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CONTENTS

3 CASE

All readers have free access to our electronic magazine and mail box service CASE. Find out how to log on using this step-by-step guide.

UPGRADE

4 Preview

A peek at next month's news.

5 MSX Machines

The first part of our MSX group review, starting with a new model to be on microcomputing.

7 IBM

A desk system with IBM's basic, loads of software, up-to-date models, all for around £3,000—cheap at double the price.



14 New printers

We test out a selection of the latest printers, including Epson's LQ and the Logotype Colour Jet printer.

18 Disk drives

Find out the cheapest way of replacing your obsolete tape with a disk drive.

22 Hung games designer

DIY Spectrum games to avoid standard.

24 Motorola 68000: pure power

We discover the uses of the 68000's power, some tapped on Intel's system like the Stretch Q1.

PROGRAMMING

30 Commodore's interactive Battleships

Play the Battleships game on 660 Commodore computers using this compact coding and online single wiring.

35 Spectrum's evolution

Check traps to alert and estimate group systems on the Spectrum.

39 Dragon programming

A guide to the Dragon's 6800 processor, and how to program it as assembler.

(Single credit readers may spot that page 4 jumps to page 14, page 16 to 19, page 114 to 124, and 120 to 121, or not missing anything - the odd page numbering is the result of production difficulties and we apologise.)

49 Oric/Dragon assembler editor

Our Oric/Dragon program provides the best. For powerful assembly-based assembler-creating programs - being for the Oric and Dragon.

51 BBC security

Secure your Beeb sources from prying prisms with these program patches.

53 Oricals

A cash prize for the winner of the brain-busting quiz.

58 Cymbal competition results

We announce the winners of our Cymbal competition, and supply a handy-up engineering program for those wanting to send music messages.

60 Hi-Dat

We list the top ten games for the Spectrum/Commodore Vic and the BBC and Dragon, with reviews of the top three and two more.

CLINIC

73 Commodore Vic/40

An answer to your Vic 20 and 40 questions, plus reviews of hardware and software to help you get the most powerful disk system.

ANSWERS

80-84C

86 Sinclair Spectrum/2001

100 Atari/Oricals

102 Oric

103 Answers

PROFESSIONAL

114 Operating systems

Our guide to disk operating systems continues with a detailed description of the commands and features available.

DATA FILE



122 Keeping it clean

We look at products that claim to give your microcomputing more power and improve reliability.

127 Books/hell

141 Logo/ File

144 CASE news

147 Input

154 Beeb issues, next issue, letters and subscriptions

160 Advertisement index

COMPUTER

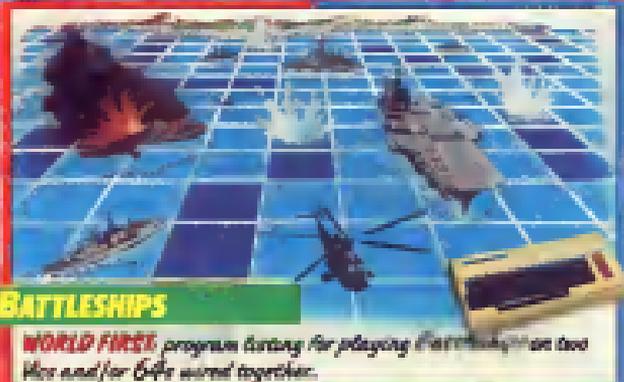
Answers

SOLVES YOUR MICRO QUERIES & PROBLEMS

COMMODORE CLINIC



Turn your 64 into a professional system...
Measure the size of your programs...
Maggie: builds a nest for your data?



BATTLESHIPS

WORLD FIRE! program listing for playing Battleships on two Vics and for 64s wired together.

SINCLAIR

Programming tips plus listings for quick draw graphics and animation...

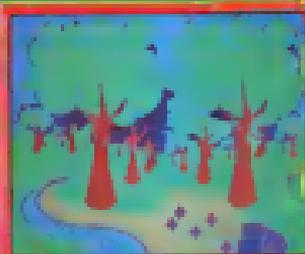
BBC

Search for the pirates using routines that keep your printer from livin' private.

DRAGON

The Dragon's 6809 processor revealed, plus programming hints.

GAMES CHARTS



The top ten games for the Spectrum, Commodore Vic and 64, BBC and Dragon, plus reviews of the top three and fast movers.

MSX MICROS



Do they set new standards?

HELPFUL HURG

We try out the new fast five games designer from Melbourne House.

CYPHER RESULTS

We reveal the winner of the toughest decoding exercise outside GCHQ, plus a listing to send secret messages.

DISK DRIVES

We test out budget disk drives.

KEEP IT CLEAN

Will cassette, disk and screen cleaners keep your system running reliably?

SUPERCHARGED 68000

The QLs and Macintosh's chip offers a new order of power to the people.

CROSSWORD

A program listing for the Orion and Dragon to help you solve crosswords.

OPERATING SYSTEMS

Details on the differences between disk operating systems.

CABB

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CABB: UP AND BUZZING!

Get into Computer "Answers" Bulletin board with this simple step-by-step guide.

1 Check the references on your system. It must have an ASCII (or, in the case of the Apple II/III) serial port. If it has it, then go to step 2, else stop.

2 If you haven't got an ASCII port you will have to buy one to plug in. For a good source of these:

3 Get a suitable modem. If your phone connects to the wall via a standard British Telecom jack-plate, go to step 3a. Otherwise:

4 Get a BT jack-plate, either installed (naturally will cost the £25 equivalent) and go to step 3, or if you can't afford it, buy an external straight modem (which you have a Telephone at which you will have to get the plug). Go to step 3.

5 As they're cheap these days (£20 instead of £150 +), your best bet is to buy a direct coupled or "hard-wired" modem like the Buzzbox.

6 Get the correct type of modem. It must be either 300/300 baud, GCFIT (V.21), synchronous, full duplex, computer-to-computer use with bulletin boards and no line discipline, or 1200/1200 baud (two-way), GCFIT (V.22) synchronous, full duplex, computer-to-computer with Prosci and Muxcom and a few on-line databases.

It is useful but not necessary to have options for answer/originate and full/full duplex.

7 Check you have connection software. If not, see March issue (page 146) for examples that will run on popular modems. If you have a problem loading the right program go to step 8. Otherwise:

8 Contact the supplier of the modem to find out what software is available, armed with the specifications given below, if no luck contact your own group, if no luck contact us.

9 The software must support the board name used by your modem (check against step 6). If you are simply wanting to chat with the board, find out what mail you're to get and place orders (the 4 pins step 1), else if you want to download files (including programs listings) then get 10.

10 Your software must sup-

port the following protocol set: 0 user line, 8 data bits, 1 stop bit, no parity. You will need an error checking protocol on streams other than streams.

We recommend that you get software that supports the Comshare (also known as Sinclair's) protocols, which is supported by CABB. These aren't necessary if you only intend to download straight text (ASCII) files to a local computer.

11 Your software must support the following settings: 1 user line, 7 data bits, 1 stop bit, no parity.

12 If you want to download text files, check that your software supports the 3, 0, 0, 0, CRR software handshaking protocol and that it has built-in file download/uploading files.

13 Your Computer Answer Bulletin Board (CABB) on 045 411 8816/18 (local service).
By Tony Dennis, forestry editor.



COMPUTER
ANSWERS IS ON THE
AIR WE SHOW YOU
HOW TO GET ON
TO CABB AND ALL
RELEVANT
INFORMATION

Get the full details for our new bulletin board

'Bulletin' information continues on page 144.

Model	Operating mode	Price	Supplier
Apple II+, II	3000 two face card	£100	Apple dealers
Apple 400, 500, 800, 900, 1000 etc.	400 two face	£110	Apple dealers
Commodore 16, 64	3000 two face	£75	Wear Magazine, PO Box 48, Ipswich IP4 3AD, Tel: 0479 80384
48 only	Modem/3000	£85	Commodore dealers
Osprey 22, 64	3000 interface	£47.50	Osprey Computers, 4-6 Mill Lane, Chipping Norton, Oxfordshire
Lynx	Hardware interface		See forthcoming issue
Orin/Atlas		£21.50	Medular Concepts/Peripherals, 12 High Street, Clifton, Swansea SA1 3BF, Tel: 0792 84444
Tandy TR-80 (87)	3000/1200	£77.50	Tandy dealers
Texas SI-85, 88	Supersynchronous 3000	£77	Parker Electronics, 4 Dorset House, New St, London, EC4A 3DF, Tel: 0453 4443
2400	Universal modem adaptor	£27.75	Microcomputer Resources, 4 Brook Road, Fox Street Village, St Albans, Herts, Tel: 04727 7217
ES Spectrum	Atari/MSX interface + software	£26.50	PCW Software, 199 All Saints Drive, Stroud, Glos

MSX HEADS WEST

Athough all month, business promises to be brisk in the U.S. for MSX from a new parallel to that of the Spectrum's to an exempt country, Japan.

There are now 11 monthly issues building MSX machines and just three months left and that they are expected to get out of their homebases.

With a range of MSX machines poised to enter the Western market, what exactly are we looking forward to? What is it about MSX that has impressed everyone within the region? Let the rest there to find out, and returned with details of several MSX

THE FIRST PART OF A LOOK AT THE FOLLOWING RANGE OF JAPANESE MSX MICROS

machines, one of which will be looking up this month (Sony and Hitachi), and the rest to next month's issue.

MSX computers and the 286 CPU, TMS 9918A (by Texas Instruments) and Matsushita's MSX Home. Going on the specifications, many in this country have dismissed them as low performance machines, but having been in Japan to see the actual machines, we are sure you that for a £190 to £200 computer, they are very good value - if only for the fact that they are all extremely well

built on the expected Japanese standard.

When ASCII Monthly of Japan posted the MSX standard to the manufacturers, it insisted that all MSX machines are built to the full MSX requirements, so that they are backwards and forth were compatible. All MSX machines have the same basic hardware with a few, however, they may have different software. The MSX machine is built so that it is as flexible and expandable as possible.

There has a link to the MSX

UPGRADE

When this month you can plug in an external expansion RAM to a disk operating system. The cartridge slot can be expanded to take up to 16 peripherals. The RAM can be increased up to 1 Mbyte in steps of 64K, by plugging into the cartridge slot (the Micro Warehouse). The maximum memory requirement for a MSX was put at 256 Kbytes. Some ROM and more than 512K of RAM, however, most have at least 128 Kbytes.

MSX graphics can handle up to 1024x1024 with 16 colours and 32 pixels. The good thing about the TMS 9918A graphics chip is that it can do its own video RAM (VDRAM), so graphics do not eat up the user RAM. In colours are some.

Their Sony, known to us for good designs, is being caught more digital looking MSX computer. The word Hit Bit was put on the Japanese word for 'people', and it certainly is a friendly-looking computer, advertised more like a hi fi.

The Hit comes in a choice of two colours, red and silver. Its body is well-shaped, with a very conspicuous shiny black screen behind the keyboard which contains the on/off switch and the cartridge ROM slot. It has a coach-type keyboard with large and clearly marked keys, making it easy to use, with the function keys and colour keys slightly raised above the rest, the rest key is thoughtfully protected in permanent recessed area.

You could say that Sony Hit fits in above the more complete MSX machines, as the basic model comes with all the necessary interfaces there are: UART and video outputs for the display, two sets come up to two Atari type protocols, and there is one 50 pin I/O bus, a cartridge slot at the top, and a Centronics port.

The Sony Hit has come with 128 Kbytes of memory, plus a 4K byte volatile RAM cartridge. When the machine is switched on a menu is displayed so you can choose which of the four features options you require, as well as MSX files. The computer is equipped with an address manager, Schedule menu and Home program. The CMOS RAM cartridge can be used with three programs (or you can store your friends' address and telephone

SONY HIT BIT 55



THE HIT BIT MAINTAINS SONY'S REPUTATION OF GOOD-LOOKING MACHINES - WHAT ELSE HAS IT TO OFFER?

numbers, for example). The cartridge can hold up to 60 names and addresses.

The good thing about it is that it is very accessible cost

priced with type of 8086 and software - plug in the cartridge and there it is. The database programs will certainly pay to use but it is not really all that

sophisticated.

The Hit Bit is a machine for games playing on casual days are large, well spaced and arranged on a neat screen. The optional joystick is robust but much too firm (the standard joystick just making two players game).

Sony is one of the few hardware companies which also sells games software, such as *Goldenrod* and *Jeopardy*. *Jeopardy* is a 3-D *Duke*-type game (Sony has several forms with a number of arcade game manufacturers to convert video games to MSX machines). *Goldenrod* (which unfortunately is the proper version), is an 8086 cartridge to work all Sony software. It plays a rather weak game at level one, but level it is very tough. *Goldenrod* is very much worth its placing a score is shown using cursor keys and writing an answer and when you play a video cartridge, please carefully *Jeopardy*.

One of the strong points about MSX computers is, of course, software compatibility. Over 100 software titles have been published, and you are assured of high quality since the software houses have to compete with reputable companies like Sony, only 30 per cent of a market in cassette form (prices ranging about £8.50, and normally £14.95).

For a computer which has almost complete range of interfaces (except BSCSI) and built-in software, the Sony Hit Bit is a bargain - definitely one of the cheaper MSX machines. If you don't mind that having a proper keyboard, this machine is well worth considering.

SONY HIT BIT 55 SPECIFICATION	
CPU: MSX	
ROM: MSX Basic, ROM 256 and 1K 15 pins with ROM 6K	
RAM: 128	
Video: 640x1024	
Screen: 32 x 24 or 40 x 24 text, and 228 x 172 in colour graphics	
Sound: 8K	
Keyboard: Touchtype	
Interfaces: compatible video and TV output, cassette 1200/2400 baud printer Centronics multi menu I/O, one 50 pin expansion port and a cartridge slot (with 64K and 128K types)	
Addressable RAM: CMOS 256x8x1024	

MULTI-INTERFACED AND HIGH RESOLUTION SOFTWARE. THE HIT BIT IS A BARGAIN.

UPGRADE

what gets you the 1190 and under MSX Model. We are unsure whether this is due to the Japanese TV system or because of the graphics chip, but they are excellent if used with a monitor.

The graphics are suitable for drawing letter patterns on screen, and some MSX code pages include coding facilities to do so. There are enough codes to do mathematics, and there can be constructed fairly good flow statements. There are also some handling facilities which allow basic programs to be interrupted when spaces, carriage, keys are pressed, errors occur and so on.

The numeric interface has two basic pages (100 based and 1000 based). When creating constants, the base rate is automatically detected so that the user does not have to specify the base rate for the constants. The primary interface is the usual Commodore type interface and there are MSX pointers which carry for all graphics elements (but only in systems with a Commodore interface can be used).

MSX Basic is an extended version of Microsoft Basic version 4.5, has generally 194000 bytes is designed to follow the CBI Basic which is a standard Basic in the 16-bit machine

MSX MODELS ARE EXCELLENT FOR THEIR PRICE, THE HARDWARE AND MSX BASIC WORK WELL, AND EXPANSION FACILITIES ENSURE WIDE RANGE OF ADD-ON SUPPORT.

MINIMUM MSX SPECIFICATION (SET BY ASCII MICROSOFT)

CPU	1MHz 8080/8085/8088/8080
RAM	128K Bytes (Optional 256K)
Display Controller	4096 Pixels (Optional 6400)
ROM	128K Bytes (Optional 256K)
Mass Store	512K Bytes
Audio output	4 channels
Video output	1 channel
Carriage control	1 channel
On-line controller	1 channel
On-line printer	1 channel

Do not be misled, you must maintain a minimum 128K of both ROM and RAM.

world. Although it does not have the sophisticated character set of MSX Basic, so far as MSX Basic is about the best version of Basic Microsoft has produced. MSX Basic is limited with up to 14 digit accuracy - which is not accurate than most 8 bit machines. You can specify whether you want single precision or double precision, and what numbers are printed they can be formatted to a number between 0 and 99999.

The graphics commands are similar to that of the Commodore in a graphics environ-

ment and commands such as PRINT, END and PAUSE (P.A.), however, it is expanded to cater for 16 colours and 16 tones.

There are two chips which can be inserted instead on top of the main system so they can be used for line copying solution. There are also solutions to let you print graphics to which you can print in line and which is not.

Unlike Spectrum or Amiga machines, MSX computers do not use totally up to their capabilities - in fact, it appears as if that they have gone out of

the way to make it efficient. There are a couple of reasons for this. First, because MSX was to become the industry standard, it had to be made with chips which are widely available (chips like 2801 have so many second source manufacturers, that it is a chip and they are guaranteed line chip shortage problems, which have been getting worse recently). Second, the chips chosen are those which have been proven to be successful and that most systems are familiar with. The MSX computers are designed to be as compatible as possible, and because the chips are the familiar 2801 and TMS9918A, the peripherals are easy to build.

So where does the limit lie for the average customer? There are a number of progressive benefits. The increasing number of manufacturers will ensure high standards, and because the peripherals can be made in the MSX standard, you get a huge choice of add-ons to give a number of manufacturers.

By the time you read this, the MSX BIOS (basic operating system) controller and floppy disk will be out in Japan. When we reviewed the article a prototype of MSX BIOS was in working order, and we were told that it was up to the disk drive manufacturer to adapt to their disks.

Hitachi's entry into MSX can only be described as cautious, and a little wary. One of the biggest chip and mainframe manufacturers in Japan they have not made much impact on the home computer market.

The MB H1 is designed as a portable computer of the Epson HX120 and Tandy 1000 series, with carrying handle and a detachable power pack. Why a home computer would want to be portable is a point well beyond us, but it certainly is a fall of surprise.

Inside the machine as you will see a Hitachi logo and an introduction with a menu of options as to the graphics - a nice touch. From the keyboard the H1 and you get a machine made machine, Hitachi is the only manufacturer to provide such a variety of software. There are 15 commands, and this machine was used to develop the MSX machine and its software. It is a machine by Hitachi per-

HITACHI MB H1

RATHER AN ODDITY IN THE MSX WORLD. HOW DOES THE MB H1 COMPARE TO WESTERN LAP-TOP MICROSP?

performance. It is a well known fact that...

If you print on the machine regularly, you have to use a...

MSX language programs. It is very fast and is a graphics H1 as a graphics program which allows you to draw pictures on...

HITACHI MB H1 SPECIFICATION

CPU	2MHz
RAM	128K Bytes (Optional 256K)
RAM	128K
Memory	128K Bytes
Screen	320 x 240 (Optional 640 x 480) 16-bit colour graphics
Printer	1200 dpi
Keyboard	Full size keyboard
Interface	Compatible video and TV output, cassette 1200/1400 baud, audio mini disc, CD, tape cartridge, floppy disk, two parallel ports
On-line port	Optional

WITH UNCONVENTIONAL BUT INTERESTING FEATURES, THE MB H1 IS IDEAL FOR THE MICRO ADVANTAGE.

screen using the same key, it is a menu program which also has a simple manual keyboard (the display shows the keyboard and how the keys correspond to each).

The utility software included is not that sophisticated, but interesting and simple enough to get a new piece of hardware to a computer and to use it.

After that all the standard features of MSX computers and software described, the little machine has one special point, a Commodore type, and the floppy is not standard of the MSX - it is a diskette. When we first heard about it, we thought about the computer does, that's interesting to see as far as possible. But we noticed it was standard for the view of response, who need to play the computer more games as a user friendly program?

By Tom Ross, a Japanese computer journalist

Overing \$1,000 of the value of your buy a \$1,000 machine, as the makers of the new Wren machine long, much more debate, but the deal really is a good one.

Take another look at the full power of the computer that covers five screens from disk, 427 M business machines at any where time that you ever without software, so if the package is as useful to you, the Wren offer represents a real bargain.

After a year of development, a team of experts have fulfilled their mission of producing a strong and innovative machine, based on proven technology, innovative price and capabilities. And here's why.

HARDWARE

The Wren is what you'd call a "complete" machine in that it's fully operable, built as the factory operated L420 "top top" computer like the Tandy 300 and Spire H200. The "complete" machine is designed to be ready to handle from office to use and go to home, in one processor package.

A big reason that many manufacturers make with this type of machine is to compromise the working features such as screen size, number of disk drives and so on. For portability, then to build, as the very thing is only a small fraction of the machine's use.

Thankfully the Wren has not fallen into this trap. It achieves an extraordinary in a very unusual way instead of the common fold-up-keyboard, the computer itself forward on its base to automatically cover the keyboard and reveal the display/heads.

The keyboard has a 40 key QWERTY layout with a separate cursor key (and function) pad and the two Frenet keys (F and C). An additional five function key pad, capable of 15 programmable screens, is provided on the left of the main board. The screen itself is good and the mouse and its analog are in the best position for operation with the base key.

The processor is the 8 bit 2808 running at 6MHz. The standard disk memory is 64K RAM which is expandable to 256K using memory banking techniques. There are 1000000 bits of data on the hard disk to enable the screen to have 10

WREN



IS THE NEW WREN AND ITS \$1,000 WORTH OF
COMPLEMENTARY SOFTWARE, REALLY AS
GOOD A DEAL AS IT SOUNDS? WE FIND OUT.

over 10K of RAM for the program without occupying the main store. There is an additional 64,000 for power on diagnosis and 50 bytes of CMOS RAM with battery backup to store time, date and Frenet code. For a single user machine it is loading with resources to the overall world's best of the obvious parts, over 8,000 75 10000 load (lower than most), and Commodore for parallel printers.

The rest is much less obvious, an analog output that can be used with the pig tails and the included BBC News. However, the machine

will be used in a completely normal way, a hard disk system, a monitor, base, light and computer.

Communications are already built-in and British Telecom-approved, using an auto dial system with 1000 1000 and 1000/15 (Frenet) load options. For users of the BBC model the sound can be produced internally (through a small speaker) or fed out through a 20M connector. Color output is via the RGB socket to a variable monitor or can be fed to a normal TV using a RGB to RF converter. Lastly, by those who who

could have thought that the biggest offer, a range of Wren software are available. This option is covered by a model already present and it is not the usual position for the device feature. There are two purchased 100K (at \$1,995), 100K (at \$1,795) and 100K (at \$2,495). The standard disk and half length 5 1/4 inch with a total of 100K storage - a double sided option will be available in version.

The display is a 7 inch screen with a fine line and a color. This may seem fairly small, especially in these hard to find size screens, but there is no need to worry as the characters are clear and well formed, and it presents no problems in use. In the three selectable modes: 60 x 24 selectable TV 100 resolution, 40 x 24 Frenet and 50 x 25 100 resolution.

On powering up, the check key lights up and the dog cursor are performed on a few seconds. If all is well, the main power light goes on and the Wren logo appears on the screen with an instruction to load the operating system disk into the top drive. Shortly after loading, the main "Wren Menu" displays, and at the top right is a programmed display of day, date and time (even this feature responsibility was more visible on the operating system has gone in the factory loaded-up and test check for an error message).

Most machines have to prompt the user on power up for the disk. The best way to describe the rest of the screen layout is to imagine 10 playing cards laid out in two rows of five starting at the top center and moving to the bottom right. Each "card" is laid down half covering the previous card. The card itself is not labeled options are on each card.

The software is made by using the left and right arrows, confirming the option by pressing return. On the last line no function key effects, which are - F1 or on time, F2 and F3 directory for disks A and B, F4 on disk and F5 is an error CP/M.

SOFTWARE

The software options provided on the system are: Executive Desk top, Communications, Perfect Wren, Perfect Calc, Perfect Plot, Addressed Software Programming, Disk Drive (Basic Disk), Format B

A WEALTH OF FEATURES AND GOOD
PRICE FOR ITS RANGE. MAKE THE
WREN WELL WORTH CONSIDERING.

UPGRADE

Desk Top (Desk Edition)

First way of key feature method, as well as the software in a desktop division, as it is presented in the three boxes.

On selecting this option a similar menu to the main one is displayed and contains the Time Management, Address, Desk File, Files, Calculators, Utilities Desktop, and Patch options.

This system as a whole is designed to be incremental and, as electronic replacement for the traditional office worker's tools such as diary or calculator were used. It is written in the C language and is for the moment a Windows-compatible application package. Certain features of the system are screen-throwable. For example, the typewriter and calculator can be inserted from the menu or anywhere in the system. What is not a wonder is made which shows where you have finished. In addition, a telephone number can be automatically dialed (using the normal method) simply by placing the cursor over the number and pressing a couple of keys.

The Time Management system is built around a day diary in the morning, appointments, things to do and events. The event list is very useful, as it not only shows fixed date fields but also has the ability to enter mail card dates. For example, 20/07 - Christmas Day will generate every year, and 15/08 - storage papers will generate every month. It also has good general purpose search facilities, and also gives you a search in advance (using afternoon events).

The Address system, as you would imagine carries addresses, but in addition, phone numbers, group (personal and company) is on the list and telephone numbers and group labels and contact address.

The Desk File is an integral system, comprising a personal records system, and a document creation system. The latter part allows the building of shells with headings and input areas to which the system automatically jumps, which can be used for notes, agendas, expenses (it has automatic receipt facilities), and diary when appropriate.

The Mail system is not what you would expect by its name. It is a very of systems, fully ordering your essential filing system, up to some major headings can be created, to each of them a further one sub-heading can also be set to those yet another one sub-heading - therefore, a maximum of 999 filing sub-headings can be created. When something has to be filed, the system leads you through the classification, continuing with a descriptive and numbered label ready for filing.

The Calculator (which can be recalled from the system at any where in the system) is a four function, but memory facility which can, on command, store the result into a document. The Typewriter, in the same way as the Calculator, is recalled directly anywhere in the executive system, can control the dumping of pages, and act as a simple and fast filing system. The Utility Backup routine's price program is to create backups and format new disks, and, when required, create new partitions for the formatted Desk Top hardware. In addition, it allows system configurations such as label format, printer type and whether the phone numbers should be provided with a '0' (for an outside line) as would be required in an office environment.

The Patch option allows you to the main menu. Throughout the system many details were provided - such as approximate time and date entry - and as a whole the system fulfilled its function. However, there were one or two slight anomalies and bugs. One that is to be expected in early in a system's life - papers in the address system can have both a 'blank' for the name or two pages the same name. There is also some slight 'font' handling of screen updates. For example, after a calculation has been called and selected some of the box edges of say the diary page may be lost. The data is not corrupted in any way, but it looks a rather untidy impression.

Two features which would be of great use, but did not appear to exist, were the ability to take a phone number from the address file into the diary to build up a list of calls to be made for/brought in, and the ability to list off the complete diary for a number of weeks ahead. In theory available on more one able to fill the

system, and you wish to check on the specific dates systems settings in so as a business device.

COMMUNICATIONS

The communications with the system are simple and to be driven. The main is a 16-bit logging on and off using four per cent numbers as manual data. There is a sub-menu list of the range of phone numbers and their descriptions. For example, the Personal History number is not stored on disk, but in the 640KB RAM for security reasons but can be changed as required. Once on line, frames can be viewed in the normal way and can be saved for future use. What of course there are no to be viewed from a disk file. With the address of a suitable provider, hard copy of the frames is available.

Programs (such as loading (telecommunications) is available and a number of Wren programs are already in Microsoft MS-DOS (see page 60). The Wren is also capable of message processing, reading and receiving. The colour graphics of Paint are represented on the Wren screen as 'grey' lines, but full colour is possible by the addition of a suitable monitor (RGB) or a converter (RGB to B/W) and a normal colour TV.

Programming is a facility to load BBC Basic (200 version) for programming and execution of Basic programs. The manual provides summary of the added commands unique to the BBC interpreter over and above BBC Basic.

The Disk Copy (Basic Disk) and Personal Disk (Basic Disk) utilities are provided to manage drive formatting and disk copying (the latter format prior to copy). Both work well, but lack an alternate and option at the user should you enter them by mistake.

A utility menu is provided to interface with CP/M to mass drive or hardware such as remote, which makes life much easier for the first time user. In addition, some features often only found on the more up-market systems are provided, such as Design Characters Sets, Delete Keys and Configure System.

CP/M 3.0 Commodore format to CP/M plus, the operating system supported, is the most advanced 16-bit version from the Digital Research stable. This arrived a while after the 16-bit versions such as

CP/M 86, illustrating the company's continuing commitment to 16-bit machines. It offers considerable software scope and added features over the CP/M 80 system version 3.0. The first noticeable advance is the improved speed of the resident file disk system.

Included along with the Wren user pack are the three 'Perfect' manuals, it is also possible to purchase the full CP/M 3.0 manual, an 80-page guide to BBC Basic and a Wren technical manual. The user guide introduces the hardware/software concepts, provides an overview of the 'Perfect' user and a depth coverage of the Communications and Graphics Desk Top options. A section is devoted to the operating system and software information is provided (if you already program in Basic) to work with the BBC Basic. The manual was good, providing useful training and some support for the first time user, and reference information for the more experienced. It was one of the few manuals that covered the very important area of backup and recovery.

The only obvious criticism of the Wren is that it is not 16-bit - but if it is a good price or working, then you will have to think again after contacting the manufacturer - the Wren has been seen of its so-called better bit relatives.

When considering a machine to complete it in the only one that seemed appropriate was the IBM PC. Both machines are used for business and personal will be used for home and 'fun' use. They both have excellent screen operating systems and yet also have colour sound and potential capability.

So the Wren is a machine with a wealth of features at a good price which is clearly aimed to a wide range of applications, and equally as good operating in a desk top business system for screen applications, as it would be a business machine.

By Keith Humphrey of the National Computer Centre, From Business Systems.

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DOT-MATRIX COMES OF AGE

CAN THE LATEST RANGE OF DOT-MATRIX PRINTER ACHIEVE QUALITY ON A PAR WITH DAISSY-WHEELS? WE FIND OUT

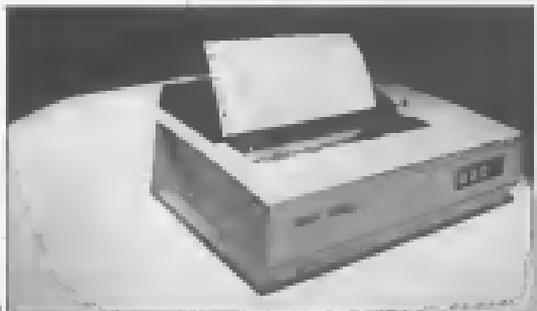
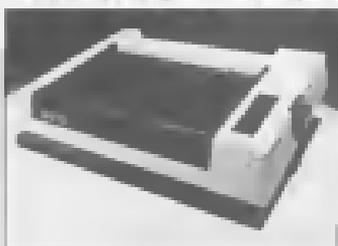
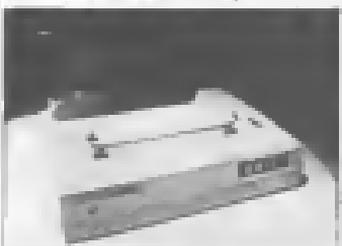
A new generation of dot-matrix printers have gone some way to overcoming many of the traditional shortcomings associated with the technology. Latest models on the market are not only able to produce colour graphics, but also can create print that's sharp enough to compare with the most traditional look-alikes.

In the January issue of Computer Associates we saw how daisy-wheel printers are excellent for producing smart print, but because of the way they produce an image on paper they're not suitable for drawing graphics. If you want to produce nice screen images and pretty presentations, as well as text, the type of printer used will have to be a dot-matrix, either in daisy-wheel.

Unlike daisy-wheel printers, which print using a hammer to strike an arm with the character on it, (see Computer Associates, January '84 issue), dot-matrix printers use a matrix, or 'mask' grid. By forcing pins through the grid and across a ribbon, the dot-matrix printer can produce virtually any shape, not being confined to any set characters. As the resolution of your display on how close together the holes on the grid are, or how many pins the head uses, the print is not usually better quality, although reasonably nice prints.

Especially in the home most people associate with colour, budget printers and only a few hundred a new machine is the HP Price, like LQ1100.

For right the letter for HP700A — also looks, shows about the price right the letter using with the Japanese technology before. Then/Step — new letter quality print at low price.



The LQ is a real beauty, and even as well as a price of £1200, it'll print a nice sharp image as a table-top printer but not for that price. All the features anyone could want have been included. It is a 24-pin and a 24-pin dot-matrix printer, so it's a quality print mode, proportional spacing (important when producing letters), and a fairly efficient user-defined character set (also downloadable).

The machine is quite complex, so Epson supply with a suitable comprehensive manual that reads *Who and How to use*. Every feature is explained in detail, and starting off with the mode as a very straightforward. Like the daisy-wheel printer looked in the January issue, all the special effects on the LQ1100 are accessed through the HP codes, as we used a BBC Micro with the printer, all the special codes look the form of VDU2 a system. Although these can look a little mind-boggling and long-winded, they are quite easy to see when in a picture. All the commands used are placed in a VDU1 command, the code that causes the new characters to be downloaded.

The great head of the LQ uses either 24 or 48 pins. In the former mode, new letter-quality print can be obtained, as good as some daisy-wheel (see Fig 2), but in clear comparison it does tend to struggle a little and become fuzzy around the edges. However, if in the latter mode, the quality is quite a lot better. In all the operation, print is more letter quality.

For example, if you want a fast print out there is a dual print mode that prints at 360 cps rather than 97, a vast improvement, though the print is very dirty.

One feature that stands out on the LQ, as well as the new letter-quality print, is the ability to accept user-defined characters and use them with character codes already used. Up to 128 user-defined characters can be downloaded to the printer and stored in its RAM (the RAM is not normally used by the printer as it usually contains its characters from one of eight character sets (also in ROM).

Before defining a character, a location in RAM must be used to tell the printer where it normally is to be stored. Once the location is specified and the character designed, it can be sent to the printer. It is not possible to print the character until the RAM is stored in the place where the character is stored. This is done using another ESCAPE code (ESC

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It is then possible to print the character by sending it to a dot-matrix printer.

Another handy mode gives the user the ability to print on single or dot-matrix using only 8, or 8x24 pins. There are six 8-pin and three 24-pin image modes. By using the various bit-image modes, simple dot-drawings and icons can be constructed in different print densities, EPO 2 even gives a quadruple-density mode.

Included in the IQ's ROM are 11 character sets including Japanese, German and Danish, each of which is software selectable using EPO 4. Using EPO 5, it is also possible to put any of the sets into a download character set so that they could've been downloaded.

To complement its excellent printing ability, the IQ also has a good external design, with some handy features: a removable interface card on the rear is a very handy facility, as is a lower Commodore, EPO 10 and IEEE 488 interface to be easily accessed post. The operation of the machine can be changed by dipswitches, as well as through software control, and three or four wheels are easy to reach—you don't have to spend time undoing bits of screws and removing half of the printer's body. Three seats or drawers can, the IQ is a surprisingly quiet machine, that lets you a soft gear from its internal fan.

Although the facilities offered by the IQ are very comprehensive, they are not enough to justify the high price, unless you are fast paying for a robust design that should give the printer a long life. For most people a vast majority of the features will be unused so there are just many more printers that can handle three 1/2-inch jets of the most popular word-processors, cannot be recommended to use all the features, and 1/2-inch jets with which the article was written certainly can't.

The Tandy King RPS 10 is a dot-matrix printer far cheaper than the IQ, but still produces some very favourable print. Virtually all the features on the IQ including near letter quality mode (see Fig



4), merged and condensed pairs, and extra and subscripts are available on the RPS 10 and they are all scanned in the same way using EPO 6 under (NLQ) mode can be switched into slowly by holding down the FORM FEED key on power-up, it is then possible to define your own RAM character set (128 characters in all) in the same way and download the ROM set. Data Memory are also working on a ROM that will allow you to download

Below the EPO 6 interface putting a new character set into the printer gives and features compressed

Printer	Speed (lines)	Serial Data	Bit-sets	Price	Supplier
C-100	48	Commodore 8510 (100,00) 8510 (100,00) (100,00)	8100 (10,00) 8100 (100,00)	173,00	Intertec
CP-1000	18	8510 (100,00) 8510 (100,00)	8100 (10,00) 8100 (100,00)	199,00	Ashco
CP-100	100	8510 (100,00) 8510 (100,00)	8100 (10,00) 8100 (100,00)	143,00	Data Efficiency
EP-100	100	Commodore 8510 (100,00)	As above	158,00 (100,00) (100,00)	Data Efficiency
IQ-1000	100	Commodore 8510 (100,00) 8510 (100,00)	TRIPLEX (100,00) 8100 (100,00) 8100 (100,00)	200,00	Spans

Prices figures do brackets denote price of options. A/V means the price was not available at the time of writing or passed

Printer	Resolution	Response time (spacing)	Graphics mode	Costed	Supplier
C-100	YES	NO	YES	YES	Intertec
CP-1000	NO	NO	YES	YES	Ashco
CP-100	YES	YES	YES	NO	Data Efficiency
EP-100	YES	YES	YES	NO	Data Efficiency
IQ-1000	YES	YES	YES	NO	Spans

DRIVE AHEAD WITH DISKS

ADDING A DISK DRIVE CAN GIVE YOUR MICRO A NEW LEASE OF LIFE... BUT WHICH IS THE BEST FOR EACH SYSTEM? WE FOUND OUT

Disk drives can change the whole character of your micro - not only do they provide fast access to masses of data, but with a good DCS, can give a machine a new lease of life. Computers and offices, they can free you from the drag of cassette.

In the last issue of *Computer Upgrade*, we took a look at ways of linking disk drives to the more popular micros, so let's take a closer view of the drives themselves. The systems we'll be looking at are those with a 14-way pin connector, the SER, and the Spectrum (with disk controller).

Since the early days of the home office micro, the 5 1/4 inch disk has been regarded as the most popular standard, but this is now being superseded by the 3 1/2 inch and 5 1/8 inch drive. Most of the popularity of the smaller drive comes from its compact design, but there is an advantage that 3 1/2 inch disks have over their larger relatives - that of strength. Unlike larger drives, 3 1/2 inch ones are disks that are located in a sturdy plastic casing, protected from prying fingers and the hazards of bending.

The Micro Pulse, from Northern Computers, is one such rugged format in a casing made with Northern Computer's own plastic front. The 3 1/2 inch Minicore drive comes complete with power cables, a format disk and an interesting little piece of software called the Mirror. The Micro Pulse is compatible with the Acorn interface, so there are no hassles trying to get it DFS-80M.

The capacity of the 3 1/2 inch drives compares favourably with that of the larger ones. For instance, when a disk is formatted to 40 tracks on the Micro Pulse, the capacity per side of a double-sided disk is 180K bytes. This increases to 300K

when it is formatted for 70 tracks, 40 x 16-bit logical data, close on the Micro Pulse. 120 16-bit bytes are reserved for 288K bytes, used for a BBC disk.

If your drive has the Acorn DFS, you will also have the Acorn utilities disk, but on a 5 1/4 inch disk. As a result, a software disk supplied with the Micro Pulse has all the formatting and verifying programs on it. These include both 40 and 80 track versions. If, on the other hand, you have the Worked Electronics or Pure AMCCOM DFS, then there is no need for a utilities disk, as everything is contained in ROM.

The Mirror, an interesting utility, enables the user to transfer virtually any BBC program from cassette to disk, something which neither DFS-80 nor Knowledge offers. By following three easy steps, programs could be loaded back to disk, with an option provided with several levels, and at a far faster speed.

After starting the Mirror, the user is asked the

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Tel: (0224) 812404.

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Queens Way, 640
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Open Supplies

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London SE25 8BE.
Tel: (011) 701 8888.

Pace Data Systems,

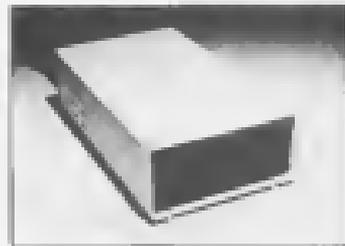
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Woolford, B25 6DS.
Tel: (0274) 729306.

Purdon Microsystems,

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Avenley,
London SE20 7YB.
Tel: (011) 629 7131/779.

Worked Electronics,

Dept BIC,
Carriff Road,
Welford, North
Tel: (02933) 40388.



ments of the game to be copied, and how many copies it wants it. Then you insert the program in its (2-1/2", 5.25", or 8-1/4") case, the tape, and hit **enter**—the program transfers over disk. Although this is an extremely useful technique, could anyone ever be bored or tired that the use of the program could enhance the enjoyment of copying the program?

Open Supplies is another company that produces a disk drive almost identical to the first Northern Computers. It is again made of metal or the same creamy cabinet as the BMC model. The capacity is exactly the same and it uses the Access interface, though in this case you do not get the Micro for transferring your programs from one storage medium to another.

Perman Microsystems has not gone for the Hitachi standard but rather for the Magnetics as the Scopy. The drive is together with the DELTA disk interface computerized disk system for the Dragon 32. There are several versions of the DELTA system available, coming with either a 40 track drive with a storage capacity of 16KB, or an 80 track version with 32KB.



Perman has housed two 3 1/2 inch Scopy drives in a large plastic case—giving them full protection.

Perman has housed two 3 1/2 inch Scopy drives in a large plastic case—giving them full protection.



Though they look more of them is important, the two drives do give somewhat in weight. With its weight, they have a good shock level and a robust look, giving the impression they will last for a long time, and stand up to local handling around.

As well as disk-copies, disks, and so on, Perman supplies a hard disk system for the Dragon that is written in conjunction with Comma, another company that sells its DELTA interface. Everything about the Dragon Disk Operating System (DOS) is explained in the book, along with how data is set out on the disk and how the interface can be customized by the user, to make software drives.

Unlike the BMC that uses the RTI controller chip, the DELTA interface allows the Dragon to read double-density disks. Like the BMC, each sector on a formatted disk contains 256 bytes, but instead of 18 sectors, there are 18. This means that a formatted, single-sided, 80 track disk, has a storage capacity of 300KB, while the 80 track version has 400KB.

The DELTA disk system comprises disk controller circuitry, and an 8K ROM containing the DELTA DOS. Perman says that its main market is using a ROM to store the DOS, as that it uses only around 1KB of user RAM, a very small amount compared to the over 128K of the system.

The DELTA system stands in comparison with a wide range of competitors. In the very near future the type of disk developed on the current Dragon 32

(Left) The BMC from Northern Computers - 1775. (Far left) The drive with some Micro-RTI software.

Opposite page (above) certainly not one of the no-fapors from Open; (below) that things come in several packages—the Micro Pulse from Northern.

Left: Perman Microsystems double drive (below), a drive comparison to a



Drive	Capacity	Access	Interface	Price	Comments
max 16KB	5-15	200	per	250	775 000 1000
max 32KB	3	400	per	250	775 000 1000
max 64KB	1-5	800	per	250	775 000 1000
max 128KB	3	800	per	250	775 000 1000
max 256KB	3-15	800	per	250	775 000 1000

UPGRADE

track zero for example. Promax has introduced a special function that configures the computer to read a certain disk when it is located. The parameters go with the CMOS installed, each of which specifies a different characteristic of the disk: drive letter, number of heads, number of sectors, number of bytes, step rate (given in the manual), and disk size, are also given. Once all the requirements have been fulfilled, the computer then can be accessed on that very set of parameters. Anytime the already lost a drive and wants to build up the new system, but doesn't want to get rid of any former hardware, could find that a rather handy function.

There is another useful command which provides the ability to search through both installed system access files for a specific name. This can be used to search through whole, or parts of a file, and is convenient with search will reveal the start of the string in the start of the record containing the string.

One of the best features of the IBM T.A. system is the ability to allow the length of random access files to remain access file to where a file is spread over a disk in several different records, each one independently accessible. The industry standard for the length of a record is 128 characters, but with DEL T.A. a 256K "record" is, which is independent of themselves per record, the length can be expanded and restricted between 1 and 256 characters as the user wishes.

The DEL T.A. software currently looks the Dragon to a disk drive that can, with the help of an EPROM, that to provide the accessing tool, also provide a fairly substantial toolkit. Although Promax's Toolkit is available on both disk and cartridge, it is not compatible with Dragon Data's own disk system, so Promax's version may be the purchased. Some of the

features provided by the Toolkit are full screen editing, programmable function keys and a facility that is designed to recover crashed programs, so that this have been lost using the software command.

For anyone looking for a disk system for their Dragon, the one from Promax Microsystems is probably the best bet, although at £115 (list cost) may be called 40-track drive and hardware, it could be considered too expensive.

The Ryle drive 580 and Hybrid cable (already mentioned in the April issue of Computer Associates), would prove to be a revolutionary advance in the world of home access disk systems. At a time of writing, the drive was available to run with the BBC, Cere 1 and Amstruc. The Hybrid cable is only needed with the Cere version, due to the Cere's lack of a disk interface, a constant of a 54-way cable with disk controller and ROM, all equipped into a reader that can be used (see the photo on page 18).

As far as the Cere version is concerned, the Ryle drive gives the machine a couple of benefits, adding much more than just a convenient means of mass storage. The drive being just a drive, the system, known by I.T.L. Kalked, gives the machine a totally new dimension. Commands that were left out from its basic such as WINDOW, VIEW, and NEW have all been added, allowing the user to view any directory. The DIAL also has the programmer select colours (with background and foreground) by means of using control codes.

From what we have seen, things are certainly changing in the world of the disk drive. Not only do they provide a system for mass storage, but so in the case of the Ryle drive and Cere, they can change the whole character of a machine, allowing it to grow into a real, adult machine.

By Steve Applebaum, staff writer

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The more games created, the more progression of packages that help design games are a professional—the sheer of having to learn how before you can use your own—yourself is a hidden potential as for a real standing block. HURGL, from the Australian software company Melbourne House, takes the guess a step forward.

Unlike some of the previous attempts, HURGL (High Level User Interface) Real-time Game design) for the IBM Spectrum, tries to fix the programmer of the non-removal of the old character screen. It flows into other (Delenda) and so on and offers a package which makes almost anything possible. This might sound ambitious as the Melbourne House has created a off-gate way.

It is interesting to refer to HURGL as a programmer's tool, as there is absolutely no programming involved. All the HURGL has to do is fish through the program, read by menu, selecting various options to make up the game. However, some programming might be necessary to design a background, which means using Basic, or a commercial design package.

The HURGL way is never left open of screen and screen. One menu, the player's menu table, has nine options above. The player's menu table is a central element, as a given screen to the stage generator for all the characters that will appear in the game.

The use of the player's figure can range between a character 4 x 3 and 3 x 1 square, and two take up of the right colour available on the Spectrum. Before designing a character, the user is asked of the name, character is to be used in each direction, and if not, is there going to be any movement. If the main character is used as each character, a total of eight different positions can be compared to form a complete movement. On the other hand, when a different design is used as each character, two figures are used per movement. Although this only gives a single movement, it can still be quite effective.

After designing a character for the player, the object menu is entered and the user does for the screen and other colors. This is the same as the player menu with the exception of no option to design a user-defined path for the screen.

HURGL



WHAT DOES TO MAKE THE HURGL GAMES DESIGNER ONE OF THE BEST IN ITS FIELD? WE FIND OUT.

In an arcade game the movement of the screen should be made as unpredictable as possible to retain interest, and HURGL has a very clever system to do this. A monolithic table that refers to the screen has the designer give each character a weighting, or value, that will determine how likely a character is to move in any one direction. Paths can also be defined for a ball, and a jump path for the player's character. Each of these are executed during play by pushing the fire button on the joystick, or else, depending on which is being used.

As well as a weighting system for the screen movement HURGL has a powerful collision table (obstacle box) which can be used for both player and object characters. The table consists of an 8 x 8 grid with each column representing a different colour. Along the top of the grid are all the possible player colours, while all the rest may go down the right hand side. Symbols at the top right of the table denote each thing is 001, 00 00, 00 and 0000. By placing data on a different, or within, combi-

binations it is possible to say what will happen when the colour combination occurs. As there are 64 different positions on the grid, every movement combination is available.

Various other combinatorial items can be added to make a game more exciting. These include the boundaries within which a player and object can move, where pre-defined explosions will take place and the resistance of a player or object. As each stage of the design it is best to have any data using the BASIC GRAPHICS facility in the screen, because saving good character data can take some time.

While trying to design a game, we took advantage of a PLAN game system as the main menu. With this the game can be placed in any position through-out development. In most of the cases we used in the game did not perform the way it was supposed to, this could be more due to bad design on our part rather than HURGL itself, but whatever, it shows that it is not as easy as it is a tool for. Sometimes the results are different colored characters moving randomly around the

screen, making obviously an error of all.

Like some of the other game design packages looked at in the January '81 issue of *Game Developer*, HURGL has some draw backs that may be being the perfect program. While HURGL is looking—compared to Quade's *Game Designer*—is in the class of a second order. In *Game Designer* sounds could be changed by moving slide controls displayed on screen, which made it very easy to use.

The other shortcoming is the lack of a library to design backgrounds, though the manual says this can be done through Basic and LDraw and a game—however, if you have ever tried to do screen designs using similar graphics commands, you will know just how time-consuming it can be. Melbourne House mention that they produce a design package called *Melbourne House* (see *Computer Games*, April '84 issue)—maybe it's worth a try.

Melbourne House hopes HURGL will appeal to a large number of screenmen in comparison who bought screen for *Character*, and want to re-learn their own games without having to go to the trouble of learning Basic. HURGL are fairly generous but facility—but don't believe a game can be designed within minutes as the screen suggest. However, compared to designing a game in Basic, from scratch, the time is very close.

If HURGL had come out before *Character* it would have been a sure-fire winner, but because of the launch of *Game Designer* it will not rise to software "super stardom" as quickly as it might have. Of the two packages, we would recommend HURGL because of the greater variety it allows. There is also the added bonus of being able to sell any games screen using HURGL, though these would be confined to other people with the package, as it may be used as the main program.

By Steve Applebaum, staff writer.

AS FAR AS GAMES DESIGNERS GO, HURGL IS THE MOST COMPREHENSIVE WE'VE SEEN. BUT WHEN IT COMES TO ADDING BACKGROUND AND SOUND, ITS LIMITATIONS ARE APPARENT.

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intensive use of all the external registers, for example, if a 32-bit number needed to be temporarily stored, it would be quicker to bring it into an address register, rather than use a RAM.

However, it is important to note that a program running on the QL at 7.5MHz could run even faster than 7.5 times the speed of an (algorithmically) identical program on a 1MHz 6502 micro. This is because fewer lines of 6502 code would be required to perform the same task as the equivalent 6502 program. So, in addition to the 7.5-fold speed advantage, the 6502 should require only one half to one third of the number of lines of code.

This would mean the QL has an increased speed advantage over the 1MHz 6502 BBC of anything from two to 18 times! The register layout of the 6502 looks very operation-comparison with P/P.

Whereas the QL will be competing against 6502 machines (such as the BBC, Amstrad and Commodore), the Apple Mac will be competing against the IBM PC and the new range of home computers currently appearing, all using the Intel 8086/8088 processors. In this comparison there is no clock speed advantage to the Apple's 68000, as the Intel chips are quite capable of working up to 10MHz, so a speed-comparison has to be based on the efficiency of the instruction sets. For a true application, the 68000 in the Apple is likely to run an equivalent program up to twice as fast as the IBM PC, the speed advantage being possible because fewer lines of code would be required to do the 68000 instructions intelligently than others.

But to end by quoting a press release from Motorola (see Reader's), the performance of the MC68000 is higher than any 8-bit microprocessor and superior to several 16-bit microprocessors, as 32 bit power is not yet available in the home.

By Dr Peter Tunnicliffe, oxford.ac.uk/whitton



MC687	Memory Refresh/Cache
MU2	Speed Multiply
MU1	Unsigned Multiply
MBCD	Registers (Decimal with External)
MBC	Registers
MOP	Pin Operation
MC1	One's Complement
CR	Logical CR
PA	Push Effective Address
BC2T	Branch Take and Branch
BC1	Branch Left without External
BC2B	Branch Right without External
BC1B	Branch Left with External
BC2B	Branch Right with External
BS	Branch from Exception
BSB	Branch and Branch
BSL	Branch from Subroutine
MBCD	Subtract (Decimal with External)
SCC	Sign Conditional
LTCP	Sign
SAB	Subtract
DMCP	Binary Data Register/Buffer
TOL	Test and Set Overflow
TBAF	Trap
TBAFV	Trap on Overflow
TSI	Test
UMX	Unlatch

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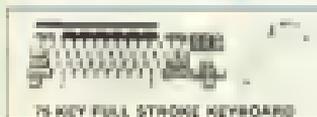
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LETTER QUALITY PRINTER: The ADAM system has a built-in word processor and a daisywheel printer. The printer is designed to produce letter quality output. It has a built-in word processor and a daisywheel printer. The printer is also compatible with Colecovision games consoles.

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The Fleet



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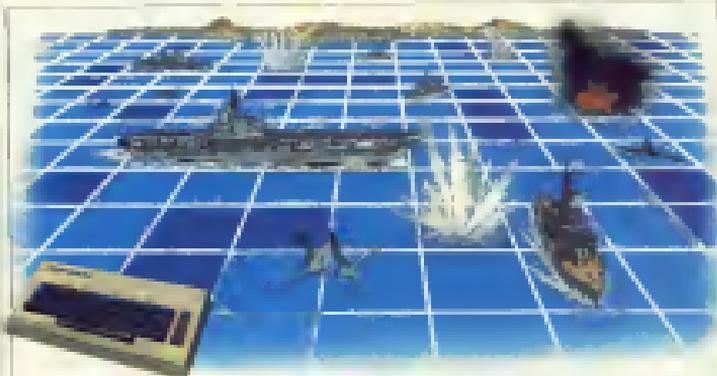
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BATTLE STATIONS!

GOT TWO VICs AND A SPARE FRIEND? THEN YOU'RE READY TO SET SAIL FOR BATTLESHIPS—OUR COMPUTER VERSION OF THE TRADITIONAL GAME.

Battleships has been a game-and-paper contest for years—but now's here all you Vic 20 owners can pass those rainy afternoons playing the game on your steering station.

Part of the design of the Vic allows the user port to be configured as an RS232C serial console console port, which is normally used to connect a printer or a modem. Under these conditions it is necessary to use an interface to convert the Vic's signal voltages, 0 and 5V on the RS232C standard voltages, -12 and +12V. However, if all you want to do is to connect two Vics together, then a third piece of cable is really all you need. Having done this you have the deal set up for Battleships. The game is executed in real-time two Vics back-to-back at 50K baud rates, but will also run on a 64 (although the error messages aren't quite here).

The principle of the game is quite simple: the two players each have a Vic hooked by a cable and arranged so that they cannot see each other's screen. Each player has a number of ships (in this game he has one carrier, two destroyers) and three frigates arranged over a square board area, and he has to guess the location of his opponent's ships before his own are destroyed.

An attack carrier covers four squares, a destroyer two and a frigate only one. The board area is divided into 100 squares, each of which has a co-ordinate to identify it. The top row are A1, B1, C1 to H1, the next row are A2, B2, C2 to H2 down to the bottom row H9 to H9.

Each player has to set up his own ships, then when both are ready, they start to see how they attack other's ships by typing on the co-ordinates of a square where they think a ship may be lurking. After a player has made a shot, the screen tells him whether he has scored a hit or not, and the square he shot at is changed (usually video-on his screen, so that he knows which squares he has already tried). In order to keep the pace of the game down, some things are left to the honour of the players. You

should never have shot the squares forming your own destroyer in a straight line, and the two players are advised to battle hard.

It takes just two (not one) ends of the optional squares) to make an attack carrier, two for a destroyer and only one for a frigate. The first player to sink all his opponent's ships has won the battle.

Before you can connect these two serial cables to connect the two user ports together—Fig. 1 shows the connections required. You should be able to get all the bits from your Commodore dealer, who will also make the cable up for you if you are not an expert at soldering. The cable itself should be proper computer-quality screened cable or ribbon cable and should not be too long (not that it probably the maximum) and it should be kept well clear of mains leads, and TV antennas. Fig. 2 shows the layout of the program. If you are running on a small Vic you should have at least a Commodore 51000, which plays nice from to play the game.

Line 100 opens the channel to the RS232C port, and lines 110 to 130 set up a few variables, line 1000 to 1080 get the co-ordinates straight, and line of your own instructions on how to play, line 1100 to 1180 put the battle area on the screen, and lines 1200 and 1300 prepare for a ship type (A, D or F). Depending on which ship was selected, the program jumps to 1500, 1550 or 1600 to make the co-ordinates of each square for the ship. Changes of life and large Vics may also require some more code in order to keep people shooting and spreading their search cones all over the screen instead of in a few selected squares. As each square is scored, an 'X', 'D' or 'F' is put into the corresponding element of the array #M% (The symbol '%' is our convention for referring to a two-dimensional array).

Lines 2000 to 2090 check whether the setting up phase is complete. Line 2040 is quite interesting because we are not using a true RS232C link, it is possible that once you had opened the channel, some garbage will come down the line before the



other means is ready to connect, if so, the K6250 software will think that there is a half-assaulted character in the buffer, and will give a warning tone when the next few characters appear. It also tests to see if this has happened, and if so, a CRT refresh clears the buffer. ST will show an error after this, but that doesn't bother us.

The game proper starts at 2300, which prompts the player for the coordinates of the square he wishes to attack, and line 2310 starts the cursor flashing. Line 2320 tests if a key has been pressed, if so, the player is making an attacking move and the program jumps to 2360. Line 2330 tests if the move has fired a shot. If so the program loops back to 2310. It's done! has fired, so assumes the 10 co-ordinates of the square under attack and line 2340 gets the Y co-ordinates. Line 2350 stops the cursor flashing and the program comes to line 2400.

If the player is keying the co-ordinates of a square he wishes to attack, the program comes to line 2360, which inputs the co-ordinates. Line 2370 sends data to the other computer, and line 2380 waits for a message to come back giving the result of the shot. If 'C' is 'M', then the shot missed, if 'R', then a hit was scored. A 'W' means that all the other ships have been lost and the player has won. Lines 2390 and 2400 tell the player whether he has hit or missed, and lines 2370 and 2380 change the square he hit or missed to reverse video so that he knows that he has already attacked that square. The array A\$(,) normally contains zeros, a -1 in an element means that the corresponding square has already been fired at, and subroutine 3000, which displays a character in that square on the screen, will print in reverse video.

When the enemy fires a shot, the program comes to line 3000, which determines whether a ship has been hit or not. If a ship is hit, that square on the screen is blanked out, and the corresponding element in the array with a character is blank by line 3010. Line 3020 decrements N, the count of the number of squares left, and if it is zero it tells the player that he has lost the game, and sends a 'W' back to the other computer to tell it that it has won. If the other player has been scored, then an 'R' or 'M' respectively is sent back.

The program contains a number of subroutines. 10000 displays the board area on the screen, 11000 gives the instructions on how to play. Subroutine 10000 also is the cursor flashing, waits for a key to be pressed and then turns the cursor off and displays the character on the screen. The key pressed is

returned in A\$. Subroutine 3000 inputs the co-ordinates of a square, verifies that they are legal, and puts them into Y1 and Y2. Subroutine 30000 tests if a square is occupied by looking in the relevant element in array A\$. Subroutine 30400 puts a new character into an element of array A\$ and displays the character in that square on the screen. If the square has already been shot at by the player, then the corresponding element of A\$(,) will be set, and the character is displayed on the screen in reverse video. Subroutine 40000 displays a message on the last line of the screen.

Now you know how it all works, you're ready to have fun playing—and maybe tinkering with—the 30 kilobyte program, which is overlaid on page 33. By Clark Proctor, a computer programmer.

See *Fast Forward* on page 120 of the *Success Manual*.



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EXTENDED ANIMATION

THE FIRST PART OF A LOOK AT GETTING THE MOST OUT OF YOUR SPECTRUM'S UDG FACILITIES TO ACHIEVE ANIMATED EFFECTS

Around 8K Spectrum owners are likely to be amazed only at Basic, exploring the computer's early abilities to handle user-defined graphics can be fun too.

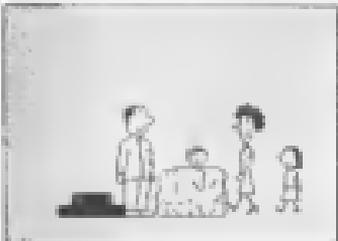
The two programs in this article enable you to draw frame pictures, one line, row/line on the screen, almost instantaneously, during the running of your Basic program. You can achieve cartoon animation, using Basic only, with no knowledge of machine-code.

There are two ways of drawing detailed pictures using Basic: the first way is to use a sequence of PLOT, GOTO and GOSUB commands—a good method for drawing boxes, circles, hand legs and so on, but not for anything more complex. The second way of drawing detailed pictures in Basic is to use UDG characters.

To draw a whole row two characters high and four characters long, you need $2 \times 2 \times 4$ UDG characters. This amounts making out 16 numbers (2 characters \times 2 lines per character \times 4). You could enter data on UDG on tape, or to gain more speed, use the UDG characters, but you will need to keep changing the UDGs, as there are only 74 altogether, and that is enough for only three or four pictures.

So if you want to use Basic commands alone to draw detailed pictures there are two problems—difficulty and slowness. The two programs, GR3 and STOR3, which we will be looking at, make the drawing of detailed pictures much easier and quicker.

The techniques we needed for the 16K Spectrum, but you can apply it to the 16K Spectrum if you replace all occurrences of 30000 with 20000, and replace 3000 with 2000. Also, refer to the 16K version of the program GR3DRAWER (Fig. 7), not the 48K version (Fig. 4). Both versions are listed at the end of the article. The program STOR3 (Fig. 8) is suitable for the 16K and 48K Spectrum.



GR3DRAWER is a Basic program which makes a machine code program when you run it called GR3. GR3 is a substitute for accompanying your own Basic program. GR3 draws a picture any size from 1×1 characters up to the full screen of 32×24 characters, almost instantaneously, whenever it is called.

STOR3 is a Basic program which you use to transfer your drawings from paper to computer memory. Once you have stored these drawings, save them on

tape. GR3 uses the picture data generated using STOR3 to display the picture on the screen.

Your Basic Program now occupies part of the computer's memory. In another part you GR3, and in another part the data for the drawings.

During the running of the Basic program, you GR3 and the data to draw pictures almost instantaneously on the TV screen. To begin with make a drawing of your picture on paper for 2×2 grid-papers, not 10×10 like ordinary graph paper. An example is shown in Fig. 1.

Now it's time to fit the program components in memory. Type CLEAR:1000. Now overwriting above address 30000 is safe from being overwritten by a Basic program which fits below 30000. GR3 and the picture fit above 30000. GR3 consists of 75 numbers, and each occupies one address. The addresses are 02280-03704. When you run GR3DRAWER, it puts the 75 numbers into three addresses to make GR3. The picture consists of lots of numbers, each between 0 and 153, and each occupying one address. The addresses are 30000 onwards. Between 30000 and 30009, and the start of GR3, there are 02279 minus 30000 = 15379 spare addresses which can be used for pictures. The program STOR3 puts the numbers for a picture into addresses 30000 onwards. The car drawing in Fig. 1 occupies 48 addresses. You cannot have GR3DRAWER and STOR3 in memory at the same time, so you use them one after the other.

GR3 works in the following way: suppose you have a 2×2 characters drawing of a car stored in memory at addresses 30000 onwards, and GR3 is also in memory. You cannot use the car, but if you enter a few lines of Basic and call the subprogram GR3, it will copy the 48 numbers which define the car into another part of memory, the screen-display area of memory, and you will be able to see the car. This is because the screen-display area of memory is numbered 30 every 2 rows, so second for the computer to create the TV display, so when you use the car, you are not looking at 48 numbers which were previously not visible because they were elsewhere in memory. If the rest of the screen is blank, you are looking at 48 numbers which define the car, and 8000-number screen. The procedure for using GR3 is



Fig. 1 (left) shows a preliminary grid design of a car picture.



Fig. 4 (above) shows an animated response taken from the 'Oliver's Dinner' package. Animation for all the family? The picture list shows a SMP produced by the package 'Cartoon Animation', which employs many of the techniques mentioned here.

and STORES are shown in Fig. 2.

Remember that you could include **GRABBER** as a storage block programmed your own, at an stage 8 in Fig. 2. Alternatively, since you have **GRB** at memory, one of your tape using the command **SAVE GRB CODE 0000 10**. When you meet a task necessary after the computer hardware is installed, use the command **LOAD "" CODE**.

To use **STORE** to store your picture, type **CLR 0000**, type **LOAD STORE**, then **FIN**. When asked for the start address, type **0000** (the **RAM**). Specify the length (L) and height (H) of your picture. You are now provided with a grid L characters long and H characters high. Altogether there are L x H character locations or 'spaces'. Choose one of these using the direction keys, then press L when you have selected one. This square is magnified 64 times, and drawn as a large square block in the map to the left of the grid. Fill in each line of space (8 lines altogether). Press B for a black line, W for a white line (strictly speaking 'ink' not 'black'), and paper too (white). Press R for a report of the picture line. Press L for a complete line. If you press L then you will have to make a complete line from 0 bits. Back bit can be black or white, so eight times you

are asked to choose a white bit is a black bit.

STORE provides you with 20 **SAVE** statements for each drawing, which it writes on the screen for you to type in. Suppose the instructions for the first two drawings are **SAVE NAME CODE 0000 08** and **SAVE NAME CODE 0008 8**. You can save the pictures one after the other on tape using these **SAVE** statements, or alternatively, you could save them together using the line **SAVE NAME CODE 0000 08**. Note that the individual lengths have been added together, to give a new length of 8.

When you type **NAME GRABBER** and **pin**, 75 numbers and addresses 0000-0074. These numbers form the machine-code subaddress **GRB**, which has just been used in computer memory.

As well as making **GRB GRABBER** available a few lines of **Block** to you in **RAM**, if you have not got a picture stored above **RAMTOP** in the tape, **GRABBER** draws part of the computer base (a section of **RAM**). To do this **GRB** is used for the start address of the picture to save. As you work in **RAM** memory, and **RAM** provides us with the best language. In terms of bits and bytes of statistics between 0 and 255. When the bit is treated as data for a picture, we get a picture of **word**.



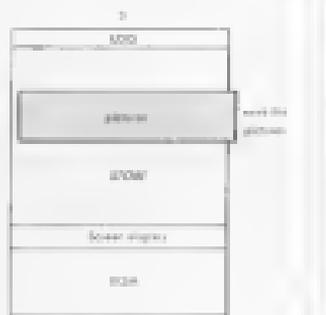
RAMTOP is set to 00000



Switch the computer on CLEAR 0000
Load STORE
FIN



Use STORE to store one or more pictures above **RAMTOP**



Save the pictures on tape using the line **SAVE NAME CODE 0000 08** length. The one has a length of 8 (square you can switch off the computer)

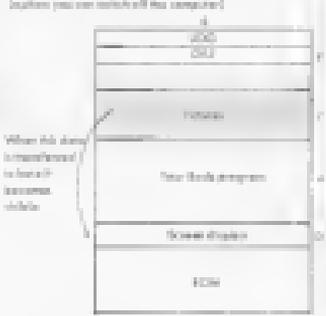
It will be 40000 to 00000000



Switch on the computer CLEAR 0000
LOAD GRABBER
FIN



GRAB in the picture using the line **LOAD CODE**. This stage can be omitted if you will the computer switched on between steps 3 and 4.



Add some **Block** of your own to **GRABBER** to make your own **Block** program. Press B in transfer C to D. It is a subaddress. A picture appears in a grid (RAM) (RAM)

GRM will draw your own picture on the screen at the speed you could expect by using the delay values for height, length, and address and so on. It is important that you do not draw below the bottom line of the screen. You can draw as low as row 20 (there are 23 rows), and 20-21 lines or lower, or you will draw off the screen.

If you use GRMMAKER then you'll be using the format in Fig. 3, that type GRM file will use a demonstration of the drawing code to which the computer can interpret 8194 numbers, which is the total number in the screen display. You also see what happens when the computer sees an error screen display on the first pass.

To call GRM during the Running of a Basic Program (in order to Draw a Picture) first present a valid the following information about the drawing using the format shown in Fig. 4.

Note that the address of the picture is split into two numbers called 'height' and 'length', these can be worked out from the address as follows: $LET height = INT (address/256)$

$LET length = address - height * 256$

To call GRM after all this information has been passed, use the command: $LET G=GRM$

If you had a Basic program where line 200 was 200 $LET G=GRM$ then when the program reaches line 200 it will draw a picture, and then go on to line 201 as the Basic program (or the next higher line if there is no line 201).

There are two ways of achieving cartoon animation: the first is to move a picture around the screen, suppose you want to move a car from left to right. To the rear of the picture of the car include a column of blank squares, equal in height to the height of the car. Now plot the appropriate values for height, length, Y co-ordinate, height, and length, draw out the loop which starts at line 200 in Fig. 5, to move the car. The blank squares are the process of drawing. If you did not have the blank squares, you would end up with 20 car wide of cars.

The second way of achieving cartoon animation is to draw different pictures at the same place.

For the drawing with a children's path, called Chase a Goose. The program draws the path using the driver 600-608 (1170) number of screen draw points. I, GRM, has drawing mode data, such as, GRM for drawing some text. Fig. 6 shows the game used for two months plus all the other parts used to construct the game.

In this month's issue of Computer Answers we'll be looking at how you can incorporate colour into these techniques.

By Stephen Fowler, author of the Spectrum packages Graphics Subsystems, Draw 15 and Goose a Goose.

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Fig. 3 contains the GRMMAKER draw lines, Fig. 4 is the GRM drawing information, Fig. 5 car moving technique

Fig. 6 shows the GRM version of GRMMAKER Fig. 8 the GRM version.

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In further issues of Computer Answers we will be looking at how to employ colour with the techniques outlined above.

THE HEART OF THE DRAGON

WHAT ARE THE ADVANTAGES OF THE DRAGON'S MOTOROLA 6809 CHIP?
HOW CAN IT HELP YOU TO PROGRAM DIRECTLY IN ASSEMBLY?

Design being rather inflexible, the Dragon II's Motorola puts a very sophisticated device. The 6809 chip offers the Dragon user more advanced Assembly programming facilities than the popular 6800 or 6801 processor.

At the assembly level, the user has the opportunity to learn about the structure of Basic machines at a much more fundamental level, but before going on to explore its potential, let's take a brief look at the history of the 6809, a bit of a journey to the hardware world.

When the Dragon II was originally put together, the designers adopted the Motorola 6808, which was (and still is) an unshakable processor. In many ways it was a final step, while there were many software writers prepared to turn their hand against working for the predominant 6801 and 6800 based machines, very few had the conviction of the Motorola chip in domestic programming applications.

Perhaps of greater importance, it is a more keen eye to adopt existing assembly programs to 6801 and 6802 based machines, such as the Spectrum and the Vic 20, that demonstrates that code in a significantly different microprocessor—thus proving the machine a larger well more based than the 6809.

This is not to say that there is anything wrong with the 6809 chip. It is flanked by some program aids, utilities and compilers if systems are given aid in the last 8-bit microprocessors ever marketed. Given the processor's obvious success, it is curious as to why the 6809 has not in the home market. Essentially it was simply a matter of timing: all the competitive chips had been firmly established long before the arrival of Motorola's offering. So what gave the Motorola device combatable head and shoulders above its rivals?

Essentially, it is the programming facilities directly available from the chip itself. The operation is advanced: the assembly language is composed of 24 basic instructions, which when given the complement of 16 addressing modes and 24 indirect sub-modes bring the total number of instructions to a potential 1440. Combine the 16-bit mode-8-bit and four 16-bit registers, plus a range of sophisticated device handling facilities and the 6809 has the potential to rival the performance of many 16-bit processors. Fig. 1 gives a programming model of the 6809.

However, the Dragon's performance does not really match that of a 16-bit business machine, at least in terms of speed. This is directly related to the manner in which the resident Basic interprets the 6809 assembly code during program execution. To execute a Basic command, it has to be translated line by line from the 6809 into understood (that is 6809 assembly language) or more precisely, a binary representation of the assembly code! Where the Basic is interpreted, as in the case of the Dragon, the command has to be translated every time it is executed—clearly an inefficient process, especially when sleep is required.

However, because the interpreter never finishes

when sleep is required, it is going to be available only. The resulting assembly code will eventually be, with a little assistance. The method of translation of Basic is by no means unique to the Dragon, it is shared, together with the inherent problems, by almost every home main.

By programming the Dragon directly in assembly language you can bypass the Basic interpreter, and in the process have the opportunity to harness much of the power not afforded to the Basic.

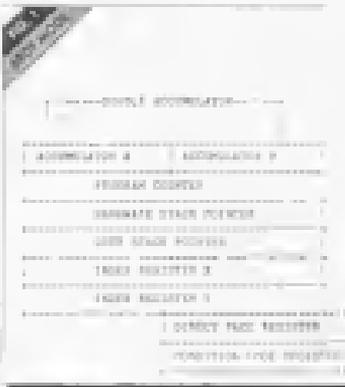
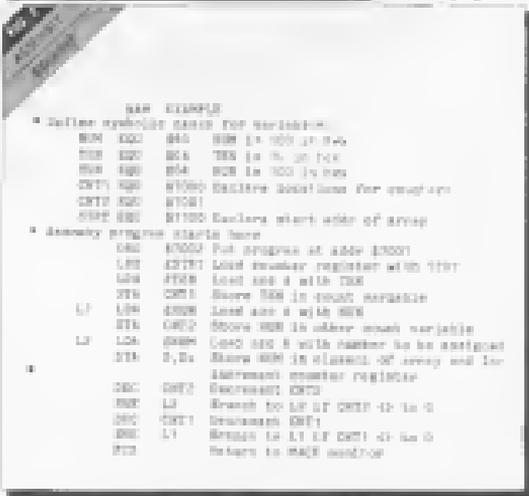


Fig. 1 (left) gives a programming model of the Motorola 6809 chip. Fig. 2 (right) Assembly definition program.



NEVER A XWORD

WE PRESENT CIRCLES - A CROSSWORD-CREATING PROGRAM FOR THE APPE, ORIC AND DRAGON MACHINES.

PROGRAMMING

Crossword puzzles are fun - I don't know any words. American puzzle fans, and thinking programs of the like, tends to make them my favorite. I've been able to handle

However, as crossword puzzles are made using grid, and, in W.C. Fields' old, "writing words having in with thinking for", or an out to drive a couple computers and its solving crossword. Nothing that would help solve any of them, but a program that would take away some of the word list making that crossword puzzle was going to go through. The final program was called Crossword Generator, rather a misnomer, as it doesn't was a penny from any crossword computer. Nevertheless, here is the program for your enjoyment and improvement.

The Cross system basically consists of a large dictionary of words, and a number of routines to search through them in a number of ways. The words are held in a special order so that it is so easy to type in more plants or "D" answers. There are many ways in which crossword puzzle may wish to search through a word list, but two methods stand out as the most useful. First, the program should be able to find all letters, regardless of any given set of letters. Second, given a complete set of letters and empty space (for example --A--B--C) the program should be able to find all words that match.

The word dictionary has different words for each word length. The shortest possible length being three letters, and the longest around 15 letters.

Each word length is further divided into three

sections to take account of allowable single letter extensions. Almost all words start and to End with a D and S extensions, many words take an S but not D, but very few take a D but not an S. Because of this, the dictionary is organized into the sections shown in Fig. 1. Any word can be added by following the procedure in Fig. 2. The idea behind this is

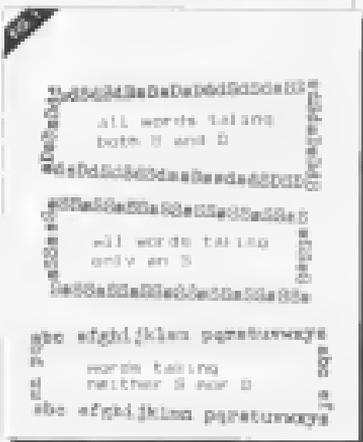


Fig. 1 shows the organization of the word dictionary. Fig. 2 shows some sample Crossword output. Fig. 3 follows the procedure for adding a word to the Crossword dictionary.

```

*****
* COMPUTER ANSWERS *
* CIRCLES *
*****
ENTER SEARCH TYPE -
A: ANAGRAM
T: TEMPLATE
G: GUT

```

```

SEARCH (A, T, G): T
TEMPLATE: -C-D
ACID ICEP
READY (PRESS RETURN):

```

```

SEARCH (A, T, G): A
ANAGRAM OF: DICE
ICEP
READY (PRESS RETURN):

```

```

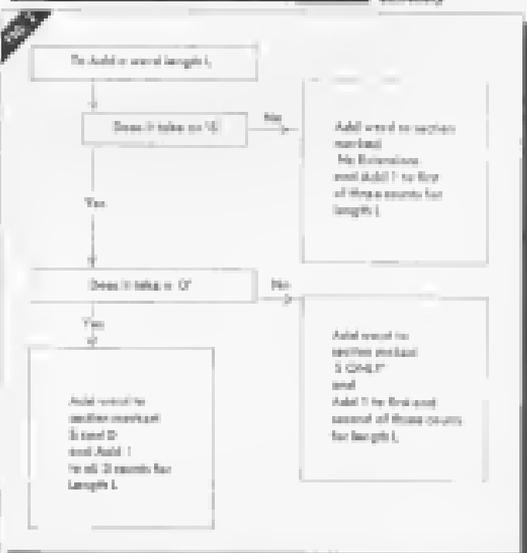
SEARCH (A, T, G): T
TEMPLATE: -----D
ADVANCED ADVISED
ADMITTED ROTATED
READY (PRESS RETURN):

```

```

SEARCH (A, T, G): G

```



64

hardware

For more information on the products listed in this column, turn to the "Hardware" section of the "Software" section of this issue. For more information on the products listed in this issue, turn to the "Software" section of this issue.

Product	Manufacturer	Price	Comments
286/386/486	IBM	\$1,200	IBM's new 286/386/486 series of PCs.
286/386/486	IBM	\$1,200	IBM's new 286/386/486 series of PCs.
286/386/486	IBM	\$1,200	IBM's new 286/386/486 series of PCs.
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286/386/486	IBM	\$1,200	IBM's new 286/386/486 series of PCs.

software selection

For more information on the products listed in this column, turn to the "Software" section of this issue. For more information on the products listed in this issue, turn to the "Software" section of this issue.

WORD PROCESSING

WORD PROCESSING AIDS
 Word processing aids are software programs that help you write and edit documents more efficiently. They can help you format text, create tables, and insert graphics. Some examples include:

- WORD PROCESSING AIDS** (IBM): A collection of software programs that help you write and edit documents more efficiently.
- WORD PROCESSING AIDS** (IBM): A collection of software programs that help you write and edit documents more efficiently.
- WORD PROCESSING AIDS** (IBM): A collection of software programs that help you write and edit documents more efficiently.

UTILITIES

Utilities are software programs that help you manage your computer system. They can help you format disks, defragment hard drives, and backup data. Some examples include:

- UTILITIES** (IBM): A collection of software programs that help you manage your computer system.
- UTILITIES** (IBM): A collection of software programs that help you manage your computer system.
- UTILITIES** (IBM): A collection of software programs that help you manage your computer system.

DATAFILES DATABASES

Datafiles and databases are software programs that help you store and retrieve information. They can help you manage customer lists, inventory, and financial records. Some examples include:

- DATAFILES DATABASES** (IBM): A collection of software programs that help you store and retrieve information.
- DATAFILES DATABASES** (IBM): A collection of software programs that help you store and retrieve information.
- DATAFILES DATABASES** (IBM): A collection of software programs that help you store and retrieve information.

For more information on the products listed in this column, turn to the "Software" section of this issue. For more information on the products listed in this issue, turn to the "Software" section of this issue.

RECREATIONAL

Recreational software is designed to provide entertainment and relaxation. It can include games, puzzles, and educational programs. Some examples include:

- RECREATIONAL** (IBM): A collection of software programs that provide entertainment and relaxation.
- RECREATIONAL** (IBM): A collection of software programs that provide entertainment and relaxation.
- RECREATIONAL** (IBM): A collection of software programs that provide entertainment and relaxation.

FINANCE & BUSINESS

Finance and business software is designed to help you manage your financial and business affairs. It can include spreadsheets, databases, and reporting tools. Some examples include:

- FINANCE & BUSINESS** (IBM): A collection of software programs that help you manage your financial and business affairs.
- FINANCE & BUSINESS** (IBM): A collection of software programs that help you manage your financial and business affairs.
- FINANCE & BUSINESS** (IBM): A collection of software programs that help you manage your financial and business affairs.



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 800-828-8888

(0 227) 2662819

8 weeks/10 months in use for prepared
 in this program name, your credit card
 number and expiry date, your address
 and telephone number

For more information on the products listed in this column, turn to the "Software" section of this issue. For more information on the products listed in this issue, turn to the "Software" section of this issue.

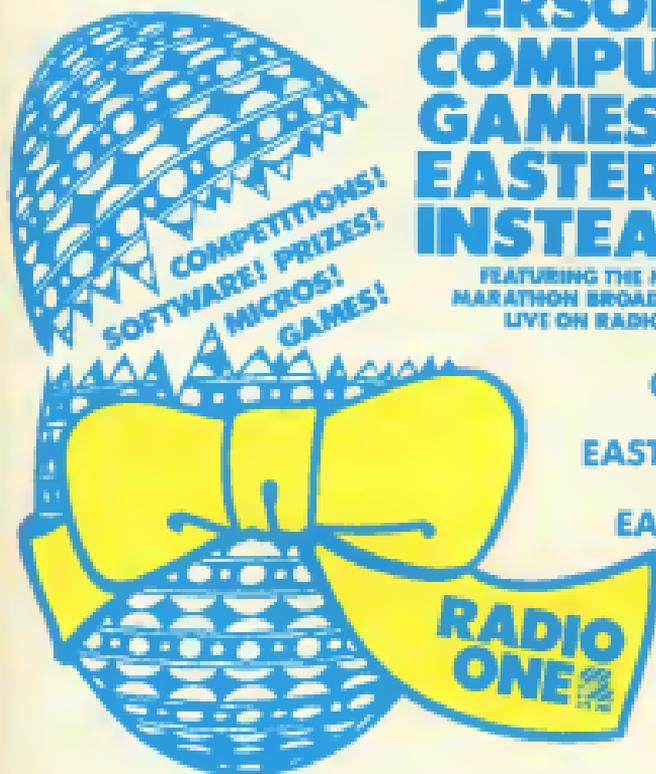
the six-four supplies company

P.O. Box 18, Whiteville, Kent. CTS (U) Incorporated by The Royal Software Centre, Ashford, Kent is division of T. Davies & Sons (Ltd)

GROWN OUT OF EASTER EGGS?

VISIT THE PERSONAL COMPUTER GAMES EASTER SHOW INSTEAD

FEATURING THE MUSIC
MARATHON BROADCAST
LIVE ON RADIO ONE  275 205



GOOD FRIDAY

APRIL 20TH - 10-6

EASTER SATURDAY

APRIL 21ST 10-6

EASTER SUNDAY

APRIL 22ND 10-6

SOLIHULL
CONFERENCE CENTRE
HOMER RD SOLIHULL WEST MIDLANDS

Special competitions from Atari, Ultimate and Imagine

Games from Llamasoft, Vision, Romik,
Audiogenic, Tansoft and lots, lots more!

FREE INFO BY TELEPHONE TO
THE FIRST 100 PAGE MAILINGS
• EVERY DAY •

The winner of our encrypting competition will get the Compaq Portable PC supplied by our UK distributor Mullertron. This is IBM PC compatible, featuring 1.6Mn 8088 processor, 256 Kbytes of RAM, two 320 Kbyte disk drives and a built-in nice look green screen. There's also a built-in 8232 controller. Controls parallel port. Software provided includes Multimate and 800 Basic. (Manual costs £3.45.)

Mullertron,
Mullertron House,
Northampton Road,
Beacons, Derby DE5 1JZ
Tel: 02071 361261



COMPETITION CRACKED

FIG. 1: THE ENCRYPTING PROGRAM.

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With over 500 entries, many involving "brute force", no help in the language (puzz!) and a good price, our Cypriot puzzle is ready to begin a cracking competition.

All you had to do was decode the message (Fig. 2), and receive a question contained within it. An encrypting little event to the competitors was that the decoding was contained in the message itself, in the middle of later entries we managed to hit the shoulder (sorry, rules in rules).

So how could the message be solved? The encrypting program is based on Fig. 1. A message is typed into the program, then the letters are related according to a number (the "rotator factor"). If the letter was a consonant then the rotator was forward, if a vowel, then it was backwards. The message was further punched by two three-letter keywords. There was probably many ways in which the problem of deciphering the message could be solved - here are a few of them.

With a success it was possible to alter the program slightly so that the rotator message could be typed in, and then we used by different amounts. It was then possible, with a sharp eye, to pick up the rotator factor by making logarithmic letter combinations, despite the punching done by the keywords. Our problem with this technique, though, was that it was not possible to rotate the message out as a one (this is, rotate by one, another message, rotate by another one and so on), for example, the letter D would become E, then the message would remain and it would become D again! It was necessary to start from the original message each time and make breaks, then one, then three, and so on.

We thought most people would start off by trying in this way. Obviously other methods were discovered, and were necessary if we had some special functions. One was to rotate the cryptogram of the word OPTL, and to take the letter from the rotator

TOP

TEN

BBC	
↑ 1	THE KINGDOM VALLEY
↑ 2	CHUCKLE EGG
↑ 3	THE GREAT ESCAPE
↓ 4	THE GREAT ESCAPE
↑ 5	THE GREAT ESCAPE
↑ 6	THE GREAT ESCAPE
↓ 7	THE GREAT ESCAPE
↑ 8	THE GREAT ESCAPE
↑ 9	THE GREAT ESCAPE
↑ 10	THE GREAT ESCAPE

THE KINGDOM VALLEY

Life in *Warrennot* is hard for a greedy, adventurous seeking treasure hunter - not only do you have to contend with the dragons, but with the fury of a host of wood and wonderful monsters.

Warrennot is the location for the action in *Five Kingdom Valley*, a new adventure game from Big Byte. Also notable has dated simulation *The Matrix*, *TOP* has full screen graphics for business - 175 of them - and the ability to talk to some of the characters who live in *Warrennot*. Although not quite in *The Hobbit's* class, it is a worthy contender.

There is no real story behind the game, but there is supposed to be two kings in the valley, each of whom hates the other. Most of the time is taken up by various rivers and lakes, the targets of which is sea, though local grass given at the start of the game, to have magical powers along with the secret of life nearby. All the player has to do is stay alive as long as possible whilst trying to collect pieces of treasure, each of which can be used in 'The Great Esc' - *Warrennot's* local.

With a good vocabulary, one using graphics and plenty of video, *Five Kingdom Valley* is a well-made screen on the adventure genre, and should not lose of entertainment to adventure-minded Bob users, a 'level-10' class of BBC adventure software well worth looking at.



Left: river settings from Big Byte's *Five Kingdom Valley*.

CHUCKLE EGG

Chuckle Egg (from A&P Software) is yet another variation on the ladder-and-ladders theme. You play the ladder, who goes this up and down the various ladders and elevators collecting eggs, whilst avoiding a host of mad chickens. What there is in the way of documentation also gives a warning on getting a crazy duck, caged in the top-left hand side of the screen, until the times we played *Chuckle Egg*, the cage contained a cloud and the weird, forced final video looked up - more of a dead duck than a crazy one.

Although *Chuckle Egg* is scored on our BBC list of two stars, it is certainly not one of the best games for the Beeb and it is slow speed/very managed to go through three levels (but total will take its speed to new levels) game play. To the last level game play *Chuckle Egg* will prove to cause that a slow 'Space Invaders' style. Not much of a challenge.

747 FLIGHT SIMULATOR

747, from Decora Soft, is a flight simulator for those who would like to fly, but get none standing on top-ice. The screen display shows a control panel at the 747 and view through the cockpit window. As the pilot, it is your job to land the plane safely and gently, to make it the passengers spill their in-flight food.

Like so many flight simulators, *747* is complex, using many of the BBC's keys, and quite dull. It is also only under documentation. However, of flight simulators are your thing (there aren't many others for the BBC), *Decora Soft's* offering is probably worth looking up.

By Steve Applebaum, staff writer.

Five Kingdom Valley (priced £9.99) from Big Byte.
Tel: (261) 700 7071.
Chuckle Egg (priced £7.95) from A&P Software.
Tel: (0706) 341111.
747 Flight Simulator (priced £8.95) from Decora Soft.
Tel: (0900) 206076.

TOP

TEN

ON A GOOD 10

- | | | | |
|-----|----------------------------|------|-------------------------|
| ↑ 1 | PROBABLY YOUR FAVORITE | ↓ 6 | STAR WARS: DARK FORCES |
| ↑ 2 | PROBABLY YOUR FAVORITE | ↓ 7 | STAR WARS: DROID ATTACK |
| → 3 | THE ONLY GAMES RECOMMENDED | ↓ 8 | STAR WARS: JEDI POWER |
| → 4 | THE ONLY GAMES RECOMMENDED | ↑ 9 | STAR WARS: JEDI POWER |
| ↓ 5 | THE ONLY GAMES RECOMMENDED | ↑ 10 | STAR WARS: JEDI POWER |

FAST MOVIES
 Phobos (Microdeal),
 Shuttle For Droids
 Dem's, Space Fighter
 (Microdeal)

For right from "Frogger"
 licensed programmer by
 Cable Software, right
 tracks gambling from
 Microdeal's
 Hungry Horace



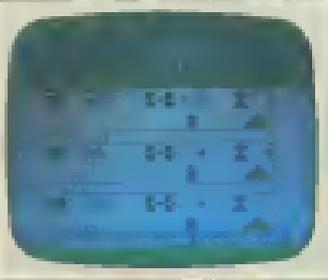
HUNGRY HORACE

Hungry Horace (from Microdeal) is a "Pac Man" game-like (close enough to be recognizable, but different enough to be legal). You control Horace as he eats round-a-park-the-hair-a-variety-of-uses (they are being on the screen as one level), choosing flowers and being chased by guards as usual. Horace is a large (and fat) blob on legs, while the guards are heads on wheels looking feet.

As well as gaining points for choosing flowers, Horace gains extra points for eating up all the guards (which they suddenly drop from one to nine). There were bonus points can be accumulated by eating the alien ball, and that eating alien and guard in range, guards go back for a short while after the ball goes off. Horace appears like it can only go to the center (up), but some of the paths were a little convoluted, and become visible after playing a few times.

PHOBOS

Phobos (from Microdeal) has three levels of difficulty to make it the only variable feature in the game. Other than that, you simply move the ball to "T" key to flip a square ball round an uncompassionate point-of-view simulation. The ball moves rather smoothly and the tapper. The ball moves rather automatically up the spring, which has three sides, a reasonable approximation of the real thing, which is floating around in the simulation. I thought it's nothing to compare with the excellent Phobos (Construction Set on the Apple). More you feel than anything else—dislike down.



DRAGRUNNER

Dragrunner (from Cable Software), number 1 on the "The List" chart, is a "Frogger"-type game, except Sidney has to be guided through a maze-like way. It is not as well you're told to the general when the place is, because the obstacles are fairly irregular. Sidney can only be controlled by a joystick, which is a pity as we think it is much more friendly to offer both keyboard and joystick options. The movement of the joystick controller lets it rather why, nevertheless, the game is good fun, and a fairly well deserved award.

THE KING OF DARKNESS

The King of Darkness (by Westwood) is a game that plays more strange kind of maze, but not so simple. As far as action goes, playing King may be frustrating to the point of giving up very early on.

The game begins with the player having to guide a "U" around a maze. Small black squares represent the different locations are placed around the screen. Going to the different places is not easy, as well as maze and handles have to be constantly avoided. Attacks are frequent, and generally less and unless opponents has been weakened to the point of death, sometimes can win. Another major handle allowing to remove and reload the tape after having several of the locations—but as most of them are the same, there seems little point in trying each one.

Compared to such as Black Crystal (for the Spectrum), King of Darkness is possibly a better one.
 By Dr Peter Turner, technical editor

Hungry Horace (printed
 £2.99) from
 Microdeal
 Phobos (printed £2.99) from
 Microdeal,
 tel 807261 6745
 Dragrunner (printed
 £2.99) and King of
 Darkness (printed £2.99)
 from
 Westwood,
 tel 0111 357 5736

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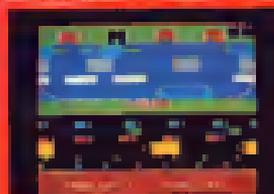
The machines will become heavier and harder to dig up as your skill develops, testing you even further. \$7.95 cassette, \$11.95 disc.

These programs are available in the new dual 4850 track format. There are many more Acornsoft DR, Model B programs available from your local Acorn stockist.

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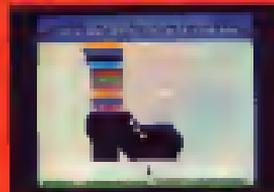
GUN MANIA - £7.95

Use your gun to shoot through the maze and collect items to help you progress. You will be able to see the maze from a top-down perspective and will be able to see the items and traps as you move through the maze.



BALLOONMAN - £7.95

Use your gun to shoot through the maze and collect items to help you progress. You will be able to see the maze from a top-down perspective and will be able to see the items and traps as you move through the maze.



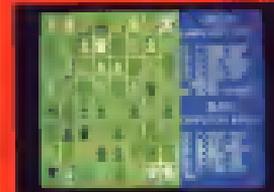
NIGHTMARE PARK - £5.95

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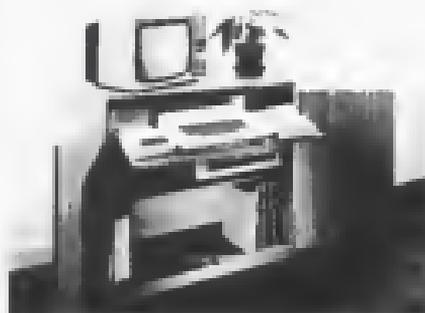


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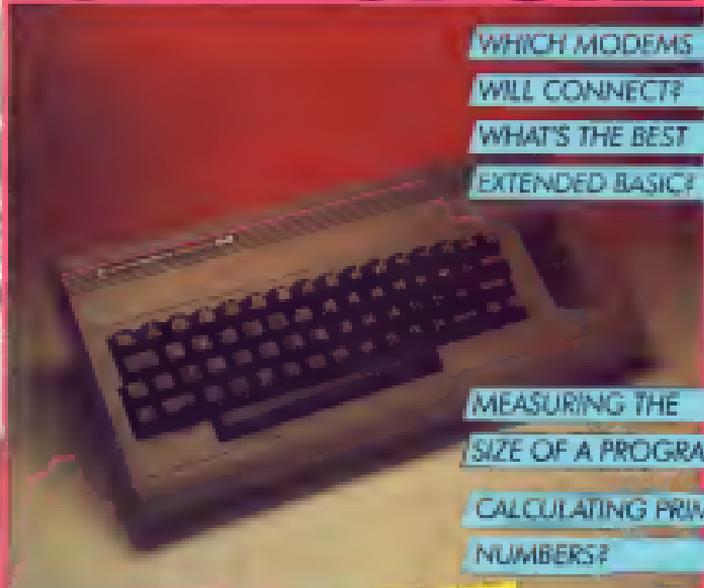
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The 286 Value Plus (left) and the Commodore 64 (right) are the C/P/M software available from Impact at £1,999.99999.

TELEPRINTER IMPRACTICABLE

I have been given an 80-0170-76 286V.

Teletypewriter and serial interface, which had worked previously, I believe, from a 286 as you know.

Commodore 64 which I would like to use with it is Teletypewriter do you know of any software which would do it? Can you tell me the cost of Commodore 64 286, so that I can see this cartridge is viable with serial interface and software?

A/Clack, London.

We think it unlikely that anybody would have produced commercial software to drive a teletypewriter, because the potential market would be so small. The 286 cartridge for the Commodore 64 is well served

also (however, Impact produces a 286 Value plus - see above). In any event, it wouldn't represent a cost-effective solution to your problem, because the 286 cartridge will be marketed with CP/M (which is the main reason for its existence), so you would be paying not only for the hardware, but also for the operating system.

The real cost would be close to that of the cheapest of the currently available dot matrix printers, any of which would run around ten times faster, occupy less than a quarter of the space, have many more features, and you wouldn't need air protection every time you used it.

So we're afraid that any thing you do which involves an expenditure of more than a few pounds will exceed the value of the teletypewriter.

BK DOWNGRADING?

I'm wanting to play BK games on my V/A 20 with 128K RAM packs so is it possible to downgrade to 4K, and if so could you give me the necessary program (as should I buy a

reliable 128K RAM pack)?

Keith Foster, Edinburgh

There is no need to downgrade your V/A, as programs written for an 8K machine will work equally successfully with 128K expansion.

MODEM MANIA

Which modems can be used with Com's modems to target into Manager 500? How do you join? What software is required? Is it available on cartridge? Will the unit have to be machine dependent? What will a complete package cost? Will I be able to access CANH using my Microsoft 500 modem? Are there any Commodore-approved units?

D/P of Apple, Glasgow

At present, Proton has not released a package to allow access to Manager for the 64. However, Tandem has the TM300 plus software which will allow access to Proton databases, including Microsoft. The software should be

available on cassette, disk or ROM from Tandem.

Commodore itself has plans to launch its own modem plus cartridge-based software to support the 4.190 mod, but we don't yet know that it will have Proton support.

Armed with the Tandem modem you can access Proton for £5 per quarter at both Proton and Microsoft for £13 per quarter. We don't know if Tandem's software will be compatible with CANH (Compu-Share Access Network Board), but armed with the correct software you could use the TM300 to access it based

Tandem Marketing

Albert Road, Harlow

Mid Essex, Essex, SSG 4 7T1

Tel: 0464 54021

ANY ROM COMMS?

I have a V/A 20 can you tell me if there is a ROM chip to be used in conjunction with a modem so, communication is possible between an act and/or other computers and could you suggest a suitable modem?

C. Edwards, Mid

We know of no ROM chip which communicates software for the 64 for the moment. See page 114 of the March issue of Computer Analyst for a range of variable modems. You will need an RS232 interface from either Oxford Computer Systems or Minor Micros computers.

MEMORY CHECKING

Is there a quick and easy way to ascertain the size of a program in Kbytes?

Also, what is the storage capacity of one side of a C10, C12 and C15 cassette?

P/O J. Beer, Devon

There are a number of system variables whose contents can be printed to give you almost any information you could want about the size of your programmed routines.

First there is a variable called `lines` at locations 45 and 46, which prints to the screen of the Basic program. So `PRINT PRINT@45 - 256 * memory` will give you the memory location in decimal. Similarly, the given 2049, which is one less than the value which the

manual sets the program itself, appears to contain a null byte. A second variable called `RAM%`, pointing to the start of your variable area, appears in the next row (locations 50 and 48). So you can write `PRINT PRINT@48 - 256 * RAM%` to determine this value.

The trouble is one byte after the end of the program itself, so you subtracting the two numbers printed on press the length of the program area. `PRINT@47 - 48` tells you where any always used begins, so subtracting `PRINT@48 - PRINT@47` in the same way gives the space occupied by simple variable `PRINT@49 - 50` gives the end of the array (1 = 1), and `PRINT@51 - 52` shows the end of string storage.

If you need to know how much memory is left - amount 150-50) with you, the highest address used by Basic.

As far as tape storage expansion is concerned, it's difficult to give hard and fast replies, because it all depends on how many programs or files you are saving on a tape. Each file will have a header and trailer label which occupies quite a bit of space, so to increase the physical gaps between files. As a rough rule of thumb, reckon that you are saving about 100 bytes/sec, so that the maximum of tape will save $5 \times 60 \times 100 = 300,000$ bytes.

This means that one side of a C10 cassette will hold about 300K, a C12 cassette about 750K, and a C15 cassette about 900K.

TV OK FOR INDIAN TAKEAWAY

A friend of mine from India would like to buy a Commodore 64, but the Indian TV is Pal M and the sound is different frequency — will the 64 work with Pal M if not, is there any other home computer suitable for use in India?

D. J. P. Chester, London

We think it is unlikely that a British standard Commodore 64 will run properly on PAL M, and the same will go for any other PCs with UHF standard output. There are two solutions: first, replace the monitor with a local one (this will, however, contradict the guarantee); second, use the composite video output if a monitor rather than a television.

Since several colour monitors are now available at a similar price to a portable colour television, this is not an expensive solution, and the picture will, of course, be higher quality.

CAN I SAVE MY CODING!

I have one programme using machine code routines with Basic loaders. I would like to be able to save the machine code to tape or disk for future use, rather than always have to use the Basic loader program — can this be achieved?

R. J. Miller, Coventry

Any program must be loaded by some other program (unless of course, it is held in ROM), so whatever technique you come up with the use of a loader of some sort. The more basic routines chosen a Basic loader is because everybody has Basic, and it is easy to do. An assembler will produce machine code save and load routines, and, if you propose to do much work at machine level, will be an invaluable aid to writing code to write.



The backbone of a PC 26 — the usual suspect for a take-over in the UK

▲ MAKING MODEM CONNECTIONS

I am thinking of buying a VIC 20. I would like use it to store information such as names and addresses, files of books, author and publishers — possible on this machine?

Also, is there a modem suitable for the VIC, and do I need to buy an RS232 interface?

Alison Lupton, Swindon

To store your second question first, you will need an RS232 interface in order to use the VIC 20 with a modem. Microware is planning to release an RS232 for the VIC

ground just in an £20, enabling it to use their own (unapproved) modem. Otherwise you could use the Interlog from Oxford Computer Systems (priced £99.95), or build your own interface for around £30 using the articles we printed in the November '83 and January 84 issues of Computer Users' Company. UK has no plans for a VIC 20 RS232 interface yet.

RT-approved modems, like DataSaver's Modems, cost from £90 upwards.

For an interesting selection of software applications, directory enquiries and other

add-ons, contact Sock Computers who have a large range of extras.

Oxford Computer Systems,

Highgate Road
Woodstock Oxford
Tel: 0993 23700

Microware, Inc.,

PO Box 45
1000 W. 4th Street
Tel: 0473 5004

Sock,
202 286 Davis Road
Bosch

I received 126 B.N.
Tel: 021 931521

'MOON BUGGY' SPLASH

I have made many attempts at loading Astron's Moon Buggy on my Commodore 64. I have tried switching off speakers and using different methods of loading, but still to no avail. I would be grateful if you could suggest other methods of loading.

David P.M. Northampton

Assuming that your Commodore 64 loads other programs

successfully, there can be no fault with the cassette version so it can only be that there is some fault with the tape itself.

Whatever reason you use when loading, the computer should not indicate that it has found a program and display the usual screen on the screen. In fact, the only thing to do is type LOAD. If you are unsure of a program name, because the Commodore 64 will show load the next program on the tape reference to name.

We did consider the price policy that you had been told a version of Moon Buggy for some other machine is correct, but as far as we can tell Astron has no other record of the Commodore 64. We suggest you request a copy from some tape store, your dealer, or some Amiga group!

Astron Software,
C/O M.
Culver,
Jenny

IS THE 64 A GOOD BEGINNERS CHOICE? ▼

Originally I was going to get a BBC B, but later I thought the Commodore 64 a better buy for the average user. Could you give me your thoughts on this?

Could you also tell me if a Commodore 64 starter kit will come out in the near future?

Christopher Dale Clark
Broadly, the BBC Model B and the Commodore 64 have pretty similar features, and on the face of it, that makes the latter a good buy on price grounds. You'll pay around half as much again for a Model B as for a 64.

However, there are differences worth pointing out. In particular, BBC Basic is a very simple and fast implementation. It allows for powerful handling and automatic parameter passing, features which are very unusual. In contrast, the Commodore Basic looks very easy to use: it doesn't even have built-in features for handling bit-res graphics or reserved chips. Consequently, programs can frequently consist of lots of apparently meaningless FORNOS. On the other hand, the 64's sound chip is more sophisticated than those for the BBC Basic, and can be given independent



sound characteristics.

Back on the BBC's side of the fence, the highest cost good graphics modes are much higher than that of the 64, and, to the same general area, the resolution modes are incredible.

In the end, it all depends on what the 'average user' wants to do with his machine. If, for instance, good sound is more important than very large graphics, then the 64 has the edge. You should start by making a list of the general areas you're most likely to be

interested in, and match those to the computer you ultimately buy.

One other consideration is software. The best range of software (and the cheapest) is always going to be that available for the most popular

machines because of the potential market. Worldwide, the BBC is pretty small here compared to the 64, so that would be another reason for choosing the 64. Lastly, we don't know of any plans for a 64 starter kit.

ERROR FAULTS

When I try Unifile II, a problem arises when loading data I get a blank message. It says to long (then on 2016) - can you help?

Edmond Leach

We haven't used Unifile, and since it's quite a complex piece of software, we'd suggest you write to David Lawrence, author of *The Working Commodore 64*, at *Sanctus Books*. As the author, he's most likely person to put his finger on the problem.

However, you could do a little detective work yourself first. The line on which the error occurs is accepting single

characters in TL, using them to see if a carriage return code (control) has been reached, and if not, adding them to a list. Try putting a stop to this line and process +END. Then continue and report it. This way you can see how the string is being built up, and so when you get the error message occurs. You'll probably get some clues as to why the problem is happening, and perhaps, even how to solve it.

Sanctus Books,
Holtspur Court
17 Winton Road
London WC2J 3JF

LISTENING BANK?

Agent from your own CASH, I would like like the services my bank account out of normal hours (due to the nature of my work) with my Vic 20. I have found that the Bank of Scotland operate such a scheme, due to their lack of high street branches. Could you tell me what modes I would require, bearing in mind a possible and log out app made to a 64. Also, are other banks operating an online part app such operation?

24 Chorltonville Shopp

The Bank of Scotland's service is offered to companies with the Nottingham

Building Society. It is part of Pretext, called HomeLink, and can be accessed with a 1280/15 bank mode. You should be able to obtain a variable modem and software for the 64 or Vic 20 from Telexnet. The modem is the same, T24160 for both machines.

We believe that the Midland Bank is also working with the idea of offering banking facilities to Pretext users. HomeLink should be on Pretext page 100.

Nottingham Building Society,
Newspaper House
2-3 Upper Parliament Street
Nottingham NG1 3BX

Telexnet Marketing,
Alford Road North
Malvern Worce WR14 3TF
Tel 02455 5542

ADDRESS ERRATA

In the Commodore Clinic of the February issue of *Computer Answers*, we mentioned an accounts package from the specific software company, but printed a wrong address.

Their correct address is given below. Our apologies for any inconvenience this may

have caused them or their customers.

Specific Software,
10 Toft Road,
Dunstable
West-Midlands DN8 2DD
Tel 05243 7377

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EXPLOIT YOUR UPGRADE POTENTIAL

THE COMMODORE 64 IS A MACHINE WITH GREAT ADD-ON POSSIBILITIES

WE SURVEY THE MARKET.

There's one question in the Commodore 64 office: plenty of "what-if" questions, you see. Instead of adding a monitor or disk drive, what if the price was above the price of the low machine? However, the real "what-if" question provides three models in higher price range: the advantage being the name of Commodore and its increasing number of independent companies providing a diverse set of hardware.

Initially the Commodore 64 seems lacking in features which are just often generated by users in various applications. But as shortcomings can be rectified. When using word-processing and database packages, the speed of loading and finding files really requires a disk drive. With word processing, the facility for saving files enhances the screen makes things the screen (so that what is seen on screen can be the user in the printed output).

Business users really need the opportunity of using the CP/M operating system with an almost unlimited choice of programs, and for getting started a simple program editor proved in proportion to the Commodore 64 would be very useful, and add-ons to provide all these facilities are around.

DISK DRIVES

Floppy disks have the advantage of making access for loading data fast—and the drawback of costing as much as the original Commodore 64. The Commodore 1541 disk drive uses 5 1/4 inch disks and has a capacity of 170K—no large by today's standards, but larger than the drive supplied as standard for the Apple II. The drive just plugs into the back of the Commodore 64 using the 15.25 inch socket with a cable supplied. There are drives looking virtually identical with just one difference, the number 1540. They were originally intended for use with the Mac II, so make sure you get the 1541.

Using just a single disk drive as a terminal or transient environment makes it more difficult to make copies and back-ups, so a second 1541 drive could be fitted into the expansion just fitting a cable from the drive into the back of the first one. This is technically known as "daisy-chaining." If the capacity of the Commodore 1540 drive just isn't enough, one of the floppy disk drives designed for other microcomputers in the Commodore range.

Your first step will be to buy an interface, as the standard on the rest of the Commodore drives is the IEEE 488. Here there is a choice which depends basically on how much you want to spend and the amount of versatility required. By far the most sophisticated (and the most expensive) is the Interport from Oxford Computer Systems (model 291). This accessory plugs in to the back of the Commodore 64, and has both RS232 and IEEE ports available. Not only is the Interport virtually transparent to the user, it also doesn't take up room from the computer and has its own range of commands.

Another interface is available from Datac with just the IEEE 488, model 294 95. Analogous

interfaces have been designed for other microcomputers, but with a floppy controller makes allowing the Commodore 64 to interface to itself with the 1541, and the 1540, and other Commodore 64 drives, and provides a range of other features, and provides a range of other features.



interface has been selected, the choice of drive is only Commodore. The independent disk drive market doesn't seem to have expanded for Commodore as much as for the Apple and IBM market, probably as a result of the demand.

Commodore do produce a 4090 disk system, which is a double drive unit with each drive having the same 170K capacity as the 1541 model (made sure here that the system uses the latest version of Commodore's disk operating system). However it costs around the £300 mark—less than two 1541s, but 50 per cent more than the cost of a Commodore 64 drive. There is a good case here for disk drive price to drop with the rapid increase in sales to people who can afford doubling the price of their system by adding a disk drive—and tripling it if they need a two drive system. If the capacity of the 4090 is still insufficient, then the another 4090 is available. This will provide around 340K per drive, but the price is going to be in the £200 area, but uses the one of a Commodore 64. This isn't the final size of drive available which could be used with the 64, but shows the amount of different type of system probably makes more sense.

In any case the cost of the interface must be added to the cost, outside Commodore of 64, make the drive should be used to work with a program before purchasing it. Currently the Commodore 1541 disk drive runs complex with a word-processing package. This is in form of charge.

PRINTERS

Commodore do produce their own range of printers, more priced in proportion to the success like the Commodore 64. There is a choice really depending on whether the Commodore printer meet your budget and technical needs or not—if they don't, then you can look to the market as mentioned to open the door for using brands like Epson, Seiko, and so on.

The range from Commodore includes the 1215, a dot-matrix printer operating at 30 cps with reader

The Epson Data 20 Matrix Plus (right) is a plug-in cartridge 80-column matrix printer that makes the Commodore 64 to act as a dumb terminal. It's priced at £200 (left) the Commodore 1241 uses 8 1/2 inch drives, and has a capacity of 170K.

(See right) the Commodore 1226 is a dot-matrix printer that makes the Commodore 64 to act as a dumb terminal.

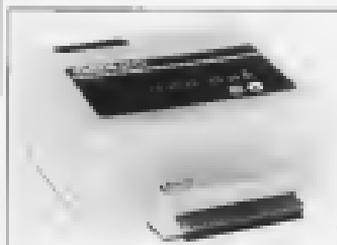
level mechanism. This model costs £160. Factor up the costs that it is the 1500, which is rated at 40 cps, and a 15-dimensional. However, the 1500 printer/punch costs just £169.99, and plus graphics, and has space for four colors, plus letters and numbers at 14 cps.

If you use another make of printer, an interface will be required. Further examples of interfaces are the Commodore parallel supplied by Shack (priced £10) or 80-column cassette for the Commodore line but alternatively Shack can also supply an IBM and RS/232 interface of £79 and £79 respectively.

Academics' value costs £19.99 for Commodore, and it holds the complete software software RAM. Education provide a Commodore add-on which includes automatic conversion into readable documents of the 80's manual codes. Commodore themselves also produce an RS/232C interface at



The latest parallel printer interface can translate the interface set to ASCII, and print through graphics characters priced £19.99



£14.99

Adding another manufacturer's attitude to yet another company's printer has all the good habits of things going wrong with nobody taking the blame—so make sure you see the computer working before parting with money. Most people have problems with interfacing printers to monitors, then almost any other problem—don't try to set screens, saving what have and a lot more.

SPT supply a Commodore printer program on separate disk, priced £19.99 each £10 without.

MONITORS

The downsized TV set was never really intended for use with a screen, though it does work acceptably,

but if this type of work is to be done with the Commodore 64 monitor figure, you need a display of 80 columns then you will need a monitor. Using a monitor has the added advantage of forcing the domestic television set (by the rest of the family, making you far more popular).

But before you start considering an outlay of around £270 from Commodore (or at least £199 from other suppliers) it's best to make your needs. For example, do you really need colour?—one of the suppliers of 80 columns attachments for the Commodore 64 specifies the use of a monochrome monitor. The extra cost will be around £80-£100, plus more cable which will be under £10.

In the main on TV deals, there is a firm of companies which a colour TV set that has direct video input can be used (but also with the 80 column attachment and EPROM screen, we have mentioned here). The input is used when a film from a video recorder is shown, and can give a better result than a composite video set.

80 COLUMN DISPLAY

By adding this feature to the Commodore 64, it can compete with the far more expensive macro systems. The system we mentioned came from Impos Design and is called VideoFax 80. Adding the plus-in cartridge replaces the original 80-column and provides clear characters in either 80 or 80-column mode. There is a tremendous increase in the screen area too, which means that the up-

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The Commodore 64 look-alike monitor (right) runs on and displays just 64 K—but before buying, ask yourself if it isn't really necessary.



grade needs a monochrome monitor (instead of a color TV).

Adding the facility for 40 columns on screen (with 80-column mode) is an equally useful, however, Video Pak 64 (three inputs) offers the most. Included in the package is the Word Manager, a word-processing package with Mailmerge facilities (retail costs £34.95 on its own). There is also Plus Manager, an easy-to-use spreadsheet which can run up to 64 rows and 254 columns. The package includes communications software which allows screen image capture on the ready at instantaneous E2030 type printer. With the Video Pak 64, the use of a disk drive is optional, though it will improve the effective speed of operation. Complete, the package costs £125, 116 if you opt for the software supplied with the system is subvented, the use of the base 80 column machines (if available on its own) will be very low. However, a better sense is have the package elsewhere.

SPT electronics also do an 80 column unit, which costs £118, or, with two disks and SPRINT, £138.

ADDING CP/M

With the more popular operating systems of all, but likely to be overtaken by PC DOS, CP/M is a planned product (according to the current Commodore-64 price list). No firm price and availability are known as yet, however, there is a form of CP/M available, not from Commodore, but, again through Input Design.

Called the 280 Video Pak, this plug-in cartridge (sometimes has a built-in 280 microprocessor designed to run any CP/M 2.2 program in 80 columns. As long as the chips have been formatted for use with Commodore disk drives, and according to Input, programs formatted for the 64 are available through Lifestar. Above it, the same time as the acquisition became available, Microsoft announced that Multiplan would be available for the Commodore 64, so this could be the first of many programs available in Commodore disk format.

The 280 Video Pak also includes a disk-based version of an improved word (locally version of V.I.P. M-called 88-80) by the IBM CPM which is a processing mode to your choice of printer. Again the upgrade must be used with a minimum two screen TV, or more be added at the cost of using CP/M with the Commodore 64. An external power supply is also required, and is available at the price of £120.

Again bearing in mind that the add-on also includes the features of the Video Pak (the Plus Manager spreadsheet and Word Manager word processor, the actual list cost of adding CP/M is just £180—so although this machine is virtually the same price as a complete Commodore 64 computer, the improvements it brings make it, roughly a 50% better system altogether, with just the same old price.

CP/M from Commodore themselves is likely to be available soon, and probably from other sources eventually. One thing that is certain is that there will be no shortage of programs for the Commodore 64 over these machines because there were widely available.

GRAPHICS ATTACHMENTS

Although there is a printer plugin available for the Commodore 64 for creating charts, graphical images and presentations, a graphics tablet is extremely useful. With use of clear acetate, the user 'draws' using a stylus and the whole system should come complete with software.

Once available from Audiovisual Systems (AVS), called the Kiosk Pad (maximum size: 8.5x11 inches and weighing just 100). The active pad surface is a slightly recessed five-inch square with red-inked buttons located along it. The Kiosk Pad is held up by the left hand, with the left thumb pulling out of the buttons, and the right hand using a stylus along the central drawing. The Kiosk Pad also includes your three magazines, Commodore, Practical Commodore Palace, so that the user can build up a picture using traditional drawings combined with different the pen combined on the screen.

By Neville Ash, a Computer Consultant

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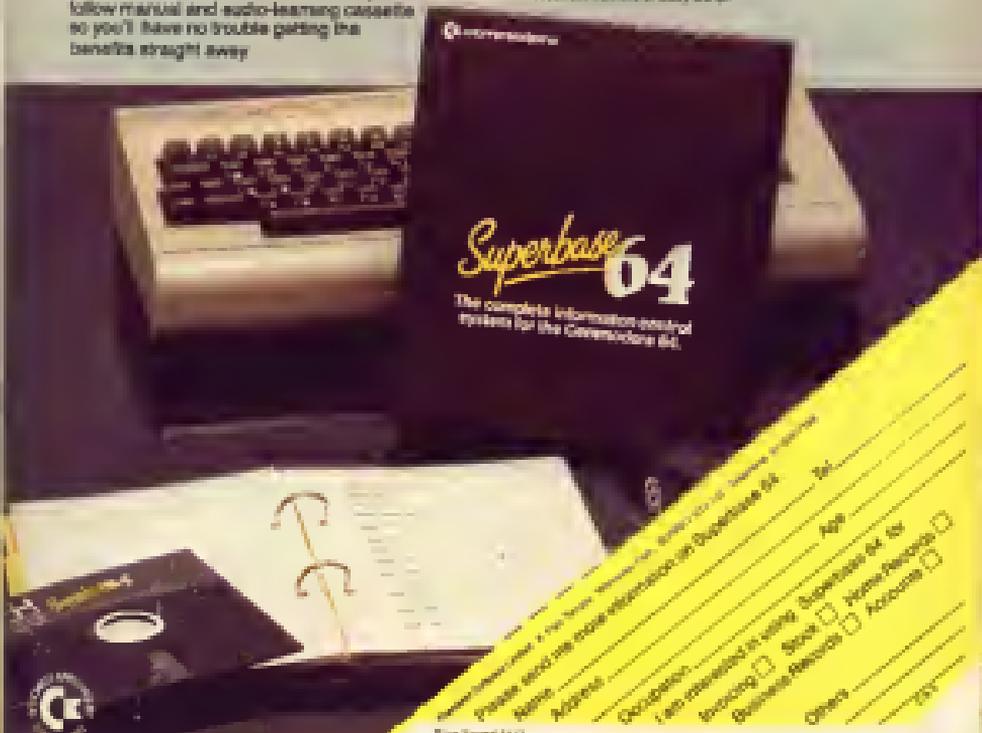
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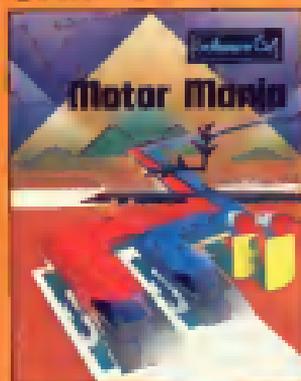
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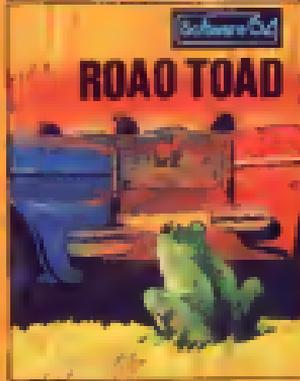
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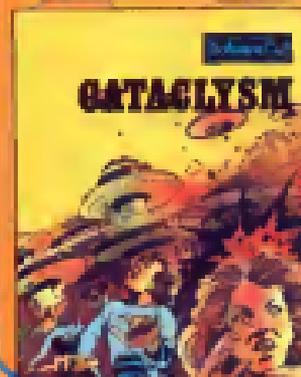
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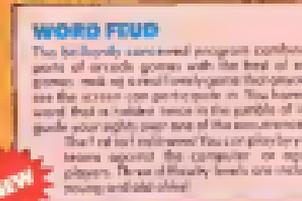
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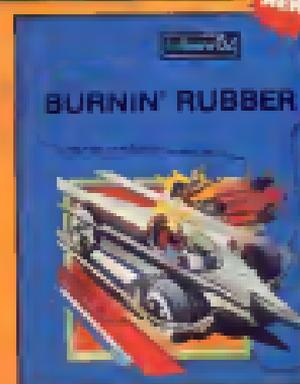


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MAGPIE: A USER-DESIGNED DATABASE?

A desktop program called Magpie sounds slightly worrying—will it nibble at your valuable data and hoard it in some inaccessible nest deep inside the system? However, this new package from Audingman for the Commodore 64 is nothing if not user-friendly, and in some respects quite innovative.

Magpie uses the unusual combination of a language for the program and data to store the data and applications. The package contains the cartridge, which has the Help screen for the commands, and two example applications and the manual.

One of Magpie provides several pop-up menus, something which is more often found with the new mouse-operated systems like Macintosh and Lisa. The second difference is the cursor: instead of a square and ready, the option selected is shown in red on a white background, and the space is selected the chosen character color to black.

After entering the cartridge the main cursor appears on the screen. There are five choices for positions, the calculator, file system, Create system, and load and save (see above right).

The Commodore 64's special function keys are used to manipulate the screen. F1 brings the cursor to the top of the line, F2 moves the cursor up by one option at a time, F4 operates the chosen selection, F6, produced with shift lock, produces the Help facility for the particular option being used, and F7 moves the selection down one option at a time.

Before reaching the main menu, Magpie wants to know which disk drive is being used. The program can be used with the 1541 drive, and also with the 4040, 4050 and 4050A with a suitable interface like the Intertek's i-card.

Taking the second option of the menu, Calculator, brings up Magpie's calculator. Again it's all done in red/black, user selected. This option can also be used as a conventional calculator.

The third option, System, offers you complete applications which will be held on disk, loaded onto the 64 when required. As each option is taken, a second menu appears



which overwrites the original one, the chosen selection appears in white on a black background.

Making list is an example of an application produced using Magpie and the menu has eleven options: Add names, delete names, delete name, find name, insert name, list names, new name, save names, delete name, and delete name.

All applications using Magpie start with a form for pages which will contain the data to be used. Magpie can have two of these pages (names) active at the same time, and each can have its own database.

Once the form has been entered, it can be reviewed as a number of ways: sequential access can be used where the program starts at the first record and works its way through to the end of the file, natural access where the natural position of the information is used, searched access

where Magpie works through according to systems that you've already defined.

Indexed access can be used with a named field as the key. So that when the key is entered Magpie can find the appropriate record, sorted access can be used where one of the special characters of the index file is in sorted order. With the system records can be created in sections, and Magpie finds them in order.

The various components of Magpie are controlled by Procedures. That is just another name for a group of commands which, linked together, perform a specific job. The user selects the procedure into the menu, and Magpie enters this command, then returning to the menu and display end of procedure.

By using Magpie a whole sequence of commands can be used with the Begin and Repeat structure available, and

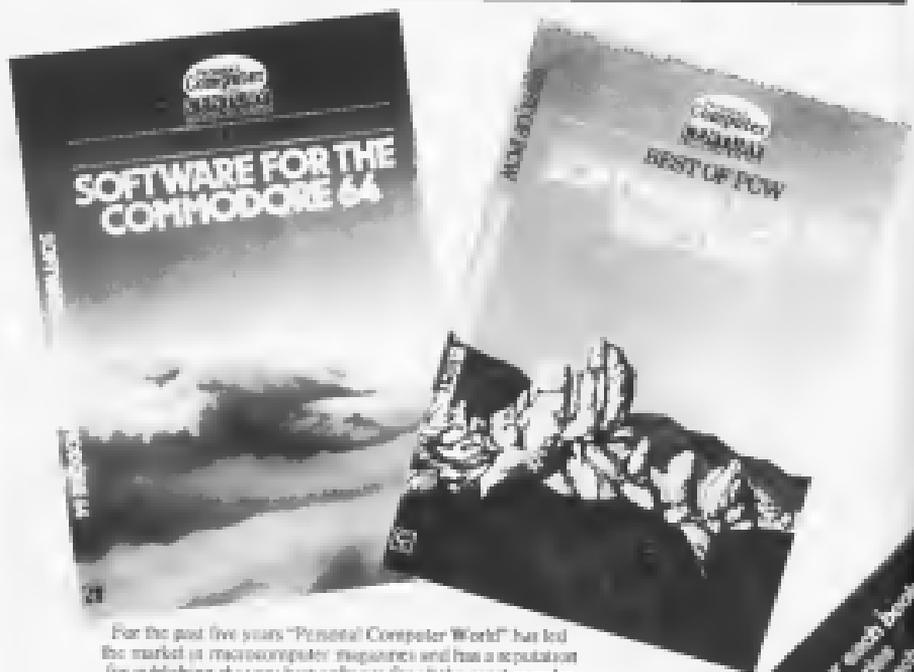
a procedure can be based on a set number has been reached, or changes made to allow multiple decisions. If this wasn't enough to a sophisticated database, Magpie can also produce graphics—such as horizontal bar graphs, vertical bar graphs, and pie charts.

Magpie must be the most advanced type of database currently available for the Commodore 64. In any event, explore the latest state-of-the-art systems with its pop-up menus, has password security, and is truly programmable. The package can be as simple or as sophisticated as the user requires, or flat, the only main drawback could be the speed of operations of the 1541 disk drive.

By Neville Ash, a computer consultant.

Magpie is priced £99 from Audingman, PO Box 50 Reading, Berks. Tel: 0734 610000.

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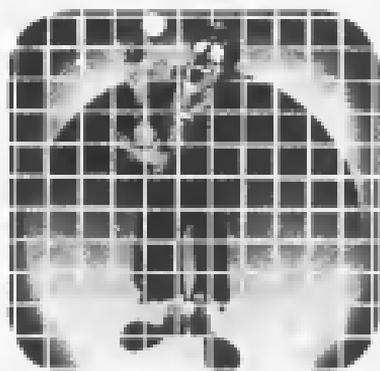
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WHICH VDU COMMAND

Acorn's ViewRAM supports

programmable highlighter, E-post printer driver supports enhanced 331 character typeface. What is the ViewRAM for this effect?

Geoff J. Pevsner, Reading

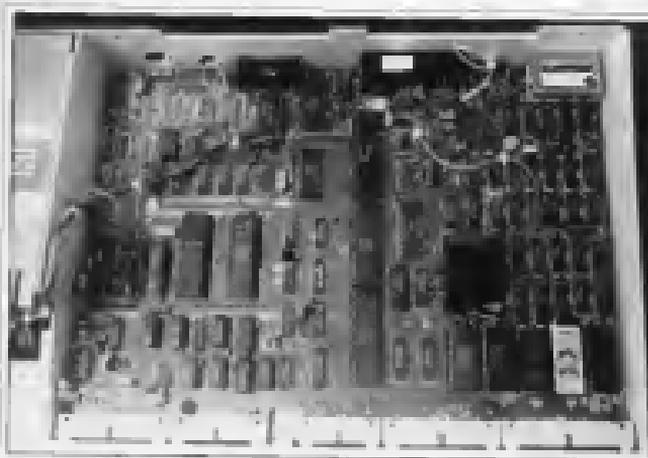
The following text, copied from lines, will put the Epac into 132 character mode (BBC SP 1.04) 1.14:

Unfortunately, you cannot enter this command once you are in View, and to top it all, the Epac printer-driver resets the printer back to its default setting when every time a print is begun. This means that it is hard to 80 columns mode. We obtained Acornsoft's Epac printer driver, and it is a very complete piece of code. It would have been nice to be able to extend it so that the 132 column option would be one of the highlight codes, but we were unable to achieve this. However the following steps will convert an Epac driver that does not reset the printer back to 80 columns:

*Codepage 100
*A0000000

*AcornPrinter 1000 + 100

The procedure will then be to enter the new command above (which you could "hide" in a "HMC" file), then once you are in View command mode, enter printer driver.



Is it all dead-end? Some designs ROMs cause damage to your BBC's system?

▲ CAN ROMS DAMAGE?

There are an ever-increasing number of ROMs coming on to the market for the BBC Micro. Provided the instructions are strictly adhered to, the fitting seems to be simple enough however, opinions seem to vary as to whether any damage can be done to a

computer if one of these ROMs is defective, either because of the program itself or due to a production fault, or by misbehaving during the fitting of the ROM. Obviously there is no way of testing beforehand. Any news? J. J. Allen, Brighton
We haven't (0202 82705 80)

case of faulty ROMs causing damage since they are only temporary devices, it would seem unlikely that damage would do anything more serious than crash the system. If you are really nervous, you could install a RAM board in a subways ROM socket, and copy your ROM software onto it. Damage could, however, be done by incorrect insertion of ROMs, loading or breaking test, and so on.

Both the BBC and ROMs are supposedly 5 volts, but any sensitive device should be willing to fit a ROM for you if you are worried. All the ROM based software that we have seen has been supplied with clear fitting instructions.

ACADEMIC CHOICE

Am going to do some Open University computer courses over the next two or three years. I am willing to spend up to about £1,500 on hardware and £400 on software. I must be able to program in UCSD Pascal, structured BASIC and assembly language. I am also interested in Lisp - what machine would you recommend? Also, how does the BBC's Pascal-T to UCSD Pascal?

D. Johnson, Blyth

A BBC Model B with two disk drives and printer would be a good choice and will hold your budget, but wouldn't quite meet your specifications. BBC Basic offers programming in the form of REPORT, LISTS, loops and files and powerful procedures in the form of a 1500 character built-in for Basic interpreter.

We haven't come up with anyone offering UCSD Pascal for the BBC yet. BBC's Pascal-T is a Pascal subset in ROM, and doesn't support records, sets or files. It compiles down to translated-interpreter code, and if it sounds like Fort's it's not surprising, as this Pascal compiler was written in Fort.

Acornsoft's 5 Pascal is also a subset, compiling down to 8080 machine code, rather than the UCSD P-system. It is not yet available in the form of writing. However, Acornsoft's Lisp is available at £14.95 for cassette, and £29.95 for the disk version.

Form 1 from ZIP has 50 FT form

HCCS Associates,
223 Queen Road

Lower Hill, Gainshead
Tynes and Wears NE7 5BT
Tel: (0428) 821754

DRIVE SWAP

I use Pen 4832 and 6040 drives in a cabinet we will shortly take delivery of a BBC Band disk interface. I feel it should be possible to use the 1MBits bus to send and receive the signals to use our 4040 disk drive. We cannot afford BBC compatible drives at the moment (and I prefer the Commodore system in any case). Is it possible now to build it to be done?

J. G. Baker, Blyth

We have been (passively) surprised to find that disk drives

from other companies have worked successfully with our BBC Micro. Drives that have been used with a Maxion and with a Pac (using a Commodore disk system) were able to be plugged straight into the BBC disk carrier and used. All the drives used were 4040s needed, and it may be that your drives are the same. Trying to use the 1MBits bus would save you down a very non-standard road. If your drives don't work, then remember that drives are getting cheaper all the time, so you may soon be able to afford them.

SCROLL INFO SOURCES

I have a 48K Spectrum on which I'm writing an arcade-style game, and am after getting continuous side-way scrolling such as in an *Scramble* and a constant background sound. How do I achieve these effects?

Also, could you recommend some books on programming the Spectrum which include keyboard graphics, sound and Machine code?

Andrew Parsons, Brighton

A book would probably be the best source for finding the information you require, as you need a machine code routine which does the same thing about. We suggest you buy a book called *Doing Things* covering your ZX Spectrum by Dr Tony Jones (published by Interleaf, priced £7.95). This contains all the information you should need to get the effects you require.

RAMPANT GRIZZLY CURE

I have a problem with any copy of *Imagae's* *As Dragons* game.

When I am not touching the keyboard the bear character has a sound of its own and goes tearing around the screen. Can you help me?

P. Hunter, Kent

It sounds as if you either have a bad copy (if the rest of the ZX Spectrum works normally) or you are affected by the 'Wired' Syndrome' or Model 3 Syndrome, the EAR socket (the 4 of the keyboard type) is now Binary 3 the Models One and Two, it was Binary 0.

This crash-up of the keyboard checking routine changes the effect you describe. Send the program back as both cases and go in up-to-date copy which should work on all models.

FINDING FUNCTIONS/ MODEM CHOICE

On the ZX Spectrum there is no scroll function neither is there any 'line' or 'clear', so on the ZX81. Can you give me the Spectrum equivalent? Will this allow me to use many ZX81 programs on my ZX Spectrum? Also, could you tell me how to use a modem on a Spectrum, and how much would it cost?

Al Sarge, Essex

The Spectrum equivalent of SCROLL is PRND (see page 78) There is no fast or slow mode on the Spectrum, it is always fast in comparison with the ZX81. Simply quote three statements when you are dealing with ZX81 in

Spectrum mode.

As the Spectrum has no serial port you will need an RS232C interface in order to use a modem. To allow Spectrum users the facility to access Microsoft Personal, Pison has produced the VTX5080 which is software, modem and software on ROM all in one unit and costs £70.00.

Should you wish to make other decisions, such as our CAME, then the Micro Menu interface is available, priced £10.50. With regard to software for communications using the Micro Menu interface, we printed a program called Spectrum in the March '84 issue of *Computer January*. PTV Software has two pro-

grams to run with the same interface and will give software plus interface at £35.50.

Using the Micro Menu interface, any commercially available modem can be used. As yet, no-one has produced the software to allow the Pison VTX, so be wary either to a 1200 half duplex modem (also on sale) or to a 1200/75 baud modem for Personal in comparison boards like our own CAME.

Micro Menu,

230 Colchester Road

London N1 1EN

Tel: 011 607 3037

PTV Software,

130 Alford Drive

Stroud Kent

ACCOUNTING FOR TASTE?

I have a 48K ZX Spectrum could you suggest a program for invoicing?

J. Stevens, Yorkshire

I am a 48K Spectrum owner; could you please tell me HTR could help me keep a daily account, with up to 300 entries for a whole year, and then work out the total loss/profit?

Also, could I subscribe to *Micro Menu* - my choice of the pages which can be accessed free of charge?

C. D. Moore, Middlefield

Your number of entries (300 a day) is quite high, but *Micro Menu*, like some of the other pages listed might be able to provide a suitable program. The data can be stored on tape or disk, but disks are more expensive to store.

To subscribe to *Micro Menu* you must first obtain an adapter like their VTX5080 in which you can use our Personal. This costs approx £99. You then have to have a suitable front to take the modem by British Telecom, and pay annual charges for the modem and the telephone line at £7

and a three-monthly subscription charge to Microsoft for access Personal and Microsoft. The price change comes on top of this. Most of the pages are free, and there is plenty of warning before you pay for a page.

Tomahawk,

41 Keston House

Franklin Road

Brackley Kent

Kepp, 45A Wood Hill

London N10 3PN

Halsbury, 10 Parkway

Highway Park

London NW11 3AA

Micro Menu, PO Box 17

Brighton Sussex

Book 11/1/83

MONOROOM

I have a ZX Spectrum, which I use with my colour TV, but I struggle (and I'm a bit of a klutz) with video display. What's wrong?

Jonathan Comp, Essex

The ZX Spectrum needs time to warm like any other device, by adjusting the TV control after it has been on for about half an hour.

GETTING TO DATA FASTER

Could you explain how a Microdrive and interface would make a difference to using a database (as opposed to just using a Spectrum 48K and cassette system)? I know that a Microdrive can hold just under 100K, it is usually 48K (or under) (can be held on RAM), I don't quite see any advantages.

Eric Brennan, London

The single advantage to speed databases need to access information quickly. Entering a tape from beginning to end can take a few minutes, but any information on a Microdrive can be found and loaded in 30 seconds.

In any database the information is held on files which on tape or Microdrive can be up to 15K long. Only the section of the file required at the time is loaded onto the ZX Spectrum (as you say, a maximum of 48K). The sections need to be swapped on the fastest speed possible, hence the improvement by using the Microdrive. Files can also be copied much quicker and more using another

The BBC Micro can now give your children a private education.

The BBC Microcomputer now accounts for 80% of the computers being ordered under the current DSO1 Primary School Scheme.

It's also the computer which a rapidly increasing number of people are choosing for their homes.

One of the reasons for its success is that it makes learning highly entertaining for everybody from children who are getting to grips with the alphabet, to adults who want a gentle but intensive introduction to the complex world of computing.

Now, there's a substantial new catalogue of educational programs specially for the BBC Microcomputer.

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

Make faces without getting scolded.

With the new **FaceMaker** program, your children can make over a million faces. It's like an artist's kit, allowing them to depict anyone they want. They start by choosing the eyes. Then they can choose the mouth, the ears, the nose, the hair outline and the hairstyle.

And if they really fancy dressing up, they can add earrings and hats.

In doing all this, they learn to read and spell, as well as developing their powers of description.

The money program, two parts for the price of one.

Mr T is an engaging little figure in a tin who can teach your children all the complexities of our money system.

His **Money Box** program has two games, each of which can be played at different levels.

In **Money Match**, the challenge is to collect a set of coins, matching them according to shape, size and value.

In **Money Box**, you can give your child and Mr T a helping hand to get all the coins on the screen into the box. (It's always difficult, because the coins on the screen are based on the small change you have to handle)

A chance to teach the Micro a thing or two.
With the **Animal Vegetable Mineral** program, the children can get the computer guessing.

They think of an object. The BBC Micro has to decide what it is.

If it doesn't come up with the answer, the children can keep giving it hints.

In doing so, they are encouraged to question the difference between such things as crocodiles and alligators, or whether oil is vegetable or mineral.

The program also encourages them to consult refer-



ence books so that they can ask the computer increasingly tough questions.

Questions on Julius Caesar from J. Julius Norwich.

Julius Julius Norwich's **History Quiz** is one of the new BBC Micro Grandmaster quiz series which also covers theatre, crime and detection, music, science fiction and royalty.

On the history front, there are 100 hours' testing questions, covering all aspects of British history from Julius Caesar to Margaret Thatcher.

And to increase the educational value, Mr Norwich has posed the questions from angles which will give a broader understanding of events.

For the full catalogue, clip the coupon.

There are thirty more new BBC Micro programs in Acornsoft's new catalogue.

For a free copy, complete the coupon, or telephone 0932-79400. Or ask your local BBC Micro dealer.

If you've not yet a BBC Micro owner, you can get full details of the computer at the same time.

To Acornsoft, via Nicker Marketing, Herringwood Lane, Weymouth, Dorset DT9 2BL. Please send me the new Acornsoft catalogue "to Home With The BBC Microcomputer"

I would also like details of the BBC Micro

Name _____

Address _____

Postcode _____



ACORNSOFT

CUSTOM CASSETTE

I understand that it is possible to make your own leads to use an ordinary tape recorder with the Commodore computer; is the same thing possible with the new Atari, and if so, how?

C.T. Price, Apts.

The 410 cassette recorder is not just any old recorder with an expensive lead hanging out—apart from the fact that it has a two-track head, it is also modified internally. The Atari computer record data using a method known as Frequency Shift Keying, so the Atari error rate the required sound frequencies and sends them out

to the recorder and these frequencies are sent out in a very fine waveform. The 410 receives the signals and records them on tape.

This may seem a little like my other computer's recording method, but the system above slightly when the data is sent from the 410 to the computer. The 410 listens to the tape

and interprets the frequencies that were recorded onto the tape, either high or low frequencies. After listening to the sounds, the 410 sends out an electrical current to the computer, which is either zero voltage for a binary zero or 5 volts for binary 1.

No other commercial tape recorder will have the same accuracy installed. Commercial tape recorders are only able to send out sound frequencies and not the straight voltage required by the Atari, an advantage to this is a more reliable lead.

Adapters are available to produce the circuitry inside the 410 but we have only from those advertised in the US. You could buy one from the UK, but by the time you have paid for it and shipped a return you may as well have bought the 410 or 1010 recorder.

Kathalady is such a simple-minded consideration, that we think paying the extra is probably worth it.



800 in the family—the Atari 800 is able to use VCS peripherals.

JOYSTICK DIVISION?

Can the Atari 800 take the Atari VCS video games and joystick?

Steve Adams, Herts., Atari
The Atari 800 will accept any of the joysticks in addition that are available for the VCS machine. It will not, however, be able to use the cartridge. The VCS and 800 use different processors, and apart from anything else, the physical size of the things is too big for the 800.

DRAGON

WHICH IS BEST DOS?

I run both Dragon and Commodore 64 systems now. I hear that the Dragon disk system will run DOS and Plus, and that these have advantages over CP/M and the Commodore operating system I use now. Is this so? (If principal use is for a small business.)

Graham Smith, Ipswich

Plus and DOS do have advantages over CP/M, largely due to the fact that they use draggled tapes and take advantage of advances in software technology. However, CP/M has one enormous advantage over both these operating systems—a few have around for so long that there are literally hundreds of application programs which will run under it. A comparison of Plus and Plus II will cope with the word-processing and file-handling demands of a small business, but there are plenty of other packages to choose from. The choice for users of Plus and DOS is more likely to be more limited.

DOUBLE DRIVE COSTS

I am interested in purchasing a Dragon disk drive. How much would a double disk drive cost, and what makes are available?

Also, what is the cheapest graphics printer on the market for the Dragon?

Stephen Roberts

Dragon Drive's disk drives cost £175 for a single drive and £300 for a dual. An alternative

option is the Quantum drive which works with the Debiton systems (cost £200 for a single drive and £375 for a dual). The two systems are comparable in terms of disk capacity, but the Debiton system is more user-friendly and versatile than Dragon Drive's disk extensions to the Macintosh-like supplied.

As disk drives for the Dragon are a relatively new product, disk-based software

is fairly scarce at the moment, but this situation is likely to change rapidly. The cheapest graphics printer for the Dragon currently available is the MCP 60 colour printer (this offers low colour printing using standard halftone print, and costs £149.95). All the more sophisticated should be available from your local Dragon dealer.

The quality of print is quite reasonable.

MEMORY ADDITIONS

Can you add RAM chips to a circuit board via the Z801 card edge board to a Dragon 31?

Could you tell me how to add it to the existing Dragon memory? Also, is there a compiler for the Dragon 31?

Andrew Wilson, Essex

It is possible to add extra memory to the Dragon via the cartridge socket, as all the necessary address, data and R/W lines are brought out at the connector. The cartridge socket connections are exactly the same as those in the Tandy Colour Computer and are

described in the Colour Computer Technical Reference Manual (available from Tandy at 750) 48K and 128K RAM packs for the Dragon are also advertised by Soft Shop, priced £24.95 and £44.95 respectively.

One word of warning—top extra RAM attached to the cartridge port will not increase the amount of memory available for these programs, as it is not contiguous with the basic program area. It will only be useful for data storage and machine code storage.

The Spring Basic compiler is an integral subset of Dragon

Basic, and it is claimed that programs written for it will run 5-10 times faster than the interpreted equivalent programs. It costs £24.95 and is available from Data Software.

Other software also makes a Pascal compiler, called Pasa Pascal, worth looking at.

Soft Shop,

66 Colindale Avenue,

Settle-up House,

Northwood, Middlesex TW9 1PL

Data Software,

Altrincham Road,

Widnes, Greater Manchester,

Area 0527 1521.

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7 COLOUR INK JET PRINTER

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With Centronics parallel interface
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Also prints overhead transparencies.

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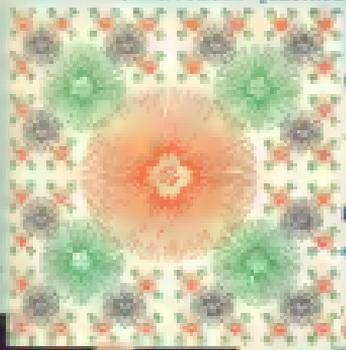
- Ballbed POSTD interface
- Visulata & RISC interface
- Apple II interface
- IBM PC dump

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640 dots/inch, 1200 dots/line @ 60
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Prints lined rollpaper with single sheet
feed. A4.
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from BBC Micro screen - j size mode



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Free software, only £225.

If you own a BBC Micro, you can now download, store and run programs (transmitted free of charge via Ceefax) with the new Teletext Adaptor, priced £225 inc. VAT.

These programs make up the BBC Telesoftware Service (which is intended to become a computer software broadcasting channel) and although primarily educational, they will soon develop into general interest and business areas.

And, as they will change every two weeks, you'll soon be able to build up a vast bank of top quality software without ever having to put your hand in your pocket.

But that's not all the adaptor has to offer. It also enables you to gain access to the normal teletext store of data. This is different to simply having a teletext TV because it means

this data can now be transferred to memory and manipulated in any way you wish (making graphs or bar charts for instance).

It's yet another development in our programme to help you fully realise your BBC Micro's potential.

If you're a credit card holder you can order the Teletext Adaptor by ringing 01-200 0200 at any time or 0933-79300 during office hours.

(You can also find out the address of your local BBC Micro dealer by calling the same numbers.)

Alternatively, you can order it by sending off the coupon below.



Technical Specifications

Access to Teletext and Telesoftware Services broadcast on UHF channels E20 to E69

Speed of max. data capture rate approx. 128k baud.

5 lines of Teletext per frame.)

Height 300mm, Width 280mm, Depth 120mm, Weight 2kg.

Colour: BBC Computer cream.

Construction: Moulded top and bottom to match BBC

computer profile. ABS injection moulded plastic.

Controls: Four tuning potentiometers on rear panel.

Blank on/off switch on rear panel.

Power on 240v, 50/60Hz, 15w.

Operating Temperature: 10° to 35°C.

Designed and manufactured to comply with BS445 Class 1 standard.

To: BBC Microcomputers, c/o Vector Marketing,
Deception Estate, Welthamplough, Northants NN6 2PH.
Please send me _____ BBC Teletext Adaptor at £225
each, inc. VAT and delivery. I enclose P/B cheque payable to
Readers A/C, Acorn Computers Ltd, or charge my credit card.

Card Number _____

Acorn Personal Purchase Order

Name _____

Address _____

The BBC Microcomputer System.

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COMMODORE

64

An arcade adventure of awesome proportions. The evil powers of hell have scattered the signs of ZODIAC in the 400 chambers of THE ABYSS. You have to find and recover these magical creations and fight all the way by annihilating all those who stand in your way.

J.S.

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UPGRADE TO WHERE?

APPLE! 3

I have had an Apple II for four years, and have been very pleased with it. I want to upgrade to another Apple, as I'm impressed with the reliability and software available. I have thought about a IIe and III. What do you think?

Philippine Tava

Of the three newer machines from Apple, only the IIe seems to have been a success. The Apple III got rather a bad reputation, didn't catch the imagination of the independent software companies, nor hold its own among members. We suspect the Apple III is often used simply to emulate the Apple II, which is rather pointless.

Prices of the IIe seem to be falling again, and we have found it down to £495 if it is correct to fall it may be a better bet, because of the software and hardware support, than the IIIc's. However, it's difficult to see why.

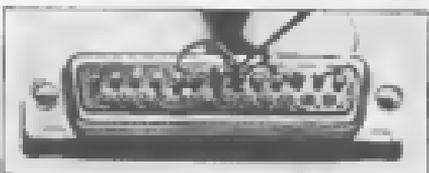
The IIfx got the most critical reviews when it was first launched - reviews, except in the press it was generally priced around £2,000, which is now higher than Apple is offering. The price has dropped a lot, but it can't drop too much too quickly because of the lack of credibility and confidence that such a change of price conveys.

We have not used the Lisa extensively, but have used the Xerox Star system based on a similar idea, and was in fact available quite a bit before the Lisa. The machine and software is very impressive, and part of current cheaper models well on the shelves (except the price).

Apple seem to have gone directly got round the problem by launching a new series, the Macintosh. This is a new design Lisa, at the far more expensive and unstable price of around £1,700.

We covered the Macintosh in the April issue of Computer Abuse (page 18), and suspect that this machine is probably your best bet.

RS232 TRANSFER CONNECTIONS



RS232C software transfer is a really fast operation

How can I transfer files between an Osborne portable, IBM PC, and a T1094A, via a RS232C?

VR Jones, Montreal

Of your three machines, communication to the T1094A is likely to present the most problems. The transfer of files, both programs and data, is a daily business, more between game machines than between machines. Obviously trouble may well occur if you try to translate a program to a computer with an operating system in which it was not designed to run.

However, data can be successfully communicated to virtually any computer. If your IBM PC has the CP/M operating system, you can get quite a way using the provided or third party utilities. With these it is possible to re-assign drives to such a way that data computer files can be assigned to read into and the other computer to receive.

This is an extension of the ability that CP/M normally used. In transferring a group of saved files from one disk to another on the same machine. If you have not yet recognized the full range of facilities of these two wide ranging programs, then this would be a worthwhile

Even so, CP/M does not utilize its limitations and it can be re-

written in the slot of programs it can transfer. In addition, it is not very good at coping with groups of files. These problems are overcome by a transfer of programs that can be performed specifically in-file transfer. A simple standard is the package ESTAM, which is available from many good dealers. It is very simple to use as both the computers have ESTAM installed (one is set to receive files on a named disk and the other is set to transmit a named file or wild card group of files. Forwarding such things as hard news and party are set to search there will be no problems).

The main draw-back though is that both machines have to have ESTAM installed. ESTAM has to be customized for each machine to fit of

transfer programming which may well be beyond the average user. The normal way is to get a dealer who has already done the work and has a system available for the machines you want to use. A more sophisticated package without this need to reassemble and possessing other additional facilities, is the package Supplier Link from Suppliers Systems Corporation. In the T1094A may well require a small specially written program, but to the first contact by Trues Instruments that solves.

Supplies Systems,

12 Park Avenue
Wood Dale, IL 60191
Tel 815 594 8820

Trues Instruments,

Tel 0203 67434

MEMORY EXPANSION?

DRAGON 3

Which is the best hardware expansion for under £200?

Is there a disk drive for the Dragon? Is there a UK memory expansion, and optional CP/M?

Which is the best printer for the Dragon?

Which is the best word-processor under £50?

Philippine Tava

Nevertheless, the term "business computers" were applied to many models to mean either a dedicated machine with two floppy disk drives, with disk data running CP/M, or a 16-bit-based machine with two floppy disk drives, IBM International's BMM, running under MS-DOS. Inevitably, some sort of system are used with hard disk drives to overcome the data storage limitation.

Let's try to help you that you will be able to buy neither of these configurations for under £200, so we are looking at some computers with the capability to be used as business machines. Without doubt, the best value for money should be the recently introduced Sinclair QL at £199 - although at the moment the only software available for it is the fact file package which comes with the machine.

As regards the printer, the QL has two RS232C ports, so you choose of printer in your opinion. The reason that disk drives are common in business machines is that because floppy disk drives are often of limited capacity (although this is improving by leaps and bounds), and that drives enable you to have your programs on one disk and data files on the other, and second, to allow the backing of impor-

tant data files.

Some disk operating systems (such as Acorn's DFS) allow you to back up files with only one drive, but CP/M or MP using require a dual drive for disk copies. There is a disk drive for the Dragon which is available from Dragon Data, also a disk upgrade on a per-exchange basis. CP/M is not available, as this requires a 8088 compatible processor (the Dragon uses the 8085).

You can use any printer with a Commodore interface with the Dragon, Epson printers are considered for reliability and other reasons (but for money). As regards word processors for the Dragon, Teletext is a highly popular of its own £29.95 and is available from Mercury.

Microsoft,

41 Tern Road,
St Austell, Cornwall

LORDS OF TIME

Join the ranks of acclaimed para-text puzzle adventures, at £2.95, for

BBC 200 **COMMODORE 64** **SPECTRUM** 400 **LYNX** 400 **NASCOM** 300 **ORIC** 400 **ATARI** 300

ADVENTURE REVIEWS

Adventures which have a first response time are generally in the amount of different number of locations and are available to present to various "empty smashing" (see page 13)

"Colonel Adventure" is probably a Practical Computing's top ten games choice for 1985. Fascinating although as best

PCW Dec 83

Colonel Adventure: For once here is a program that I can say is so nice, it makes itself. This really recommended.

Computer Choice Dec 83

Colonel Adventure is one of the best in my class. I would recommend it to any adventurer.

Adult User Feb 84

Adventure Quest: This has always been one of the best adventures for me. I can't remember the last I read book or about eight months in the past.

PCW 1984 Jan 84

Thank you Adventure's Quest is a wonderful program. Last month's most challenging. If you like adventures then this one is for you.

—MCUSER 10

Colonel Adventure is simply superb. For those who want to know what another adventure is better than our Mr. Dungeon Adventure is recommended. With more than 500 locations, 120 messages and 100 objects, I will have a good time.

Electronic Computing Nov 83

ADVENTURE REVIEWS

Colonel Adventure undoubtedly the best Adventure game around. Level 5 Computer game received awards for quality this into 1984. I really enjoyed Adventure. It's not only the best of the lot, it's also the most interesting. You'll find it very interesting and fun to play. It's not only the best of the lot, it's also the most interesting.

The program is logical and the program is well worth the money which for a computer program is a high recommendation.

MicroAdventure Dec 83

Good! All of Level 5's adventures are real game programs, not homebrew experiments. In exploring the world in one of the games is not only a great job, but it's also a great job.

It's a program that is not only a good job, but it's also a great job. It's a program that is not only a good job, but it's also a great job.

It's a program that is not only a good job, but it's also a great job. It's a program that is not only a good job, but it's also a great job.

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—PCW 10 Feb 84



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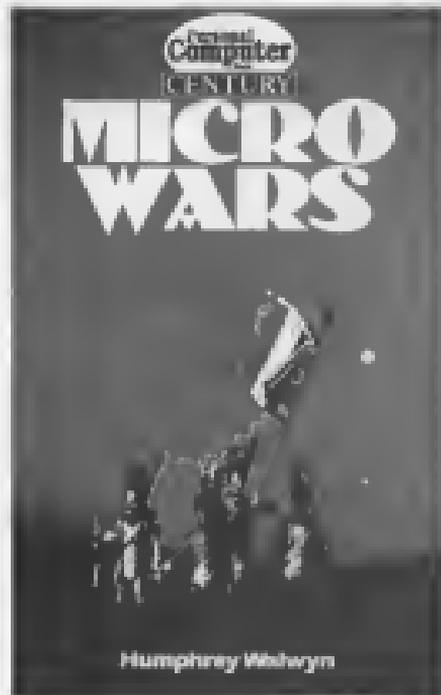
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FIG. 1

- INP 1 —change input or output device
- INQ —findings to do file
- CP —compare input and output files
- CDP —copy files
- DEL —delete output files
- DIR —list directory
- DIS —list files in directory
- LDF —print files in directory
- PI —print files in directory
- PR —print any directory
- PRD —print output volume translations
- PRP —print files in directory
- REL —release volume from scratch protection
- RES —release file
- RPT —release field from deletion protection
- SCR —scratch output volume
- SEC —secure field with password
- SET —set old and new password
- WER —verify any output volume
- WR —write to file(s)

protected, and is not a full protected protection system. The two commands FILE (direct output to a file), and DIR (direct input from a file) offer simple direct output.

BCS

BCS (Business Operating System) is a sophisticated, multi-user and network operating system with many facilities. It would be impossible to cover to any depth all the options provided (the company we might succeed in doing!) in a short article. The system (like many others) has logical and physical addresses, a summary of these used is given in Fig. 2.

BCS has many commands but in general the system is menu driven — command it goes and you are then required to do an operation, series of prompts which may require more commands or simply the number of which ever suits you with the command to act upon. A list of commands is given in Fig. 3.

Some of the 'menu' commands have a series of sub-commands, the B* file utility is one of these. It has a total of 18 options, we have listed some of these of more interest to casual user of the system.

FIG. 2

- B* without base
- B* —write characters after column to
- B* —write to screen
- B* —write from tape
- B* —print files from user number 1
- B* —write message to file
- B* —change base of location of hard base on file
- B* —copy to tape or to other disk
- B* —do random distribution disks
- B* —log of file as output device
- B* —page from after a file
- B* —put copy of file finding string
- B* —read and copy any file
- B* —read copy after finding strings
- B* —append files to volume
- B* —append files to tape unit
- B* —verify the copy
- B* —write sequential only files
- B* —write high order file
- B* —write file — old file/ file name utility
- [B*] sub: — save spaces (B* type) to enable

FIG. 3

Number	Function
LOGICAL —	
000	console
101	Logical unit — printer
102	Serial information — paper tape punch
103	Serial information — paper tape reader
104	—
105	Serial information — console out
106	LSF
107	Console (Console Day Unit)
108	Printer
109	Paper tape punch
110	Paper tape reader
111	Serial console
112	User defined console
113	User file device
114	User punch number 1
115	User punch number 2
116	User reader number 1
117	User reader number 2

- FILE assignments**
- CON = B* 000/01/01/11/01/01
 - LSF = 01/01/01/01/01/01/01/01
 - PR = 11/11/01/11/01/11/01/11
 - PRD = 11/11/01/11/01/11/01/11
 - PRP = 11/11/01/11/01/11/01/11
 - REL — Display of file on logged drive
 - RES — Display of file on drive d
 - RPT — Display of file on drive d
 - SCR — Display of file on drive d
 - SEC — Display of file on drive d
 - SET — Display of file on drive d
 - WER — Display of file on drive d
 - WR — Display of file on drive d

One of the major facilities of BCS is the ability within the operating system to produce a screen-based menu. This makes the design of a business system very easy.

UTILITIES OF THE B* FILE UTILITY

The single user single tasking version from Digital Research have many utilities, eg. compress, DE has the same basic effect across the whole range, however in most versions a command may have more than one facility, CP/M is the example, append file to the powerful CP (P) utility. A B-

Fig. 1 (left) shows a summary of BCS utilities, Fig. 2 (left) contains the main BCS commands, Fig. 3 (left) shows the BCS sub-commands, Fig. 4 (left) shows CP/M 2.2 commands/functions and assignments.

Fig. 3 (left) contains a list of B* options.



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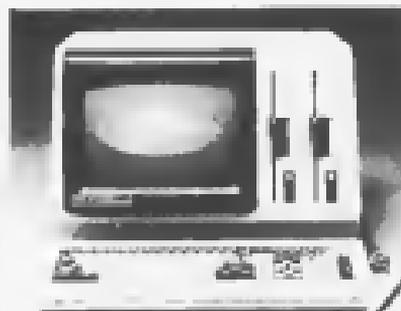
Fig. 18 (24M) gives a list of basic operating commands

Fig. 18

Set Time (day) (time)	→ set command or specified time	ECOM (date)	→ compare the information and differences between two entries
ECAL (month)	→ print a calendar for a single month	ECOPY (day)	→ process (reconstruct) a description file
year	→ print a calendar for a single year (years 1-1999)	EPMD	→ automatically for searching utility
ECAT (file)	→ display file contents	EPREP	→ search file for a specified string
ECD	→ display the user directory	ESLUT	→ list process number in system and device files for printing
ECDD	→ change working directory to file	ESZ	→ directory file
ECRDD	→ (date) set date on calendar file	ESZL	
EW		ESZM	
W	→ login name level	ESZP	→ date or treatment
D	→ group	ESZR	→ online manual
M	→ modules	ESZS	→ create directory
S	→ set of device level	ESZT	→ copy a file
		ESZU	→ control of online processes
Op Codes		ESZV	→ print names of working directory
+	→ add parenthesis	ESZW	→ search utility with entry system
-	→ remove parenthesis	ESZXL	→ special file from an English word
~	→ negate absolute parenthesis	ESZYL	→ list terminal port and options
		ESZYT	→ configure
Permissions		ESZY	→ configure to be connected
r	→ read	ESZZ	→ copy a complete message in a center file
w	→ write	ESZC	→ control with character, word and file options
x	→ execute	ESZTS (user)	→ write to another terminal
u	→ user permission from present mode		
g	→ group permission from present mode		
o	→ other permission from present mode		

By Eric Rayburn, of the National Computing Center.

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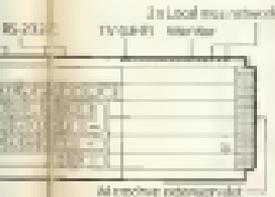
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Two Microdrives built into the QL are optional accessories to the popular and proven 100K Microdrives, but give you extra capacity of at least 100K bytes each and instant data transfer rate. Typical access speeds are 1.5 seconds, and loading of up to 100 bytes per second. The Sinclair QL has two built-in microdrives. It requires a further accessory can be connected.

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A beginner can be using QL Quill for word processing within minutes.

QL Quill brings you all the features of a very advanced word processing package.

Spreadsheet



QL Alphas makes simultaneous calculations and 'what if' model calculations easier than they've ever been. Simple applications are presented including budget planning and cash flow analysis. QL Alphas allows you to enter rows, columns and cells by name, not just letters and numbers. Function keys can be assigned to change a number and carry out a complete 'what if' calculation with a single key stroke.

Business graphics



QL Graphs a high resolution colour program using four or you probably won't refer to the manual. It handles anything from bars, shaded curves and heliographs to overlapping or stacked bars or pie charts. QL Graph does not require you to format your display before entering data. It handles Graphs and saving automatically or under your control. Text can be added or altered as easily as words.

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The QLIII is the QL Ultra Series. Membership is open to all QL owners for an annual fee of £10. QLIII members receive one free update for each of the four programs supplied with the QL, and six free monthly newsletters. Sinclair has also made a number of improvements for QLIII members to colour software assistance on QL Quill, Alphas, Address or Graph by writing to Peter.

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KEEPING IT CLEAN

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It is amazing how sweeping a sparkling clean floor can be—just remember when you first got a 4.5 disk system you literally let bits of food-slice than a fifty one, however, the biggest advantage to be gained from a well-maintained drive, apart from peace of mind, is reliable data loading.

The most interesting part of our investigation concerned data recorder cleaners. The majority of these are quite understandably supplied by the same manufacturers who service the video market, and the difference between these markets is significant, while the video world places a great deal of emphasis on the tape head, the phosphor and capstan are more important in the computer world. If dirty, these two parts of the recorder can affect tape speed and prevent accurate data recording. A clean tape head wins in a contest.

The cheapest form of data (reusable) recorder cleaner is the cloth-dissolved cassette type. These tend to get dirty very quickly and therefore need frequent replacement. There is also a danger that the cleaner action of rubbing previously collected dirt across the head will scratch it. With Scotch 3010-made data cassette head cleaner which comes with a small tube of cleaning fluid. As 3010 (the VAT), it represents a reasonable compromise between the dry and wet aspects of cleaning though. Presumably, if your cloth/cassette comes out before you run out of fluid you could buy just the cassette and save even more money.

A rather different approach to head cleaning is taken by Alltop (available from Three Marketing) it has a cassette disk cleaner in the form of a transparent cassette case, covered in a cloth tape, the cleaner has one of 50 pads onto which the unit sprays the special cleaning fluid supplied. A series of raps cause the tape head pad to automatically wipe off the debris. What we found that Alltop cleaning wasn't as good as it looked dirty very quickly, therefore, if you are serious about keeping your data recorder clean, we'd recommend Alltop's water version, water pads are replaceable and so free of any data recorder have been reported, you in effect already have a spare. Alltop states that video system deliberately use the cassette pad-clip in reverse, making them replaceable.

Despite the price you helped on Alltop products, a system had worked as a good cleaning fluid could not find quite that the cassette had used, but the store recommended the cleaning cassette was found down. Good news for Sigma 4000 users is that Alltop also makes a more expensive version of its cleaning systems.

Micro-cassettes with great money can afford disk drives instead of cassettes, and the same reflects in the price of drive head cleaners—the cheapest complete system we spotted was around £10 or £5 for just a disk just the cassette cleaners, completely dry disk drive cleaners are available (some dryers, which doesn't require the user to add solvent). The 'dry' method of cleaning has its advantages in that the user doesn't get out any solvent.

On the other hand, the danger with dry cleaning is again obvious—particles of dirt cleaned off will

remain the drive head. The way out of this is generally disposable cleaning disks which slip inside the disk holder. The cleaning disk can be sprayed by the user or more pre-soaked in a tank (the latter being more expensive).

When buying, ask whether the cleaning disk is suitable for double-sided disk drives. Few manufacturers will supply one-sided disk cleaners, but it is a point to check. Automation Products, which makes the Flapjack brand cleaners, claims that other manufacturers use too thick a layer on the double-sided drives. This can lead to the cleaning disk failing to clean a single drive properly. To overcome this Automation uses a post-off label. Presumably, no other firms do, so the problem survives!



The Clean Cooks (from left) 1. Photo 3010

There is no doubt of value in using disposable disk drive cleaners in that the cleaning disk might disintegrate and break up on the drive. It is also important for the solvent to be cleaned off the head thoroughly. For this reason repeated use of the same drive cleaner is not recommended—if the cleaner looks dirty it should be thrown away regardless of how many times it has been put through.

An interest only 14 inch and 8 inch disk drive cleaners are on the market. The big cleaning companies are developing ones to cope with the case 5-1/2 inch drives (many of which are now available for the Mac). Automation told us that it expects to have a disposable disk which fits inside a cartridge and should be suitable for machines like the Apollo. For the present, a company like MAF will clean the Sony 5.5 inch drive for you, should you require.

Finally, there is an interesting cleaner now available for disk cleaners—obviously they can't all have the only product approved by the big disk drive manufacturers (nominally, MAF) and this one had made up supplying MAF cleaning has because of the experience at own manufacturer department had when trying various makes on approximately 50 machines.

It was used to find heads along with cassettes and disk drive cleaners, but various cleaners were tested



Automation Facilities' personal computer accessories. Six inch floppy disk drive cleaner (price £175.00)

along else (unless we come to trying the products for ourselves). For a start nothing seemed to work on the mesh screen that covers our Brno monitor ACE said it used steam cleaners, but we came to the small conclusion that actually taking the cover off was the only way to clean this particular monitor. We did try a roller cleaner from Avon as that worked well on several desks, but not computer desks.

On CRT (glass) screens the purpose-made cleaning fluids we tried seemed to work perfectly adequately. Denis Mansfield of Space Systems explained in some depth why he thought specially formulated screen cleaners should be used. One problem with using wetting-up liquid (steering you) with wetting up that everybody likes having usually gets removed. On a more permanent basis it is difficult to prevent screen wetting-up liquid plus the fact that detergent almost inevitably contains salt, which is corrosive.

Brno Mansfield also put a persuasive argument against using the same kind of solvent used for disk drives onto the VDU screen. Most drive solvents are isopropanol, which is both inflammable and toxic and does not do the kind of thing you want to spray all over yourself or the screen. His own company's product is formulated to be non-flammable and non-toxic, as well as including copes and inhibitors. When you consider that at Glass Screen restorations £2.00 is asked worth the trouble. Automation makes sure screen screen wipes which are reasonably good.

The majority of cleaning equipment manufacturers avoid selling their computer products as second hand. For two good reasons. The most important for the many users is that second hand up the controlled environment as believed by manufacturers, more important is that second hand has possible gas which are inflammable. The by-product of using pump sprays or just simple bottles instead of the your jet only gets you for your money.

The same sort of argument can be made if you need hot for desks which cleaning companies supply. Although they work, such desks take up the same position as a cleaning hot than they work, and therefore cost more than they are really worth. Unless you are really busy, using standard screen or roller rollers is best as good. The above does not really apply to

cleaning screen boards, as they can be extremely expensive. In reality a tool like the Dust Off from Friling & Cross would be the ideal piece of equipment to use. It uses a mixture of pressurised gas to blow away debris, and a good amount of air.

For general cleaning there are a variety of cleaners available for removing the dirt from the keyboard and body of the screen. The foam type cleaners seemed to work very well but a lot did depend on personal preference. For instance, one cleaner did a very effective job, but left behind a rather unpleasant smell. Again, the special cloths provided for this kind of job seemed very expensive for what they were, and most of all would appear to be best as good (and his order to return).

Part of the reason for keeping your screen bright and sparkling is to reduce the chances of dirt and dirt leading to 'key' over your desks or monitors, thus, it does make sense to take advantage of the state-of-the-art and solutions on the market to get down the amount of dirt and steam around your screen. However, while the dust-free roller DTF for your monitor home comes, people who work in noisy, exposed offices might find this useful.

So far so good, attention has been made of how to clean phosphoric like products. For the cleaning, the same featured spray cleaners appeared for standard use to be used. To clean the type first there are a variety of products that you can use. Some provide a special fine brush for removing the heavy deposits, lighter deposits could then be removed with one of their cleaning wands (a heavy-duty cotton ball) applied as advised. A more sophisticated method would be to try special spray wheel, double end polished cleaning kit from company the GMS or Avon, ground around £30.

When buying cleaning materials it does pay to shop around. Specialist shops sell a Leds disk case in which includes a VDU cleaner and an inlet around as well as disk cleaner for £12.95 (see VDU), which seems good value.

Those micro-computer who need to thoroughly decontaminate their screens to clean it, should try screen shops for up rollers and low-foam cloths, which water shops are alternative sources for quality computer level cleaners.

By Tony Daniels, deputy editor

CLEANERS

Avon,
Buckton Way
Buckton, Peterborough
Tel: (0753) 244711

Avon,
4 Alconton Trading Co
Interior Team Road
Alconton
Wendybury, Aylesbury
Tel: (01492) 3001

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Baker Road
Wargrave, Berkshire
Tel: (07330) 3612

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London SE17 7LN
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Crossroads,
Bentley Road Street
Macclesfield
Cheshire SK11 6JF
Tel: (06254) 61300

Friling,
Walsley Lighthouse
Hove
Tel: (0420) 20000

G M Computers Services,
Green Lane, Westwood
Widcombe
Tel: (0756) 27607

James (UK),
Devy Road
Alderton, Buryton
Cheshire WY17 1Z
Tel: (0926) 42919

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Tel: (041) 629 5607

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Woodburn Industrial Park
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Walsley, Gorton/City
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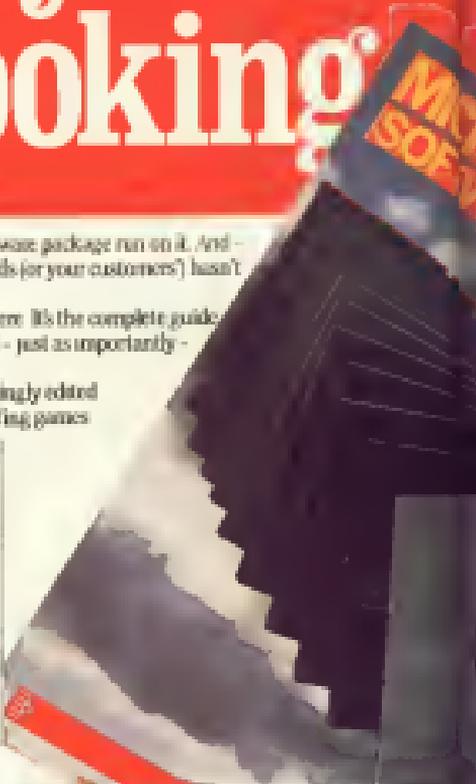
A glance at our twelve main category listings confirms just how complete is our Microcomputer Software Directory. In 3,000 software products are listed, under these titles: Spreadsheets, Software, Utilities, Accounting, Management Systems, Other Business & Commercial Systems, Professional Services, Industry & Manufacturing, Retail & Distribution, Scientific, Educational, Government, Games/Hobby/Utility, Miscellaneous.

Each entry gives the package name, function, supplier, cost and also tells you which machines it will run on.

Matching with your machine

If you already have a machine, you'll want to know about compatibility. So we've included an index by machine make and model. And, just to make life even still, we also cross refer machine type with operating systems.

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Knowing where to go

There's little point in identifying the perfect package unless you know where to go for it. Our separate alpha listing of suppliers provides all the information you need: addresses, phone numbers, who to speak to, and an outline of which other packages are available from them. This section could save you a few fruitless journeys.

Pinpointing special needs

Some packages may be tailored to the unique requirements of your business or profession. The quick reference Occupation Index at the back of the book can cut your search time to minutes. And if you already know of a package by name, just go straight to it. They're all indexed by title and acronym in the A-Z index.

In short, if you want to find exactly what you're looking for, *Microcomputer Software Directory* is exactly what you've been looking for.

CMS - Garage Management Systems (page 27)

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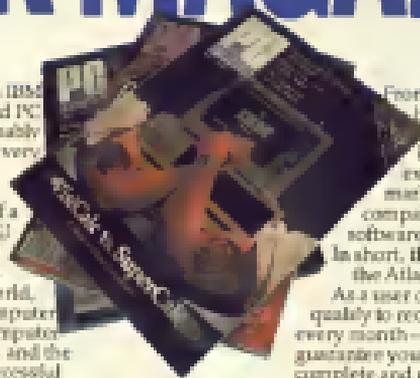
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Commodore 64 Machine Code Master, by D Lawrence and H England

Machine code programming is one of those things that either fits you well or it doesn't. To explore the last byte and microsecond out of your program — or to borrow you said.

For many applications, only machine code is good enough. The trouble is that programming in assembly language is a very time-consuming affair without the right support software — a monitor and assembler.

Commodore 64 Machine Code Master aims to provide three essential pieces of system software for users of the Commodore 64. It also gives some examples of machine code in the form of modifications to the Basic interpreter. It is not, as the subtitle claims, a library of machine code routines, save those not some machine code routines is there, but primarily the book is about an assembler. Neither is it an introduction to assembly language or assembly language programming for the 6502 or 6510 micro processor if you don't already know how to program in assembly language, you'll have to look elsewhere.

The first chapter of the book covers a monitor program. This is a piece of software, as that name implies in Basic, which lets you examine and alter the contents of memory in the old days, using a monitor was the only way of communicating with memory — until today because it was. Monitors will have their uses if you're programming in machine code, though.

The next section covers a disassembler program, which means machine code programs can assemble language if you know what you're doing. Programs are increasingly more comprehensible in that format as a screen of hex — a handy utility book for checking your own programs and taking apart other people's.

The rest of the first part of the book covers the assembler program itself, along with an associated editor. Again, for which thing is it Basic, which point that it is possible to write an assembler in Basic. It also shows that it's not a very good idea even with the full explanations provided, the program is very difficult to follow. This is due to lack of effort on the part of the authors,

Commodore 64

machine code master

by D Lawrence and H England

about machine code support



ers, although a few diagrams or flowcharts might have helped to illustrate some tricky points. The problem lies to part with the difficulty of the concepts — an assembler is quite a complicated program, mostly, though, the trouble is the primitive unadorned lines of the Commodore 64, which hides the concepts as a mass of hex numbers.

One interesting point is the provision of alternatives for each line of the program, along with a means to check them. This should help trap some of those typing errors that always seem to creep in.

The second part of the book provides some machine code routines which carried the commands available in Basic. Reversing programs which have been wonderfully deleted, removing superfluous RSTs and spacers and defining multiple locations for the address. In the process you can learn a lot about how the Basic interpreter works, though again some diagrams might have helped.

The book will give you an adequate assembler for the 6502 and a good idea of what a complex program an assembler is. Once you've got it running, the fun has only just begun. **Practical Basic Programming, by PE Gilling.**

Once you've learned to program, but before you've passed the critical eye needed to critique or writing your own programs, you might want some practice in implementing "real life" problems in Basic. The aim of this book is to show the reader how to write practical and useful Basic programs.

The first chapter gives a brief survey of the features of Microsoft Basic, which is used throughout the book. A lot of the more "standard" Basic

around, Microsoft Basic should present few problems, but it's as well to start off with a clear idea of the language we're using.

The next chapter contains a very useful set of programs which help in three — debugger traps, that is, which it's your task to spot. Some of the programs are quite complex, doing things like hash coding and string processing. It's therefore a challenge to get them sorted out. For the more difficult programs simple input is given, along with the required output.

This would seem to be a good way to get to grips with Basic. You don't have to write the whole program yourself, but you certainly need to understand what's going on if you're going to find the bugs. Unfortunately no solutions are provided. It would have been nice to have had some suggested solutions, but by comparison with your own and for whatever it's worth.

The next two chapters, which together form about half of the book, consist of a number of problems. These are essentially a business or data-processing type, and range from simple calculations of trials and means to more complex processing of names and address list information. In each case a statement of the problem is given. This is followed by some general suggestions as to how it might be solved, along with fragments of code where appropriate. Test data is provided, as is a sample of what the final output might look like (some of this is a bit over the top — with almost two pages of information on imaginary houses to illustrate a program for estate agents).

The techniques suggested for solving the various problems are quite valid, but perhaps more space could have been devoted to explaining them more fully, the book seems to concentrate on the provision of the problems rather than the specifics of how they might be implemented. This is not necessarily a bad thing, it just means that you'll need to be quite familiar with the mechanics of programming to be able to take advantage of the book.

If you want to look at "business" applications, this could be the right approach for you. **By Alan Yevonin, a research scientist at inter-patentational physics.**

DATA FILE

BOOKSHELF



WE LOOK AT

A BOOK ON

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ON THE

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AND ONE FOR

THOSE WANTING

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'SHARKS' BITE BACK

I t was the French philosopher Descartes who coined the phrase "property is theft", 124 years later Malcolm X expressed those same sentiments in a rather more forceful tone. Show me a capitalist, and I'll show you a bloodsucker!

It is obvious that many of our readers share the same sort of views about the software industry, looking back through 11 months of Legal File Two, and again, problems have arisen in which users have lawfully defended themselves in conflict with software houses over the ways in which they use their programs.

So are software houses really nothing more than a bunch of sharks who exploit the laws of the land in order to rip off the consumer? Should we in this country get behind the point of view that is now being advocated as in some one American State—that software should not be protected by copyright, so programs are for the general good and should be made freely available to anyone who wants them? Does the language of Simon-dar-Francoise, the "would you please come over to my modified property theft"? Or could it just be that software houses do actually have some objectives in their lives, and are not just steep in the wool of those who some people might have you believe?

Without getting too bogged down in all the minutiae of this country's intellectual property laws (which are in a sense anyway), there are currently in existence a wide range of legal devices to help manufacturers protect the fruits of their labors from unauthorized reproduction—or piracy, as it is more frequently termed. Patents, trademarks and copyright are just three of them. Although each one is aimed at protecting a different aspect of intellectual property they all share the same ultimate objective—to enable the creator to reap the maximum rewards for his efforts by being able to commercially exploit his or her creation, whatever or wherever, for a specified period of time—without competition.

Now admittedly it may be morally difficult to justify the

steal of patent rights—which normally last for 16 years—being extended to cover an invention which could help feed of starvation amongst the world's starving billions (the fact is certainly not the case

namely obesity).

The lesson, then, is simple: the wish to copy or release products there are no second best of the cherry. The manufacturer—often a hardware company or a software house—



with most computer related products. Despite incidents such as the education field, most computer products, whether hardware or software, are aimed at the business and non-business markets. Thus, they are primarily commercial products and, which lives do not depend and which, if we are going to the family business, are not relatively necessary most people could do without altogether. Thus can therefore tend to be no "moral" objections to, say, a software house commercially exploiting a word-processing program for all its worth.

Clearly stated in the software house which has to be taken into account if you are to understand why the software industry attempts to protect—and actually—to prevent them covers the fact that the computer market is highly volatile. Thus, unlike many other products (such as, for example, the appliances which has enjoyed a relatively long life despite variations in demand prompted by the vagaries of fashion), with computers the life expectancy of a specific product is usually very limited.

Take, for instance, something as trivial as games software. In 1981-82 Atari's Pacman was the undisputed market leader, yet had it been launched a few months later, by which time another game might have caught the public's imagination, or it had simply failed to catch-on, Pacman would have sunk almost imme-

diately into the product after the first year around and explain it for all its worth. For the duration of an hour, for the product fails and completely fails without trace.

Having in mind the development costs and the vast promotional budgets most companies within the computer industry now invest, it is hardly surprising that when they do make a success, they are highly motivated and whip out the big legal stick against anyone whose activities may have an adverse effect upon their profit margins.

It is also worth bearing in mind that "profitability" means a lot more than just keeping company directors in cars and yachts without profit companies do not have the funds to invest in the development of new product lines, or expand their production facilities. And they do not have the returns to reinvest the maintenance of their current. Disrupted profits—in other words—not only mean lower sales but also mean that their bank managers, but can also have to achieve effect upon the health of the UK company industry generally—which is something we're sure you can relate to.

Protecting profits then can well be one of the considerations when organizations like software houses make such an effort to fight piracy, but simple greed is certainly not the sole motivating factor behind their actions.

DATA FILE

LEGAL FILE



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Charles Christie (left) is a qualified barrister and a computer writer, who will be using his

knowledge of Britain's legal system to answer your complaints and queries in a comprehensible way. If you need access to the legal file use the question card found in with this issue.

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FRESH MODEM 1000

We have at last had a chance to properly see the Modem 1000 from Prism. It is provided as part of the package to allow for BSC to access Front-End Systems included in the cost (£2049) (inc. V.A.T.) in the Microsoft software to ROM, as well as first installation of a Telecom coding socket (if you buy to suit). Unlike the Networking Interface previously provided by Prism, the Modem 1000 is direct connect rather than asymmetric coupled.

Incidentally, if you already have a Networking Interface for the BSC and wish to upgrade from cassette to ROM, the latter can be purchased separately from Microsoft for £240.

Having visited ourselves for the Modem 1000 worked efficiently on Microsoft, we were pleased to find out that the Modem 1000 did indeed work at 1200/1200 half duplex in order to do this we used the disk provided being posted in our June '83 issue, reconfiguring a 1200-based operation, then:

RD-1000
RD-1001

Using two separate BSC Micros both attached to Modem 1000s, it was clear indeed you can run modems to Telecom while the other was not to the Telecom. After that it was a matter of course moving a la 'wally-wally' using the word 'over' and

PRISM MULTI-MODEM — HERE AT LAST



The BSC is shown with the ROM (700K), Telecom, Processor, the Modem and (above) - C&D, with the same modem under the name 'Egmont'.

communications had ceased. We then simply reversed settings so that the other micro could begin communicating.

The same modem is used for Microsoft's Apple package at 1200/1200 half duplex operation will be possible. It is in fact able to use Prism software to access other compatible 1200/1200 databases but sadly C&D is not one of them, however, Hudson bank software is almost certainly compatible with Prism if you don't worried concerning above graphics.

There are a few free public access 1200/1200 databases

which can be accessed with Prism software. I refer to (BSC) 944775 is one of them (the others were posted in the April issue of Computer Access).

At the time of writing it is not possible to use the Prism VTX5000 or the 1200/1200 half duplex modem as standard, but Prism will have it still less much the appropriate software will cost.

However you can help when installing a Modem 1000 drive from the manufacturer, IFT, the G4 IFT, has provided its own continuous connection for the BSC, Bases, Apple II, Tandy Model 101, Commodore 64, 5000, 4000, and 8000. Prism runs from 075 to 078. Again the G&D Terminal 2 is capable of only 1200/75 or 1200/1200 half duplex operation but it does have BT approval.

G&D will also be selling the 1200/1200 half duplex program for the VTX 5000.

modems, along with the relevant passwords if required.

Unfortunately, it does remain possible to use the TM100 along with other communications software, such as Prism's Comshare ROM, which would have allowed sophisticated file transfer.

The other problem with Telecom's software was that not all the bugs were to have been covered. As you may find the software created using all the numbers we'd find our money. It would have been interesting to have experimented with 1200/1200 half duplex communications, but the software decided instead we'd fork enough to 078-90 (inc. V.A.T.), the TM100 takes job, but seemed better.

Other packages available now include Apple, Commodore 64 and Pro, and IBM PC. Future releases will cover the Vic 30, CPM machines and especially Diagen, Biscuit, Spectrum, Microsoft and Q-Point depend on the machine used.

MORE MODEMS

When it comes to multi-modem or asymmetric modems which can be used to access C&D or Microsoft. It gives some typical examples. We have not had the chance to fully test the Asymmetric modem yet, but it looks good value if the price really will be £795 (inc. V.A.T.) the cheap.

SPECTRUM MODEM SELECTION

Can one obtain a modem for the £5. Spectrum? Yes, would it be possible to give details of price and use. Also, is there a disk drive available for the same machine? The Disk Command

There are two clear choices of modem either a Prism VTX5000 which allows you to access Front-End Systems and also 1200/75 half duplex, or a 800/800 full modem to access Hudson banks.

For the latter you need an RS232 interface such as the one from Micro Main and priced £53.50. The Prism costs £78.95, while 800/800

based modems cost from £70 (DataCom Executive) up to £140 (DataCom Executive) up to £140. A new generation of multi-based into systems are coming, but as yet the cheapest one will not have BT approval.

You'll also need a communications software package such as Andrew Chinn's Spectrum (included in the March 84 issue of Computer Access), the software for accessing Microsoft comes with the VTX on ROM, though.

As for a disk drive go, we are aware on the same at our AppleLink.

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DATA COMMAND 100 MODEM

Another great Computer friendly feature to us was the TM100 from Telecom which is again a 1200/75 (asymmetric) modem. The one we tested was supplied for the BSC. Called a 'smart' modem, the TM100 is BT approved and can act. The software supplied on cassette also allowed storage of some expensive telephone

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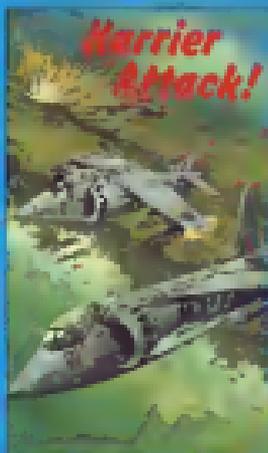
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Advanced Resources	147	Hisoft	70	Screenplay	93
Akhtar Instruments	71			S.E. Computing	112
Anilog	88/104	I		Selen S/W	78
A & R Software	87	Itek Systems	66	Silicon Shop	27
APM Computer Centre	16	Integres Ltd.	101	Sirona Soft	107
AudioGenic	I.B.C./86	IPC Magazines	74	Sinclair	190/191
Automation Facilities	138	Isis Hather Ltd.	87	W. H. Smiths	63/69
Artex S/W	109	ITL Ltd.	32	Soflex	112
				SoftInfo Ltd.	96
B		J		Softmachine	67
Brainstorm	112	J.P. Magnetics	139	Softricks	121
				Software Ltd.	I.P.C.
C		L		Solo S/W	64
Calco	72	Leigh Computer Systems	72	Sophisticated Games	96
Cambridge Microcomputer Centre	2	Levall 9	108	Sinch Computer Services Ltd.	90
Cascade Games	94			System	90
Concordia	135	M		T	
Conway	154	Marcol Cabinets	72	Technology Research Ltd	26
		Mayfair Micros	70	The Sixty-Four Suppliers Co.	84
D		McGrow Hill	158	Thor	32
Datac	106	MDR Micro-Engine	34	Triumph Adler	156/157
Datapen Micro Technology	106	Microcomputer Disks	22	Tyrell Computer Systems	107
Daystar	16	Microfunst	96		
D.D.T. S/W	96	Microsites	O.B.C.	U	
Design International	156	N		Ultimate	129
Digital Peripherals	20	Nelson	94		
Disking	80/81	Newnes	139	V	
Duckworth	78	Northern Computers	147	Viga	140
Duplex	143			Visa	111
Durell	159	O		VLI Computer People	145
		Opus Supplies	21	W	
E		Oxford Computer Systems	66	Waking Computer Centre	129
Epson	28/29	P		World Wide Computers Ltd.	16
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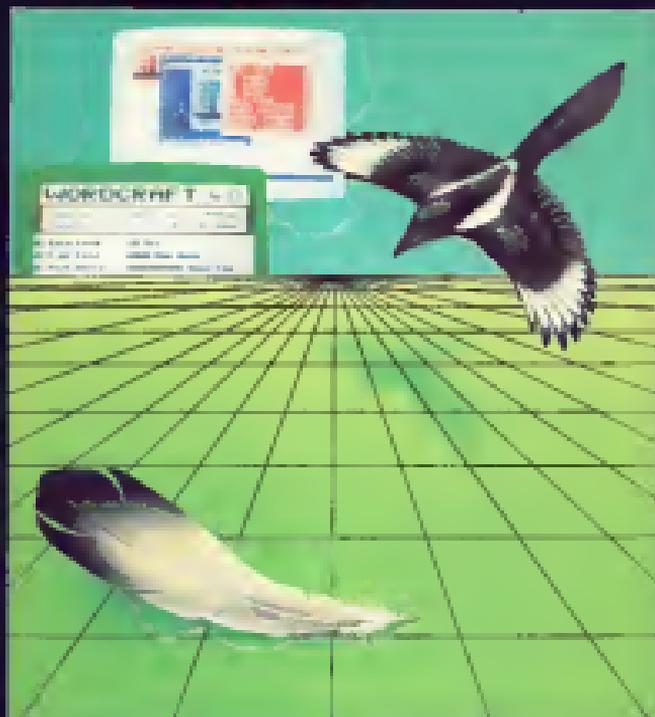
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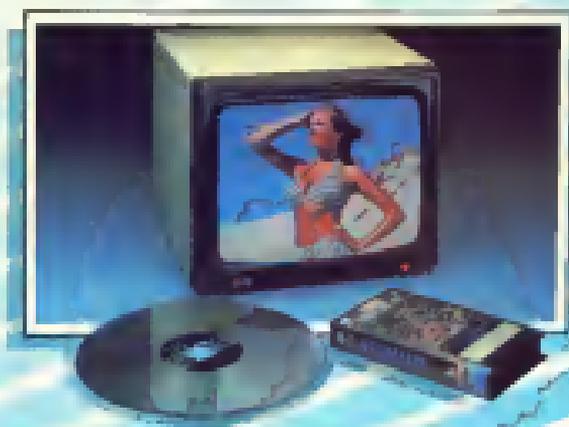
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