PROC@ : IF CX<>&A4 AND CX<>&F2 : PROCsyntax("DEF not followed by FN or PROC") : ENDPROC
1850 UX=129 : TX=FNprocnam(0) : I%=0
1860 ENDPROC
1870 :
1880 DEF PROC DIM : REPEAT : PROC@ : UX=131 : n%=FNnam : IF (TX AND 1) : PROCref : ELSE UX=132 : PROCref : IF FNexp1(164)>7 : PROCsyntax("Illegal byte array DIM")
1890 UNTIL CX<>44 : ENDPROC
1900 :
1910 DEF PROC ELSE : PROC@ : IF CX=&8D : PROCqo(1) : I%=1 : ELSE I%=0
1920 ENDPROC
1930 :
1940 DEF PROC ERROR : PROClineref(&4FFF) : PROC@ : IF CX=&87 : PROC@ : ELSE I%=0
1950 ENDPROC
1960 :
1970 DEF PROC FOR : PROC@ : IF FNvar(133)>7 : PROCsyntax("Invalid FOR variable") : ENDPROC
1980 IF CX<>ASC="" : PROCsyntax("Missing =") : ENDPROC
1990 PROC@ : IF FNexp1(5)>7 : PROCsyntax("Invalid FOR start value") : ENDPROC
2000 IF CX<>&8B : PROCsyntax("Missing TO") : ENDPROC
2010 PROC@ : IF FNexp1(6)>7 : PROCsyntax("Invalid FOR end value") : ENDPROC
2020 IF CX<>&8B : ENDPROC
2030 PROC@ : IF FNexp1(7)<8 : ENDPROC : ELSE PROCsyntax("Invalid STEP value") : ENDPROC

```

```

2040 :
2050 DEF PROC IF : I%=2 : PROC@ : IF FNexp1(3)>7 : PROCsyntax("IF - String expression invalid") : ENDPROC
2060 IF CX=&8C : PROC@ : IF CX=&8D : PROCqo(0) : ELSE IF FNmore0 : PROCstat
2070 ENDPROC
2080 :
2090 DEF PROC INPUT : PROC@ : IF CX=35 : PROCchannel0 : PROCvlist(138) : ENDPROC : ELSE IF CX=&86 : PROC@
2100 UX=137 : IF FNmore0 : IF FNformat<>0 : REPEAT : TX=FNvar(UX) : UNTIL FNformat=0
2110 ENDPROC
2120 :
2130 DEF PROC NEXT : IF NOT FNmore : ENDPROC
2140 REPEAT : IF CX=44 : REPEAT : PROC@ : UNTIL CX<>44
2150 IF FNmore0 : IF FNvar(134)>7 : PROCsyntax("Invalid NEXT variable")
2160 UNTIL CX<>44 : ENDPROC
2170 :
2180 DEF PROC ON : PROC@ : IF CX=&85 : PROC_ERROR : ENDPROC
2190 IF FNexp1(12)>7 : PROCsyntax("ON - String expression invalid") : ENDPROC
2200 IF CX=&E4 : q%=1 : ELSE IF CX=&E5 : q%=0 : ELSE PROCsyntax("Missing 60TO/60SUB after ON") : ENDPROC
2210 REPEAT : PROC@ : PROCqo(q%) : UNTIL CX<>44
2220 IF CX=&8B : PROC_ELSE
2230 ENDPROC
2240 :
2250 DEF PROC PRINT : PROC@ : IF CX=35 : PROCchannel0 : PROCparams(10) : ENDPROC
2260 UX=9 : IF FNmore0 : IF FNformat<>0 : REPEAT : TX=FNexp1(UX) : UNTIL FNformat=0
2270 ENDPROC
2280 :
2290 DEF PROC REPEAT : IF FNmore : PROCstat
2300 ENDPROC
2310 :
2320 DEF PROC RESTORE : IF FNmore : PROCqo(2) : ELSE PROClineref(&20000)
2330 ENDPROC
2340 :
2350 DEF PROC TRACE : PROC@ : IF CX=&87 OR CX=&EE : PROC@ : ELSE PROCqo(5)
2360 ENDPROC
2370 :

```

```

2380 DEF PROC UNTIL : PROC@ : IF FNexp1(4)>7 : PROCsyntax("UNTIL - String expression invalid")
2390 ENDPROC
2400 :
2410 DEF PROC VDU : w%=0 : REPEAT : IF CX=59 : w%=w%-1
2420 v%=0 : IF NOT FNmore : w%=w%+1 : ELSE IF FNexp1(1)>7 : PROCsyntax("Invalid VDU argument")
2430 IF w%>0 : w%=w%-1 : ELSE IF v%1 OR v%=17 OR v%=22 : w%=1 : ELSE IF v%=18 OR v%=31 : w%=2 : ELSE IF v%=21 OR v%=29 : w%=4 : ELSE IF v%=19 OR v%=25 : w%=5 : ELSE IF v%=24 : w%=8 : ELSE IF v%=23 : w%=9
2440 UNTIL P%>L% OR CX<>44 AND CX<>59
2450 IF w%>0 : PROCsyntax("VDU parameter may be missing")
2460 ENDPROC
2470 :
2480 DEF PROC channel : PROC@ : IF CX<>35 : PROCsyntax("Missing #") : ENDPROC
2490 DEF PROC channel0
2500 PROC@ : IF FNval(8)<8 : ENDPROC : ELSE PROCsyntax("Illegal Channel-number") : ENDPROC
2510 :
2520 DEF FNformat : IF CX=&89 : PROC@ : TX=FNval(25) : =FNformat : ELSE IF CX=&8A : q%=FNargs(25) : =FNformat
2530 IF CX=34 : TX=FNstring : =FNformat : ELSE IF CX=39 OR CX=44 OR CX=59 OR CX=126 AND UX=9 : PROC@ : =FNformat : ELSE =FNmore0
2540 :
2550 DEF PROC qo(q%) : IF CX=&8D : PROClineref(FNlineno+q%*K%) : ENDPROC : ELSE IF FNexp1(13)<8 : PROClineref(6%+q%*K%) : ENDPROC : ELSE PROCsyntax("Invalid line-number expression") : ENDPROC
2560 DEF FNlineno : PROC@ : OX=(CX AND 48 EOR 16)*4+(CX AND 4 EOR 4)*1000 : PROC@ : OX=OX+(CX AND 63) : PROC@ : OX=OX+(CX AND 63)*256 : PROC@ : =OX
2570 :
2580 DEF PROC params(UX) : REPEAT : PROC@ : TX=FNexp1(UX) : UNTIL P%>L% OR CX<>44 : ENDPROC
2590 DEF PROC vlist(UX) : REPEAT : PROC@ : TX=FNvar(UX) : UNTIL P%>L% OR CX<>44 : ENDPROC
2600 :
2610 DEF PROC@ : REPEAT : P%=P%+1 : CX=P%*B% : UNTIL CX<>&20 : ENDPROC

```



```

2620 DEF PROC@i : PZ=PX+1 : CZ=PX?BX
: ENDPROC
2630 DEF PROC@c : IF CZ=&20 : PROC@
: ENDPROC : ELSE ENDPROC
2640 :
2650 DEF PROCsyntax(m$)
2660 PRINT TAB(0,13) CHR$131 "Error
in line "; NZ " , (statement " DZ " ), "
CHR$131 "at offset " PZ " , char=" C
Z "(&" ^CZ " ) " ; IF CZ>31 AND CZ<12
8 : PRINT CHR$34 CHR$CZ CHR$34 " : "
ELSE PRINT " : "
2670 PRINT CHR$130 m$ ' : FOR JZ=0 T
O LZ : IF JZ?BX>31 AND JZ?BX<128 : PR
INT CHR$(JZ?BX) ; : NEXT : ELSE PRINT
CHR$255 ; : NEXT
2680 PRINT 'TAB(PZMOD40)^^" TAB(0,24
) CHR$129 "Press any key to continue"
CHR$7 GET$ TAB(0,13) SPC240 SPC239;
2690 IF IZ=2 AND CZ<>58 AND CZ<>&8B
: REPEAT : PROC@ : UNTIL CZ=58 OR CZ=
&8B OR PZ=LZ : ELSE IF CZ<>58 : REPE
AT : PROC@ : UNTIL CZ=58 OR PZ=LZ
2700 ENDPROC
2710 :
2720 DEF PROCe : PROCer("Out of spac

```

```

e")
2730 DEF PROCer(m$) : PRINT TAB(0,15
) CHR$7 m$ : CLOSE#0 : STOP
2740 :
2750 DEF PROCref : PROC@c : IF FZ+5>
NZ : PROCe
2760 YZ=0 : XZ=QZ!SZ : REPEAT : ZY=
Z : YZ=XZ : XZ=!XZ AND GX : IF YZ=0 :
UNTIL TRUE : PROC@d : ENDPROC : ELS
E UNTIL $(YZ+5)>n$ : IF $(YZ+5)<n$
: PROC@d : ENDPROC
2770 YZ=YZ+2 : XZ=(!YZ) AND GX : !YZ
=FZ+((!YZ) AND HZ) : !FZ=NZ*KZ+XZ : F
Z?4=UZ : FZ=FZ+5 : WZ=WZ+1 : ENDPROC
2780 :
2790 DEF PROC@d : VZ=VZ+1 : WZ=WZ+1
: IF FZ+11+LENN$>MZ : PROCe
2800 IF ZY=0 : QZ!SZ=FZ : ELSE !ZY=F
Z+(!ZY AND HZ)
2810 !FZ=YZ : FZ?4=TX : $(FZ+5)=n$ :
YZ=FZ+2 : FZ=FZ+6+LENN$ : !YZ=FZ+((!
YZ) AND HZ) : !FZ=NZ*KZ : FZ?4=UZ : F
Z=FZ+5 : ENDPROC
2820 :
2830 DEF PROClineref(OZ) : IF FZ+8>M
Z : PROCe

```

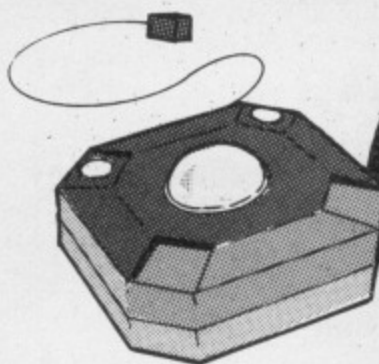
```

2840 YZ=0 : XZ=QZ!232 : REPEAT : ZY=
YZ : YZ=XZ : XZ=!XZ AND GX : IF YZ=0
: UNTIL TRUE : PROCline@d : ENDPROC
: ELSE UNTIL YZ!4>OZ : IF YZ!4<>OZ :
PROCline@d : ENDPROC
2850 YZ=YZ+2 : XZ=(!YZ) AND GX : !YZ
=FZ+((!YZ) AND HZ) : !FZ=NZ*KZ+XZ : F
Z=FZ+4 : WZ=WZ+1 : ENDPROC
2860 :
2870 DEF PROCline@d : VZ=VZ+1 : WZ=
WZ+1 : IF ZY=0 : QZ!232=FZ : ELSE !ZY
=FZ+(!ZY AND HZ)
2880 !FZ=YZ : FZ!4=OZ : YZ=FZ+2 : FZ
=FZ+8 : !YZ=FZ+((!YZ) AND HZ) : !FZ=N
Z*KZ : FZ=FZ+4 : ENDPROC
2890 :
2900 PRINT TAB(0,18) CHR$131"Reload
tape/disc with PART2 (if reqd)"CHR$1
31"Press any key when ready" CHR$7 GE
T$ : CHAIN "Part2"

```

This listing is included in this month's cassette tape offer. See order form on Page 199.

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From Page 69

```

10 REM WHODUNNIT ?
20 REM
30 REM by KEN SMITH
40 REM (c) The Micro User
50 IFPAGE<>&E0060T04270
60 MODE7
70 ENVELOPE1,3,0,0,0,0,121,0,-10
,-5,-2,120,120
80 VDU23;0202;0;0;0;
90 DIM S$(9),W$(9),R$(9),S(9,9,3),
W(9,9,3),A(9),A$(52)
100 jX=0:tX=0:DZ=1:qX=0:mX=0:nX=0:P
X=RND(10)-1:SX=10^4
110 c$="":h$=CHR$141:r$=CHR$129:g$=
CHR$130:y$=CHR$131:b$=CHR$132:m$=CHR$
133:n$=CHR$134:i$=CHR$135:f$=CHR$136
120 PROCD(7,11,9,"WHODUNNIT ?")
130 PROC1:TIME=0
140 REPEAT
150 IFSX<=0SX=0:PROCY:RUN
160 PROCM:IFTX=RND(9-DX)PROCL
170 UNTILFALSE
180 DEFPROC:PROCB
190 CLS:PROCB:PROCD(7,1,2,"WHODUNNI
T ?"):PROCD(1,14,2,"Rank"+y$+D$)
200 PRINTTAB(0,4)h$+f$+y$+D$+"What Next ?
";TAB(14,4);CHR$137;r$+"Score"+y$+R$
Hi"+y$+HX;TAB(0,5)h$+f$+y$+D$+"What Next ?
";TAB(14,5);CHR$137;r$+"Score"+y$+R$
Hi"+y$+HX
210 L$=r$+STRING$(38,CHR$255)
220 PRINTTAB(1,6);L$
230 PROCD(3,0,7,"See the plan of th
e Manor.....<1>")
240 PROCD(5,0,9,"Move to another ro
om.....<2>")
250 A$="List current location of ":
PROCD(1,0,11,A$+"suspects..<3>")
260 PROCD(6,0,13,A$+"weapons...<4>
")
270 A$="List past location of ":PRO
CD(2,0,15,A$+"suspects.....<5>")
280 PROCD(3,0,17,A$+"weapons.....<
6>")
290 PROCD(5,0,19,"Change your detec
tive rank.....<7>")
300 PROCD(6,0,21,"Pause/Quit the in
vestigation.....<8>")
310 PRINTTAB(1,23);L$;
320 *FX15,1
330 REPEATBX=INSTR("12345678",GET$)
:UNTILBX
340 ONBXGOTO350,360,370,450,460,540
,850,920
350 PROCJ:ENDPROC
360 PROCH:PROCS:ENDPROC
370 CLS:mX=1:PROCD(2,0,0,"Current (

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known) location of suspects.):PRINTT
AB(1,2)r$;STRING$(37,CHR$255)
380 TX=3:FORCX=0T09:FORBX=0T09
390 IFmX=1ANDS(BX,CX,3)=-1PROCD(5,0
,TX,R$(CX)):PROCD(3,18,TX,S$(BX)):TX=
TX+2
400 IFnX=1ANDW(BX,CX,3)=-1PROCD(5,0
,TX,R$(CX)):PROCD(3,18,TX,W$(BX)):TX=
TX+2
410 NEXT:NEXT
420 IFTX=3PROCD(1,0,8,"No locations
known at present."):PROCB
430 PROCC
440 mX=0:nX=0:ENDPROC
450 CLS:nX=1:PROCD(2,0,0,"Current (
known) locations of weapons.):PRINTT
AB(1,2)r$;STRING$(37,CHR$255):GOTO380
460 CLS:mX=1:PROCD(2,0,0,"Known loc
ation of suspects at the time"):PROCD
(2,0,2,"the murder occurred."+r$+STRIN
G$(17,CHR$255))
470 TX=4:FORCX=0T09:FORBX=0T09
480 IFmX=1ANDS(BX,CX,2)=-1ANDS(BX,C
X,0)<>0PROCD(5,0,TX,R$(CX)):PROCD(3,1
8,TX,S$(BX)):TX=TX+2
490 IFnX=1ANDW(BX,CX,2)=-1ANDW(BX,C
X,0)<>0PROCD(5,0,TX,R$(CX)):PROCD(3,1
8,TX,W$(BX)):TX=TX+2
500 NEXT:NEXT
510 IFTX=4PROCD(1,0,8,"All previous
locations are unknown."):PROCB
520 PROCC
530 mX=0:nX=0:ENDPROC
540 CLS:nX=1:PROCD(2,0,0,"Known loc
ation of weapons at the time"):PROCD(
2,0,2,"the murder occurred."+r$+STRIN
G$(16,CHR$255)):GOTO470
550 DEFPROCF
560 CLS:A$=r$+"ACCUSATION"+y$+"The
":b$="Key in the number of the ":PROC
D(3,0,0,A$+"Murderer was -")
570 TX=2:FORBX=0T09:PROCD(7,6,TX,CH
R$(BX+48)+r$+S$(BX)):TX=TX+2:NEXT:PRO
CD(3,0,22,f$+b$+"murderer.")
580 *FX15,1
590 REPEATX=INSTR("0123456789",GET
$):UNTILX:X=X-1
600 CLS:PROCD(3,0,0,A$+"Murder took
place in -")

```

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610 TX=2:FORBX=0T09:PROCD(7,6,TX,CH
R$(BX+48)+r$+S$(BX)):TX=TX+2:NEXT:PRO
CD(3,0,22,f$+b$+"room.")
620 *FX15,1
630 REPEATY=INSTR("0123456789",GET
$):UNTILY:Y=Y-1
640 CLS:PROCD(3,0,0,A$+"Weapon used
was -")
650 TX=2:FORBX=0T09:PROCD(7,6,TX,CH
R$(BX+48)+r$+W$(BX)):TX=TX+2:NEXT:PRO
CD(3,0,22,f$+b$+"weapon.")
660 *FX15,1
670 REPEATZ=INSTR("0123456789",GET
$):UNTILZ:Z=Z-1
680 IFS(XZ,PZ,1)<>-1CLS:VDU7:PROCP(
5,9,"You must be in the"+i$+"same roo
m"+m$+"as the person you're accusing
"):GOTO820
690 CLS:PROCP(1,0,"Your accusation
reads as follows"):PROCP(3,3,"Cecil
Effingham was murdered in "+R$(Y$)+"b
y "+S$(X$)+"who used "+W$(Z$))
700 PROCD(2,1,12,"Is this correct Y
/N ?"):A$=GET$
710 IFA$="N"ORA$="n"GOTO560
720 IFA$="Y"ORA$="y"ELSEVDU7:GOTO70
0
730 IFX=KXANDZ=XWZANDY=XMZPROCD(5,
0,12,f$+"CONGRATULATIONS ! You were r
ight."):SX=SX+1000*(DX-1):PROCF:PROCC
:PROCY:GOTO830ELSEPROCD(5,0,12,f$+"A
false accusation !"):PROCB
740 IFX<>KXANDZ<>WZANDY<>MXSZ=SX
-750
750 IF(XZ<>KXANDZ<>WZ)OR(ZZ<>WZAND
YZ<>MZ)OR(XZ<>KXANDY<>MX)SZ=SX-500
760 SX=SX-250
770 b$="at the time of the murder "
:c$="was in "
780 FORBX=0T09
790 IFX<>KXANDS(XZ,BZ,0)=-1ANDBX<>
YZPROCP(2,15,S$(XZ)+c$+R$(BZ)+b$):S(X
Z,BZ,2)=-1:GOTO820
800 IFZ<>WZANDW(ZZ,BZ,0)=-1ANDBZ<>
YZPROCP(2,15,b$+W$(ZZ)+c$+R$(BZ)):W(Z
Z,BZ,2)=-1:GOTO820
810 NEXT
820 PROCC:ENDPROC
830 IFSX>HXHX=SX
840 RUN
850 CLS
860 PROCD(2,9,2,"Detective Rank"):P
RINTTAB(7,4)r$;STRING$(23,CHR$255):RE
STORE4190:FORBX=1T05:READd$
870 IFBZ=DXPROCD(3,7,4+BX*2,CHR$(BX
+48)+ " "+d$):D$d$ELSEPROCD(5,7,4+BX*
2,CHR$(BX+48)+ " "+d$)

```


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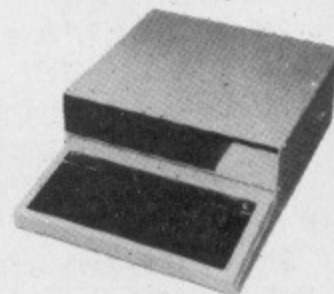
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From Page 161

```

880 NEXT
890 PROCP(2,18,"Key in the number to
change the rank or"+y$+"SPACE BAR"+
g$+"to return to the menu ")
900 CX=GET-48:IFCX=-16ENDPROC
910 IFCX<10RCX>5VDU7:GOTO900ELSEDX=
CX:GOTO860
920 CLS:PROCD(5,9,5,"PAUSE or QUIT
?"):PROCD(2,0,10,"Press"+i$+"SPACE"+g
$+"to resume investigations."):pZ=TIM
E
930 PROCD(2,0,15,"Press"+i$+'Q'+g
$+"to quit investigations.")
940 A$=GET$
950 IFA$=" "THENTIME=pZ:ENDPROC
960 IFA$="Q"ORA$="q"SZ=0:PROCY:RUN
ELSE940
970 DEFPROCS
980 FORBZ=1TODZ
990 pZ=RND(10)-1:uZ=RND(10)-1:vZ=RN
D(10)-1:xZ=RND(10)-1:yZ=RND(10)-1:zZ=
RND(10)-1
1000 c=0:w=0:FORCZ=0T09
1010 IFS(CZ,yZ,1)=-1c=c+1
1020 IFW(CZ,zZ,1)=-10RW(CZ,zZ,3)=-1w
=w+1
1030 NEXT
1040 IFw>3BZ=DX:GOTO1080
1050 IFC>3BZ=DX:GOTO1080
1060 IFS(pZ,vZ,1)=-1S(pZ,vZ,1)=0:S(p
Z,vZ,3)=0:S(pZ,yZ,1)=-1
1070 IFW(uZ,xZ,1)=-1ANDW(uZ,xZ,3)<-
1W(uZ,xZ,1)=0:W(uZ,zZ,1)=-1
1080 NEXTBZ
1090 ENDPROC
1100 DEFPROCH
1110 PROCB
1120 FORBZ=0T09:PROCD(7,0,3+BZ*2,CHR
$(BZ+48)+" "+CHR$129+R$(BZ)):NEXT
1130 PROCD(2,16,9,"Which room next ?
")
1140 *FX15,1
1150 REPEATBZ=INSTR("0123456789",GET
$):UNTILBZ=BZ-1
1160 SZ=SZ-ABS(PZ-BZ):PZ=BZ
1170 PROCD(3,16,11,R$(PZ))
1180 PROCB
1190 IFSZ<=0SZ=0:PROCY:RUN ELSEPROC6
1200 PROCD(5,0,2,"In this room you f
ind :-"):TX=4
1210 oZ=0:FORBZ=0T09
1220 IFS(BZ,PZ,1)=-1PROCD(3,(38-LEN(
S$(BZ)))/2,TX,S$(BZ)):TX=TX+2:S(BZ,PZ
,3)=-1oZ=oZ+1:IX=BZ
1230 NEXT
1240 IFoZ=0oZ=""o$="":PROCD(1,15,4,
"no-one!"):PROCB ELSEO$="Obtain a sta

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tement from a suspect.(O)":o$="Make
an accusation.(A)"
1250 PROCD(1,0,12,"What will you do
?"):PROCD(2,0,14,0$):PROCD(2,0,16,"Se
arch the room for hidden clues.(S)"
:PROCD(2,0,18,"Leave the room for els
ewhere.(L)":PROCD(2,0,20,o$)
1260 PRINTTAB(1,22)r$;STRING$(38,CHR
$255):PRINTTAB(13,23)h$r$Score";y$S$
;TAB(13,24)h$r$Score"y$S$;
1270 *FX15,1
1280 A$=GET$
1290 IF(A$="A"ORA$="a")ANDoZ<>0PROCF
:GOTO1190
1300 IF(A$="O"ORA$="o")ANDoZ<>0PROCO
:GOTO1190
1310 IFA$="L"ORA$="l"ENDPROC
1320 IFA$="S"ORA$="s"PROCK:GOTO1190E
LSEVDU7:GOTO1280
1330 DEFPROCG:CLS:PROCP(5,0,"You are
in"+R$(PZ)):ENDPROC
1340 DEFPROCD
1350 IFoZ=16GOTO1430
1360 PROC6:TX=8
1370 PROCP(2,3,"Which suspect do you
wish to get a statement from ? Key n
umber ")
1380 FORBZ=0T09
1390 IFS(BZ,PZ,1)=-1PROCD(3,0,TX,CHR
$(BZ+48)+" "+S$(BZ)):TX=TX+2
1400 NEXT
1410 *FX15,1
1420 REPEATIX=INSTR("0123456789",GET
$):UNTILIX=IX-1
1430 IFQZ=PZANDNX=IXELSEUX=18-DZ*2
1440 QZ=PZ:NZ=IX
1450 IFS(IX,PZ,1)<-1VDU7:GOTO1410
1460 PROC6:PROCP(2,2,CHR$129+S$(IX)+
g$+"makes the following statement "):
PROCN(IX,PZ)
1470 IFUX<1PROCS:PROCC:ENDPROC
1480 PRINTTAB(0,23)h$g$Another stat
ement"i$Y/N ?";TAB(0,24)h$g$Another
statement"i$Y/N ?";A$=GET$
1490 *FX15,1
1500 IFA$="Y"ORA$="y"GOTO1460
1510 IFA$="N"ORA$="n"ENDPROC ELSEVDU
7:GOTO1480
1520 ENDPROC
1530 DEFPROCK:CLS:TX=12:PROC6
1540 CX=0
1550 IFW(CX,PZ,3)=-1ANDqZ=0GOTO1580
1560 CZ=CX+1:IFCZ>9ELSE1550
1570 GOTO1620
1580 PROCP(3,6,"Remember, you have a
Iready searched in"+r$+R$(PZ)+y$+"and
found ")
1590 FORBZ=0T09
1600 IFW(BZ,PZ,3)=-1PROCD(1,(38-LEN(

```

```

W$(BZ)))/2,TX-1,W$(BZ)):TX=TX+2
1610 NEXT:GOTO1740
1620 PROCD(3,0,3,"Do you wish to mak
e a quick search"):PROCD(3,0,5,"(Q) o
r a thorough search (T) ?")
1630 *FX15,1
1640 A$=GET$
1650 IFA$="Q"ORA$="q"A$="A quick":RZ
=DX+4:GOTO1670
1660 IFA$="T"ORA$="t"A$="A thorough"
:RZ=DX+8ELSEVDU7:GOTO1640
1670 SZ=SZ-(20-RZ):o=0
1680 PROCD(4,0,8,"Searching "+R$(PZ)
+").":pZ=TIME:REPEAT:SOUND1,-9,25,2:S
OUND1,-9,50,2:UNTILTIME>pZ+(RZ*25):PR
OCS
1690 FORBZ=0T09
1700 PROCD(3,0,8,A$+y$+"search of"+r
$+R$(PZ)):PROCD(3,0,10,"has uncovered
:- ")
1710 IFW(BZ,PZ,1)=-1ANDRND(RZ)>1ANDW
(BZ,PZ,3)<-1PROCD(1,(38-LEN(W$(BZ))
)/2,TX,W$(BZ)):TX=TX+2:W(BZ,PZ,3)=-1:i
=BZ:o=o+1:SZ=SZ+DX*RND(9):PROCF
1720 NEXT
1730 IFo=0PROCD(11,14,12,"Nothing !"
):PROCB
1740 PROCD(2,0,20,"Do you wish to se
arch again (Y/N) ?")
1750 *FX15,1
1760 G$=GET$:IFG$="Y"ORG$="y"qZ=1:PR
OCK:ENDPROC
1770 IFG$="N"ORG$="n"qZ=0:CLS:ENDPRO
C ELSEVDU7:GOTO1760
1780 ENDPROC
1790 DEFPROCB:SZ=SZ-(INT(TIME/500))+
jZ:jZ=INT(TIME/500):IFSZ<=0SZ=0
1800 ENDPROC
1810 DEFPROCS:SZ=SZ-50:ENDPROC
1820 DEFPROCC:CLS
1830 PRINTTAB(3,2)y$BATHROOM";TAB(1
5,3)y$BEDROOM";TAB(29,4)y$STUDY";TA
B(3,9)y$DINING";TAB(4,10)y$ROOM";TA
B(3,16)y$KITCHEN"
1840 PRINTTAB(28,12)y$LOUNGE";TAB(1
5,12)y$BALLROOM";TAB(2,21)y$CELLAR"
;TAB(16,21)y$HALL";TAB(28,19)y$LIBR
ARY"
1850 PRINTTAB(0,0)r$;STRING$(38,CHR$
255)
1860 FORTZ=1T023
1870 PRINTTAB(0,TX)r$;CHR$255
1880 IFTZ>18THEN1920
1890 IFTZ=30RTZ=9THEN1910
1900 PRINTTAB(12,TX)r$;CHR$255
1910 IFTZ=30RTZ=110RTZ=18THEN1930
1920 PRINTTAB(25,TX)r$;CHR$255

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Game of the Month

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```

1930 PRINTTAB(37,TX)R$;CHR$255
1940 IFTX>19PRINTTAB(9,TX)R$;CHR$255
1950 NEXT
1960 PRINTTAB(0,4)R$;STRING$(13,CHR$
255);TAB(25,8)R$;STRING$(5,CHR$255);"
";STRING$(6,CHR$255);TAB(0,14)R$;ST
RING$(6,CHR$255);" ";STRING$(5,CHR$2
55)
1970 PRINTTAB(25,16)R$;STRING$(5,CHR
$255);" ";STRING$(6,CHR$255);TAB(0,1
9)R$;STRING$(4,CHR$255);" ";STRING$(
4,CHR$255);" ";STRING$(6,CHR$255);"
"STRING$(6,CHR$255)
1980 PRINTTAB(12,6)R$;STRING$(14,CHR
$255);TAB(0,23)R$;STRING$(38,CHR$255)
1990 PROCC:ENDPROC
2000 DEFPROC(c,x,y,z$):PRINTTAB(x,y
);h$;CHR$(c+128);z$;TAB(x,y+1);h$;CHR
$(c+128);z$:ENDPROC
2010 DEFPROC
2020 *FX15,1
2030 PRINTTAB(2,24)Y$;STRING$(11,CHR
$255);f$;"SPACE BAR ";STRING$(12,CHR$
255);:A$=GET$:IFA$=" " CLS:ENDPROC EL
SEVDU7:GOTO2030
2040 DEFPROC
2050 CLS:PROC(3,9,7,f$+"G A M E
O V E R"):PROC(5,10,11,"( Murder Sum
mary )"):PRINT "y$ Your Score";i$;
S$;y$ " High Score";i$;HX:PROCC:CLS
2060 FORCX=0TO9
2070 PRINT " Room : "Y$;R$(CX) "
2080 P$="was here at the time of the
murder.";Q$="is now to be found here
."
2090 FORBX=0TO9
2100 IFS(BX,CX,0)<>0I=B$:PRINT;Y$+S$
(BX)'r$+p$;
2110 IFW(BX,CX,0)<>0J=B$:PRINT;Y$+W$
(BX)'r$+p$
2120 IFS(BX,CX,1)=-1PRINT;m$+S$(BX)'
+r$+q$
2130 IFW(BX,CX,1)=-1PRINT;m$+W$(BX)'
+r$+q$
2140 NEXT
2150 IFCX=MXPRINTR$"The murder was c
ommitted in "Y$+R$(CX)+R$"by"Y$+S$(
i);'r$using"Y$+W$(j)
2160 PROCC
2170 NEXT
2180 CLS:PROC(7,6,7,"Another Invest
igation ?"):PROCC
2190 ENDPROC
2200 DEFPROCI
2210 RESTORE4160
2220 FORBX=0TO9:READR$(BX),S$(BX),W$
(BX):NEXT

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2230 MX=RND(10)-1
2240 FORCX=2TO3:FORBX=0TO9:FORGZ=0TO
9:S(GX,BX,CX)=0:W(GX,BX,CX)=0:NEXT:NE
XT:NEXT
2250 PROC(1,5,13,"A Murder Investig
ation.")
2260 FORCX=0TO1:PROCr
2270 FORBX=0TO9
2280 IFBX=MXANDCX=0S(A(BX),BX,CX)=1:
KX=A(BX)ELSE(A(BX),BX,CX)=-1
2290 NEXT
2300 PROC(4,10,17,"by"+G$+"Ken Smit
h.")
2310 NEXT
2320 FORCX=0TO1:PROCr
2330 FORBX=0TO9
2340 IFBX=MXANDCX=0W(A(BX),BX,CX)=1:
WX=A(BX)ELSEW(A(BX),BX,CX)=-1
2350 NEXT
2360 NEXT
2370 RESTORE4200:FORBX=0TO52:READA$(
BX):NEXT
2380 RESTORE4190:READD$
2390 ENDPROC
2400 DEFPROCr
2410 FORBX=0TO9
2420 PROCr
2430 A(BX)=RZ
2440 IFBX=0GOTO2480
2450 EX=0
2460 IFA(EX)<>A(BX)ELSE2420
2470 EX=EX+1:IFEX<>BXGOTO2460
2480 NEXT
2490 ENDPROC
2500 DEFPROCR:RX=RND(10)-1:ENDPROC
2510 DEFPROCP(c,y,z$)
2520 z=LEN(z$):z$=LEFT$(z$,z-1)+". "
2530 W$="":L$="":SW=39:FORFX=1TOLEN(
z$)
2540 S$=MID$(z$,FX,1):AX=ASC(S$)
2550 IFAX>96ANDAX<123ANDFX=1AX=AX-32
:S$=CHR$AX
2560 IFAX<>32ANDAX<129W$=W$+S$:GOTO2
590
2570 IFSW<=LEN(W$)+1PROC(c,0,y,L$):
SW=39:y=y+2:L$=""
2580 L$=L$+W$+S$:SW=SW-(LEN(W$)+1):W
$=""
2590 NEXT:PROC(c,0,y,L$)
2600 ENDPROC
2610 DEFPROCA(RX)
2620 AX=-1:BZ=-1:CZ=-1:DZ=-1
2630 IFRX=0VX=1:AX=1:GOTO2730
2640 IFRX=9VX=7:AX=7:GOTO2730
2650 IFRX=1AX=0:BZ=2:JX=RND(2):V$=MI
D$("02",JX,1)
2660 IFRX=2AX=1:BZ=3:JX=RND(2):V$=MI
D$("13",JX,1)
2670 IFRX=3AX=2:BZ=4:CZ=5:JX=RND(3):

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```

V$=MID$("245",JX,1)
2680 IFRX=4AX=3:BZ=5:JX=RND(2):V$=MI
D$("35",JX,1)
2690 IFRX=5AX=3:BZ=4:CZ=6:DZ=8:JX=RN
D(4):V$=MID$("3468",JX,1)
2700 IFRX=6ORRX=8AX=5:BZ=7:JX=RND(2)
:V$=MID$("57",JX,1)
2710 IFRX=7AX=6:BZ=8:CZ=9:JX=RND(3):
V$=MID$("689",JX,1)
2720 VZ=ASC(V$)-48
2730 IFBZ=-1BZ=AX
2740 IFCZ=-1CZ=AX
2750 IFDZ=-1DZ=AX
2760 ENDPROC
2770 DEFPROCN(IX,PX)
2780 Q$="":TX=7:A$=A$(RND(7)-1)
2790 IFIX=KXLX=1ELSELX=0
2800 RZ=RND(10)-1:IFRZ=PXGOTO2800
2810 FORBX=0TO9
2820 IFS(BX,PX,0)<>0S=BZ
2830 IFW(BX,PX,0)<>0W=BZ
2840 IFS(IX,BX,0)<>0E=BZELSE2800
2850 FORCX=0TO9
2860 IFW(CX,eX,0)<>0F=CX
2870 NEXT
2880 IFS(BX,rX,0)<>0G=BZ
2890 IFW(BX,rX,0)<>0H=BZ
2900 NEXT
2910 TX=TX+1:IFTX>9TX=RND(8)
2920 B$=""
2930 IFUX>10ELSE3070
2940 IFTX=1ANDS(IX,PX,0)<>0B$=A$(19)
+A$(7)+A$(21):S(IX,PX,2)=-1:PROCS
2950 IFTX=1ANDLX=1B$=A$(19)+A$(7)+A$
(21):S(IX,PX,2)=-1:PROCS
2960 IFTX=2ANDS(SZ,PX,0)<>0ANDSZ<>IX
B$=S$(SZ)+A$(7)+A$(21):S(SZ,PX,2)=-1:
PROCS
2970 IFTX=3AND(W(FX,eX,0)<>0ORLX=1)B
$=W$(FX)+A$(7)+A$(12)+A$(30)
2980 IFTX=4ANDW(WX,PX,0)<>0B$=W$(WX)
+A$(7)+A$(21):W(WX,PX,2)=-1:PROCS
2990 IFTX=5ANDGX<>1Xb$=S$(GX)+A$(7)+
R$(RX):S(GX,RX,2)=-1:PROCS
3000 IFTX=6B$=W$(HX)+A$(7)+R$(RX):W(
HX,RX,2)=-1:PROCS
3010 IFTX=7ANDS(IX,eX,0)<>0B$=A$(19)
+A$(7)+R$(eX):S(IX,eX,2)=-1:PROCS
3020 IFTX=7ANDLX=1B$=A$(19)+A$(7)+R$
(GX):S(IX,GX,2)=-1:PROCS
3030 IFTX=8ANDW(FX,eX,0)<>0B$=A$(19)
+A$(7)+A$(12)+W$(FX)
3040 IFTX=8ANDLX=1B$=A$(19)+A$(7)+A$
(12)+W$(HX)
3050 IFTX=9ANDGX<>1Xb$=S$(GX)+A$(7)+
A$(12)+W$(HX)
3060 IFB$=""ELSE3990

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```

3070 IFU>8ELSE3280
3080 IFt=1ANDK<5b=A$(24)+A$(25)+A$(26)+A$(27)
3090 IFt=1ANDI=KXANDK>4b=A$(24)+A$(25)+A$(26)+A$(27)
3100 IFt=2ANDK<4b=A$(24)+A$(25)+A$(26)+A$(28)
3110 IFt=2ANDI=KXANDK<5b=A$(24)+A$(25)+A$(26)+A$(28)
3120 IFt=3ANDK/2=INT(K/2)b=A$(24)+A$(25)+A$(26)+A$(38)
3130 IFt=3ANDK/2<>INT(K/2)ANDI=KXb=A$(24)+A$(25)+A$(26)+A$(38)
3140 IFt=4ANDr<>Mxb=A$(24)+A$(25)+A$(29)+R$(r)
3150 IFt=5ANDg<>KXANDg<>Ixb=A$(24)+A$(25)+A$(26)+S$(g)
3160 IFt=6b=A$(24)+A$(25)+A$(26)+A$(38)
3170 IFt=7ANDh<>Wxb=A$(24)+A$(25)+A$(31)+W$(h)
3180 IF(t=8ORt=9)k=RND(6)+7ELSE3270
3190 IFI=KXGOTO3260
3200 IFW=6ANDk=8GOTO3180
3210 IF(W=8ORW=2)ANDk=9GOTO3180
3220 IFW=4ANDk=10GOTO3180
3230 IFW=5ANDk=11GOTO3180
3240 IF(W=3ORW=8ORW=9)ANDk=12GOTO3180
3250 IFW=7ANDk=13GOTO3180
3260 b=A$(24)+A$(k+24):S=S-25
3270 IFb<>"a$=":GOTO3990
3280 IFU>6ELSE3540
3290 IFt=4GOTO3370
3300 PROCA(e)
3310 IFt=1b=A$(19)+A$(7)+A$(9)+R$(V)
3320 FORI=0TO9
3330 IFS(I,V,0)<>0ANDt=2ANDI<>Ixb=S$(I)+A$(7)+A$(9)+A$(20)
3340 IFW(I,V,0)<>0ANDt=4b=W$(I)+A$(7)+A$(9)+A$(20)
3350 IFt=3AND(P=aXORP=bXORP=cXORP=d) b=A$(19)+A$(7)+A$(9)+A$(21)
3360 NEXT
3370 IFt=9PROCA(P)ELSE3410
3380 FORB=0TO9
3390 IFS(B,V,0)<>0ANDBX<>Ixb=A$(9)+A$(21)+A$(22)+S$(B)
3400 NEXT
3410 IFt=6GOTO3470
3420 PROCA(r)
3430 FORB=0TO9
3440 IFW(B,V,0)<>0ANDt=5b=W$(B)+A$(7)+A$(9)+R$(r)
3450 IFS(B,V,0)<>0ANDt=6ANDBX<>I

```

```

b=S$(B)+A$(7)+A$(9)+R$(r)
3460 NEXT
3470 PROCA(M)
3480 FORB=0TO9
3490 IFS(B,V,0)<>0ANDt=7ANDBX<>Ixb=S$(B)+A$(7)+A$(9)+A$(23)
3500 IFS(I,V,0)<>0ANDt=7b=A$(19)+A$(7)+A$(9)+A$(23)
3510 IFW(B,V,0)<>0ANDt=8b=W$(B)+A$(7)+A$(9)+A$(23)
3520 NEXT
3530 IFb$=""ELSE3990
3540 IFU>4ELSE3700
3550 IFt=1ANDS(I,P,0)<>-1b=A$(19)+A$(8)+A$(21)
3560 IFt=1ANDS(I,P,0)=1b=A$(19)+A$(8)+A$(21)
3570 IFt=2ANDf<>hxb=W$(h)+A$(8)+A$(12)+A$(30)
3580 IFt=2ANDf=hXANDI=KXb=W$(h)+A$(8)+A$(12)+A$(30)
3590 IFt=3ANDg<>Ixb=S$(g)+A$(8)+A$(21)
3600 IFt=4ANDh<>wxb=W$(h)+A$(8)+A$(21)
3610 BX=RND(10)-1:IFB=IXGOTO3610
3620 IFt=5ANDS(B,r,0)<>-1ANDBX<>Ixb=S$(B)+A$(8)+R$(r)
3630 IFt=6ANDW(B,r,0)<>-1 b=W$(B)+A$(8)+R$(r)
3640 IFt=7ANDr<>exb=A$(19)+A$(8)+R$(r)
3650 IFt=7ANDr=eXANDI=KXb=A$(19)+A$(8)+R$(r)
3660 IFt=8ANDr<>exb=A$(19)+A$(8)+A$(12)+W$(h)
3670 IFt=8ANDr=eXANDI=KXb=A$(19)+A$(8)+A$(12)+W$(h)
3680 IFt=9ANDW(B,r,0)<>S(B,r,0)b=S$(B)+A$(8)+A$(12)+W$(B)
3690 IFb$=""ELSE3990
3700 IFU>2a$=""ELSE3940
3710 FORB=0TO9
3720 IFW(B,r,1)=-1iX=BX

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```

3730 NEXT
3740 PROCA(r)
3750 IFt=1AND(W(i,a,0)<>0ORW(i,c,0)<>0ORW(i,d,0)<>0)ANDW(i,r,1)<>0b=W$(i)+A$(7)+A$(14)+A$(13)
3760 IFt=2ANDW(i,a,0)=0ANDW(i,b,0)=0ANDW(i,c,0)=0ANDW(i,d,0)=0b=W$(i)+A$(8)+A$(9)+A$(14)+A$(13)
3770 FORB=0TO9
3780 IFt=3AND(S(B,a,0)<>0ORS(B,c,0)<>0ORS(B,d,0)<>0)ANDI<>0xb=S$(B)+A$(7)+A$(9)+A$(18)+W$(i)+A$(11)
3790 IFt=4ANDS(B,a,0)=0ANDS(B,b,0)=0ANDS(B,c,0)=0ANDS(B,d,0)=0ANDI<>0xb=S$(B)+A$(8)+A$(9)+A$(18)+W$(i)+A$(13)
3800 IFt=5ANDS(B,r,0)<>0ANDW(i,r,1)=-1ANDBX<>Ixb=S$(B)+A$(7)+A$(12)+W$(i)+A$(13)
3810 NEXT
3820 FORB=0TO9
3830 IFW(B,r,0)<>0iX=BX
3840 NEXT
3850 PROCA(r)
3860 IFt=6ANDW(i,a,1)=0ANDW(i,b,1)=0ANDW(i,c,1)=0ANDW(i,d,1)=0b=W$(i)+A$(18)+A$(9)+A$(14)+A$(17)
3870 IFt=7AND(W(i,a,1)=-1ORW(i,b,1)=-1ORW(i,c,1)=-1ORW(i,d,1)=-1)b=W$(i)+A$(13)+A$(16)+A$(9)+A$(14)+A$(17)
3880 FORB=0TO9
3890 FORC=0TO9
3900 IFt=8ANDW(B,C,0)<>0ANDW(B,C,1)=-1b=W$(B)+A$(15)
3910 NEXT
3920 NEXT
3930 IFt=9ANDW(w,P,0)<>0 b=W$(w)+A$(7)+A$(21):W(W,P,2)=-1:PROCs
3940 IFb$=""ANDU<3ELSE3990
3950 a$=""
3960 FORB=1TO9
3970 IFt=BXb=A$(B+38)
3980 NEXT
3990 IFb=c$ORb$=""GOTO2910
4000 c$=b$:Q$a$+b$:PRDPC(3,T,Q):S=X-S-(U*X*D)
4010 UX=UX-2
4020 IFU>0ANDT<8a$=A$(RND(5)+47)+",":b$="":T=15:GOTO2910
4030 ENDPROC
4040 DEFPROCL
4050 A$="":c=RND(2):r=RND(10)-1:IFrX=M%GOTO4050
4060 FORB=0TO9
4070 IFS(B,r,0)<>0ANDS(B,r,2)=0ANDc=1S(B,r,2)=-1:A=S$(B)

```



```

4080 IFW(B%,r%,0)<>0ANDW(B%,r%,2)=0A
NDc=2W(B%,r%,2)=-1:A$=W$(B%)
4090 NEXT:PROC:PROCf
4100 IFA$=""$OTO4050
4110 CLS:PROCD(5,0,4,"A note is hand
ed to you saying:-"):PROCP(2,0,A$+"wa
s in "+R$(r%)+$at the time of the mur
der "):PROCD(5,0,14,"The note is unsi
gned.")
4120 PROCC:ENDPROC
4130 DEFPROCb:SOUND1,-15,20,6:SOUND1
,-15,0,6:ENDPROC
4140 DEFPROCf:LOCALA,B:RESTORE4150:F
ORI=1TO6:READ A,B:SOUND1,0,0,1:SOUND1
,-15,A,B:NEXT:ENDPROC
4150 DATA53,1,61,1,69,1,77,4,69,2,77
,4
4160 DATAthe bathroom ,Dr Adams ,the
carving knife ,the bedroom ,Gregg th
e butler ,the chain saw ,the study ,M
ajor Caine ,the duelling pistol ,the
lounge ,Harry the gardener ,the knitt
ing needle ,the library ,Reverend Jon
es
4170 DATAthe paperweight ,the ballro
on ,Felicity the maid ,the pillow ,th

```

```

e dining room ,Mrs Dwight ,the rat po
ison ,the kitchen ,Beatrice the nanny
,the silk scarf ,the hall ,Lady Effi
ngham ,the walking stick
4180 DATAthe cellar ,Isabel the cook
,the wrench
4190 DATADetective Constable,Detecti
ve Sergeant,Detective Inspector,Super
intendent,Chief Inspector
4200 DATAat the time the murder occu
rred ,When the murder was committed ,
At the time of the murder ,Around the
time of the murder ,As I recall now
- at about 10.30pm ,At 10.30pm ,Aroun
d 10.30pm
4210 DATAwas in ,was not in ,an adjo
ining room to ,the one where ,can now
be found ,the same room as ,is now ,
where it ,has been in the same room a
ll the time ,in ,was earlier ,is not
in
4220 DATAI ,where I was ,this room ,
was occupied by ,where the murder occ
urred
4230 DATAthe Earl wasn't ,murdered ,
by ,a woman ,a man ,in ,me ,with ,sho

```

```

t ,stabbed ,suffocated ,poisoned ,kil
led by a blow to the head ,strangled
,a servant
4240 DATAI'm afraid I've nothing mor
e to say at present ,I'm sorry I can'
t be of anymore assistance ,Like to a
ssist you some more but I need time t
o think ,Let me think a while. Come b
ack a little later ,That's about it I
'm afraid
4250 DATAI've nothing much to add to
what you already know ,You're the de
tective - you go and find out who did
it ,No further comment ,I'd rather n
ot say anymore at present
4260 DATAFurthermore,Also,In additio
n,Moreover,Besides
4270 *TAPE
4280 FORI%=0TO TOP-PAGE STEP4
4290 I%=&E00=I%:PAGE:NEXT
4300 ?&13=?&13-(PAGE-&E00)DIV256
4310 PAGE=&E00:RUN

```

This listing is included in this month's cassette tape offer. See order form on Page 199.

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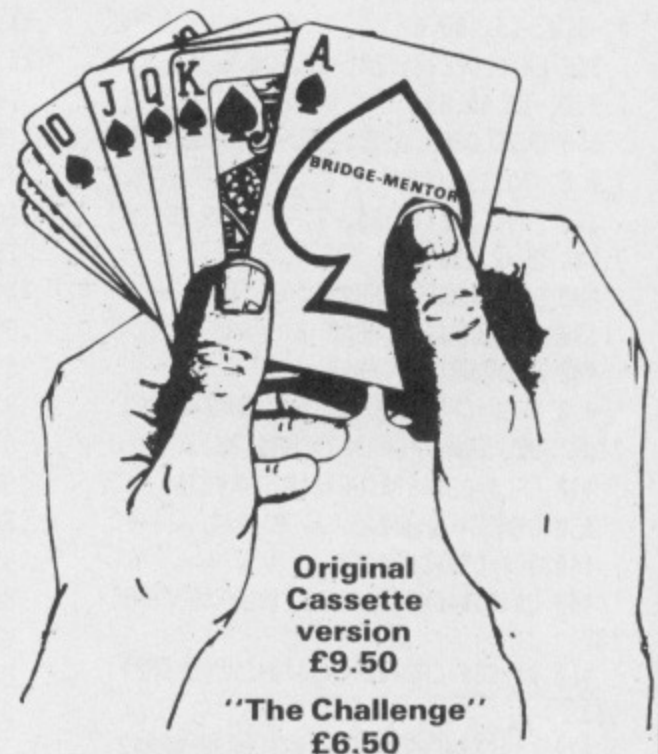
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**Original
Cassette
version
£9.50**

**"The Challenge"
£6.50**

From Page 111

```

140 FORIX=1TO20
150 PROCgloop
160 PROCguzzler
170 NEXT
180 UNTILFNFUEL
190 PROCgame
200 UNTILFALSE
210 END
220 DEFPROCchar
230 VDU23,230,121,253,143,189,189,1
43,253,121
240 VDU23,231,158,191,241,189,189,2
41,191,158
250 VDU23,232,255,36,126,219,219,21
9,195,126
260 VDU23,233,126,195,219,219,219,1
26,36,255
270 VDU23,236,0,255,129,189,189,129
,255,0
280 VDU23,237,126,66,90,90,90,90,66
,126
290 VDU23,238,0,127,65,93,93,93,67,
126
300 VDU23,239,126,67,93,93,93,65,12
7,0
310 VDU23,240,0,254,130,186,186,186
,194,126
320 VDU23,241,126,194,186,186,186,1
30,254,0
330 VDU23,242,255,255,255,255,255,2
55,255,255
340 ENVELOPE1,1,20,-15,-15,5,5,5,10
0,-3,0,-15,100,0
350 ENVELOPE2,1,20,-20,-20,2,1,1,12
7,0,0,-15,80,80
360 ENVELOPE3,1,20,-15,-15,6,3,3,12
7,0,0,-15,126,126
370 ENVELOPE4,1,60,-4,-2,2,25,25,12
7,-4,-2,-2,126,90
380 C2$=CHR$17+CHR$2
390 C3$=CHR$17+CHR$3
400 C4$=CHR$17+CHR$4
410 CFS$=CHR$17+CHR$11+CHR$17+CHR$1
31+" FUEL LOW "+CHR$17+CHR$128
420 CFC$=C3$+STRING$(10,CHR$236)
430 G$=C2$+CHR$242
440 GU$=C3$+CHR$230
450 U$=C3$+CHR$32+CHR$11+CHR$8+CHR$
232
460 D$=C3$+CHR$32+CHR$10+CHR$8+CHR$
233
470 L$=C3$+CHR$32+CHR$8+CHR$8+CHR$2
31
480 R$=C3$+CHR$32+CHR$230

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```

490 HIX=0:SZ=0
500 ENDPROC
510 DEFPROCstart
520 IFSX>HIX HIX=5X
530 SZ=0:OUX=3:SCX=0
540 FX=50:GX=100
550 ENDPROC
560 DEFPROCscreen
570 VDU23;8202;0;0;0;
580 VDU29,640;480;
590 VDU19,2,0,0,0,0
600 CLS:COLOUR3
610 FORIX=0TO19:SZ(XZ,31)=128:SZ(XZ
,2)=128:NEXT
620 FORYZ=0TO31:SZ(0,YZ)=128:SZ(19,
YZ)=128:NEXT
630 DD$=CHR$237+CHR$8+CHR$10
640 PRINTTAB(0,31)CHR$239+STRING$(1
8,CHR$236)+CHR$241;
650 PRINTTAB(0,0)CHR$11+CHR$238+STR
ING$(18,CHR$236)+CHR$240;
660 PRINTTAB(0,1)STRING$(30,DD$);
670 PRINTTAB(19,1)STRING$(30,DD$);
680 PRINTTAB(0,2)CHR$238+STRING$(18
,CHR$236)+CHR$240;
690 FORXZ=7TO12:FORYZ=11TO22:PRINTT
AB(XZ,YZ)G$:SZ(XZ,YZ)=129:NEXT:NEXT
700 COLOUR4:RESTORE
710 REPEAT
720 READXX:IFXZ>20 NX=XZ:GOTO770
730 IFNZ=238:BX=240:CZ=241:DX=239 E
LSEBX=NX:CZ=NX:DX=NX
740 READYX
750 PRINTTAB(XZ,YZ)CHR$NX TAB(19-XZ
,YZ)CHR$BX TAB(19-XZ,33-YZ)CHR$CX TAB
(XZ,33-YZ)CHR$DX
760 SZ(XZ,YZ)=128:SZ(19-XZ,YZ)=128:
SZ(19-XZ,33-YZ)=128:SZ(XZ,33-YZ)=128
770 UNTILNX=255
780 NX=0
790 FORIX=1TO8:READXX,YZ:PROCnew(XZ
,YZ):NEXT
800 VDU19,2,2,0,0,0
810 XZ=10:YZ=3:CZ=TRUE
820 PRINTTAB(XZ,YZ)GU$
830 PRINTTAB(1,1)"FUEL ";FXTAB(10,1
)"SC ";SZ
840 ENDPROC
850 DATA236
860 DATA2,4,3,4,4,4,5,4,6,4,7,4,8
870 DATA4,9,4,3,6,4,6,5,6,7,6,8,6
880 DATA9,6,8,14,9,14,10,16,5,8,6
890 DATAB,7,8,9,8,8,10,9,10,9,12,8,
12
900 DATA237
910 DATA2,7,2,8,2,9,2,10,2,12,2,14

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```

920 DATA2,16,4,9,4,10,4,11,4,13,4
930 DATA14,4,15,4,16,6,11,6,12,6,13
940 DATA6,15,6,16
950 DATA238
960 DATAB,16,2,6,4,8,6,10
970 DATA255
980 DATA7,10,12,10,7,23,12,23
990 DATA6,14,6,19,13,14,13,19
1000 DEFPROCguzzler
1010 SZ(XZ,YZ)=0
1020 IFINKEY=58 IFSX(XZ,YZ-1)<>128 P
RINTTAB(XZ,YZ)U$:YZ=YZ-1:SOUND2,2,50,
1:GOTO1060
1030 IFINKEY=42 IFSX(XZ,YZ+1)<>128 P
RINTTAB(XZ,YZ)D$:YZ=YZ+1:SOUND2,2,50,
1:GOTO1060
1040 IFINKEY=26 IFSX(XZ-1,YZ)<>128 P
RINTTAB(XZ,YZ)L$:XZ=XZ-1:SOUND2,2,100
,1:GOTO1060
1050 IFINKEY=122 IFSX(XZ+1,YZ)<>128 P
RINTTAB(XZ,YZ)R$:XZ=XZ+1:SOUND2,2,10
0,1:GOTO1060
1060 IFSX(XZ,YZ)=129 PROCgap ELSEIF(
SZ(XZ,YZ)<128ANDSZ(XZ,YZ)>0) PROCrgm(
SZ(XZ,YZ)) ELSEPROCd(0)
1070 SZ(XZ,YZ)=131:ENDPROC
1080 DEFFNFUEL
1090 FX=FX-1:PRINTTAB(6,1)C3$;FXCHR$
32
1100 IFNZ=0 =TRUE ELSEIFFX>25 =FALSE
ELSEIFFX=25 SOUND3,3,50,15:PRINTTAB(
5,31)CFS$; TAB(5,2)CFS$; ELSEIFFX=0 =
TRUE
1110 =FALSE
1120 DEFPROCd(TX):TX=TIME+TX:REPEATU
NTILTIME>TX:ENDPROC
1130 DEFPROCgloop
1140 IFRND(1500)>GX ENDPROC ELSEIFNX
>1 MX=RND(NX)ELSEIFNX=1 MX=1 ELSE END
PROC
1150 SOUND1,1,50,3
1160 PROCnew(UX?MX-1,VX?MX)
1170 PROCnew(UX?MX+1,VX?MX)
1180 PROCnew(UX?MX,VX?MX+1)
1190 PROCnew(UX?MX,VX?MX-1)
1200 IFCXPROCrem(MX)ELSECX=TRUE
1210 ENDPROC
1220 DEFPROCnew(AZ,BX)
1230 KX=SZ(AZ,BX)
1240 IFKX=0 ELSEIFKX<130 ENDPROC ELS
EIFKX=131 CX=FALSE:ENDPROC
1250 PRINTTAB(AZ,BX)G$
1260 NX=NX+1:UX?NX=AZ:VX?NX=BX
1270 SZ(AZ,BX)=NX
1280 ENDPROC
1290 DEFPROCrem(NX)

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1300 SX(UX?MX,VX?MZ)=129
1310 IFMX=NX NX=NX-1:ENDPROC
1320 UX?MX=UX?NX:VX?MZ=VX?NX
1330 SZ(UX?NX,VX?NZ)=MX
1340 NX=NX-1
1350 ENDPROC
1360 DEFPROCrgm(MX)
1370 UX?MX=UX?NX:VX?MZ=VX?NX
1380 SX(UX?NX,VX?NZ)=MX
1390 NX=NX-1
1400 DEFPROCgap
1410 SZ=SZ+5
1420 SOUND3,4,50,2
1430 PRINTTAB(13,1)C3$;SZ
1440 PROCngw(X-1,Y)
1450 PROCngw(X+1,Y)
1460 PROCngw(X,Y+1)
1470 PROCngw(X,Y-1)
1480 ENDPROC
1490 DEFPROCngw(AX,BX)
1500 IFSX(AX,BX)<>129 ENDPROC
1510 NX=NX+1:UX?NX=AX:VX?NZ=BX
1520 SX(AX,BX)=NX
1530 ENDPROC
1540 DEFPROCgame
1550 IFFX=0 PROCgloopwin ELSE PROCguzlerwin
1560 COLOUR132:CLS:COLOUR3
1570 PRINT''TAB(5)"SCORE CARD"
1580 PRINTTAB(4)"*****"

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```

1590 PRINT''TAB(1)"CITIES SAVED ";S
CX
1600 PRINT''TAB(1)"YOUR SCORE ";SX
1610 PRINT''TAB(1)"HIGH SCORE ";HI
Z
1620 IFGUX<>0 PRINT''TAB(1)"GUZZLER
S "STRING$(GUX,GU#+CHR$32)
1630 IF GUX=0 PRINT''TAB(5)"GAME O
VER":IF SX>HIX PRINT'TAB(4)"YOU GOT T
HE''TAB(4)"HIGH SCORE!"
1640 IF SCZ<100 GX=100+14*SCZ:FZ=50+
5*SCZ ELSE GX=1500:FZ=550
1650 IFGUX=0 PROCstart
1660 FORXZ=0TO19:FORYZ=0TO31
1670 SZ(XZ,YZ)=0:NEXT:NEXT
1680 PRINTTAB(1,29)"RETURN TO CONTIN
UE"
1690 COLOUR128
1700 REPEATUNTILINKEY-74
1710 ENDPROC
1720 DEFPROCgloopwin
1730 PRINTTAB(5,31)CFC$;TAB(5,2)CFC
$;
1740 GCOL0,2
1750 GUX=GUX-1
1760 FORXZ=0TO500 STEP4
1770 YZ=XZ:IFYZ>450 YZ=450
1780 SOUND1,-15,(YZ+XZ)DIV5,1
1790 SOUND2,-15,(YZ+XZ)DIV6,1
1800 SOUND3,-15,(YZ+XZ)DIV7,1

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1810 MOVEXZ,YZ:DRAW-XZ,YZ:DRAW-XZ,-Y
Z:DRAWXZ,-YZ:DRAWXZ,YZ:NEXT
1820 COLOUR0:COLOUR130:PRINTTAB(3,6)
"THE GLOOP WINS"TAB(5,10)"YOU RAN OUT
"TAB(7,12)"OF FUEL"
1830 PROCd(50):FORIZ=200TO400 STEP-5:
SOUND1,-15,IZ,2:SOUND2,-15,IZ+5,2:NEX
T
1840 COLOUR128
1850 ENDPROC
1860 DEFPROCguzlerwin
1870 SZ=SZ+100+SCZ*10:SCZ=SCZ+1
1880 COLOUR3:PRINTTAB(2,6)"CONGRATUL
ATIONS!"TAB(3,8)"YOU SAVED THE"TAB
(8,10)"CITY"
1890 FORIZ=200TO63 STEP2:SOUND1,-15,I
Z,2:SOUND2,-15,IZ*2,2:SOUND3,-15,IZ*4
,2:NEXT
1900 PROCd(100)
1910 ENDPROC
1920 DEFPROCinitializeuser
1930 T$=STRING$(40,CHR$0)
1940 T$=CHR$132+CHR$157+CHR$141+CHR$
131+"THE SUPER GREEN GLOOP GULPER GAM
E"
1950 PRINTT$'T$'
1960 T$=CHR$146+STRING$(39,CHR$243)
1970 PRINTT$'
1980 T$=CHR$32+CHR$130
1990 PRINTT$"THE CITY IS BEING INVAD
ED BY THE"'"T$"DREADED CREEPING MUTANT
GREEN GLOOP."
2000 PRINTT$"IT'S UP TO YOU TO SAVE
IT BY GULPING"'"T$"THE GLOOP WITH YOUR
TRUSTY GLOOP"'"T$"GUZZLER BEFORE THE
GLOOP GULPS YOU !"'"
2010 PRINTT$"YOU USE THE CURSOR KEYS
TO STEER"'"T$"YOUR GUZZLER. POINTS AR
E AWARDED FOR"'"T$"GLOOP GULPED AND CI
TIES CLEARED."
2020 PRINTT$"GLOOP BUZZLING USES ENE
RGY SO YOU"'"T$"MUST COMPLETE YOUR MIS
SION BEFORE"'"T$"YOUR FUEL RUNS OUT."
2030 T$=CHR$146+STRING$(39,CHR$243)
2040 PRINT''T$;
2050 PRINT'TAB(20)CHR$130"RETURN TO
START ";
2060 REPEATUNTILINKEY(10)=TRUE
2070 REPEATUNTILGET=13
2080 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 199.



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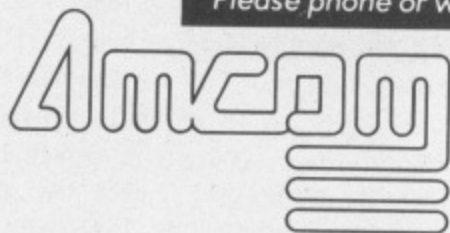
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```

+CHR$byte%
 620 char%=char%+1
 630 UNTIL byte%=255
 640 NEXT
 650 total%=FNtotal
 660 *FX200
 670 CLS
 680 ENDPROC
 690 DEFPROCget_new_defs
 700 LOCAL f_key%,key code%,X%,space%
,k$
 710 VDU22,6
 720 VDU19,0,back%:0;19,1,fore%:0;
 730 PROCwindow(2):PROCcolour(0,1):C
LS
 740 PRINTTAB(0,6)"TAB for menu";
 750 *FX220,9
 760 PROCprint_defs
 770 REPEAT
 780 PROCwindow(.)
 790 key_code%=FNkey_code
 800 f_key%=key_code%-200
 810 PROCcolour(0,1):CLS
 820 PROCshift_ctrl(f_key%):PRINT" -
type definition."
 830 PRINT""Press ";;PROCshift_ctr
l(f_key%):PRINT" again when complete.
""Escape to leave unchanged.";
 840 VDU13,11,11,11,11:PROCcolour(1,
0):PRINT">>";:PROCcolour(0,1):PRINT"
";
 850 k$="":space%=max%-total%+LENkey
$(f_key%)
 860 *FX229,1
 870 REPEAT
 880 REPEAT
 890 X%=GET
 900 IF (LENk%=31 OR LENk%>space%) A
ND X%<>127 AND X%<>key_code% AND X%<>
27 VDU7
 910 UNTIL (LENk%<31 AND LENk%<=spac
e%) OR X%=127 OR X%=key_code% OR X%=2
7
 920 IF X%<>27 k%=FNbuild_up(k%,X%)
 930 UNTIL X%=key_code% OR X%=27
 940 *FX21 7
 950 IF X%<>27 CLS:total%=total%-LEN
key$(f_key%):key$(f_key%)=k$:total%=t
otal%+LENkey$(f_key%):PROCcolour(1,0)
:PROCwindow(1):PROCdefinition(f_key%)
 960 *FX229
 970 UNTIL FALSE
 980 ENDPROC
 990 DEFFNkey_code
1000 LOCALK%
1010 REPEAT
1020 REPEAT

```

```

1030 PROCcolour(0,1):CLS
1040 PRINT"Press the ";;IF shift% P
RINT"shift"; ELSE PRINT"ctrl";
1050 PRINT" function key""which you
want to define."
1060 PRINT"Escape for ";;IF shift%
PRINT"ctrl"; ELSE PRINT"shift";
1070 PRINT" keys."
1080 PRINT"TAB for menu.";
1090 *FX21 0
1100 K%=GET
1110 CLS
1120 IF K%=27 THEN shift%=NOT shift%
:PROCprint_defs:PROCwindow(2)
1130 UNTIL (K%)=200 AND K%<=215 AND
shift%) OR (K%)=216 AND K%<=231 AND N
OT shift%)
1140 IF key$(K%-200)=lock$ VDU7
1150 UNTIL key$(K%-200)<>lock$
1160 =K%
1170 DEFPROCshift_ctrl(K%)
1180 IF K%<16 PRINT"Shift f-";K%; EL
SE PRINT"Ctrl f-";K%-16;
1190 ENDPROC
1200 DEFFNbuild_up(k%,X%)
1210 IF (X%)=32 AND X%<127) OR X%=13
k%=k$+CHR%X%:IF X%<>13 VDUX% ELSE IF
X%=13:PROCcolour(1,0):PRINT"R";:PROC
colour(0,1)
1220 IF X%=1 OR X%=4 OR X%=19 k%=k$+
CHR%X%:PROCcolour(1,0):PRINTCHR$(X%+6
4);:PROCcolour(0,1)
1230 IF X%=127 AND LENk%>0 k%=LEFT$(
k$,LENk%-1):VDUX%
1240 IF X%=128 AND X%<=137 k%=k$+CH
R%X%:PROCcolour(1,0):PRINT;X%-128;:PR
OCcolour(0,1)
1250 IF X%=9 k%=k$+CHR%9:PROCcolour(
1,0):PRINT"T";:PROCcolour(0,1)
1260 IF X%=140 AND X%<=143:PROCcolo
ur(1,0):PRINTCHR$(240+X%-140);:k%=k$+
CHR%X%:PROCcolour(0,1)
1270 IF X%=212 AND X%<=215 PROCcolo
ur(1,0):PRINTCHR$(244+X%-212);:k%=k$+
CHR$(X%-56):PROCcolour(0,1)
1280 IF X%=228 AND X%<=231 PROCcolo
ur(1,0):PRINTCHR$(248+X%-228);:k%=k$+
CHR$(X%-56):PROCcolour(0,1)
1290 =k$
1300 DEFPROCprint_defs
1310 LOCALN%,start%
1320 PROCwindow(1):PROCcolour(1,0):C
LS
1330 IF shift% start%=0 ELSE start%=
16
1340 PROCcolour(0,1):IF shift% PRINT
" Shift f-keys " ELSE PRINT" Ctrl f-k
eys "
1350 PRINT

```

```

1360 PROCcolour(1,0)
1370 FOR N%=start% TO start%+11
1380 IF start%=0 PRINTN%, " ; ELSE P
RINTN%-16". ";
1390 PROCdefinition(N%)
-1400 NEXT
1410 ENDPROC
1420 DEFPROCdefinition(N%)
1430 LOCAL LX
1440 IF shift% LX=N% ELSE LX=N%-16
1450 PRINTTAB(5,2+LX)SPC(35);:PRINTT
AB(5,2+LX);
1460 IF key$(N%)<>lock$ PROCprint_st
ring(key$(N%)) ELSE PRINT"Not availab
le"
1470 ENDPROC
1480 DEFPROCsave_code(code)
1490 LOCALf$,Q$,ok%
1500 PROCwindow(2)
1510 REPEAT:ok%=TRUE:CLS
1520 PRINTCHR$131;:INPUTLINE"Save wi
th what file name? "f$
1530 IF FNfiling_system=4 THEN IF FN
file_exists(f$) PRINT"CHR$7CHR$134"Fi
le exists...overwrite?":Q%=GET$:IF I
NSTR("Nn",Q%)<>0 ok%=FALSE
1540 UNTIL ok%
1550 CLS
1560 PRINT"CHR$131"Saving code....."
;
1570 IF FNfiling_system=4 THEN IF FN
file_exists(f$):PROCoscli("ACCESS "+f
$)
1580 PROCoscli("SAVE "+f$+" "+STR%~c
ode+" "+STR%~P%+" "+STR%~init)
1590 IF FNfiling_system=4 THEN PROCo
scli("ACCESS "+f$+" L")
1600 ENDPROC
1610 DEFPROCprint_string(S%)
1620 LOCALN%,X%
1630 FOR N%=1 TO LEN$S
1640 X%=MID$(S%,N%,1)
1650 IF ASCX%=32 AND ASCX%<128 PRIN
TX%;
1660 IF ASCX%=13 PROCcolour(0,1):PRI
NT"R";:PROCcolour(1,0)
1670 IF ASCX%=128 AND ASCX%<=139 PR
OCcolour(0,1):PRINT;ASCX%-128;:PROCCo
lour(1,0)
1680 IF ASCX%=1 OR ASCX%=4 OR ASCX%=
19 k%=k$+CHR%X%:PROCcolour(0,1):PRINT
CHR$(ASCX%+64);:PROCcolour(1,0)
1690 IF ASCX%=9 PROCcolour(0,1):PRIN
T"T";:PROCcolour(1,0)
1700 IF ASCX%=140 AND ASCX%<=143 PR
OCcolour(0,1):PRINTCHR$(240+ASCX%-140
);:PROCcolour(1,0)
1710 IF ASCX%=156 AND ASCX%<=159 PR
OCcolour(0,1):PRINTCHR$(244+ASCX%-156

```



```

);:PROCcolour(1,0)
1720 IF ASCX$>=172 AND ASCX$<=175 PR
OCcolour(0,1):PRINTCHR$(248+ASCX$-172
);:PROCcolour(1,0)
1730 NEXT
1740 PRINT
1750 ENDPROC
1760 DEFPROClock
1770 LOCAL NZ
1780 key$(10)=lock$:key$(26)=lock$
1790 FOR NZ=12 TO 15
1800 key$(NZ)=lock$
1810 key$(NZ+16)=lock$
1820 NEXT
1830 ENDPROC
1840 DEFFNtotal
1850 LOCALTZ,NZ
1860 FOR NZ=0 TO 31
1870 IF key$(NZ)<>lock$ TZ=TZ+LENkey
$(NZ)
1880 NEXT
1890 =TZ
1900 Returns TRUE or FALSE if file e
xists/doesn't exist on disc.
1910 Not called on tape machines.
1920 DEFFNfile_exists(F$)
1930 LOCALXZ
1940 XZ=OPENIN F$
1950 CLOSE#XZ
1960 =NOT(XZ=0)
1970 Returns 1 or 2 if tape, 4 if disc
1980 DEFFNfiling_system
1990 AZ=0:XZ=0:YZ=0
2000 =USR(&FFDA) AND &FF
2010 DEFFNget
2020 LOCAL QZ
2030 QZ=GET
2040 IF QZ=42:PROCCos_command
2050 =QZ
2060 DEFPROCos_command
2070 LOCAL A$,QZ
2080 PRINT'CHR$130;:INPUT"*A$"
2090 PROCCoscli(A$)
2100 PRINT'CHR$134"Hit a key";
2110 QZ=FNget
2120 ENDPROC
2130 DEFPROCoscli(A$)
2140 LOCAL QZ
2150 XZ=osclibuff% MOD &100:YZ=oscli
buff% DIV &100
2160 $osclibuff%=A$:CALL&FFF7
2170 ENDPROC
2180 DEFPROCwindow(WZ)
2190 IF WZ=0 VDU26 ELSE VDU28
2200 IF WZ=1 VDU0,15,39,0
2210 IF WZ=2 VDU0,24,39,16
2220 ENDPROC
2230 DEFPROCcolour(FZ,BZ)
2240 COLOURFZ:COLOUR128+BZ
2250 ENDPROC
2260 DEFPROCreport:LOCALQZ
2270 VDU7
2280 total%=FNtotal
2290 IF ERR<>17 THEN PRINT'REPORT:P
RINT'CHR$134"Hit a key";:QZ=FNget
2300 ENDPROC
2310 DEFPROCinit
2320 LOCAL NZ
2330 *FX200 1
2340 @Z=3
2350 DIM key$(31)
2360 DIM osclibuff% 30
2370 FOR NZ=0 TO 27:key$(NZ)=STRING$
(31," ");NEXT
2380 FOR NZ=0 TO 27:key$(NZ)="" :NEXT
2390 lock%=CHR$255:PROClack
2400 *FX4,2
2410 *FX12 3
2420 *FX213,150
2430 *FX225,128
2440 *FX226,200
2450 *FX227,216
2460 VDU23,240,0,16,32,64,255,64,32,
16,23,241,0,8,4,2,255,2,4,8,23,242,16
,16,16,16,146,84,56,16,23,243,16,56,8
4,146,16,16,16,16
2470 VDU23,244,0,16,36,68,255,68,36,
16,23,245,0,8,36,34,255,34,36,8,23,24
6,16,16,124,16,146,84,56,16,23,247,16
,56,84,146,16,124,16,16
2480 VDU23,248,0,16,41,73,255,73,41,
16,23,249,0,8,148,146,255,146,148,8,2
3,250,124,16,16,124,146,84,56,16,23,2
51,16,56,84,146,124,16,16,124
2490 shift%=TRUE
2500 *FX200 0
2510 ENDPROC
2520 DEFPROCassemble_code(code)
2530 REM Returns execution address t
o main prog in "init"
2540 PROCcolour(0,1):PROCwindow(2):C
LS
2550 PRINT'CHR$131"Assembling code..
...";
2560 insv=&22A:REM insert character
into buffer vector
2570 osbyte=&FFF4
2580 FOR opt%=0 TO 2 STEP 2
2590 PZ=code
2600 [OPT opt%
2610 .key_table OPT FNequs(STRING$(7
0,CHR$0))
2620 .init \execution address when
first run
2630 SEI
2640 LDA insv:STA oldvec \store ol
d vector contents
2650 LDA insv+1:STA oldvec+1
2660 LDA#intercept MOD &100:STA insv
\change vector to point to "interc
ept"
2670 LDA#intercept DIV &100:STA insv
+1
2680 CLI
2690 LDA#0
2700 STA flag
2710 LDA#134 \read cursor position
2720 JSR osbyte
2730 CPY#20 \assume if cursor high
er up screen than line 20 that we're i
n
2740 BCC end_init \Old text? page
so end initialisation
2750 LDA#138 \push return into keyb
oard buffer to remove
2760 LDX#0 \Press any key" messa
ge
2770 LDY#13
2780 JSR osbyte
2790 .end_init
2800 RTS
2810 .oldvec NOP:NOP
2820 .store NOP
2830 .flag NOP
2840 .slock NOP
2850 .intercept \insv now points he
re
2860 STA store \character passed in
A, store temporarily
2870 PHP:PHA:TXA:PHA:TYA:PHA \prese
rve registers
2880 LDA flag
2890 BNE end \if already acting on
f-key press then end
2900 CPX#0 \buffer number passed i
n X
2910 BNE end \no action if not keybo
ard buffer
2920 LDA store \restore character
2930 CMP#144 \shift f0
2940 BCC end
2950 LDA#237 \read cursor editing s
tate (X=0 if in menu)
2960 LDX#0
2970 LDY#&FF
2980 JSR osbyte
2990 CPX#0
3000 BEQ end \end if in menu
3010 LDA#0:STAslock \turn off slock
flag
3020 LDA store
3030 \check not shifted cursor keys
3040 CMP#156
3050 BCC check_ctrl_cursor
3060 CMP#160
3070 BCC end \end if shifted cur

```


From Page 173

```

sor key
3080 .check_ctrl_cursor
3090 CMP#172
3100 BCS end \end if ctrl cursor k
ev
3110 CMP#156
3120 BCSnot_shift
3130 LDA#121
3140 LDX#80 EOR &80
3150 JSRsbbyte
3160 CPX#80 EOR &80
3170 BNEend
3180 INCslock \flag s-lock on
3190 LDAstore
3200 .not_shift
3210 PHA \store character in A o
n stack
3220 LDA#1
3230 STA flag \set flag
3240 PLA \restore character to A (
=f-key character number)
3250 JSR interpret_key
3260 LDA#0
3270 STA flag \turn off flag
3280 LDAslock
3290 BEQnot_slock
3300 LDA#202:LDX#48:LDY#0
3310 JSRsbbyte \turn off shift lock
3320 .not_slock
3330 PLA:TAY:PLA:TAX:PLA \restore r
egisters but replace A with B
3340 LDA#B \seems a safe character
to return to Wordwise
3350 PLP
3360 JMP(oldvec) \exit to old inser
t character routine
3370 .end
3380 PLA:TAY:PLA:TAX:PLA:PLP \resto
re registers if no action to be taken
3390 JMP (oldvec) \exit to old inser
t character routine
3400 .interpret_key
3410 SEC \subtract 144 from f-key
y character number
3420 SBC#144 \A now contains f-key n
umber (shift f0=0 to ctrl copy=27)
3430 ASL A \each definition pointe
r in key-table is two bytes so multip
ly
3440 \key number by 2. A now
contains offset to key's pointer
3450 TAX \transfer A to X
3460 LDA key_table,X
3470 STA pointer+1 \store address of
definition in "pointer"
3480 INX
3490 LDA key_table,X
3500 STA pointer+2
3510 LDY#0
3520 .key_loop
3530 .pointer LDA&AAAA,Y \operand wi
ll be altered by the program. Avoids
need
3540 \to use any
zero page locations
3550 CMP#255 \all definitions end w
ith 255
3560 BEQ end_key_loop \so if 255 end
3570 TAX \temporarily store charac
ter in X
3580 TYA \store loop counter on st
ack
3590 PHA
3600 TXA \restore character to A
3610 TAY \and transfer to Y
3620 LDA#138
3630 LDX#0
3640 JSR sbbyte \push character i
nto keyboard buffer
3650 PLA \restore and incre
ase loop pointer
3660 TAY
3670 INY
3680 JMP key_loop
3690 .end_key_loop
3700 RTS
3710 \f key definitions
3720 .s0:OPT FNfkey(0,s0,key$(0))
3730 .s1:OPT FNfkey(1,s1,key$(1))
3740 .s2:OPT FNfkey(2,s2,key$(2))
3750 .s3:OPT FNfkey(3,s3,key$(3))
3760 .s4:OPT FNfkey(4,s4,key$(4))
3770 .s5:OPT FNfkey(5,s5,key$(5))
3780 .s6:OPT FNfkey(6,s6,key$(6))
3790 .s7:OPT FNfkey(7,s7,key$(7))
3800 .s8:OPT FNfkey(8,s8,key$(8))
3810 .s9:OPT FNfkey(9,s9,key$(9))
3820 .s10:OPT FNfkey(10,s10,"") \br
eak
3830 .s11:OPT FNfkey(11,s11,key$(11))
)
3840 .s12:OPT FNfkey(12,s12,"") \cur
sor key
3850 .s13:OPT FNfkey(13,s13,"") \cur
sor key
3860 .s14:OPT FNfkey(14,s14,"") \cur
sor key
3870 .s15:OPT FNfkey(15,s15,"") \ cur
sor key
3880 .c0:OPT FNfkey(16,c0,key$(16))
3890 .c1:OPT FNfkey(17,c1,key$(17))
3900 .c2:OPT FNfkey(18,c2,key$(18))
3910 .c3:OPT FNfkey(19,c3,key$(19))
3920 .c4:OPT FNfkey(20,c4,key$(20))
3930 .c5:OPT FNfkey(21,c5,key$(21))
3940 .c6:OPT FNfkey(22,c6,key$(22))
3950 .c7:OPT FNfkey(23,c7,key$(23))
3960 .c8:OPT FNfkey(24,c8,key$(24))
3970 .c9:OPT FNfkey(25,c9,key$(25))
3980 .c10:OPT FNfkey(26,c10,"") \bre
ak
3990 .c11:OPT FNfkey(27,c11,key$(27))
)
4000 ]
4010 NEXT
4020 ENDPROC
4030 DEFFNequs(A$)
4040 $P%=A$+CHR$255:P%=P%+1+LENA$
4050 =opt%
4060 DEFFNfkey(key,addr,A$):REM stor
es address of key's definition in tab
le
4070 LOCALdummy%
4080 dummy%=FNequs(A$)
4090 !(key_table+2*key)=addr
4100 =opt%
4110 DEFPROCmove_prog(from,to)
4120 REM Assembles code at &A00 to m
ove program up in memory.
4130 length=&70:oldpage=&72:newpage=
&74
4140 !length=TOP-PAGE
4150 !oldpage=from:!newpage=to
4160 sbbyte=&FFF4
4170 move=&A00
4180 FOR I%=0 TO 2 STEP2:P%=move
4190 [OPT I%
4200 LDA oldpage:CLC:ADClength:STA o
ldpage:LDAoldpage+1:ADClength+1:STA o
ldpage+1:DEColdpage+1:LDAnewpage:CLC:
ADClength:STAnewpage:LDAnewpage+1:ADC
length+1:STAnewpage+1:DECnewpage+1:LD
Y#&FF:LDXlength+1:BEQloloop
4210 .loop1:LDA(oldpage),Y:STA(newpa
ge),Y:DEY:CPY#&FF:BNEloop1:DEColdpage
+1:DECnewpage+1:DEX:BNEloop1
4220 .loloop:LDXlength:BEQrun:.loop2
:LDA(oldpage),Y:STA(newpage),Y:DEY:DE
X:BNEloop2
4230 .run:LDX#0:.runloop:TXA:PHA:LDA
runtext,X:CMP#&FF:BEQend:TAY:LDA#138:
LDX#0:JSRsbbyte:PLA:TAX:INX:JMPrunloo
p
4240 .end:PLA:RTS
4250 .runtext
4260 ]
4270 $runtext=CHR$23+CHR$0+CHR$1+STR
ING$(7,CHR$0)+"PAGE="+STR$to+CHR$13+"
END"+CHR$13+"RUN"+CHR$13+CHR$255
4280 P%=P%+1+LEN$runtext
4290 NEXT
4300 CALLmove
4310 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 199.

From Page 175

middle of the screen save with a new file name ready for use in your own programs. Ideal for logos.

This is my program:

```

10MODE 4:*DESK
20VDU19,0,0;0;19,1,7;0;
30GCOL 0,0
40MOVE120,152:MOVE1159,1
52
50PLOT85,120,903:PLOT85,
1159,903
60*LOAD OLDFILE 3000
70FOR Y=13256 TO 20296 S
TEP 320
80FOR X=Y TO Y+255
90?(X+10584)=255-?X
100NEXT X,Y
110REPEAT VDU7:K$=INKEY$(
100):UNTILK$=" "
120*SAVE NEWFILE 5800 800
0

```

You should alter the file names in lines 60 and 120 to suit your needs.

Disc users will benefit more than cassette users from the almost instant loading, but there's no reason why cassette users can't take advantage of this utility, remembering to use the *OPT1,0 command at the start of the program to stop cassette filing information. — David Browne, Bognor Regis.

Putting the clock right

WITH reference to your Clock program in the July issue, how can I make the displayed time appear one line lower?

As a user of Wordwise Plus, the position of the clock conflicts with "characters free" and the "insert", "overwrite" and the marker displays.

Placing the clock display one line lower would put it in a clear area. — R.K.P. Neep, Cheltenham.

● You can drop the display one line by altering line 350 to:

```
350 LDY #79: LDX #12
```

Error handling

CHRIS Bowerman's article on error handling was very interesting, but his Program III to

&90D5	0	BRK
&90D6	10	Error number
&90D7	66	B
&90D8	97	a
&90D9	100	d
&90DA	32	
&90DB	222	Token for DIM
&90DC	0	Message terminator

return error messages will not always work in the way intended.

This is through no fault of his program, but because of the way some error messages are stored in the BBC Basic I (and probably II) ROM.

Take, for example, the error message "Bad DIM" (ERR=10). In Basic I this is stored at &90D5, as shown below. The word DIM, though, is not stored as D, I, M, but, presumably to save on memory, as 222, which is its token.

As a rule any Basic error message that has any Basic word in it will have that word stored as a token. On Basic I these error messages are:

No FN, Bad DIM, DIM space, Not LOCAL, No PROC, (Surprisingly Log range and Exp range are stored in full on Basic I), Bad MODE, No such FN/PROC, No FOR, Can't Match FOR, FOR variable, Too many FORs, No TO, Too many GOSUBs, No GOSUB, ON syntax, ON range, Out of

DATA, No REPEAT, Too many REPEATs.

LINE space and RENUMBER space are also "semi-tokenised".

The word that is tokenised, that is DATA in "Out of DATA", will always be printed in capitals.

I hope that this clears up any problems that people are having in this field. — Simon Spruzen, Milton Keynes.

Further to elegance

I NOTICED a letter from R.H. Chotalia — "How not to fall on the dec" — in the July issue and am sure everyone will agree that his recursive solution is elegant to say the least.

I should like to try to improve on his efforts with the following smaller function:

```

80 DEFFNhex(nn%)
90 len%=LEN(STR$(nn%)):le
n%=len%+len% MOD 2
100 =RIGHT$(STRING$(len%,"0
")+STR$(nn%),len%)

```

By way of explanation:

Line 90: Calculate length of hex string obtained using STR\$ built-in function with a hexadecimal argument. Add 'len% MOD 2' to make an odd length even.

Line 100: Create a temporary string of zeros followed by the hex value we wish to print, and use the rightmost characters only.

The above explanation is perhaps more easily illustrated by a simpler example. Suppose we always want a field length of 4. The function then becomes a one-liner.

```

80 DEFFNhex4(nn%):=RIGHT$(
000"+STR$(nn%),4)

```

The same idea can be used for decimal values which need to be displayed with leading zeros. Just omit the ~ signs.

Thanks for a great magazine. — Stefan W. Neuman, Bristol.

Wordwise training

WE have recently taken delivery of Wordwise for the BBC Micro and are having great difficulty in

Corrupted in the Tube

I WAS interested to read of the problems experienced by J.S. Ridler (June issue) with his 6502 second processor.

I have encountered similar problems and may perhaps be able to shed a little light on the matter.

When I acquired Lisp on cassette I could never progress further than the middle of the leader program.

Repeated attempts always produced "No such variable..." with the second processor attached but not switched on. The suite of programs loaded without problem when the second processor was removed and also when attached and enabled.

The explanation from Acorn is interesting if a little strange.

Apparently the second processor takes some power from the I/O processor even when it is switched off!

In my case having a densely populated ROM board proves too great a power drain and this is the cause of the problems I have encountered.

When switched on, the second processor's own power supply (in theory) supplies sufficient power to avoid any undue load being placed upon the I/O processor.

Up to a point this explanation seems to deal with my own particular circumstances. However, I still suffer from unnerving "glitches" — graph plots going badly awry, multiple copy cursors, and so on.

It would appear that VDU

queues are corrupted in negotiating the Tube.

Since the I/O processor appears to function correctly and supports the ROM board with no apparent problem, I am at a loss to explain my continued difficulties.

I would be grateful for any suggestions. — W.J. Birtwistle, Blackpool.

● The BBC is not designed to power a ROM board full of eproms.

Adding a second processor only increases the strain on the power supply.

We know of no power supply upgrade to solve your problem.

It is interesting to notice that on the B+, Acorn proclaim they have buffered the Tube...

locating a venue for a training course on this machine.

Can you please assist us by advising us of a college in our area which does in fact run a training course? — Mrs B. Berry, Administration Officer, National London.

● We haven't heard of any college enterprising enough to run a Wordwise course. It might be worth contacting Paul Beverley of Norwich Computer Services, 6 Upper King Street, Norwich NR3 7HA.

He has written several excellent books on Wordwise and, as an ex-lecturer, he might be able to put on courses if there is sufficient interest.

Wrong line

I AM one of Alice's most avid fans and regularly type in his mini adventures even though I rarely manage to come up with a solution to most of them.

I normally don't have many problems with the listings, probably because they're quite short and within my ability to check for typing mistakes.

I have however come across a snag with Lac Dracula from the October issue, and it appears to be in the first line. The program seems to have been written so that under certain circumstances it generates an error designed to kill you. But the ON ERROR command is directed to the wrong line. Am I right or have I missed something? — Peter Gornall, Shrewsbury.

● Thanks for your letter. You are quite right, a typing error was made in line 10 as we translated Alice's program to the BBC Micro. It should as you so rightly point out have line 10 as:

```
10 ON ERROR GOTO 140
```

Easy on the pins

I HAVE found 28 pin low-profile IC sockets, which can be purchased for less than 70p, very useful for protecting the legs of eproms.

My father was over the age of 70 when he became hooked on the BBC Micro and his eyes are not as good as they used to be.

For one reason or another he keeps shuffling eproms between

One for the engineers

I REFER to the letter from D.S.T. Raubenheimer in the August issue concerning the lack of scientific and technical software, which must strike a chord in many an engineer's heart.

When I was a young engineer one of the tasks that arose from time to time was the calculation of what is called a "backwater curve". This is the shape of the

water surface upstream from a weir or other obstruction.

It was a tedious calculation, and involved the use in those days of what might now be regarded as a grotesque kind of cylindrical slide rule.

Using a short program on the BBC Micro such a calculation is now child's play.

I enclose a copy of the program, which may interest

your correspondent and other engineers (see below).

I have written some others, covering weirs, hydraulic pumps and so on, and some of the more useful mathematical routines which I have found useful.

If your correspondent would like to get in touch with me I should be happy to let him have copies. — Edmund W. Jupp, The Firs, Lymington, Devon.

```

10 REM BACKWATER CURVE
20 ON ERROR GOTO 300
30 MODE1:COLOUR1:PRINTTAB(2,22)"BACKWATER CURVE"
40 COLOUR2:ZX=3:TX=3
50 PROCdraw:PROCdata:PROCcalc:END
60 DEFPROCdraw
70 MOVE100,100:DRAW1200,100:PLOT85,100,200:MOVE1100,105:DRAW1100,200:PLOT85,100,120:MOVE100,280:DRAW1100,230:DRAW1120,225
80 DRAW1130,215:DRAW1140,200:DRAW1150,170:MOVE600,195:DRAW600,450:MOVE1120,220:DRAW1120,450:MOVE1120,400:DRAW600,400
90 MOVE600,195:DRAW600,450:MOVE1120,220:DRAW1120,450
0:MOVE1120,400:DRAW600,400
100 PRINTTAB(18,25);"d";TAB(26,18);"X";TAB(18,24);"^";TAB(18,26);"v";TAB(19,19);"<";TAB(34,19);">"
110 PRINTTAB(25,1);"d";TAB(33,1);"X"
120 ENDPROC
130 DEFPROCdata
140 COLOUR2:PRINTTAB(0,2)"ENTER:-":INPUT"MANNING'S C'T "M
150 INPUT"STREAM WIDTH "W
160 INPUT"SLOPE OF BED "S
170 INPUT"NORMAL DEPTH "P
180 INPUT"DEPTH AT HUMP "R
190 ENDPROC
200 DEFPROCcalc
205 VDU28,28,18,40,0
210 r=(R-P)/10:d=P
220 FOR n=1 TO 10:d=P+n*r
230 U=M*SQR S*((W*P)/(W+2*P))^(2/TX):Y=P^2*U^2/9.81
240 A=(d^TX-Y)/(d^TX-P^TX):B=(R^TX-Y)/(R^TX-P^TX):C=4*((d+R)^TX-8*Y)/((d+R)^TX-(8*P^TX))
250 X=INT(100*((R-d)*(A+B+C)/(6+S))+0.5)/100
260 PRINTTAB(18,ZX)INT(100*d)/100 TAB(28,ZX)X
270 ZX=ZX+1
280 NEXT
290 ENDPROC
300 REPORT:PRINT" AT LINE ";ERL
    
```

sockets and sends me a series of legless chips to mend. At his suggestion I now plug his eproms into extra 28 pin sockets which he can then mutilate at one tenth or one hundredth the cost of damaging some commercial firmware.

The dual-in-line row of pins push-pull in/out of the sockets on the main circuit or ROM boards more easily than the rather rigid, springy, eprom pins.

My excellent ATPL Sidewise ROM board tends to touch some main circuit board components and voltage leads, making it difficult to press it home securely when fitting.

Mike Mahon suggested using these 28 pin sockets to raise the board about one eighth of an inch by placing them on the connec-

tors at the two corners of the board.

I find this has the added advantage of preventing the round turned-pin legs of the ROM board damaging the sockets on the main board.

Similarly I use a zero insertion force (ZIF) socket — about £7.12 from Radio Spares — in one of my ROM board sockets for those eproms I am forever changing.

An extra 28 pin socket added to the ZIF socket raises this rather wide component above the circuit board socket sufficiently to allow eproms to be used on the sockets either side.

This combination is cheaper than the commercially available "ashtray" alternatives and as convenient, provided the lid of

your BBC is not screwed down. — Rory McCloy, Royal Infirmary, Manchester.

Othello tourney

I WAS particularly interested to see Robin Nixon's Othello program in the June edition as I had had for some time an equivalent program for the Hewlett-Packard HP85 computer.

Eventually I got around to typing it in — so much more instructive than buying the tape — and decided to arrange a challenge match between the two computers. Best of three games.

My daughter, who regularly beats the HP85, and I, who doesn't, both felt that the HP85 was the stronger player.

The first game appeared to confirm that impression as the

● Want to write to Micromail? The address is: Micromail, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

From Page 177

HP85 gradually took more and more of the board.

Frankly, if I had been playing the BBC's game I would have resigned about half-way when the HP85 had 30 squares to the BBC's six, but, being a machine, the BBC played on to what looked like inevitable destruction.

But what a fascinating game Othello is... Suddenly the HP85 was forced to play in a most dangerous square (7,7) since there was nowhere else it could play.

Immediately the BBC went in (8,8) and the HP85 was forced to play in (8,7). The BBC went in (8,1) and took the whole of the bottom row.

On three moves - not consecutively - the HP85 couldn't play at all, and before it knew where it was the BBC was in a commanding position and finally came out the winner 41 to 21 - the HP85 counts the counters and ends the game when one player runs out.

So, one game to the BBC and they embarked on the second.

Being machines, I quite expected them to play exactly the same game again, but not so. It took a quite different turn and was much more even throughout - the HP85 finally coming out the winner by 48 to 15.

One game all!

It was 11pm, but who could turn them off at this stage? The third game was evenly balanced again, with neither machine taking a commanding position at any time.

The game went right to the final square and the result was... a tie!

So one-and-a-half games each, honour was fully satisfied on both sides and the contestants - and the referee - went happily to bed.

Actually Robin Nixon's program takes a slight advantage by insisting that its opponent starts first. Luckily the HP85 program will allow either player to start - and will play parallel as well as diagonal openings.

It is also distinctly more opponent-friendly in that it never takes more than 15 seconds for a move compared with 90 seconds by the BBC.

Incidentally there is a nice

little bug in Robin Nixon's program.

If one player wipes the other off the board - it can happen - then PROCcount calls PROCgameover which calls PROCcount which calls PROCgameover which calls... with very noisy results. Why must everyone write their sound statements at level -15?

If you press Escape, you know what that does, don't you? That's right - it calls PROCgameover.

Thank you Robin Nixon and The Micro User - not to mention the unknown programmer of the HP85 version - for a great contest.

If any of your readers haven't typed in the game yet, get typing. It is well worth it. - Peter H. Lloyd, Dunstable.

Circuit boards

IS there on the market a program for help to design a printed circuit board? Here in the Netherlands such a program is not available for the BBC.

Is such a program available for the BBC or maybe with a second 6502 or Z-80?

In Holland such a program is only available for the IBM-PC and the CBM-64. - B.M. Harms, Emmen, Netherlands.

● Pineapple Software has recently released a program to help design circuit boards and can be contacted at the following address: 39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL.

ISO-Pascal and Elite

I THINK I should draw your readers' attention to the fact that ISO-Pascal does not compile when Wordwise+ is in a higher priority ROM socket than it. If the Pascal has higher priority, then both ROMs function.

There are several strange things I have found with the disc version of Elite.

If you do Copy X Delete, then press Ctrl+H while hyperspacing, then you get automatically attacked by the Thargoids. Useful for picking up alien items, if you survive.

A copyright notice also comes

up under the "Elite" sign at the beginning.

Also, if you go behind the space station so that you are looking at the face without the entrance hatch, and turn on the docking computer, the computer tries to dock with a blank wall, and you crash. - Ben Dessau.

● Unfortunately Wordwise+ makes use of *FX163 in a way that Acornsoft considers "illegal" - without any parameters. This means that Iso-Pascal, Logo and the Graphics Extension ROM won't work unless they're in a higher priority socket.

We're sure Elite fans will be grateful for your discoveries.

Clear of bugs

I SHOULD like to take this opportunity to thank you for your assistance with debugging the Harbour Command game and tell you that by inserting those two spaces the program runs successfully.

The reason I haven't used my own error routine yet is due to the machines I have previously worked on - Dragons and Tandys - these facilities were not available and I am finding the need to go right back to basics with my learning on the BBC Micro.

Because of the assistance you have given which I feel is superior to that of other magazines I have decided to take out a 12 month subscription rather than risk missing an issue in the shops. - Roger P.S. Price, Warley, West Midlands.

● We're always glad to hear from satisfied customers. Remember though, we need to have an SAE with your queries.

Mini Office on serial printer

I HAVE just read Michael Nyman's letter in The Micro User about using Mini Office with a serial printer.

As I have been doing this on a Mannesman Tally T-1612 printer I thought I had better describe my technique.

I select the RS423 output with *FX5,2 then CH." Mini Office.

This loads the loader program and then turns off the cassette motor.

I then press line feed on the printer which turns the cassette motor back on. The word processor then loads as normal and any text can be printed in the normal manner. This letter has been produced using this procedure.

I cannot offer any technical reason why line feed allows me to run the program and print via the serial port, but it works.

I have found two problems using this technique.

The first line always starts with an @ and indents the first printed line after the left margin with one blank character.

Also the first print stops after two lines and will go no further. By pressing escape and starting over again printing is as normal.

Thank you for The Micro User magazine, it's the best buy for any BBC computer user. - John Butler, Preston.

Alien war cry

HERE is a short program that sounds very much like the aliens attacking your Cobra Mark III in Elite. - K.R. Clover, Ipswich, Suffolk.

```

10 REM K.R.CLOVER 1985
20 CLS
30 *TV255
40 PRINT:PRINT "ELITE AL
IEN SHOOT"
50 PRINT"PRESS ANY KEY"
60 PRINT"KEEP PRESSED FO
R FULL ATTACK"
70 A$=GET$
80 PRINT:PRINT:PRINT
100 ENVELOPE 3,1,16,-12,1
,25,25,25,10,-10,0,-10,126,
25
130 MODE 7
140 JZ=RND(50):BZ=RND(3):
DZ=RND(25)
150 PRINT"ENVELOPE 3":PRI
NT"BZ= CHANNNEL",BZ:PRINT"J
Z= PITCH ",JZ:PRINT"DZ= DU
RATION",DZ
160 PROCA
170 GOTO 40
200 DEFPROCA SOUNDBZ,3,JZ
,DZ:ENDPROC
    
```


Paged RAM loader for B+

I FOUND the article on the B+ by Jim Notman very interesting, and it prompted me to experiment with the paged RAM.

It is possible to load languages and service ROMs from disc and run them in the paged RAM on the B+.

The program printed below prompts for a file name, which it then transforms to paged RAM.

It also changes the user vector (used by *LINE) to point to a software patch.

The patch is needed to change a *LINE command to one that is able to be read by a paged ROM. It then uses the indirect vectors to pass the command to paged RAM.

In this way a normal *command can be imple-

mented by using *LINE [command].

The program as it stands uses the NET workspace as a safe place for the patch. On NET machines the setting of P% at line 570 will need to be changed.

- T. Godman, Sandown, IoW.

P.S: After a break the user vectors will need resetting to point back to the patch.

```
?%200=%91:;%201=0
```

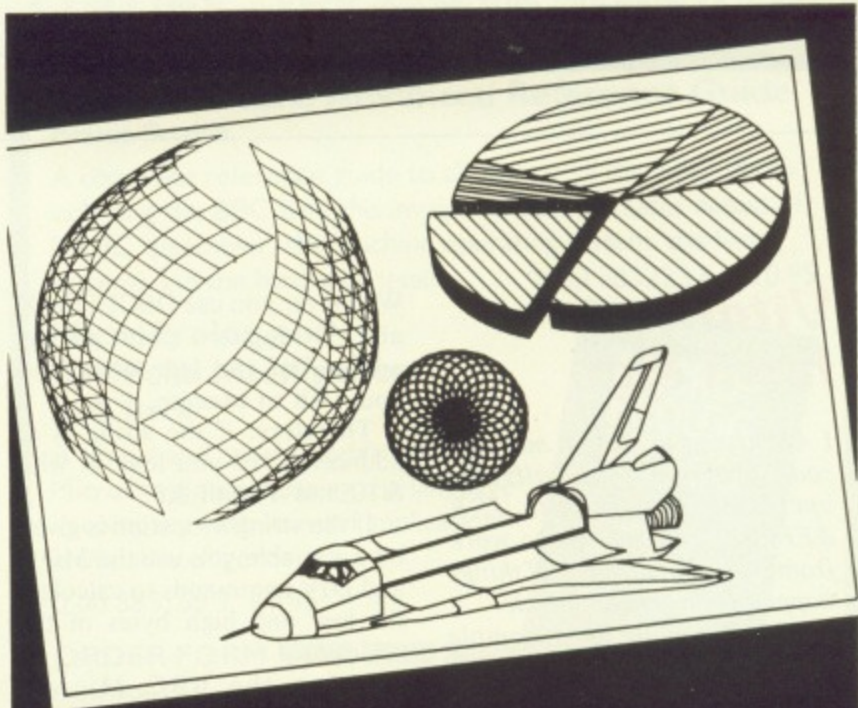
will allow you to still use *LINE [command].

● Thanks for a neat program. We must point out, though, that the ROMs you've got on disc must be from ROMs you have purchased - otherwise you're breaking copyright.

```

10 REM Paged RAM Loader
20 REM by T. Godman
30 REM BBC B+
40 MODE 7
50 DIM code% 70
80 PROCassemble
90 INPUT "Please enter filename: "file$
100 PRINT
110 OSCLI "LOAD "+file$+"2000"
120 CALL code%
130 PRINT "File transferred to paged RAM."
140 PRINT "Use *LINE command."
150 PRINT
160 END
170 REM
180 DEFPROCassemble
190 P%=code%
200 COPT2
210 SEI
220 LDA %F4
230 STA %74
240 LDA %80
250 STA %F4
260 STA %FE30
270 STA %73
280 STA %DA0
290 STA %DA1
300 LDA %20
310 STA %71
320 LDA %91
330 STA %200
340 LDA #3
350 STA %D9F
360 LDA #0
370 STA %70
380 STA %72
390 STA %201
400 TAY
410 .loop
420 LDA (%70),Y
430 STA (%72),Y
440 INY
450 BNE loop
460 INC %71
470 INC %73
480 LDA %80
490 CMP %73
500 BNE loop
510 LDA %74
520 STA %F4
530 STA %FE30
540 CLI
550 RTS
560 ]
570 P%=%91
580 COPT 2
590 LDA #4
600 STX %F2
610 STY %F3
620 LDY #0
630 JMP %FF00
640 ]
650 ENDPROC

```



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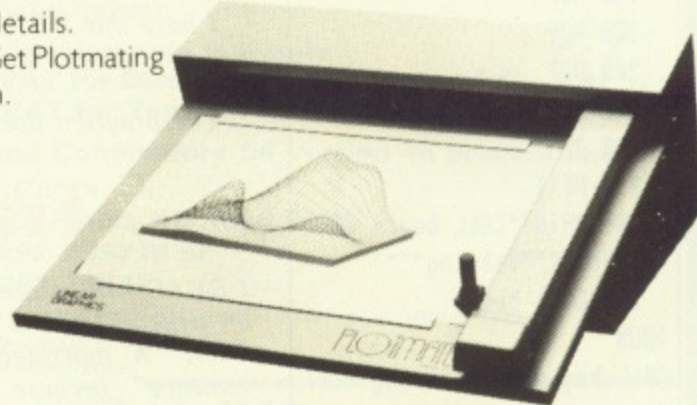
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Vital hash sign

I AM trying to write a machine code program that calls the operating system with JSR &FFF7. I can get this to work from Basic but all sorts of things happen from machine code.

The following is a sample program of the sort of thing I'm trying to do.

It should catalogue the disc but it does either nothing or gives me random error messages such as "Bad string" or "Bad command" depending on how many NOP instructions I put into the program.

```

10 DIM MC% &100
20 FOR Q=0 TO 2 STEP 2
30 PX=MC%
40 [OPT 0
50 .begin
60 LDX string MOD 256
70 LDY string DIV 256
80 JSR &FFF7
90 RTS
100 .string
110 EQU$"CAT"
120 EQU B 13
130 NOP
140 NOP
150 NOP
160 NOP
170 NOP
180 NOP
190 NOP
200 NOP
210 NOP
220 ]
230 NEXT
240 PRINT "CALL begin with
string ""$string""
250 CALL begin
>RUN
CALL begin with string "CAT"
"
Bad command at line 250
    
```

I hope that you can help as part of my latest mammoth program depends on it. I have OS 1.2, Basic II on the Issue 3 board. — H. Summers, Norwich.

● You've made a very common mistake in lines 60 and 70.

Whenever you use OSCLI the X and Y registers point to the address of the star command you wish to execute.

Therefore, if the string is at address &810 you load X with &10 and Y with &8.

If the string's location is given by a variable you use the MOD and DIV commands to calculate the low and high bytes of the address.

Using the BBC Micro's assembler we would use something like this:

```

100 LDX #string MOD 256
110 LDY #string DIV 256
    
```

We're sure you can now see the important hash character you missed out which indicates that immediate addressing is being used.

In your program you load the X and Y registers with the contents of the strings address MOD 256 and DIV 256 — both in zero page.

These will obviously point to the wrong address. This is why you get "Bad command" error messages.

Revs up and loaded

I WAS surprised to read the letter from K.G. Metcalf in your September issue regarding Revs not working with UDM's DDFS 2.0.

I have this DDFS fitted and Revs (version 1) does load with it.

The program does, however,

I READ with interest the letter on page 151 of the July Micro User, "A marriage of inconvenience", because I too had problems when I tried to use a Canon printer on my upgraded Model A.

I had been using both a Seikosha and an Epson printer quite successfully and then tried to use the then newly-introduced Canon model PW1080.

The printer would not, however work on my upgraded Model A but when tried with a Model B proved to be flawless.

seem to be well protected, taking almost a minute to load and then only if the machine has been switched off before loading.

If any readers, like me, have had trouble fitting Cheetahs Sweet Talker because of having a DDFS fitted they should send me an SAE, I'll send them details of how to get around this.

— Mark Randall, 5 Redwood Close, Irchester, Northants NN9 7BX.

Foreign characters

IN recent issues there has been some letters about the BBC Micro and foreign characters.

This can be solved by redefining the characters in Modes 1–6 or using the chip SA 5052 instead of SA 5050 for Mode 7.

After a while you will get tired of having to boot in some redefining program every time you use the computer. I finally lost my patience when, even with machine code routines I couldn't redefine the characters in a terminal emulation program (Communicator by Computer Concepts).

The following alterations will insert Swedish characters in the operating system ROM. This was done by reading the ROM with an eprom programmer from Watford Electronics.

The character definitions are located from location &0000 to &02F8 in blocks of eight consecutive bytes starting with

character &20 (blank) and ending with &7F (delete) — see User Guide, page 492.

The alterations will place the Swedish characters where a printer expects them to be (&5B-&5D and &7B-&7D) but remember that some commercial programs use the original characters for graphic effects, for example Intersheet.

The new version of the operating system must be burnt into an 27128 eprom and placed in the appropriate socket.

Changes:

```

&0100 7C 60 60 60 60 60 7C 00
&01E0 00 60 30 18 0C 06 00 00
&01E8 3E 06 06 06 06 06 3E 00
    
```

Should be changed to:

```

&0100 24 7E 66 66 7E 66 66 00
&01E0 24 3C 66 66 66 66 3C 00
&01E8 18 7E 66 66 7E 66 66 00
    
```

and:

```

&02D8 0C 18 18 70 18 18 0C 00
&02E0 18 18 18 00 18 18 18 00
&02E8 08 00 18 0E 18 18 30 00
    
```

should be changed to:

```

&02D8 14 00 3C 06 3E 66 3E 00
&02E0 24 00 3C 66 66 66 3C 00
&02E8 08 00 3C 06 3E 66 3E 00
    
```

The definitions are of course second processor compatible. — Torsten Ofverholm, Department of Anatomy, Göteborg.

● A very clever technique, but we must point out that the altered ROM must be for your use only — the copyright remains with Acorn.

Transistor leads reversed

My investigations eventually isolated the transistor identified as Q11 on the circuit diagram in the User Guide. On the issue 2 board of my Model A and on the issue 3 board of the Model B that I used, this transistor is connected at the point identified as S1.

The fault was found to be due to the fact that the collector and emitter leads were reversed when soldered to the board. Thus the collector was connected to zero volts and the emitter to pin 1 of PL9. When correctly

connected, the printer worked perfectly, as this letter proves.

As this transistor was fitted at manufacture, there may be a number of such faulty Model A machines that will not work with certain printers because those printers require more drive power on the strobe signal line.

While this may not be the fault on your correspondent's machine, publication of the above details may help other users with printer problems of an odd nature. — B.J. Townsend, Chelmsford.

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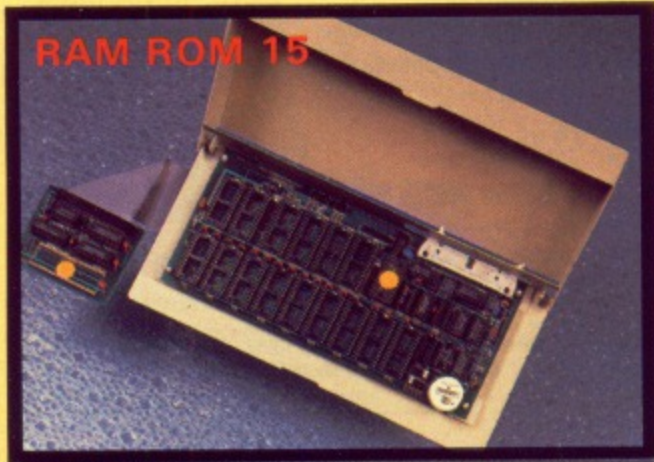
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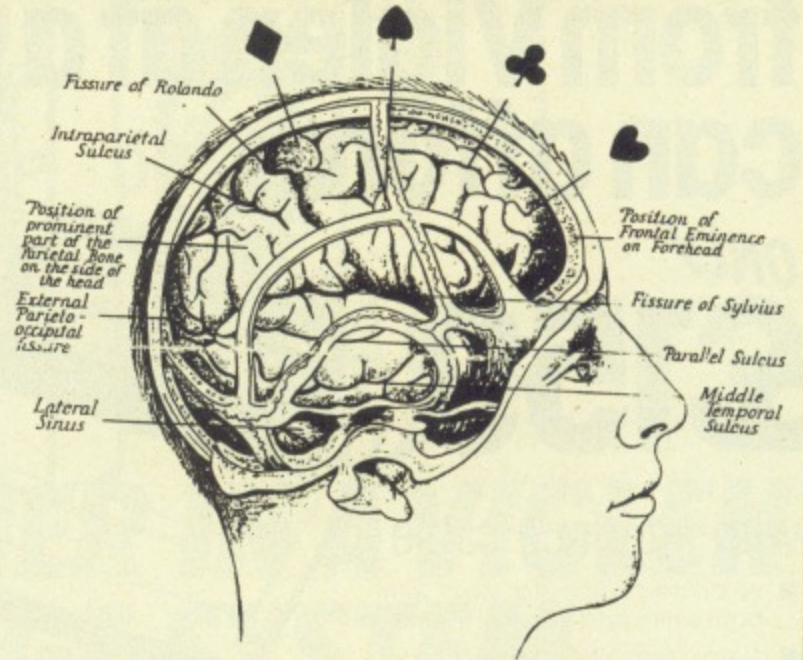
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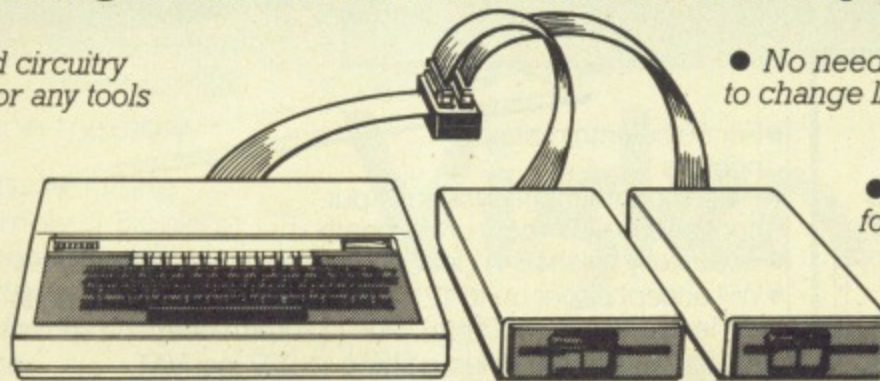
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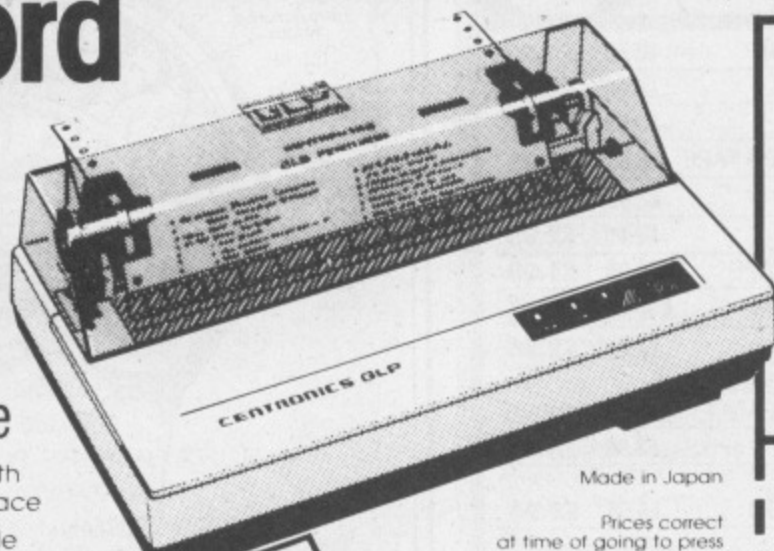
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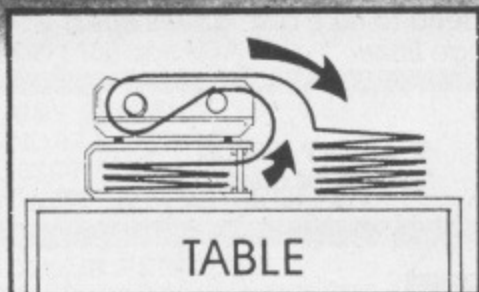
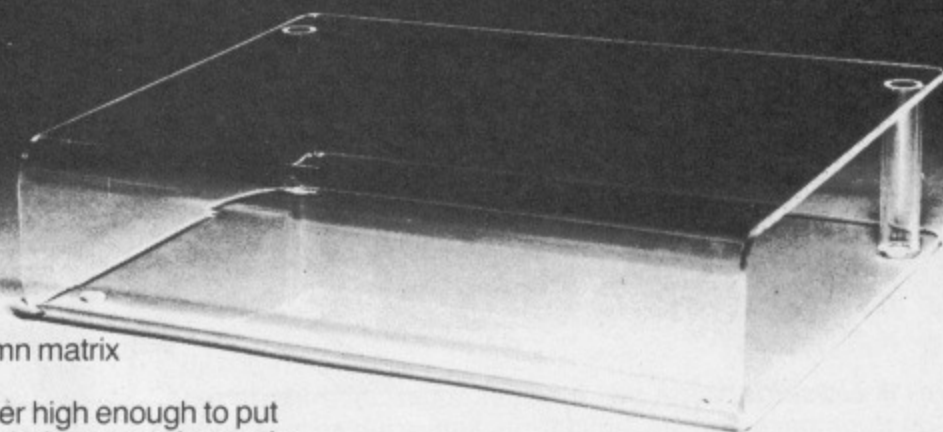
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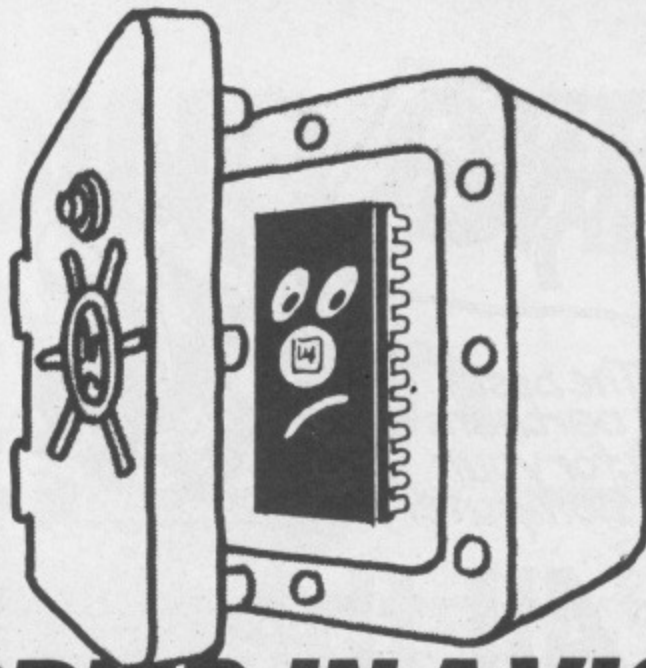
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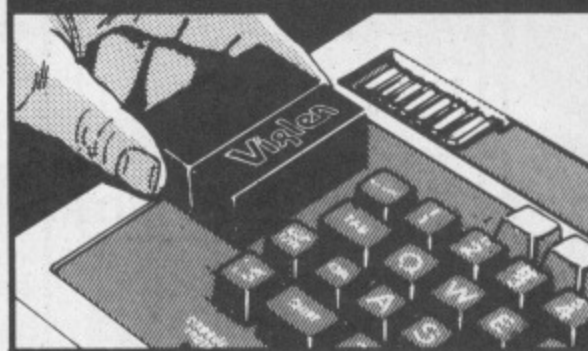
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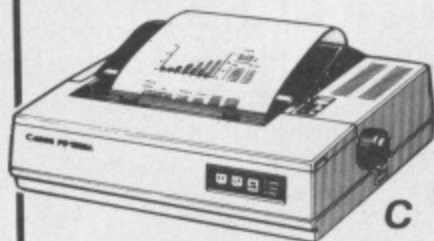
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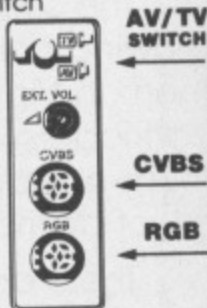
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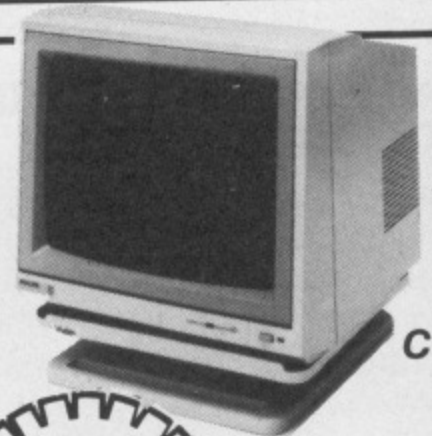
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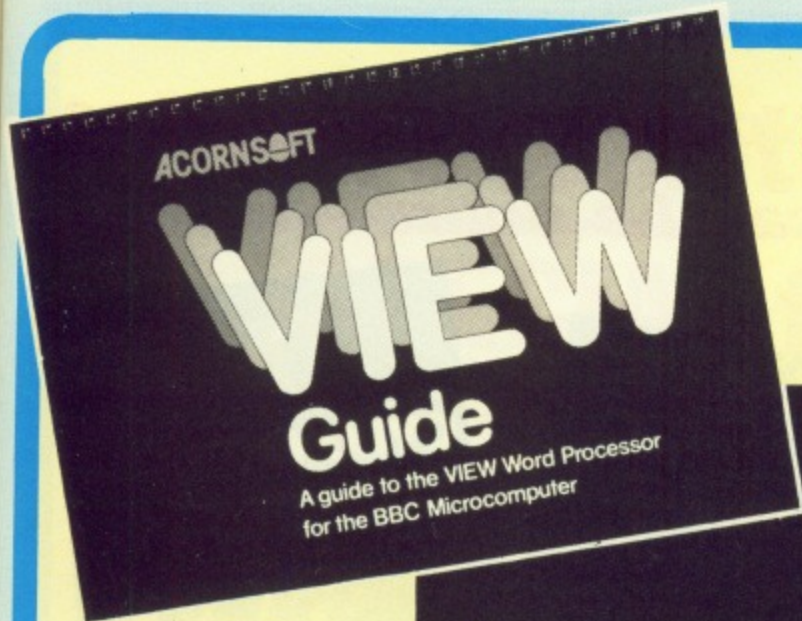
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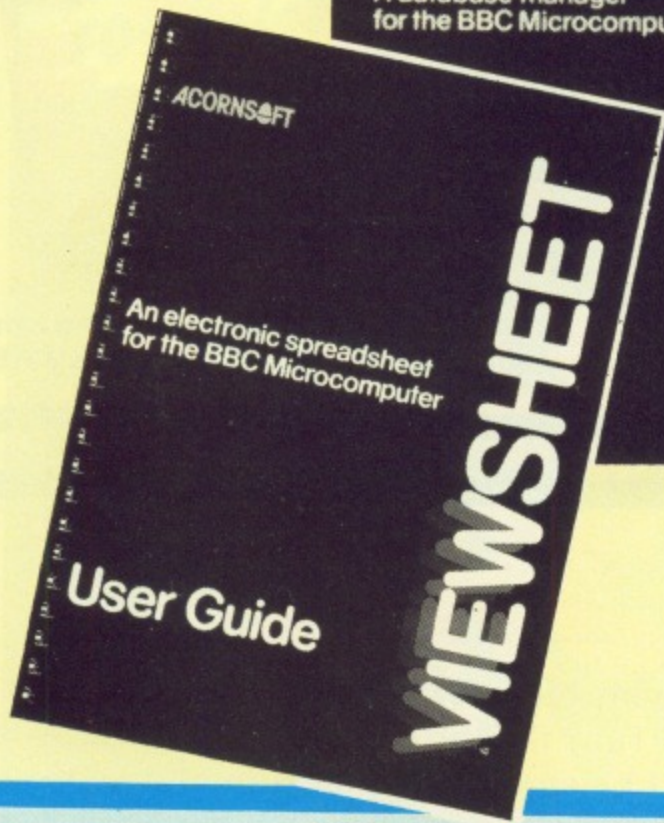
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 - ★ paged ROMs explained ★ and lots, lots more.
- With many examples to illustrate the text, this guide is the indispensable reference work for the serious BBC Micro programmer.

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The October issue of *The Micro User* has as its game of the month **Karate**, a clever martial arts simulation, ably supported by a colourful version of Solitaire.

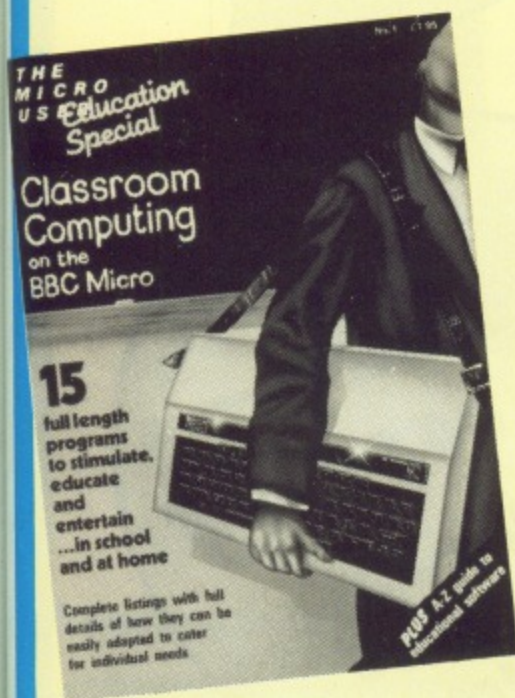
A comprehensive screen scrolling utility allows you to get your own message across in enlarged, colourful text.

Acornsoft's P-System is given good coverage and there is the start of a 3-part series on debugging and a routine to fill the gap left by BBC Basic's missing ON PROC command.

On the ROM front, A'n'F Software's 16k Slave toolkit is reviewed, along with Resource Facilities machine code monitor and a screen handler from Microsolve.

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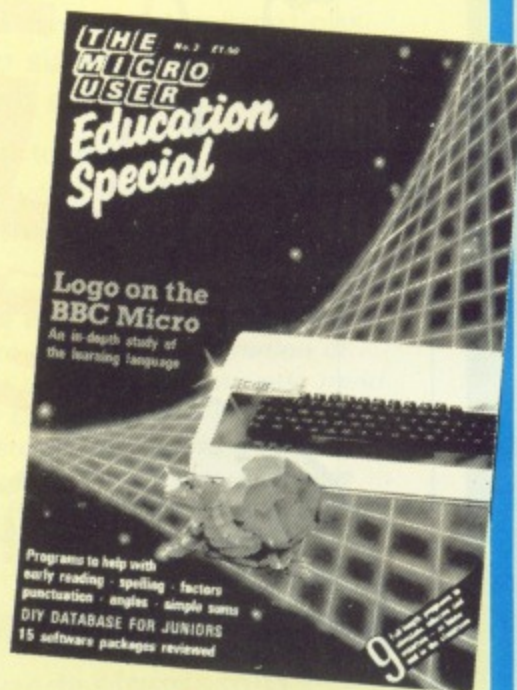
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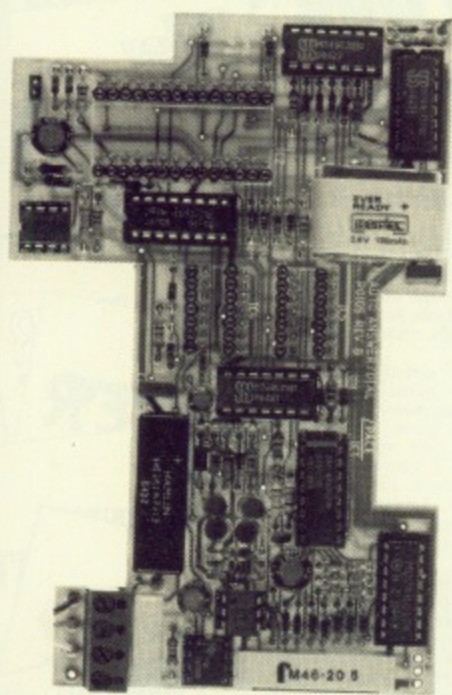
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AUGUST: Fruities, Animation, and other programs from Vol. 1, No. 6.

SEPTEMBER: Robin & Marian, Galactic Invaders and other programs from Vol. 1, No. 7.

OCTOBER: Fishing, Joykey and other programs from Vol. 1, No. 8.

NOVEMBER: Goblins, Blackjack and other programs from Vol. 1, No. 9.

DECEMBER: Tower, Rescue treasure, Santa, help Father Christmas, VDU 23, character definer. Paged, graphic techniques. Plus all the listings from the third issue of Electron User.

JANUARY 1984: Barrels, arcade game. Noteplay, musical utility. Dump1 and Dump2, multitone screen dumps. All the programs from our Sound, Beginners' and Graphics articles. Plus 12 programs from the fourth Electron User.

FEBRUARY: Invasion, arcade game. Frogs, family fun. Balance, number learning. Key, single key entry. Plus nine other programs from The Micro User.

MARCH: Mazemunch, arcade action. Birthday, family fun. Derrick, number fun. Pixelpen, high resolution.

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. Envaidd, 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 exploring. 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, an thrilling 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. Numbers, number skills.

OCTOBER: Wampus, explore the labyrinth. Balloon, escape the Goulogs. Splits, split screen utility. Pageram, paged RAM programs. Input/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. Dload, 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 tedious 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-screent spectacular. Mornington-Crescent, fun on the London underground. Calculator, AMX mouse math-

ematics. 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. Epron, a type-setting utility. Lprint, simplifies string output. Eval, the Basic command from machine code.

JULY: Fly, an arcade spectacular. Draughts, a superb tactical routine. Bells, Alice's mini-adventure. Compx, 3D noughts and crosses. Double Height, large characters in Modes 0-6. Clock, alarm utility. Compacter, compress Mode 2.

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OCTOBER: Wampus, explore the labyrinth. Balloon, escape the Goulogs. Splits, split screen utility. Pageram, paged RAM programs. Input/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. Dload, 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 tedious 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-screent spectacular. Mornington-Crescent, fun on the London underground. Calculator, AMX mouse math-

ematics. 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. Epron, a type-setting utility. Lprint, simplifies string output. Eval, the Basic command from machine code.

JULY: Fly, an arcade spectacular. Draughts, a superb tactical routine. Bells, Alice's mini-adventure. Compx, 3D noughts and crosses. Double Height, large characters in Modes 0-6. Clock, alarm utility. Compacter, compress Mode 2.

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DECEMBER: Tower, Rescue treasure, Santa, help Father Christmas, VDU 23, character definer. Paged, graphic techniques. Plus all the listings from the third issue of Electron User.

JANUARY 1984: Barrels, arcade game. Noteplay, musical utility. Dump1 and Dump2, multitone screen dumps. All the programs from our Sound, Beginners' and Graphics articles. Plus 12 programs from the fourth Electron User.

FEBRUARY: Invasion, arcade game. Frogs, family fun. Balance, number learning. Key, single key entry. Plus nine other programs from The Micro User.

MARCH: Mazemunch, arcade action. Birthday, family fun. Derrick, number fun. Pixelpen, high resolution.

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JUNE: Roadracer, 3D action. Quadline, four-in-a-line. Monitor, debugging routines. Toolkit, 8271 exploring. 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.

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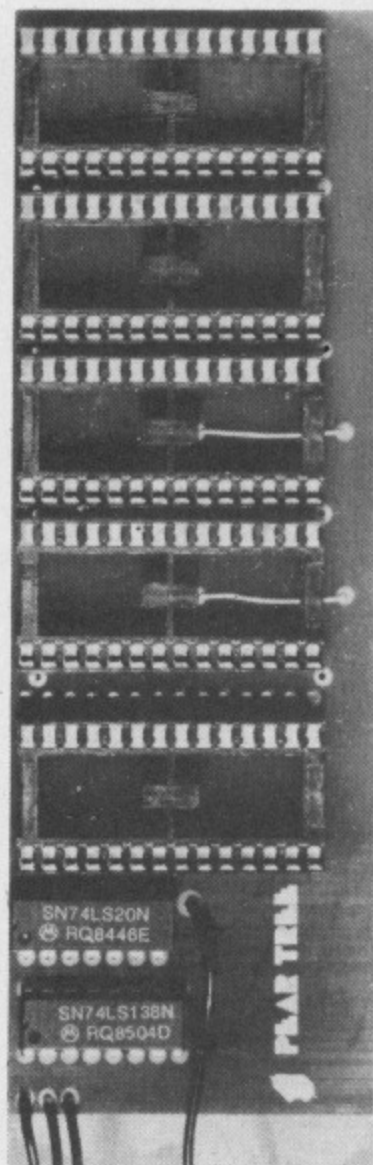
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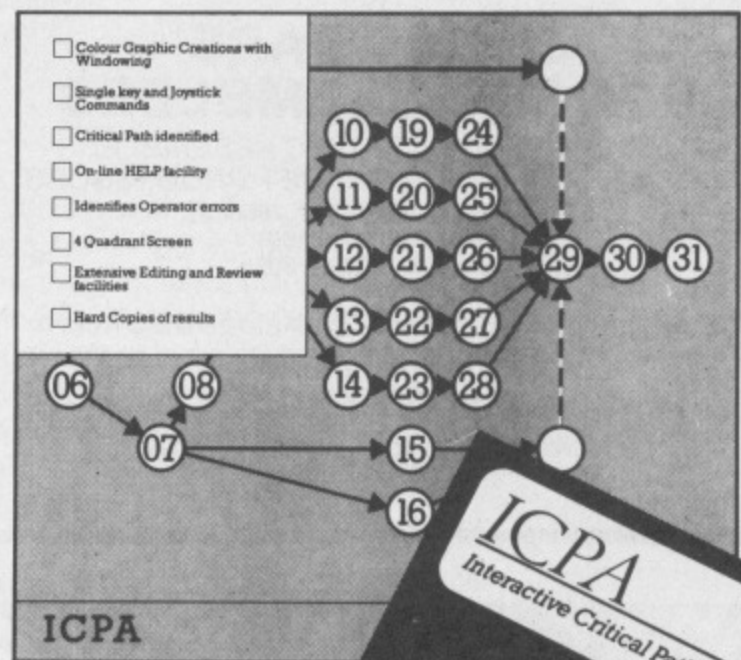
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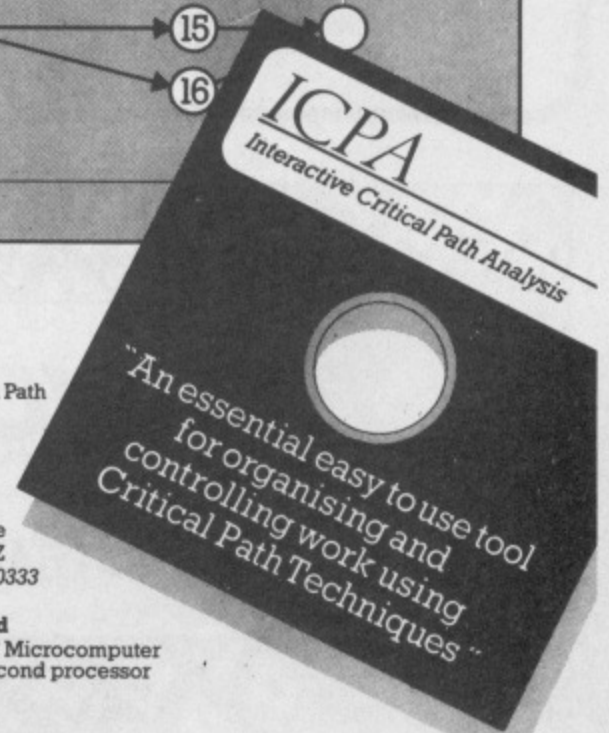
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