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November 1984

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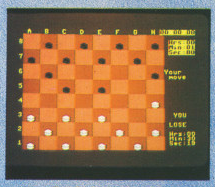

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ABC

Submitting articles
Commodore Horizons welcomes readers' contributions — either articles or program listings. Articles should be typed double-spaced with a wide margin. Programs should, whenever possible, be printed out on plain white paper, accompanied by a cassette. We cannot guarantee to return every article or program submitted, so please keep a copy. If you want to have your program returned you must include an s.a.e.

SUNSHINE

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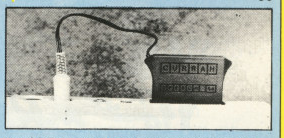

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EDITORIAL

COMMODORE'S TWO NEW machines, the C16 and Plus/4, have been a long time coming. Originally announced at the CES show in Las Vegas in January, the new machines finally made their public debut in the UK at the Commodore show in June, though they were not available for sale until September.

The C16 is designed as a direct replacement for the long serving Vic20, production of which has now ceased. With 16K RAM and 32K ROM, the C16 offers more memory than the Vic at the same price of £139.95. With enhanced graphics and sound capabilities, the C16 looks set to consolidate Commodore's presence in the low-end games market.

But, the Plus/4 is not aimed as a direct replacement for the ever-popular 64, though comparisons will undoubtedly be drawn between the two machines. The Plus/4's main distinguishing feature, as the name implies, is the suite of four integrated software packages — a word-processor, spreadsheet, database and graph-plotter. Applications, rather than games, provide the key note.

However, the Plus/4 integrated software has not met with universal acclaim. Admittedly, the four programs all reside in memory at the same time and have the ability to exchange information, but their scope appears to be limited. The spreadsheet can display information as a bar-chart, but not as a pie-chart. The word-processor lacks right justification.

The Commodore 64 will undoubtedly continue to sell in quantity well into next year, as will the new C16. Sales of the Plus/4 may be more problematical.

What must be worrying Commodore, however, is the question 'what comes next?'. By the middle of 1985 the venerable 64 will be starting to show its age. Will Commodore attempt to replace it with a new machine, or will customers be left to choose between the more limited C16 or the applications based Plus/4? And, to help Commodore concentrate its mind on the problem, Atari's shadow may be starting to loom larger by next year.

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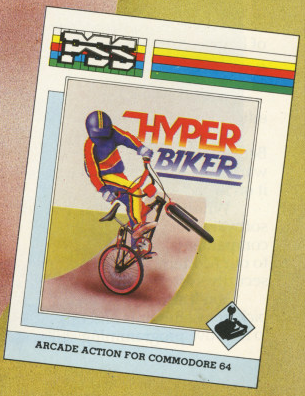

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4. Long Jump 5. High Jump 6. Bunny Hop

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LETTERS PAGE

Poke poke

HERE ARE a few useful keyboard POKEs to try out on the unexpanded Vis 20. Some may be useful if included in programs.
POKE 650,255 — key repeat
POKE 650,64 — kills key repeat
POKE 788,194 — kills RUN/STOP key
POKE 819,255 — kills SAVE function
POKE 198,0 — Clears keyboard buffer
POKE 808,100 — Kills RUN/STOP / RESTORE
POKE 37150,10 — Kills RESTORE key
POKE 198,10:POKE 631,131 — auto LOAD
PH Armstrong
Caterham
Surrey

P****d again...

WITH REGARDS to Stuart Powell's query over **Pubquest**.

The problem is solved by "Examining you", and about your personage, you will find a key which will solve your problem. As one good turn deserves another, could any of your readers help me with regards to the same Quest.

I cannot get past the tramp outside the kitchen door of the house without saying something first.

I am lost for words.

The magazine is a superb, informative and interesting read; keep up the good work. How about an Adventure Corner for the adventure fans?
John Worts
Hemel Hempstead
Herts

Basic error

I TRIED your Pokes as described in the August edition of the magazine for moving the bottom of Basic up on the CBM64. Even with these Pokes, I found as Sue Morrell did, that either RUN or NEW produced a SYNTAX ERROR message.

On inspection of the Basic RAM without the Pokes, I discovered that address 2048 contained zero. I therefore Poked zero into the first address of the Basic area after moving the bottom of Basic up with your Pokes, then loaded in the Basic program and the SYNTAX ERROR message was no longer produced.

I can only think that if the first line number of a program can be contained in 1 byte, the first byte of the Basic area is not zero-filled, but skipped over. I don't have a ROM disassembly, so I cannot check the accuracy of this guess.

I trust you find this information useful and perhaps pass it on to Sue Morrell if she is still having problems.
Steve McCarthy
Newark
Notts

Chart toppers

AS SUGGESTED by Ben Arrowsmith and Dee Lakha, could you include a chart of the bestselling Commodore games in your excellent magazine?

Also, could you squeeze a high-score sport in somewhere? I'll start by giving my scores — 626993 on **Revenge of the Mutant Camels**, 116200 on **Beach Head**.
Ian Davies
Rhondda
Mid-Glamorgan
CAN anyone beat those scores?

Kuhn Lin conquered

I HAVE just read Pete Gerrard's article on the US Gold game **Beach Head** in September's *Horizons*. I see that he did not succeed in destroying the fortress of Kuhn Lin.

He obviously hasn't practised enough! I eventually gained success, the result being that the mighty cannon blows apart and a white flag appears at the top waving.
Rhys Williams
Dyfed
Wales

...and again!

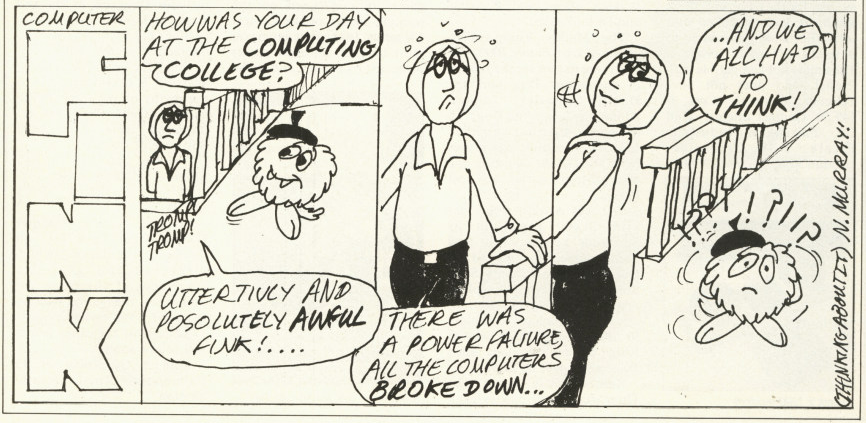
ON **Pubquest:** the cupboard might very well hold the secret to cross the road! Clue:- Try being vain?! Look out for Madhouse!
C.P.S.
Derby

Mastertronic

MASTERTRONIC has asked us to point out that there is no connection between our Star Game for October, **BMX Racer** by John Shay of Solar Software, and the Mastertronic game of the same name. Our apologies for inadvertently usurping Mastertronic's title.

While we're in apology mode, a note to readers trying to type in Tony Rushbrook's Street Bomber — the "53248 + J)" in line 3001 is a glitch and should be ignored.

This is the chance to air your views — send your tips, complaints and compliments to Letters Page, Commodore Horizons, 12-13 Little Newport Street, London WC2R 3LD



NEWS DESK

Modem mania mounts

WITH COMMODORE's Compunet Modem officially launched at the PCW show last month, several other companies have entered the modem market.

Protek's 1200 modem is a standard RS232 device costing £59.95. An interface cable costing £14.95 is needed for use with the 64. The software incorporates checksum routines and 100/1200 or 1200/75 baud rate selection. Prestel and the subsidiary Micronet service can be accessed using the modem, but the question of downloading software and accessing Compunet has not yet been resolved.

Contact Cirkit Holdings, Park Lane, Broxbourne, Herts, 0992-444111.

Meanwhile Thorn EMI Datatech has announced the VS453 modem, initially for Apple and IBM computers, but with versions for home micros to follow. Contact The Sales Dept, Data Communications Division, Thorn EMI Datatech, Spur Road, Feltham, Middlesex, 01-890 1477.

Lastly, Intelnet's 2064/V21 modem for the 64 or Vic 20 is a 300 baud device supplied with software enabling the micro to be used as a "dumb" terminal. The unit is not compatible with Prestel, and does not have Telecom approval. Cost is £49.50. Contact Intelnet, Unit C2, Faircharm Industrial Estate, 8-10 Creekside, London SE8, tel. 01-689 9947.

Protek's 1200 modem

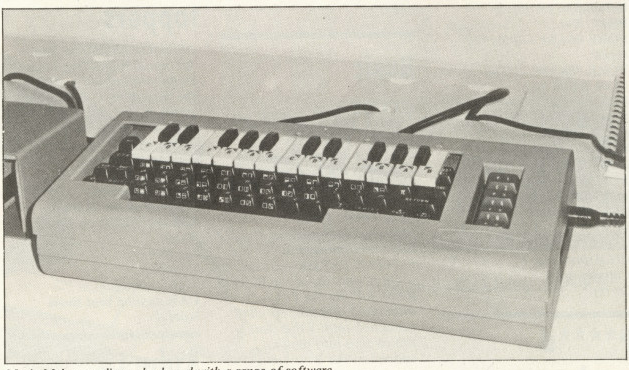
64 music – the key of life

MUSICAL 64 owners will be pleased to see the release of a clip-on mechanical keyboard overlay for the machine. Commodore's Music Maker will cost £29.95. The system will include the keyboard, which sits over the top two rows of QWERTY keys, keyboard stickers, cassette or disk software, and a music book.

Further software and book releases are planned. The initial program will allow sound synthesis using most of the facilities of the SID chip; programming of rhythms and melodies; and educational functions.

Music Maker will be available at the end of October, and we plan to carry a full review in next month's issue.

A Commodore spokesman at the PCW show spoke of the possibilities of further 64 music developments which might allow connection of the micro to other units, such as synthesisers and drum machines using the MIDI standard, though no firm details could be given at this stage.



Music Maker — clip-on keyboard with a range of software

Quicksilva attack

QUICKSILVA launched a massive assault on the Christmas games market on September 18, with a press conference attended by green-skinned aliens and Charles-and-Di lookalikes.

The Mighty Tharg, alien editor of sci-fi comic 2000 AD, was there to oversee the launch of **Strontium Dog and the Death Gauntlet**. Johnny Alpha, the Strontium Dog, is a mutant bounty-hunter featured in regular adventures in 2000 AD. The 64 game, one of a projected series, will cost £7.95.

3-D Ant Attack, which has sold 50,000 copies in its Spectrum version, has now been adapted for the 64. It features a revolutionary Soft-Solid perspective graphics system, depicting a mysterious city which you have to explore in order to save your beloved from marauding giant ants. Price again will be £7.95.

See Saw is from the Hungarian Andromeda team, and is a strategy/arcade game in which you have to breach the defences of a castle — £7.95 again.

Magic Micro Mission is two games in one based on the opening credits of the Central TV series. In the first game you must land on an alien planet protected by robots, and in the second you must penetrate the Magic Micro to carry out repairs in its mazelike interior. £7.95 again.

Stomm! — it's Johnny Alpha

Disk-based software includes **Dungeon of Ba** and **Castle of Jasoom**. Both games, costing £12.95, are real-time interactive arcade adventures in which the hero, Norman the Warrior, is drawn deeper into the myths of the story as the game proceeds. The games are imported from Accelerated Software of Canada.

Doodle, an art utility program utilising either joystick or keyboard, costs £14.95.

Finally, there's **Summer Games**, from Epyx US, an Olympic simulation which stretches the graphics capabilities of the 64 to the limit. See the games section (p32) for a full review.

Reviews of the other games will follow soon.

Contact Quicksilva at 13 Palmerston Road, Southampton.

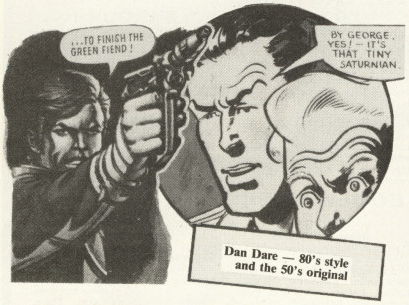
Virgin Games — who dares wins

VIRGIN Games will release a program based on cartoon hero *Dan Dare* in the spring of next year.

The program is intended for the Commodore 64, as well as the Amstrad and MSX machines.

Dan Dare, space-pilot hero of the *Eagle* comic, has recently become fashionable all over again with the relaunch of *Eagle* by IPC and the reprinting of many of *Dare's* early adventures in book form by Dragon's Dream Press.

The Virgin game will probably be a multi-screen arcade adventure done in comic-book style, with speech bubbles. At the moment no details are available as to the price or title of the game, but negotiations for copyright have been completed. More details will be made available soon.



Dan Dare — 80's style and the 50's original

Practicorp thinks ahead

PRACTICORP, producer of the **PS Programmable Spreadsheet** and **64 Doctor** programs reviewed in previous issues, has announced plans for its next batch of releases.

The new programs include business and educational packages. **Practifile** is an adaptation from a successful minicomputer version. **Inventory 64** and **PractiCalc 2** are also on the way, and on the educational games front there's **64 Pak, Tiny Tutor, Zeppelin Rescue** and **Sprint Typer. Total Health** sounds like a version of **64 Doctor** designed for human beings.

Full details of price and availability will be released shortly. Practicorp can now be contacted at Goddard Road, Whitehouse Industrial Estate, Ipswich, Suffolk, IP1 5NP, phone 0473-462721.

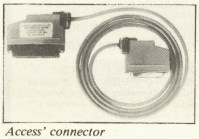
Practicorp's full line-up

RS232 access eased

ACCESS Computer Co of Stockport has developed a combined Serial interface and cable, allowing connection of RS232 printers to Commodore computers.

The £34.95 unit is supplied with simple instructions and allows the Epson RX80, FX80 and FX100 printers to be used, along with many other models including Star, Shinwa, Oki, Brother EP44, and Silver Reed printers.

Contact The Computer Centre, 61 Shaw Heath, Stockport, Cheshire, 061-477 6013.


Access' connector

Hugh's artistic winner

THE RESULTS of Commodore's International Art Competition were announced at a show at the Hayward Gallery on September 3.

The winner of the competition, which required entrants to create a still or dynamic work of art on a 64 or Vic 20, was Hugh Riley of Manchester. Hugh won a £5000 endowment to study computer art in the country of his choice, plus £1500 worth of Commodore computer equipment.

The winning piece was a study of Hugh's baby son entitled "Louis (Meditation Failure 126)".

Prizewinners in other age groups and categories included Evan Williams of Newcastle, Richard Hadland of Henley-on-Thames, Graeme Ross of Aberdeen and Joanne Delaney of Blackpool.

Hugh Riley and his winning program

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...Number One For Choice...

This is a selection of some of the very best software for the Commodore 64 from a list of over 1000 programs we can supply, covering the products of 100+ software houses in the UK, rest of Europe and the USA. A 20-page listing (which gives details of programs) and later updates are available free to customers (otherwise 50p and A4 SAE). Please add 50p P&P for orders under £20 (Europe £1 each item of software, Airmail elsewhere at cost). Make cheques/POs payable to THE SIX-FOUR SUPPLIES COMPANY.

DISCO
£9.95
(Softcell) — cassette

This is the most powerful tape to disk transfer utility you can buy. No program rewriting required, unlike with others. Menu driven. Why put up with second best? A must for all 1541 disk owners.

TAPER
£9.95
(Softcell) — cassette

Make security backups of your own BASIC/machine code programs. Very, very powerful . . . there's not a lot this one can't manage.

FASTBACK
£9.95
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Can make backups with a difference — they will load up to seven times faster than the original! One very well-known adventure now takes only 2¼ minutes instead of 15½! ALL THREE — TAPER, DISCO, FASTBACK — AT SPECIAL OFFER PRICE OF £25.75. Dealer enquiries welcome.

DISKEY
£36
(Adventure Int) — disk

Diskey gives your Commodore 64 the file-handling capabilities a serious user needs. Many users have complained about the inability of the C64 DOS to copy SEQ or PRG files, or USR files of similar form, from disk to disk. Diskey gives you not only this, but also the ability to examine, copy, or modify any disk. You can now rescue data from a crashed disk, and recover killed files. Diskey comes complete with its own DOS. Single/double-disk use.

PAPERCLIP
£75*
(Batteries Inc) — disk

LOOK AT OUR LOW, LOW PRICE. If you've been saving up for this excellent wordprocessing program, you're a little nearer than you thought. It is still the best in a very strong field. With 80-column display mode.

HOMEWORD
£48
(Sierra-On-Line) — disk

Really easy to use wordprocessor which is ideal for the casual user. Uses icon menus. Impressive.

A full selection of other word processing programs and matched utilities is available: EASYSCRIPT (disk) £60, EASY-SPELL £20, EASYMAIL £20 etc.

MULTIPLAN
£95
(Microsoft/Hesware) — disk

Easy to use but very powerful spreadsheet. You can define cells by word labels rather than co-ordinates. Sorts columns or rows numerically or alphabetically. Very highly recommended. Serial printer output.

CALCRESULT
£95
(Handic) — disk

Has true 3D (multipaging) facility, and histogram features. Versions for Commodore and Epson printers. This is a very powerful and much liked spreadsheet. Very highly recommended. Single page version £47.50 (cartridge).

MICRO ASSEMBLER
£55
(Supersoft) — cartridge

Best of the lot. If you're into machine code — or working that way — this is the one to get or save your pennies for. Features 3-pass assembler, unlimited labels, source files can be linked, monitor, full screen editor, disk or tape operation. Plus AUTO, DELETE, FORMAT, FIND, NUMBER, DISASSEMBLE, OUT and TABLE. Monitor has standard TIM commands plus hunt, transfer and disassemble.

HS-64 ASSEMBLER
£55
(JCL Software) — cartridge

Combines the features of a powerful assembler with a number of toolkit programming features. An ideal program development aid. Includes AUTO line numbering, FIND string, CHANGE string, DELETE line range, TYPE to inspect or print a file without loading it into memory, GET source text files, PUT outputs source files to disk, DO executes a file, LIST source file, RENUMber lines, JOIN program files, SCROLL multiple viewing facility, CBM code selection, ASCII code selection, RBAS reset, SIZE of file and start/end load address, SETBRK and CLRBRK to insert and remove break points from program being tested in RAM, HD and DH to give number system conversions, BOOM for a complete cold start.

KOALAPAD
£80*
(Koala Tech Corp) — inc cartridge

Comes complete with KoalaPaint cartridge which permits all those fantastic graphics facilities — commands include zoom, copy, colour swap, draw, lines, rays. Save pictures on disk and call these up from BASIC to use in your own programs! Programmer's Guide (disk £13) is useful. Logo Design Master (disk £30), Spelling I (disk £30), Colouring Series I — Geometric Designs (£25) are some of the other support programs available but it's easy to write your own.

MICRO-SIMPLEX
£178
(Micro Simplex) — disk

If you're in business and need to maintain an accurate audit trail and VAT record, this is the program for you! Will save you literally hours of work. Fully recognised by the authorities. Suitable for schemes A to F. This is a specialist, very highly developed product from a software house who offer an excellent after-sales service to registered users. Demo available on deposit.

THE LAST ONE
£97.50
(DJ 'A1' Systems) — disk

Programming aid that frees you from the graft if you're thinking of writing specific applications. Creates stand-alone error-free coding in standard BASIC. Input is in the form of one-line descriptions defining, in plain English, the user's intention. This word 'flowchart' act as basis of computer's questioning session which leads. Programs you create can be for any application. Highly recommended.

CODEWRITER
£85
(Dynatech) — disks

Database design system like TLO. Easier to work with but marginally less powerful. Disk 1 features data entry generator, disk 2 carries report and menu generator. Very flexible.

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(Precision) — disk

Really excellent database generator, still at our special price. All things considered, we think this one's the best of its type and a must for all serious Commodore 64 users. Can be used for anything from mailing lists to stock control and invoicing. Lets you tailor the database to your exact requirements. Differs from program generators such as TLO and CodeWriter in that the systems menus and core program are always the same. But Superbase is not less powerful for that — in fact it has database features and facilities beyond the needs of mere mortal folk! Now with STEPPING STONES program modules at £10 each including Job Costing/Estimating, Sales & Purchase Daybooks, Cashbook, Stock Records.

FLIGHT SIMULATOR II
£40*/£33
(Sublogic) — disk/tape

This is so good the authors think you can learn 'the ropes' as far as instrument control and flying are concerned. Accepting the limitations on the graphics side — nevertheless outstanding in terms of personal computers — the simulation is quite excellent. Expensive but it's the best one for the 64 by far . . .

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(d) £40
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(d) £27.50

S.A.M.
£48*
(Tronix) — disk

This is SOFTWARE AUTOMATIC MOUTH, a quite outstanding piece of software which gives your 64 limitless speech synthesis capability. Offers English text-to-speech or phonetic input, in direct or program modes. Full control over pitch, speed, inflexion. There really isn't anything like it, even on hardware!

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ANATOMY OF THE 1541
£14.95

Really excellent book for those keen to get inside their 1541 disk unit. Absolutely everything you need to know — includes ROM listings, descriptions of 1541 use, use of programs such as COPYALL.

COMMODORE 64 HOME COMPANION
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Plus/4 — the verdict!

COMMODORE's new 64K machine is now making an entrance to the home micro arena where its predecessor has been so successful. So, how does it compare to the 64?

The first thing that strikes you about the Plus/4 is the size — or rather the lack of it! Instead of that rather cumbersome rounded box inherited from the VIC-20, the Plus/4 features a much smaller and neater MSX-style wedge-shaped design, which is far more visually attractive and places the keyboard closer to the desk top. The rear section of the top provides ribbed ventilation slots and the unit remained cool indefinitely.

The appearance of the white keyboard is rather similar to that on the portable SX64, but the key-tops are comfortably dished. It may not be quite as acceptable to some users as the 64's, as the keys are heavily spring-loaded and rather 'bouncy', but such features are rather a matter of personal taste. In a departure from Commodore tradition the cursor keys are placed away from the main keyboard in a diamond formation at the bottom right corner of the case, which makes cursor control much easier. Four dual-purpose FUNCTION KEYS are placed in a horizontal row at the top left of the keyboard.

Warm start

A power on light and switch are provided, together with a RESET button. The RESET key normally acts in the same way as the power switch, giving a straightforward cold start, but if the RUN STOP key is pressed during RESET a warm start to the machine code monitor is made instead so you can often resurrect programs which 'hang-up'. We feel that this sequence should really have been reversed (ie a warm start by pressing the RESET key alone), as it is rather too easy to accidentally produce an unwanted cold start.

All the I/O connections are placed neatly along the back of the machine. The SERIAL (for disk drives and printers), VIDEO (for monitors), and TV sockets are identical to those on the 64, but the cassette port, user port, and joystick ports are all totally different, using small 8-pin plugs. These socket changes are irritating as the standard C2N cassette recorder and joysticks cannot be plugged in. The power supply is the familiar 'lump' provided with the 64, but with a different connector. An interesting inclusion in the row of sockets is a MEMORY EXPANSION port, promising even greater storage capacity, but there is no separate cartridge port and 64 cartridges are incompatible, as the connection differs. As usual on Commodore machines, the serial I/O does not use the industry standard RS232 voltage levels so an interface will be required for non-Commodore peripherals, and communications.

Memory switching

On power-up "COMMODORE BASIC V3.5 60671 BYTES FREE" appears at the top of the screen. The version number is a reflection of the improvements made to the BASIC since the 64's V2 and the 60671 bytes of memory directly available through BASIC is a whole 21760 bytes (21k!) more than that termed "elephantine" on the 64. Although both machines have 64K of RAM this increase in availability is achieved by some neat automatic memory switching routines (and we can't wait to see if Commodore's TV ad's will now feature a blue whale)!

The Plus/4 retains the full screen editing facilities of the 64 but adds some useful extras, such as automatic insert and flashing characters, and the editor is easier to operate with the new cursor key arrangement. In usual Commodore fashion a wealth of different graphics characters are printed on the fronts of the keys but these are not obviously re-definable.

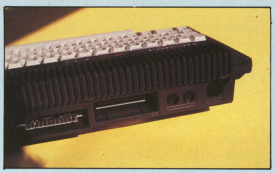
To keep up with the Joneses a WINDOW facility has been included, although this is rather rudimentary, providing only a single window via ESCape sequences. The top right and bottom left corners of the window must be defined in terms of current cursor position, so including window settings in programs is rather messy. Other ESC facilities include automatic insert, deletion of a whole line, turn off scrolling, reduce screen display (which may be necessary on some TVs), and scroll up and down.

The default settings of the function keys provide one-key entry of "GRAPHIC" (f1), "DLOAD" (f2), "DIRECTORY" (f3), "SCRNCLR" (f4), "DSAVE" (f5), "RUN" (f6), "LIST" (f7) and "HELP" (f8) and in contrast to the situation on the 64 the function keys can easily be redefined using the KEY command. The useful HELP facility assists in debugging BASIC programs. If an error comes to light during execution then pressing HELP displays the appropriate line with the aberrant section highlighted as flashing characters. Entering LIST and then calling for HELP will feature the error in context.

Slow loading

The draft manual suggests that the cassette routines are similar to those of the 64, so we suspect that it may still suffer the same problem of slow loading.

The Plus/4 operates perfectly with the 1541 Disk Drive, but inevitably it suffers from the notoriously slow access time of this unit. The 1541 is to be replaced by the 1542 which promises faster execution times. The commands supplied on the 1541 demo diskette (for the 64) are not required on the Plus/4, as the disk handling commands are all included in the 32K ROM. These disk commands comprise DSAVE, DLOAD, DIRECTORY, BACKUP, COPY, COLLECT, RENAME, SCRATCH and HEADER, with '?DS$' provided to trace



any disk handling errors.

BASIC V3.5 is a marked improvement on the tired old BASIC V2, as Commodore has taken to heart the numerous complaints from users and included many of the better features of more modern BASICs. All commands available on the 64 are included together with a number of significant additions. Commands can be abbreviated (and of course you can program the function keys to duplicate any desired sequence).

The extra non graphic and sound commands are as follows. AUTO provides automatic line numbering whilst DELETE removes program lines on request. Although Commodore has not gone the whole hog and provided a completely structured BASIC the addition of DO/LOOP/WHILE /UNTIL/EXIT should go a long way towards appeasing the purists. BASIC 3.5 supports IF . . . THEN . . . ELSE rather than just the simple IF . . . THEN, which makes for tidier programming. Modification to RSTORE now allows a line number to be specified from which to read DATA. Extensive error-trapping routines are included to make total program crashes avoidable. TRAP traps all error conditions except "UNDEF'D STATEMENT ERROR", and will re-route the program to a predefined line. Once an error has been TRAPed the guilty line number can be traced from the variable EL, with the error condition contained in the ER variable. The function ERR$(ER) gives you the error message corresponding to ER.

RESUME allows you to continue program execution after an error has been trapped. GETKEY is a GET (or INKEY$) statement which automatically waits for a key to be pressed instead of falling through. HEX$ converts from decimal to hexadecimal numbers while DEC provides the reverse conversion. The JOY function returns the value of a switch type joystick, but the industry standard 9 way D plug is not used! PRINT USING allows formatted PRINT outputs (such as columns of figures) to be produced with the minimum of effort, and PUDEF allows you to define the characters to be used in PRINT USING. INSTR is a valuable addition to

the string handling commands providing searching for one string within another. TRON and TROFF are debugging commands which print the current line number on the screen during program execution, although these commands are often more trouble than they are worth as they upset the screen display.

The graphics commands are a strong point of BASIC V3.5 as they transform graphics programming from an occult art to childs play. The SID and VIC ▶

Software on trial

THE PLUS/4 has been designed as a market leading computer system intended to maintain and, if possible, improve Commodore's prominent market position. An integral part of the system is a software package provided with the machine and held on ROM for near instant use.

Named 3-PLUS-1, the software provides facilities for word-processing, records filing, spreadsheet operations, and creation of simple graphs. The package is not a sophisticated one and does not offer the facilities of most dedicated programs in each of these fields. However, this is the first time that such a package has been made available for a mass-production computer aimed at the home or business user at this price.

So called integrated-software packages are the fashion at the moment in the highly competitive market of business software for machines such as the IBM PC. Commodore has achieved several points in the integration stakes. The 3-PLUS-1 software is integrated into the machine itself; the programs share many of the same commands; data can be transferred from one program to another; facilities from two or more of the programs can be combined to do things like creating mail-shots; and the programs with data can all be 'active' on the machine at one time.

When you switch on 3-PLUS-1 you are started off in the word processor. The working area available to you is 77 characters wide by 99 lines deep. Most of the standard facilities are provided including text entry from the keyboard (obviously), deletion and insertion of text at any point on the work area, copying or moving blocks of text, text formatting through the use of tabulation settings, word-wrapping (to automatically ensure that words are not split at the end of lines), justification by spacing words to completely fill lines, and control of the printed output.

In practical terms the documents which can be produced must be relatively short. Letters can be produced and, when used in combination with the data-base, circulars or mail-shots are possible. It would be over-ambitious to attempt to write books or lengthy articles.

A major restriction on the software is the way that the screen display is used. Only 37 characters are shown across the screen, and this means that a little less than half the width of the document is visible at any one time. This makes reading the document difficult as you must pan through the thing from one side to the other to follow a sentence through. Also it makes it difficult to plan out the format of the final document. A phrase often used to describe some word processors is "what you see is what you get", meaning that the display on the screen can be set to show the document just as it will appear when printed out. No way can 3-PLUS-1 provide this.

On using the word processor I found a number of things not to my taste. The commands are generally rather clumsy in use; for example there is no text insert mode. You must use the INST – DEL key to give you a series of spaces or a special command to insert a blank line and then type in the space provided. Hitting the RETURN key can wipe out a whole line of text if you are not careful. When working with blocks of text, the text is not obviously marked on screen and hence it is easy to make mistakes.

The second program given is a ▶

spreadsheet. This is my least favourite program of the four. The principal of a spreadsheet is to provide a grid into which numbers, formulae, and text can be placed and manipulated. The value of a spreadsheet comes from the ease of setting the thing up or modifying data and, for many practical applications, the size of the grid provided. Commodore has had to cut some corners with this program in terms of the way in which facilities are provided and the size of the spreadsheet grid.

A grid of 50 rows and 17 columns is provided, which is adequate for many uses, but an additional limitation is imposed by the memory allocation (around 7k to allow the other programs space in memory at the same time) which can mean that only half the grid spaces can actually be filled. The screen display is normally set to show 12 rows and 3 columns. A half-height display is also used, 7 rows deep, to permit both word processing and spreadsheet to be shown on the same screen.

Each space, or cell, on the grid may contain a number and may also contain text or a formula. Any formula may contain reference to other cells, either explicitly by the cell row and column numbers or by the text held in the cell. It is here that Commodore has chosen to ignore most of the other spreadsheets by using an unusual method of referring to cells by row/column and using numbers for the column reference. It is more normal to refer to column/row using letters to signify the column. Also, to make it easy to build up the spreadsheet, a function is usually included which copies a single formula into a number of other cells which automatically corrects the formula for each cell. Commodore has not provided such a function.

Data from a single row of the spreadsheet can be used to create a simple block graph and transferred to the word processor. No competition to Lotus 123, but even simple graphs can have their uses.

Graphs are produced in low-resolution to allow printout directly to standard printers. Automatic scaling is used to produce a graph 20 characters high but the scaling cannot accomodate negative values.

Last and in my opinion most useful comes a data-base program. Once again the program is relatively unsophisticated, but is very functional despite this. However the program cannot be used without a disk drive.

Up to 999 records (think of each record as a card in an index file) can be set up to form a file on a disk. Once set up, the records can be modified, sorted, specific data can be searched out, and the records can be used to provide data for use with the word processor.

The most difficult operation is the initial setting up of the data file. You must specify what type of data is required on each record and how much space must be provided for each item of data. This information cannot be changed once set up and so you must be sure of exactly what you want before you start to set up the data. After doing this, the rest is relatively easy. Alphabetical sorting is reasonably fast, as is searching the whole file for a particular item of data.

All the 3-PLUS-1 programs are designed to be used with a disk drive. This obviously will increase the cost of a full system. The data-base is dependent on a disk drive to work at all.

A separate manual is provided for 3-PLUS-1. This provides a tutorial approach to introducing the programs, as well as reference sections. Each function is individually described with the help of examples.

In summary, if you are thinking of getting a PLUS/4 just for the sake of the software, then forget it. You can get much better value elsewhere. As an addition to a potentially good general purpose microcomputer it is of more value. If you want to learn the basics of using these types of archetypal programs, but have no immediate grand plans for their use, then the PLUS/4 system is well worth further investigation. ■

John Cochrane

chips of the 64 have disappeared into obscurity but all that tedious POKEing is a thing of the past, having been replaced by a graphics system comparable to that of the Microsoft Extended Color Basic used by the Tandy CoCo, Dragon and new MSX machines.

Five different GRAPHICs modes can be set up. The default mode 0 provides a standard 25 line by 40 column text display, but selection of one of the hi-res modes reserves 10K of RAM. Mode 1 provides a full-screen 320 × 200 pixel display with the full range of colours (subject to the restriction of only one foreground colour per character square), whilst mode 3 halves the horizontal resolution but allows three foreground colours in each character space.

Split screen

Modes 2 and 4 are similar to modes 1 and 3, except that the screen is split and retains five lines for text at the bottom. CHAR allows you to print a string of characters anywhere in any mode, providing useful integration of text and hi-res graphics. COLOR assigns any of 16 colours and 8 luminance settings to either the background, any of up to three foregrounds, or the border. BOX allows you to draw filled and empty boxes, which can be rotated about their centre, and the very powerful CIRCLE command allows you to draw anything from a simple circle, through ellipses to a triangle inclined at 45 degrees. DRAW produces a straight line between two points and can be used to produce a whole shape (although not as simply as with the Microsoft DRAW command).

LOCATE places the cursor at any screen coordinates and SCALE allows the screen coordinate scale to be changed. PAINT fills defined parts of the screen with particular colours. SSHAPE and GSHAPE allow blocks of the screen to be picked up and moved, but as the information is stored in a string rather than an array the size of the area taken is much more restricted than with the similar Microsoft GET and PUT commands. The RDOT function provides the X and Y coordinates of the cursor and can also return what is beneath the cursor. RGR returns the current graphics mode, and RLUM the luminance level of a specified colour. All the graphics commands can be specified in absolute terms or relative to the cursor.

Sprite capability

One excellent feature of the 64 which has gone is the sprite capability — although dealing with sprites was so painful that most people never bothered with them anyway! Consideration of the standard of sprite graphics currently being produced on the humble Spectrum leads us to believe that expert games programmers will not find this too much of an obstacle.

Sound on the Plus/4 is a pale shadow

compared with the brilliant effects possible on the 64, but once again it is much easier to access and it still puts many other home micros to shame. The sound is routed through the TV speaker, and is controlled internally via the VOLume command which provides seven levels (with a default level of zero — which is why we began to wonder whether the sound channel on our monitor was working!).

White noise

SOUND controls the two voices available, the second of which can produce both tones and white noise. Envelopes are not supported and only the voice, tone, and duration of the note can be specified, although Commodore do give a table of musical note conversions (which regrettably require obscure values).

Although SID and VIC may be dead TED has arrived, in the form of the built in TEDMON which provides a straightforward assembler, disassembler and machine code monitor which is inevitably somewhat limited in its scope, although adequate for dealing with small sections of code. The only feature sorely missed is a trace facility, allowing you to step through your program searching for bugs. However, instant access is definitely a plus point which should lead more users to widen their programming experience into machine code.

Although the Plus/4 is now ready for launch in the UK, Commodore has been dragging its heels somewhat, because of delays in completion of the built-in software packages, so it will be the new year

before it is available in volume. There has been much speculation over the market positioning of the Plus/4 and the 64 because they are both in roughly the same price band. Although many people expected that the Plus/4 would be simply a replacement for the 64, it is becoming apparent that this is not true, and that Commodore is aiming at rather different types of user.

Commodore sees the 64 continuing as essentially a games machine, with the Plus/4 appealing more to the "serious" home user, who is interested in programming. The Plus/4 uses the newer 7501 CPU in place of the 6510, but any increase in speed this brings is eaten up by the extensions to BASIC and memory switching, as running the standard PCW Benchmarks on both machines produced effectively the same times. The Plus/4 User Guide was seen only in draft form, but promised to be an improvement on the 64 User Guide, as it contained much of the useful information previously restricted to the Programmers Reference Guide.

Our overall impression of the Plus/4 was that it was well-constructed, more user-oriented, and a marked improvement over the 64 in many other respects. The price of £300 seems rather steep (as production costs cannot be much different from those of the 64), but some allowance must be made for the free software. It is possible that Commodore is deliberately inflating the price to clearly differentiate it from the 64, and leave room for manoeuvre — just remember how much the 64 cost when it was first announced.

Outside competition

Of the outside competition, the QL and Amstrad have much faster BASIC, are technically more advanced, and seem to offer better value-for-money, although perhaps a small user-base in global terms. The MSX machines have a similar turn of speed, offer compatibility, but are rather an unknown quantity. How well the Plus/4 fares against the competition will probably depend as much on brand-loyalty and availability as anything else. ■

Keith & Steven Brain

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Sweet little 16

AFTER years of rumours about its death, the VIC20 is now officially obsolete, replaced by the Commodore C16.

The C16 comes in a starter pack, similar to the VIC, consisting of dedicated cassette deck, 'Introduction to BASIC', and four software packages, for £139.99. The 16 in the name refers to the total RAM available, though like the 64 the amount of user RAM is considerably less.

It looks just like any other Commodore machine, in the same case as its predecessors, though in a different colour scheme — the case is dark grey, and the keys light grey. The keyboard itself is the usual CBM type of thing, with decent keys, and angled, though the layout is non-standard, even compared to its predecessors. If you've got used to the positions of keys like *, +, HOME, and the all important cursor keys on the 64, then you will have great fun on a C16, as the've all changed round. I find CBM keyboards a little too soft, but typing is a personal thing.

Inside the beast is a smallish circuit board, leaving quite a bit of empty space. The American origins of the machine are immediately apparent by the metal screening all over the circuit board. In the USA, there are certain legal requirements for radio interference, but there are no such laws in the UK, so British micros usually drown out the average radio in the same room. There are few components on it, the main ones being the 7501 processor and the custom chip that does the clever stuff like producing a TV display. The 7501 is just another Commodore version of the illustrious 6502, like the 6510 in the 64.

On the C64, with its 64K of memory, when you switch on you get a message saying something like '38K bytes free'. The remaining 26K is used up by the system, so about 40% is unavailable in BASIC. On the C16, with 16K RAM, you get about 12K free, which isn't bad. However, the moment you select one of the high-res graphics modes, another 10K of memory goes down the tube, leaving you under 2K user RAM, less even than the VIC20. This I feel is the major shortcoming of the C16 — the lack of RAM. On the 16K Spectrum, about 8K is left to the user, which is quite ample for many uses, but designing a 10K screen for a machine that has only 16K is a major oversight by Commodore. It's supposed to be technically possible to expand it up to a Plus/4 and onwards to 128K, but Commodore don't have any plans for doing this themselves yet.

Previous hallmark

It has been the hallmark of previous CBM machines that the BASIC didn't support any of the machine's nice features, such as graphics and sound. It practically made it a necessity to buy one of the many 'extended BASICs', either Simon's BASIC from Commodore themselves, or one of the independent programs. Well, on the C16 Commodore have killed that piece of the market stone dead, and made poor young Simon unemployed, as BASIC version 3.5 is supplied with the machine, which has all the extra commands you would expect on any other machine.

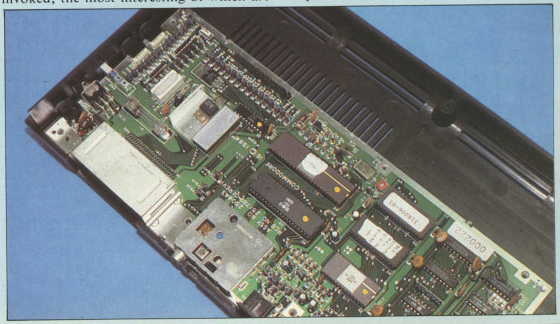
The BASIC sits in 32K of ROM, along with the kernal, which looks after the whole machine, and a machine-code monitor. The BASIC is Microsoft as you'd expect, but in the funny Commodore dialect used before. Programs are edited using the same screen editor as before, but with the addition of a few welcome features such as automatic insert mode. The same PET-type graphics characters are available, and the function keys are initially configured to produce various key sequences. The default commands are a little strange, being mainly concerned with the disk drive, and as most users would not have a disk drive, but the supplied cassette recorder, they seem an odd choice. Anyway, if you don't like them, the KEY command re-defines them to be anything else — no POKEs necessary on the C16. For entering programs there are a few other commands, like AUTO and RENUM, which are again new to CBM owners. Fans of 'structured programming' will not be impressed, its only such features being DO. .WHILE and DO. .UNTIL, with no procedures or long functions.

By pressing the ESC key followed by another, various extra functions can be invoked, the most interesting of which are the 'window' commands. Windows are one of the in things at the moment, and have appeared on the Amstrad and QL, and now the C16. However, you can have only one window at a time, so it's not really as good as the others mentioned. I believe a similar effect can be obtained on the C64 by POKEing anyway. Regrettably there is no WINDOW command, so the process of defining a window has to be done by a tedious sequence of control code printing.

The C16 has five graphics modes. The simplest is Text mode, with the usual 40 by 25 lines of text, with each letter able to be a different colour. This is the only one that doesn't take up the extra 10K of memory. In text mode, there are 15 different colours, each with 8 levels of luminance, and black, effectively giving 121 different shades, all of which can be displayed at once. There are also two high-res modes, one with 4 lines of text at the bottom of the screen, and one without. In high-res the resolution is 320 by 200, which is about average nowadays, though there is a colour restriction — you can only have two colours in one 8x8 pixel character square, the same as the Spectrum. However, you can still have 121 different colours at once. The two remaining modes are 'multi-colour' modes, which have a resolution of 160 by 200, but can have up to four different colours per character square, still with the choice of 121 colours.

Missing feature

The main feature missing on the C16 compared with the 64 is sprites. Undoubtedly the best feature of the 64, they made it much easier and faster to write



games, as the programmer didn't have to bother about the mechanics of actually putting shapes onto the screen and removing them later, since the hardware did it all. The omission of sprites on the C16 is a sad loss, and it may make it harder to write quality games for it. The Spectrum programs show that attribute problems can be overcome by skillfull software, but it has taken a few years to work it out. How fast it will be worked out on the C16 remains to be seen.

Graphics control

Controlling the graphics from BASIC is easy, with commands like DRAW, LOCATE, BOX, CIRCLE and PAINT. The Circle command doesn't just draw circles, but can produce ovals, arcs, or any kind of polygon. The CHAR command is a sort of PRINT AT command, that works in any graphics mode, and PAINT is a way of filling in areas with solid colours. The speed of the graphics generally, and especially the filling, is positively slothful, and the BASIC itself is a little slower than previous CBM dialects.

The sound facilities of the C16 are not half as good as the 64s, but are more than adequate. There are two voices, one for notes, and one for notes or noise, with overall volume control. It may have more features, but they are not accessable from BASIC, and as the Programmers Reference Guide has not yet appeared, I can't say. As it gets piped through the TV, volume is not a problem.

The built-in machine-code monitor is not earth-shattering but it's better than nothing. It has a one line assembler, disassembler, and various memory read and write modes, though it doesn't have single stepping. It seems to have code save & load commands via the cassette recorder (and not disk), but I can't be sure as I had no instructions at all for the monitor.

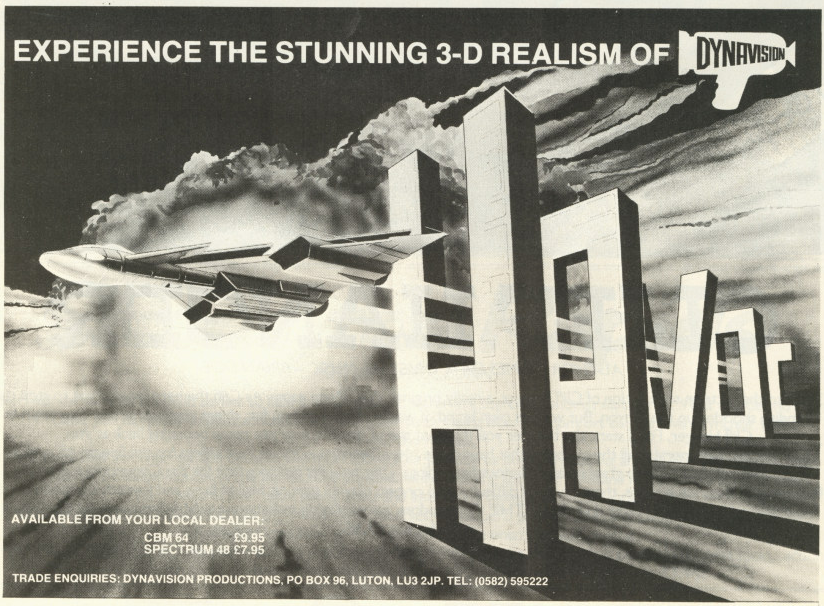
The C16 comes with its own dedicated cassette recorder, which seems to be the same as the usual one, except that it has a different plug. The tape format is similar to before, so the market for turbo loaders remains for the C16. It also connects to the notoriously slow 1541 disk drive, but also supports a new disk drive, said to be four times faster. The BASIC has various commands to control the disk drive, including various backup procedures, and a DIRECTORY command, and this latter feature is innovative on a Commodore.

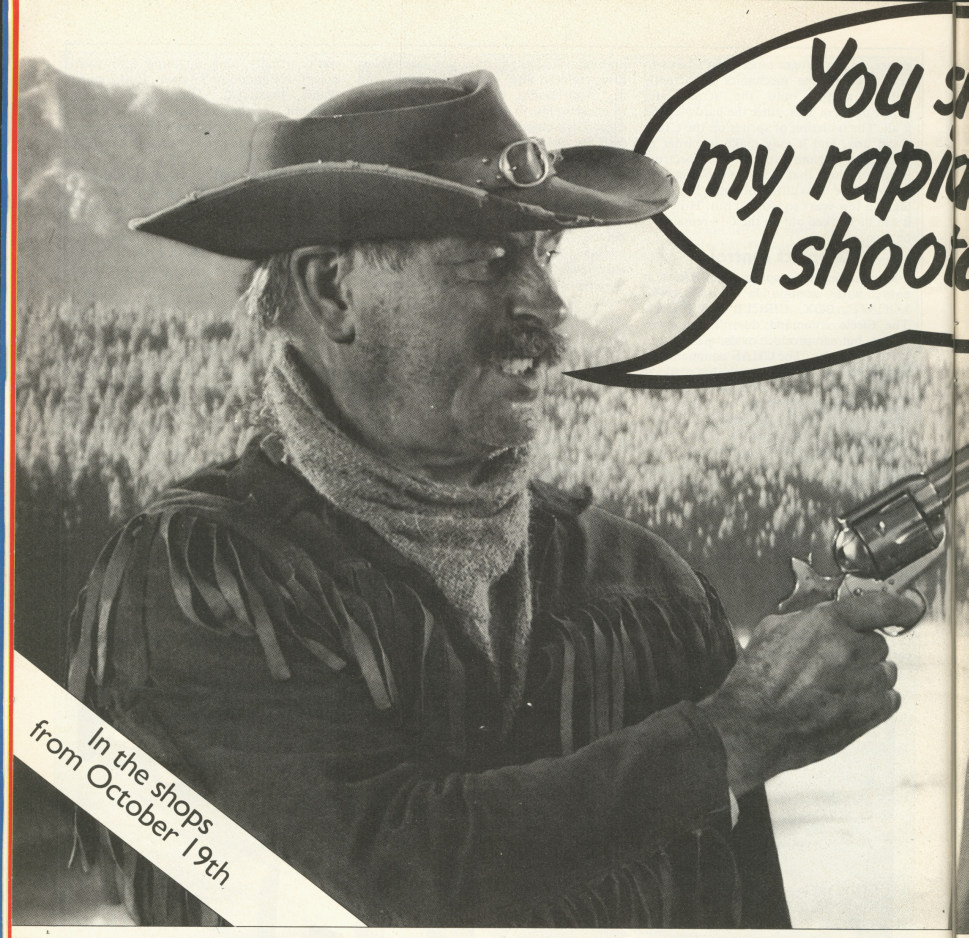
As with Sinclair's QL, the 'joystick' sockets on the C16 are something of a con by Commodore. Instead of the usual Atari-type sockets, it is cursed with two strange looking mini-DIN type sockets, so you can't actually plug anything into them except Commodore's own forthcoming 'super joysticks'. They aren't much different to the normal run-of-the-mill switched ones, so putting obscure sockets on the C16 seems to be just a way of selling more joysticks.

The documentation supplied with the review machine was very much pre-release, consisting of a couple of hundred photo-copied sheets. What was there was good, though some of the listings were inaccurate. The C16 will be supplied in a 'starter pack' with four cassettes, but these too were unavailable for review.

The C16 is basically a VIC20 with a better display and more RAM, though when using graphics a similar amount is left to the user. It competes directly with the 48K Spectrum and the Oric. Its advantages include the supplied cassette recorder, good keyboard and better graphics, while its disadvantages are the small amount of RAM and uncertain software support. Conversions from the C64 are going to take time, because of the lack of sprites and minimal user RAM, though VIC conversions will be easier. It can in no way be thought of as a replacement for the 64, though if it had 16K RAM more then it would be a certain blockbuster. As it stands it does not have enough RAM for much programming, though Commodore's marketing muscle will probably ensure that a lot of C16s will find their way into Santas sack this year. ■

Andy Pennell





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Some useful DATA for the 1520

*16-year-old **Sarah Cotton** tackles some problems she's encountered in using the 1520 printer/plotter and the use of DATA statements in programming*

THE 1520 printer/plotter, for use with the Commodore 64 or VIC-20, is one of the cheapest and most versatile of the Commodore machines, chiefly directed at the home user market. In this article I have aimed to explain how to set about using it in as simple a way as possible.

It is assumed throughout that the printer is set at device 4 although some may be at device 6. If you experience any "device not present" errors try setting the middle number of the OPEN statements to 6.

Simple

Let's begin with a simple program which will get the printer/plotter to write out your name. First remember to turn your 1520 on, and check that the pens are correctly inserted.

Run the program to assure yourself that it works.

Line 10 tells the computer that you want to talk to the 1520, indicated by the second number which is called the "device number." The first number is the "file number" which can be anything from 1 to 255. The final digit tells the computer the particular task you want this file to do — here the 0 tells it that you want to print characters.

When you refer to file 1 again in line 40 the computer knows that this file is to be used for printing characters and acts accordingly.

Line 50 finishes the program by closing the file.

Let us develop our original program by adding the lines in Program 2.

Line 15 opens up another file, this time called 2. The final 2 tells the computer that it is to be used for changing colours.

Line 25 actually performs this task. The 2 tells the computer we want to change the pen colour, and 1 is the code number of Blue. The numbers for the other colours are given in the 1520 manual.

File numbers

Try changing the file numbers in the program and check that you understand the principles of using them. Remember that you will also have to change the numbers in the PRINT statements.

You can improve and alter the way the printer writes out your name. Change the character size by adding the lines in Program 3.

The numbers for the other character sizes are given in the manual.

Program 1

```
10 OPEN1,4,0
40 PRINT#1,"YOUR NAME"
50 CLOSE1
```

Program 2

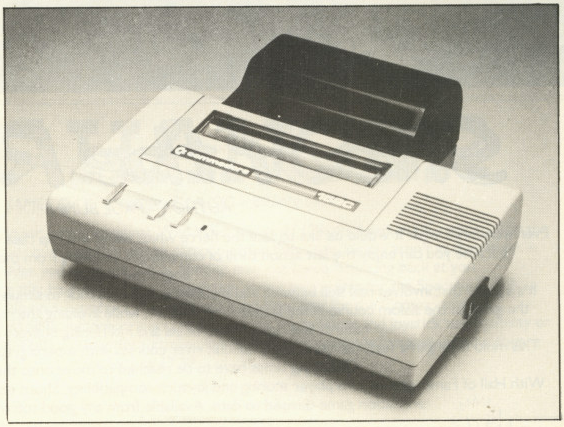
```
15 OPEN2,4,2
25 PRINT#2,"1"
60 CLOSE2
```

Program 3

```
20 OPEN3,4,3
30 PRINT#3,"2"
70 CLOSE3
```

Program 4

```
OPEN10,4,0
CMD10
LIST
CLOSE10
```



With a little help from the manual you could change to lower case (OPEN 6,4,6: PRINT 6, "x") or rotate the characters (OPEN 4,4,4: PRINT 4, "x"). Don't forget to close the files at the end of the program.

Listings

Let's say you have just written an exciting and original game for *Commodore Horizons* and now want to get a copy on paper what do you do? Listing out programs on the printer is easy, although not exactly fast (especially if they are really long). But do not despair — the quality is very good.

Write or load up a program into your computer and then type in the lines in program 4. Unfortunately the 1520 cannot print out the normal control characters used by the computer — it has its own special characters. These are shown in the manual.

On to the 1520's plotting capabilities. You can think of the paper in your printer as a piece of graph paper. When you switch it on the origin, (0,0) is at the position where the pen stops. See figure 5.

From the origin you can go up 999 steps, down 999 and across 480, each step being 1/5 mm. Points are given using (x,y) co-ordinates relative to the origin. Type in and try program 5.

Obviously you will want to draw much higher pictures, but you could find yourself coming off the top of the paper. You can overcome this in two ways — either by using the paper feed before running the program or, much better, by actually including a line to do this. Try program 6.

Notice that if you change the position of the origin you have to use print X, "R" to move and "J" to draw.

The coordinates in both of the programs were held in data statements, but this is not the only method for plotting. If you want to draw the graph of y = x + 10 the program will take this sort of shape:

Open files: Move pen down paper.
For X = 1 to 480: Y = X + 10: Draw to (X,Y)
Next X
Close files

You will notice that many of the 1520 programs I've given involve the use of DATA statements. Let's go on now to look at this useful programming aid, which has applications in many types of programs including those requiring control of sound, graphics and string handling.

DATA statements

The data statement, along with the related terms of 'Restore' and 'Read', is one of the most versatile parts of Basic. It is used when several unrelated numbers or words are required to be held in the program, and assigning them directly into variables is not efficient or feasible.

This short program number 7 should help you to understand how the three commands work.

Line 10 looks at the numbers and the word in the DATA statement, and places each in a separate variable. ▶

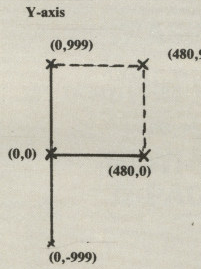
Program 5

```
10 OPEN11,4,1:REM OPEN PLOTTING FILE
20 PRINT#11,"H":REM MOVE TO ORIGIN
30 PRINT#11,"M";0,20:REM MOVE TO POSITIO
N
40 FORT=1TO4
50 READX,Y
60 PRINT#11,"D";X,Y:REM DRAW TO POINTS G
IVEN IN DATA STATEMENTS
70 NEXTT
80 CLOSE11
100 DATA0,40,10,40,10,20,0,20
```

Program 6

```
10 OPEN9,4,1
20 PRINT#9,"H":REM MOVE TO ORIGIN
30 PRINT#9,"M";0,-200:REM MOVE DOWN 200
STEPS
40 PRINT#9,"I":REM SET (0,-200) AS NEW O
RIGIN
50 PRINT#9,"R";20,0:REM MOVE TO POSITION
 (20,0) RELATIVE TO NEW ORIGIN
60 FORT=1TO3
70 READX,Y
80 PRINT#9,"J";X,Y:REM DRAW TO POINT REL
ATIVE TO NEW ORIGIN
90 NEXT
100 CLOSE9
110 DATA120,0,150,200,20,0
```

Diagram 1



Program 7

```
10 READX,Y,Z$
20 PRINTX;Y;Z$;
30 RESTORE
40 GOTO10
50 DATA12,4,HELLO
```

```
0 POKE36878,15
10 FORX=1TO20
20 READD,N
30 FORY=1TOD
40 POKE36876,N
50 NEXTY
70 NEXTX
80,POKE36876,0:POKE36878,0:END
90 DATA10,145,5,234,20,200,1,130,50,245
100 DATA40,230,20,129,60,177,10,160,30,1
44
110 DATA20,130,70,240,50,211,60,134,9,20
1
120 DATA10,135,50,167,70,198,50,133,60,1
86
```

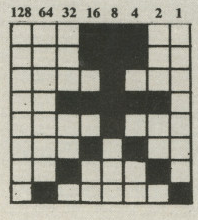
Program 9

```
1000 RESTORE
1005 INPUT"■■■■■■■■■■■■■ FIRST NAME";F$
1010 FORX=1TO10
1020 READN$,NO
1030 IFN$=F$THENPRINT"■■■■NUMBER:";NO:FO
RT=1TO3000:NEXT:GOTO1000
1040 NEXT
1050 PRINT"■■■■NAME NOT FOUND":FORT=1TO2
000:NEXT
1060 GOTO1000
2000 DATAJANE,807,JACK,0009,BILL,413,PET
E,907,SALLY,953
2010 DATAHILDA,830,JILL,333,MARTIN,927,M
ARY,672,HARRY,888
3000 REM PROGRAMMING INSTRUCTIONS (NO NE
ED TO TYPE THESE IN)
3010 REM "■"=CRSR DOWN
3020 REM "■"=CRSR RIGHT
3030 REM "■"=BLACK
3040 REM "■"=PURPLE
3050 REM "■"=RED
3060 REM "■"=CLR
```

Program 10

```
10 FORI=0TO511
20 POKE7168+I,PEEK(32768+I):NEXT
30 FORI=1TO8:READJ:POKE7168+I,J:NEXT
40 POKE36869,255
50 DATA28,28,8,62,8,20,34,65
```

Diagram 2



0+0+0+16+8+4+0+0=28
0+0+0+16+8+4+0+0=28
0+0+0+0+8+0+0+0=8
0+0+32+16+8+4+2+0=62
0+0+0+0+8+0+0+0=8
0+0+0+16+0+4+0+0=20
0+0+32+0+0+0+2+0=34
0+64+0+0+0+0+0+1=65

Line 20 prints them out on the screen.

Line 30 is added to tell the computer that when another READ statement appears it should start looking at the DATA statements from the beginning again.

DATA statements are almost essential in the playing of tunes, saving a lot of typing. Turn up your sound and try out program 8. 'X' and 'Y' are loop variables, 'N' the note to be played and 'D' the duration.

You could try changing the notes or adding more by increasing the number in line 10. Notice that the 'Restore' command is not needed as the numbers in the data statements only have to be read once.

One useful application for DATA statements is in keeping lists such as telephone directories.

Type in and run program 9 using both known and unknown names. When you are sure that it works you could put in the names and numbers of your friends.

DATA statements also become useful in handling graphics.

Nearly all the commercial games you have purchased will have included special graphics which are not designed using the PET graphics on the keyboard.

These characters are called 'high resolution graphics'. Using DATA statements you can liven up your own games by designing your own hi-res graphics for use in your programs.

If you don't have a graphics or sprite design program you'll have to begin with an 8x8 grid drawn out on paper.

"Liven up your games with hi-res"

Design your character by filling in the appropriate squares as I have done in diagram 2. Looking across columns left to right you can see that each one has a different number associated with it. These are binary numbers, and the filled-in blocks in your 8x8 grid represent "bits" of a "byte" which will control your graphic character. Add the numbers designated by the filled blocks, and when you have worked out all the figures you should be left with 8 numbers, which then should be placed in data statements such as those in program 10.

When you have run it try pressing "at", and a little man will appear.

Design some of your own graphics and add them to the program. You will have to add 8 to the loop in line 30 for each one. The characters will start at "at" and then work through the alphabet.

If you assign the 'A' key to the printing of a graphic, then the letter 'A' will only appear in any words you may wish to display in your game program if it is in reverse field. ■

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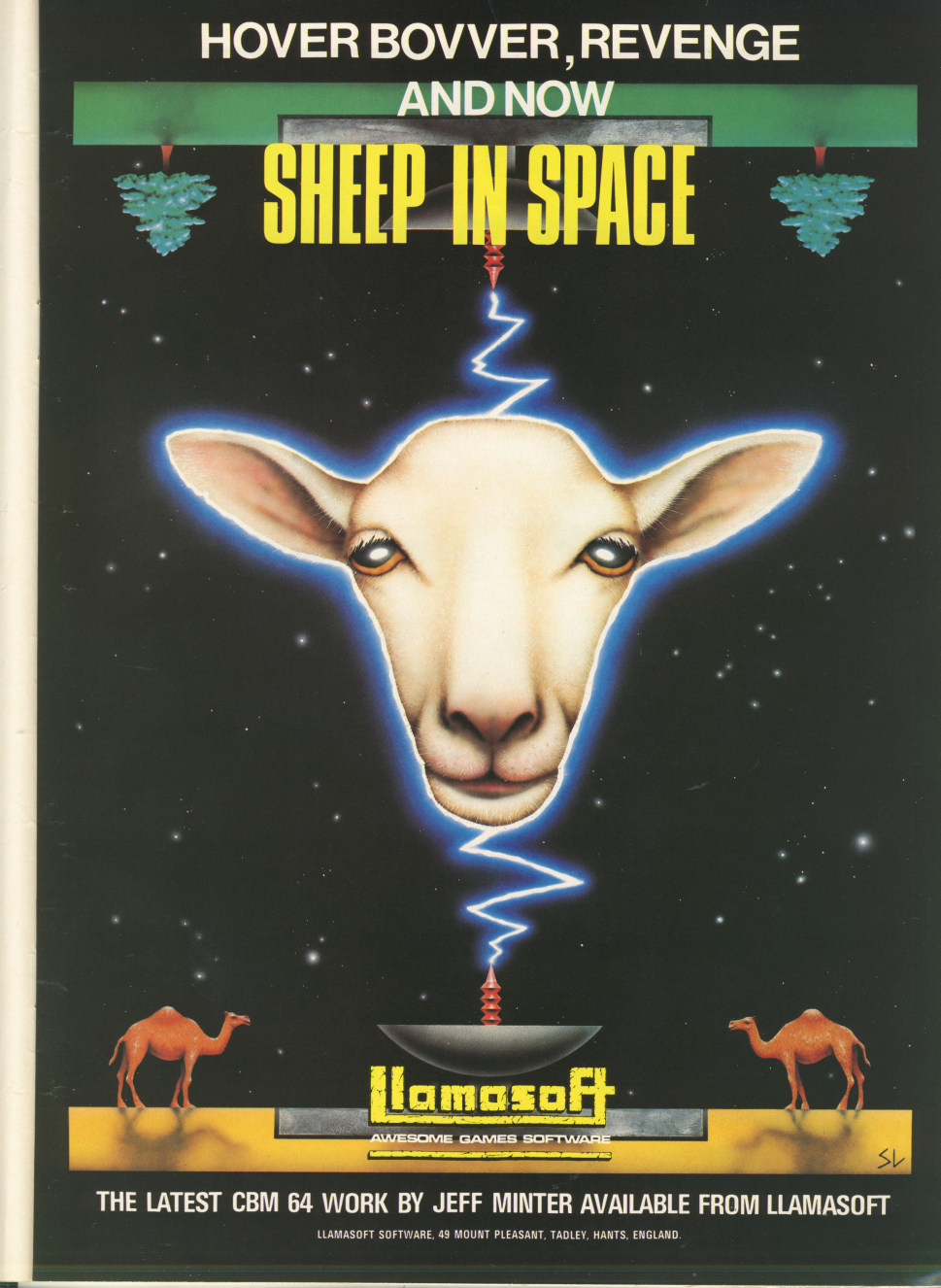

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PROFILE

The Potty Programmer

From Alligata to Gremlin Graphics, Tony Crowther has blazed a trail of original and highly playable games. ***Chris Jenkins*** *pins down the man behind Potty Pigeon and Monty Mole*

TONY CROWTHER says he wants to be famous, and he's going the right way about it. His games for Alligata and recently Gremlin Graphics have set new standards for playability, graphics and invention, and characters like **Monty Mole** and **Potty Pigeon** are following on from the successes of the earlier **Blagger, Loco** and **Killer Watt.** But the financial rewards of being a programming mega-star bring with them the complications of contractual wheeling and dealing.

"I just don't get a penny for the games I wrote for Alligata — I signed a contract at Christmas, and in all the excitement I didn't realise that one of the clauses meant that I only got royalties for my Alligata games while I worked for the company. Now that I've moved to Gremlin Graphics I won't be getting anything."

Tony's programming career started in educational software — "I'd used a BBC in school, and bought myself a Vic and taught myself programming. This was when I was 16. I went through Basic programming and then taught myself machine code using cartridge-based assemblers — I couldn't work out what I was doing some of the time, but it was working!"

Monty Mole — going underground

Tony's first six games for Alligata — "I'm not proud of them!" — included **Balloon Rescue, Damsel in Distress, Squash-a-Frog** and **Aztec Tomb Adventure.** "They were really crummy programs, Alligata's first releases, and when I wrote them I was working from home and getting a royalty, but later I went up to work there."

Tony's first big success was **Blagger,** using some of the ideas of **Manic Miner.** With Tony's distinctive style, however, Blagger came across as far more than an MM rip-off, though it was Alligata's idea to produce the game. "The programs I'm working on now are joint efforts between myself and Gremlin, who offered me £10,000 for **Percy the Potty Pigeon.** I wrote Percy in all the depression on leaving Alligata, and Gremlin offered me a directorship as well as the advance on the game."

Secrets

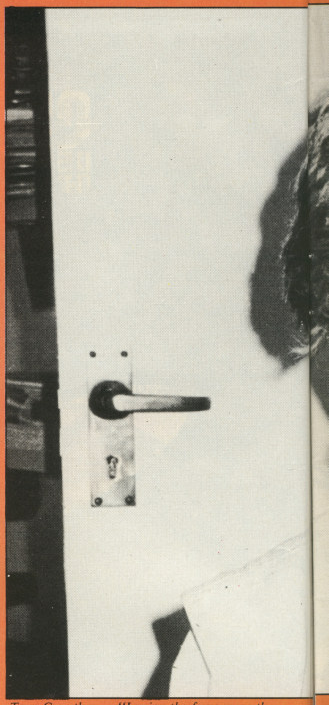
Gremlin's managing director is Geoff Brown, who also runs Centresoft/US Gold. Geoff contacted Tony after seeing his Alligata games, and Tony, who was a regular at Gremlin's Sheffield computer shop Just Micro, now works exclusively for Gremlin.

But just what is it about Tony Crowther games that makes them special? So far the distinctive large, colourful graphics and smooth scrolling effects have made each game easy to recognise as a Crowther effort — but as Tony explained, this may soon change. "There isn't anything secret about the programming techniques. I just sit down and create a full screen with as much detail as possible. The best so far is **Suicide Express,** which is due out in October. The screen only took about a week to do, and I designed it while I was on holiday in Spain. Instead of using the hi-res screen, which flickers when you try to scroll it, I just define 255 characters and build the screen up using those. It's then much easier to get smooth scrolling."

Scrolling

The basis of Tony's programs is a screen-scrolling routine with a character set, and after getting the boring bits out of the way he sits down to plan the game.

"With **Potty Pigeon** I didn't have any idea what I was going to do, then I saw



Tony Crowther — "I enjoy the fame more than

Audiogenic's **Forbidden Forest.** There are three layers to the background, which move at different speeds, so I used that idea, and the theme I worked out with my girlfriend."

Monty Mole

"**Monty Mole** is similar to **Son of Blagger** — the same type of scroll but a lot faster. Unfortunately there were problems with the first batch, because the tape duplicators couldn't get the Pavloda to work, so they changed the program. They corrupted the character set so that there weren't any 'As' in the program, then they duplicated 5000 copies before anyone realised. Sometimes it crashes, and it never auto-runs — it was a real mess, but from now on I'm making sure to check the duplicating myself!"

Perhaps Tony's best-known program, **Monty Mole** received nationwide TV coverage due to its tongue-in-cheek references to the miners' strike. "The character was the idea of Gremlin's Ian Stewart, and the original version was by Pete Harrap for the Spectrum. We looked at that and decided we wanted to do things that you couldn't do on the Spectrum, like the maze being generated randomly every time, so my version for the 64 has some similarities but a lot of differences; you only get one life, the highest score you can get is 14, and so on. It

the money!" Inset — Tony's latest, Suicide Express

was a bit of a joke, it getting on TV — Pete Harrap's dad is a miner, so we gave a story to the local paper, and the next thing we were being phoned up by the national papers and the TV people. I was in Spain so I missed it all — but it would have been me if they'd known that my grandad was the President of the Coal Board!"

So Tony's "cuddly" games, with a large playing area with scrolling backgrounds and fast action combined with original characters, have been a big success. And does he intend to carry on doing that sort of game? "No — I've done enough of those — I'd like to do a really good shoot-'em-up! **Suicide Express**, the latest Gremlin game, is the same sort of idea as Loco, but it's four times faster and the graphics are better than anything I've done before."

Tony's opinion of UK software isn't very high — "Everything seems to be a copy. Loco is actually based on an arcade game called Super Locomotive, but I only saw that once and I wrote the game a year later, so it's not a direct copy. I look at American software sometimes, and get some ideas there. The music for my games is sometimes transcribed from sheet music, sometimes written by a friend — I got him to do the Jean-Michel Jarre music for Loco, but as it turned out it wasn't what I thought it was. I asked for Equinoxe Part 5, but what I really wanted was Rydeen by the Yellow Magic Orchestra, which is what Ocean have on **Decathlon. Suicide Express** is another one I've transcribed from sheet music; it's a Sky piece from Sky 2."

Director

Tony's games should now be heading in a new direction. Having reused the ideas from his Alligata games, and come up with even better versions for Gremlin, he's now keen to get into new areas. For a start he has to think about his role as a director of Gremlin Graphics: "I'm the only one that draws a wage, because all the others have other companies backing them. I get a sum for each cassette sold, and a percentage of the company's profits. When **Suicide Express** starts selling well there should be a fair bit coming in!"

Tony's next project is connected with the Red Arrows RAF display team. "They've asked us to write a program — they asked Commodore too, and they wrote back with some ideas, but I just laughed at it! Trouble is, they just want the stunts — I've got to figure out a way to make it into a game. It's got to be really well thought out, because it could just end up looking like a commercial for the Red Arrows."

Tony's "O" Level Art and "A" Level Technical Drawing qualifications no doubt help in the design of the games, which look in some cases more like cartoons than computer games. "There's only Aardvark's **Frak**, on the BBC, that gives you a real feeling of cartoon quality — that's due to the way they draw black outlines around the characters. With my details, it's usually too small to do that. I'm doing some work on the BBC now, but really I don't rate any machines except the Commodore 64; it's so easy to write on, I can just sit back and do it. I'll give you that it's slow, and the Basic's poor, but who uses Basic? Aside from that there's nothing against it. I could write any Spectrum game I've seen, on the Commodore."

Tedious

So while he's seen MSX, and is working on the BBC, Tony's main effort should continue to be on the 64 — which is good news for all Commodore games players.

After the Red Arrows project, Tony's plans might include a game based on the Ray Harryhausen film **Clash of the Titans,** in which mythological figures battle to the death. The complications of writing an adventure don't have much appeal any more — "It does get slightly tedious, having people ringing you up asking 'How do I get past this' — I'm getting the same thing with **Monty Mole.** Another thing I've done is to design the cover artwork for **Suicide Express,** and we've had an artist paint it. I've seen the Plus/4, and though it's got no sprites I like the keyboard; you could write a sprite routine for it, but I think I'd like to write more for the C16. A lot of people will buy it, and 16K is enough to write a good game on — a lot of Atari cartridges like **Donkey Kong** and **Pole Position** are in 16K, and the early Ultimate games for the Spectrum. There's plenty you can do with 16K — like a good shoot-'em-up!" Tony comments, returning to a favourite theme.

Notepad

Tony's also working on a book on programming hints for the 64. "It's got some Basic in it, but it's largely going to be on machine code — things like screen scrolling, animated characters, machine code monitors, playing sounds using interrupts, that sort of thing — it might put me out of business! We're looking at several publishers." But why write a book now? "Fame! I'm enjoying it, getting reviewed in the magazines and getting my name in print. It's not the money that I'm after — I haven't got a Mercedes, I can't even drive! But I've got a good contract with Gremlin, and a scrap-book full of reviews of my games. Everyone in Sheffield knows me, though I don't get invited to open supermarkets yet. Gremlin's going into the American market through UK Gold, Jeff Brown's follow-up to US Gold, and we're all working together to come up with new ideas."

"I took a little notepad with me on holiday in Spain, and it's full of ideas."

It should be interesting to see what springs forth from Tony's little notepad next!

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PROGRAMMING

An ode to joy-sticks

***Frank Bingley's** novel demo progam shows you how to exploit your 64's joystick routines*

HAVING BOUGHT your 64, chances are that at some time or other you will find yourself parting with more of your hard earned cash for a joystick. When fast reflexes are needed to play some arcade games, it's much much easier to press a button or push the stick in the required direction than search a keyboard for that fiddly 'W' for up, 'A' for left etc. Possession of one of these little gadgets will also enable you to use it in your own programs, and if used to its full extent, you can eliminate touching the keyboard at all.

Having said this, we need to know how to incorporate a joystick routine into our programs. A quick look at the Commodore User Manual reveals absolutely nothing! What we need is to have a routine in our main program to check values held in BYTE 56320 with the joystick in port 2 (56321 for port 1). The first five BITS of BYTE 56320 are used to detect joystick movement.

Activity

If you type in the Extended Joystick Demo Program, leaving out the REMS if you wish, then this will show exactly what is going on inside the computer when you move the joystick. A chart is displayed at the top of the screen, which simulates the activity at this address.

The second row on the chart shows that with the joystick in central position BITS 0-6 are turned on. The top row gives the decimal value for each BIT. The third row displays the BINARY value by changing to a ONE when the BIT is turned on and ZERO when it is off. The BIT number is shown on the bottom row. Just underneath the chart gives us the format to be used in our IF – THEN statements, with the decimal total for each direction as well as the fire button.

This format may be used in all of our IF – THEN statements, which we will need to use to determine which joystick direction has been used, and what we are going to do about it. The demo program, however, PEEKS address 56320 only once, in line 500. The computer then stores this value in the variable S and takes the appropriate action from one of the next IF – THEN statement lines.

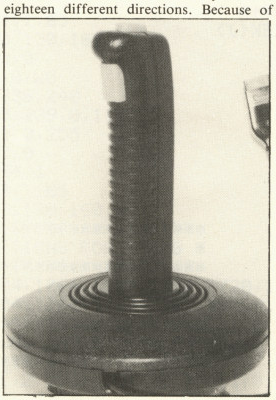
Address

Now try moving the joystick and pressing the fire button. You will see the BITS turning on and off and the binary and decimal values changing. By adding together the decimal values of all the BITS which are turned ON, we will arrive at the BYTE value held at this address. With most modern joysticks there are a total of eighteen different combinations that we can use. The animation of the juggler at the bottom of the screen proves this by juggling a total of eighteen different objects for the different combinations of movement and firing. This is only a simple demonstration, but shows that we can make an animated character perform eighteen different tasks. For instance, our character could be, say, a cowboy who walks left when we move the stick left, fire a gun whilst walking left when we press fire at the same time. If we move the stick diagonally up and left and fire, then he could throw a lassoo etc. etc.

Needless to say, not all of the IF – THEN statements need be used. If we only wanted to move left, right, up, down and fire then only the first five lines from 500-550 of the demo program would be used. Inclusion of all of the eighteen IF – THEN statements in an arcade game in Basic would probably be intolerably slow in some instances.

Ability

After you have studied the effects that the joystick movement has on the chart on the screen, we can experiment a little by modifying the program slightly to be able to move the juggler about the screen. First delete lines 600-690 in the demo program. Now alter lines 510-590 as shown in figure one, not forgetting to add line 695. Now save the new version of our program before running, (any experienced programmer knows about the perils of running an unsaved program!). Now when we move the joystick — "Hey Presto" our juggler moves about the screen in any one of eighteen different directions. Because of the fact that the computer is still going through a lengthy routine at 5000 to update the chart display, movement is not very fast. This is why X and Y are incremented or decremented by two pixels rather than the more usual and smoother one. For extra speed, try altering the twos to a higher figure. Note that when the fire button is pressed with the joystick in the upright position, the screen will change to a random colour.



Joysticks for fun and profit

Adventurous

This is not the shortest routine to move a sprite around the screen, but it does have the advantage that we have at least another eight or nine options open to us. For instance, try moving the joystick in any direction and press the fire button at the same time. Nothing happens. Our juggler doesn't even move. On looking at the chart at the top of the screen we can see that several BITS are turned off, and the total decimal value adds up to a figure not catered for in our IF – THEN statements. We deleted them in lines 600-680!

Now, as a final experiment, type in the missing lines 600-680 but add your own commands, like making the border change colour or perhaps make a different sound for each direction if the fire button is pressed simultaniously. The more adventurous may even make the juggler a different colour or make him disappear!

This then will give you some idea of how to use a joystick in your own programs. It's not the only way, but probably the simplest and move accurate way to do it. Remember, inclusion of a joystick routine in a program can make it much more acceptable and certainly a lot more fun. ▶

Modifying the program — Figure One

```
510 IF S = 111 THEN POKE 53281,INT
(RND(1)*16)
520 IF S = 123 THEN X = X—2
530 IF S = 119 THEN X = X+2
540 IF S = 126 THEN Y = Y—2
550 IF S = 125 THEN Y = Y+2
560 IF S = 122 THEN X = X—2:Y =
Y—2
570 IF S = 128 THEN X = X+2:Y =
Y—2
580 IF S = 121 THEN X = X—2:Y =
Y+2
590 IF S = 117 THEN X = X+2:Y =
Y+2
695 POKE vi,x:POKE vi+1,Y
```

Variable list

J	Joystick address (56320)
M	Memory address for spite 0 Data
VI	Video chip address
P	Sprite pointer
D(8)	Data array
BIT(8)	Bit information array
SL	Spite 0 Pointer
D	Data for sprite
TA	Total of BIT(8) array
X	Sprite 0 x position
Y	Sptie 0 y position
I(21)	Screen positions for juggled items
BAL(21)	Item movement
Z	Poke value for juggled items
Q	Pause loop
CC	Colour poke
S	BYTE value of 56320

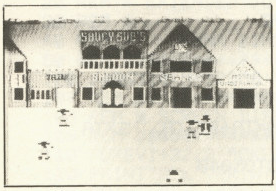
```
10 REM ***************************
20 REM * EXTENDED JOYSTICK DEMO *
30 REM *           BY           *
40 REM *   FRANK BINGLEY 1984   *
50 REM ***************************
100 J=56320:M=12800:VI=53248:P=200:X=145:Y=208:CC=54272
107 REM ******************
108 REM * SCREEN DISPLAY *
109 REM ******************
110 POKEVI+32,0:POKEVI+33,0
120 PRINT"■■■
```

```
700 POKE2040,200
710 GOSUB5000
720 GOTO500
4997 REM ************************
4998 REM * UPDATE SCREEN DISPLAY *
4999 REM ************************
5000 TA=0:FORA=1TO8:BIT(A)=(PEEK(J)AND D(A)):TA=TA+BIT(A):NEXTA
5010 PRINT"■■■■■■■■■■■■■";
5020 FORA=1TO8:IFBIT(A)<>0THENPRINT"■■■ ON";:GOTO5040
5030 PRINT"■■■OFF";
5040 NEXTA:PRINT:PRINT"■■■■■■■■■";
5050 FORA=1TO8:IFBIT(A)<>0THENPRINT"■■■  1";:GOTO5070
5060 PRINT"■■■  0";
5070 NEXTA
5080 PRINT:PRINT"■■■":PRINTTAB(24)"      ■■■■■■"TA
5090 RETURN
5997 REM ****************************
5998 REM * ANIMATE JUGGLER'S ITEMS *
5999 REM ****************************
6000 FORA=0TO21:IFA=11THENFORQ=1TO10:NEXT
6010 IFI(A)=1THENPOKEBALL(A),Z:GOTO6030
6020 POKEBALL(A),32
6030 NEXTA
6040 RETURN
19997 REM ****************
19998 REM * DECIMAL DATA *
19999 REM ****************
20000 DATA128,64,32,16,8,4,2,1
29997 REM ****************
29998 REM * SPRITE DATA *
29999 REM ****************
30000 DATA200
30001 DATA0,20,0,0,40,0,0
30002 DATA255,0,0,20,0,0,20
30003 DATA0,0,255,0,15,239,192
30004 DATA127,255,240,0,239,60,0
30005 DATA255,13,0,239,0,0,255
30006 DATA0,0,85,0,0,85,0
30007 DATA0,85,0,1,65,64,1
30008 DATA65,64,1,65,64,1,65
30009 DATA64,1,65,64,10,130,160,0
30011 DATA0,20,0,0,40,0,0
30012 DATA255,0,0,20,0,0,20
30013 DATA0,0,255,0,3,239,240
30014 DATA15,255,253,60,239,0,112
30015 DATA255,0,0,239,0,0,255
30016 DATA0,0,85,0,0,85,0
30017 DATA0,85,0,1,65,64,1
30018 DATA65,64,1,65,64,1,65
30019 DATA64,1,65,64,10,130,160,0
35997 REM ********************************
35998 REM * SCREEN POSITIONS FOR ITEMS *
35999 REM ********************************
36000 DATA1884,1844,1804,1764,1723,1682,1720,1759,1799,1839,1879
36010 DATA1884,1844,1804,1764,1723,1682,1720,1759,1799,1839,1879
36017 REM ********************************
36018 REM * DATA FOR JUGGLING SEQUENCE *
36019 REM ********************************
36020 DATA1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0
```

Soft *Hits*

The fast, the slow and the slug-like reviewed by our whacky team

Cow POKEs

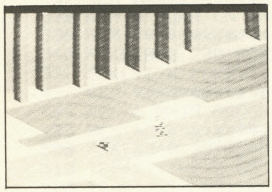


A small town, a dusty street; the undertaker shades his eyes. A long, lean figure blocks out the sun, a six-gun slung low on his hip. The bad men ride into town, eyeing the bank. "Easy . . ." they sneer . . . dust swirls . . . eyes twitch . . . hands slap leather . . . a reek of cordite . . . corpses stretched in the dust . . . it's **High Noon** and the little town is safe while you protect it. A thunder of guns, the CRACK! of dynamite, the pounding of hooves . . . you track the bad men to their hole in the wall . . . it's time for a showdown, and some-one's gonna die . . .

Mean hombres, them Ocean guys . . . good they're on our side . . .

Program: High Noon, 64
Supplier: Ocean, 6 Central Street, Manchester
Price: £7.90
Graphics: ********
Sonics: ********
Gameplay: ********

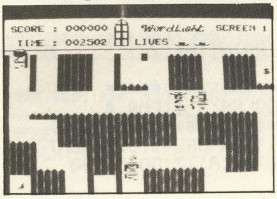
Cry Havoc



Dynavision's **Havoc** is a very sophisticated **Zaxxon** version, using a perspective graphics technique quite unlike anything seen before. Controlling your fighter through a landscape of towering buildings, strange ground markings and hostile enemies, avoiding bombs and missiles and negotiating increasingly impossible passages, you are the last chance of your besieged homeland. If it was left up to me they wouldn't have a hope. Havoc is teeth-clenchingly difficult — possibly the ultimate challenge for arcade fans, and a brilliant piece of programming.

Program: Havoc, 64
Supplier: Dynavision, PO Box 96, Luton
Price: £9.95
Graphics: *********
Sonics: ******
Gameplay: *********

Fortified

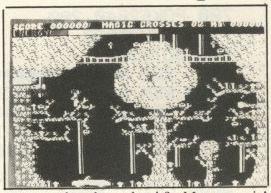


Stockade proves that there's life in the PacMan theme yet. It's very simple and charming, with decent sound effects and well-animated characters. Playing a notorious outlaw searching for treasure in a Cavalry fort, you have to avoid Injuns — beg pardon, Indians — intent on giving you a drastic haircut. Bullets and arrows fly everywhere.

Animation and sound effects are nice — a good game, and the first national release by a small company, Wordlight.

Program: Stockade, 64
Supplier: Wordlight, Caedu House, 35 Fenton Place, Porthcawl
Price: £8.95
Graphics: ******
Sonics: *****
Gameplay: *****

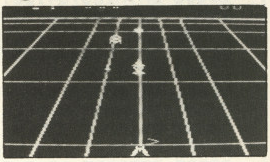
Thrilling



How do they do it? Mastertronic's latest effort, **Chiller**, is only £1.99, and makes a lot of the high-priced opposition look cheap. Based loosely on the Michael Jackson **Thriller** video, Chiller, programmed by the Darling duo, has five excellently-drawn screens — graveyard, mansion and so on — through which you have to travel collecting crosses and avoiding various ghouls. Good music and sound effects, nice animation, and it's a bargain. Whatever will they come up with next?

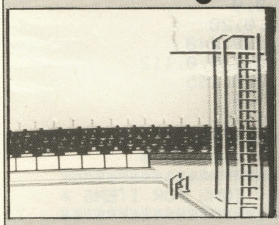
Program: Chiller, 64
Supplier: Mastertronic, Park Lane, 111 Park Road, London NW8
Price: £1.99 tape, £5.99 disk
Graphics: *******
Sonics: *******
Gameplay: *******

On the beam



Activision, having seen the light and begun to convert video console

Solid gold program



How can this Olympic program be described? What about THE BEST PROGRAM EVER WRITTEN FOR THE 64? That made you sit up and take notice, didn't it?

This disk/double tape epic from, appropriately, Epyx US, is graphically astonishing, from the animated opening ceremonies to the closing displays. The backgrounds are incredibly detailed and the movement of the characters is almost filmic.

The events — Pole Vault, Diving, Relay, 100 Metres, Gymnastics, Swimming Relay, 100 Metres Swimming and Clay Pigeon Shooting — present a fantastic opportunity for programming virtuosity, which is tackled brilliantly.

Up to 8 players can take part, and national anthems are perfectly realised.

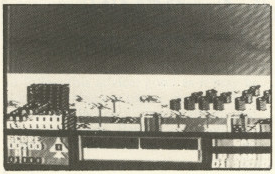
It will be a long time before a program comes along which can seriously challenge **Summer Games**. Get this one NOW!

Program: Summer Games, 64
Supplier: Quicksilva, Palmerston Park House, 13 Palmerston Road, Southampton
Price: £19.95 disk, £14.95 twin cassette
Graphics: **********
Sonics: **********
Gameplay: **********

games into software, look set to become a major force in the industry. **Beamrider** is unremarkable graphically, and the scenario is nothing new, but it's fast and furious and had me hooked pretty quickly. Looked at impassively it's just a variant of Galaxian, in which aliens zoom towards you on light-paths, and the occasional Mothership has to be dealt with using special torpedoes. Fortunately I haven't had the urge to look at Beamrider impassively, which must be a good sign.

Program: Beamrider, 64
Supplier: Activision
Price: £9.99
Graphics: *****
Sonics: ******
Gameplay: *******

Son of Patrol



Falcon Patrol is a revered Defender-derived shoot-'em-up, and FP2 is a classy sequel programmed again by Steve Lee.

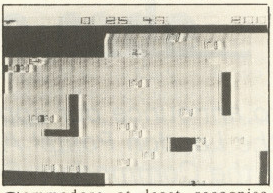
Fly your Falcon VTOL jet over the beautifully-detailed desert landscape of pyramids, bomb sites, wrecked hotels and burned out choppers — launch missiles forward or down at zooming helicopters before they nail you, or land lethal anti-aircraft emplacements. Watch your radar display and knock out radar jammers, landing on your pad to refuel in time to tackle the next wave of baddies.

Great martial music by Dave Lee, and the best explosions you've ever seen. Don't forget FP1 is on offer at £2.99 at the moment, as are many other 64 and Vic games from Virgin.

Another one for the shopping basket, Igor . . .

Program: Falcon Patrol 2, 64
Supplier: Virgin, 2-4 Vernon Yard, Portobello Road, London
Price: £7.95
Graphics: ********
Sonics: ********
Gameplay: ********

Knockout



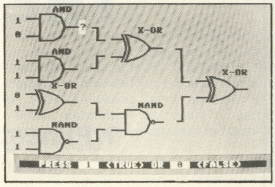
Commodore at least recognise the demand for new Vic 20 games, and **Rapier Punch** will keep Vic users happy for the moment. It's not that its particularly good, but beggars can't be choosers.

This joystick-only game places you in a darkened dungeon, around which you move spreading light (if not sweetness). Search for the hidden treasure chest, avoid spinning crosses, bullet firing dragons and dragons' eggs. You can run your enemies through with your rapier when a tone sounds, otherwise combat is fatal. You can also throw knives, but these have the habit of encouraging eggs to hatch out.

With 99 levels and a time limit to play against, Rapier Punch isn't very exciting to look at, but could offer many hours of play to the dedicated.

Program: Rapier Punch, unexpanded Vic
Supplier: Commodore, Weldon North Ind. Est, Corby
Price: £4.99
Graphics: *****
Sonics: *****
Gameplay: ******

Exam time

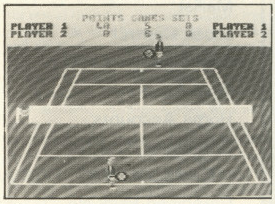


While doubtful about the value of some educational software — after all, it's the syllabus that you should be concentrating on — I must admit that the Longman's Exam Revision series looks good. So far subjects covered include Chemistry, Physics, Maths and Computer Studies, at CSE and O Level.

The Computer Studies program contains five sections, the first four covering major problem areas and the last being a database which is intended to aid revision. Each program is menu-driven and illustrates the topics with interesting graphics.

Program: Longman's Exam Software, 64
Supplier: Longman's, Longman House, Burnt Hill, Harlow, Essex
Price: TBA
Graphics: *****
Sonics: N/A
Gameplay: N/A

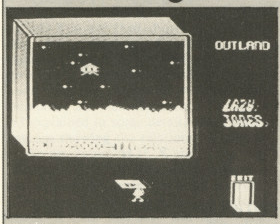
Not serious!



I've never been able to play tennis, and I can't say that my performance with **Wimbledon 63** has inspired me to try again. Although the graphics and sound effects are nice, it's no good if you can't get the ball over the net, and no matter how hard I studied the instructions I couldn't work out where I was going wrong. Pass the barley water.

Program: Wimbledon, 64
Supplier: Merlin Software, Business & Technology Centre, Bessemer Drive, Stevenage, Herts
Price: £6.95
Graphics: ********
Sonics: *****
Gameplay: ****

Living on the ceiling



Easily the best thing to emerge from Terminal, **Lazy Jones** is 17 games in one. You play the eponymous Jones, who moves around the three floors of a hotel using elevators, avoiding the manager, the ghost of the previous manager, and a hostile cleaning trolley, by leaping over them. There are 18 rooms to hide in, and — here's the zappy part — 15 of them contain games machines which you can play to add to your score. Ranging from **Eggie Chuck** to **Wild Wafers**, with marvellous sprite animation and astounding musical scores (99 Red Balloons, Fade To Grey, etc), the mini-games are all perfectly playable in themselves, and make Lazy Jones one of the most original and value-for-money programs for the 64 yet to emerge. Just one question — why does it play Living on the Ceiling every time you hide in the gents?

Buy this one!

Program: Lazy Jones, 64
Supplier: Terminal, Derby House, Derby Street, Bury
Price: £7.95
Graphics: *******
Sonics: ********
Gameplay: *********

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Dr Watson solves the 64 machine code

***Chris Whitcombe** educates himself in Machine Code with two teaching packages, and tries out a basic compiler*

ANYONE trying to teach me Machine Code would have an unenviable task. My friends who understand this strange language say "you've got to forget all about Basic and think in M/C and Hexadecimal". I'm afraid that I find it difficult to follow this advice; good as it may be. I don't even think in metric yet! I still believe in feet and inches . . . and half-crowns!

Unfortunately, Basic is not good enough if you want your Space Invaders to move about the screen at something more than a snail's pace, so I suppose that I am just going to have to knuckle down to some serious study.

Despite my pessimism, things are not quite as black as they may at first seem. There is plenty of help about in the form of books and learning packages.

One such offering comes from Honeyfold's Dr. Watson computer learning series and is entitled **Beginner's Assembly Language Programming for the CBM64**. The package contains a book and a cassette. On the tape is a full 6510 Assembler, a Machine Language Monitor and a Binary/Hexadecimal/BCD self-tutoring program. The introduction to the book implies that no pre-existing knowledge of Assembler is required. I hope this is the case!

Leisurely

Chapter 1 starts at a fairly leisurely pace using short programs to explain a few of the instructions that you will need to get started. You are then shown how to List what you have typed in, using the Assembler, and this displays a table showing the Assembly program and what it looks like in Machine Code. More commands are then added to the program and explained in some detail, along with a diagram showing the relationship between the Accumulator, ALU, X and Y registers. Like most of the chapters in the book, this one is liberally sprinkled with exercises throughout. "Just like being back at school" I hear you say. But with these, nobody will know if you cheat . . . except you. Actually, they are quite a good idea, as they do help you to discover whether or not you really have understood what you thought you had understood. Having learnt how to manipulate information into and out of the Accumulator and Registers, chapter 2 shows how to jump around a program . . . a sort of machine code GOSUB.

This necessitates explaining about the Program Counter, Unconditional jumps and a few more commands to help you on your way. The chapter ends with a short section on flags. I think I'm going to have to read this bit again . . . and do the exercises of course. The next chapter starts by explaining more Instructions on outputting information to the screen. The examples (intentionally) run so fast that you need bionic eyesight! This naturally leads on to a section about timing loops. In Basic, nothing ever happens fast enough. In Machine Code, it seems, the reverse is true. There are different 'modes' of addressing in M/C and these are all explained at some length at the end of this chapter.

Logical

Chapter 4 starts with Logical operators and continues on into the use of Hexadecimal numbers, Binary Coded Decimal, Bit Manipulation and Binary Division and Multiplication . . . Gulp! Half way through the book and things are starting to get heavy. We are now up to Advanced functions of the Assembler including the use of Labels, Memory Labels and Macro instructions. As in all the sections, these commands are explained at great length and you should be able to get the hang of it, if you don't take it too fast! This chapter ends with an explanation on how to convert your Machine Code programs into Data statements. No worries here . . . the Assembler does all the hard work for you. If you don't want to "mess about" with Assembly Language but feel instead that you would prefer to work directly in M/C, then chapter 6 is for you. This details the functions of the Machine Language Monitor (an option of the Assembler) showing how to enter or amend programs by typing Hex values straight into memory locations (EEK!). The chapter continues with sections on protecting M/C in memory, how to Save and Load (using the Monitor) and Register Display and Debugging.

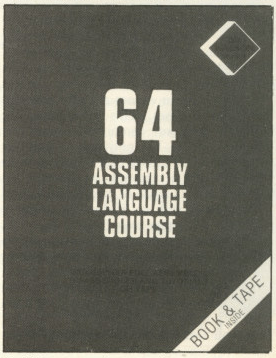
If you have got this far in the book and understood it all, then the next couple of chapters should hold no fears for you whatsoever. We are told that, after having learnt how to do things the hard way, some functions can be more easily and quickly (is this possible?) performed by using the 64's built-in subroutines. Many of the more mundane operations, like printing a character on the screen, can be readily done by using this method.

Chapter 8 explains how to use Interrupts and how to interrupt them! For the mathematicians amongst you, the rest of the chapter is devoted to signed numbers Overflows, Floating point numbers and various subroutines that could be useful when using the aforementioned in Machine Code programs.

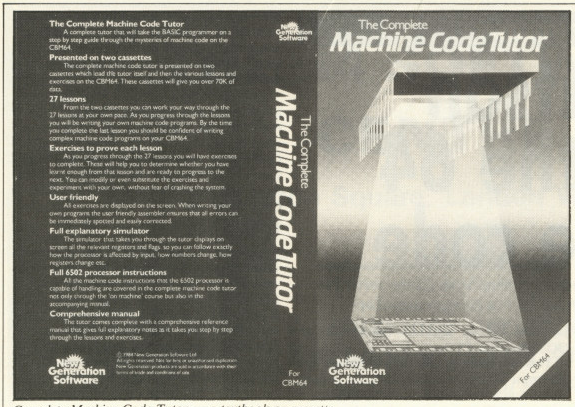
Labels

Chapter 9 has the solutions to all the exercises set throughout the book. Even Appendix 1 has exercises in it! However, it does also explain in great detail about Binary, BCD and Hex notation. The last 2 sections of the book are appendices of everything you need to know to put your newfound M/C skills to best advantage. All the 6510 Instruction set is listed along with the number of bytes each Mnemonic uses and how many clock cycles it takes to operate. The state of the various flags is also shown for each operation and Truth tables are included where appropriate. A memory map lists all the Labels along with their locations and a brief description of what they do. There are also similar lists for the Basic ROM and Kernal ROM. The last section details the Kernal routines and their uses.

The package is well presented and the book is fairly easy to follow considering the subject matter. I particularly like the way in which the first couple of chapters are not too overpowering and lead you gently into the rest of the book. So many authors try to impress you with how clever they are, and end up by only confusing you, instead of helping you to understand what they perhaps consider elementary. What you really want to know is, of course, have I now mastered Machine Code! Well no, I haven't . . . but I do feel that, with another couple of reads through the book (and a little less cheating at the exercises) I should be well on the way to learning Assembler. In conclusion, a professional package, well written and highly recommended ▶



Dr Watson — well presented



Complete Machine Code Tutor — a textbook on cassette

◀ . . . and at £12.50 good value for money too.

Another package along similar lines to the Dr. Watson is the **Complete Machine Code Tutor** from New Generation Software. This uses a different approach however and, instead of having a textbook and Assembler tape, this offering uses 2 cassettes and what might be, generously, termed a booklet. Whilst loading the first tape side, a browse through the "comprehensive reference manual" shows it to be really on a directory of what is on the tapes along with a few explanatory notes, most of which appear within the cassette text anyway, thus making the pamphlet more or less redundant.

Lessons

The 4 sides of tape are filled with lessons and exercises; the lessons being pages of text about all the various instructions and addressing modes used in Assembly Language. The exercises, unlike the Dr. Watson idea, are not in the form of a test, but are more an example program listing. By pressing the Return key, the cursor is stepped through the program line by line, and the changes made to the contents of the registers, flags, etc. are displayed in table form along with a 1 line explanation of what is happening. Although you can Edit the program and see the different values in the registers, you cannot actually run it to see what it does. This is because the package does not contain an Assembler proper . . . it is only an Assembler simulator. This means that what you have here is really a textbook on cassette. As most of us are unable to carry our 64's and TV's around with us, it does not seem to have any advantage over the real thing! As such, I'm not sure who it is supposed to appeal to. The information contained in the package is sparse, to say the least, and it does not include an Assembler . . . at £14.95 it's not cheap; give me a good book anyday.

If you feel unable, or unwilling, to get down to some serious study in your quest to master Machine Code, then there is a possible alternative.

You might like to try a Basic Compiler. The **Jetpack DTL Basic** is just such an animal and it promises to improve your Basic programs by making them run faster. DTL Basic 64 is available on tape at £14.95 or disk at £39.95, the latter version having the usual advantages of speed, larger program handling and other additional features.

Long

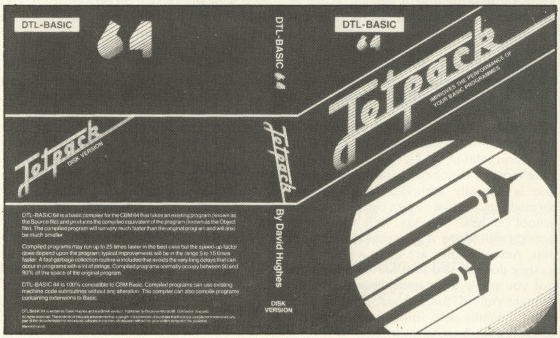
This is quite a long program, so whilst the tape is loading you will have plenty of time to study the leaflet that accompanies the cassette. It does say at the back that the company can supply separately the full Compiler manual which describes the functions of both the tape and disk compilers in more detail . . . (it doesn't say whether or not you have to pay for it!). It also states that a user of the tape version may upgrade to the disk compiler . . . but, again, no mention of money. After the program is loaded, you are prompted from the screen to enter the name of the Basic program that you want compiled, and the computer will then look for that program on the tape, and when it finds it, it will load it in and do the business. The Compiler will make 2 passes through the Source file whilst constantly displaying the number of the line being worked upon. When the second pass is complete the user is prompted to insert the tape that is to hold the new version of the program and, if you so command, a copy of the "Run Time Library File" (which is a list of Assembler routines used by Compiled programs) which is needed to enable your 64 to Run the new high-speed program that you have just created. But, looking on the bright side, the RTL file only needs to be entered into the computer's memory once, and then you can Run as many Compiled Programs as you like . . . as long as you don't switch off.

The Jetpack Compiler performs exhaustive checks whilst going about its business and will report all errors found giving the relevant line number followed by an error code; a list of which appear at the back of the leaflet.

Leaflet

It is not unusual for CBM Basic to be extended using extra statements implemented by Assembler routines in ROM or RAM. Fortunately, the DTL Basic 64 has a special feature which takes these in its stride. Also, compiled programs can use existing Machine Code subroutines without any alteration.

The leaflet claims that compiled programs CAN Run up to 25 times faster but that something between 5 and 15 times is more typical. A fast garbage collection routine is included that avoids very long delays that can occur in programs with a lot of strings. Compiled programs, it says, normally occupy between 50% and 80% of the space of the original program. I ran a couple of my poor efforts through 'Jetpack' and they were certainly faster, although it is not easy to judge by how much. Whether or not a compiler is the answer to your programming problems, only you can decide: but Jetpack could be well worth a look. I only wish that the complete manual came with the tape instead of it being an 'optional extra'. As for me, I'm sticking with Dr. Watson. ■



Jetpack DTL Basic — well worth a look

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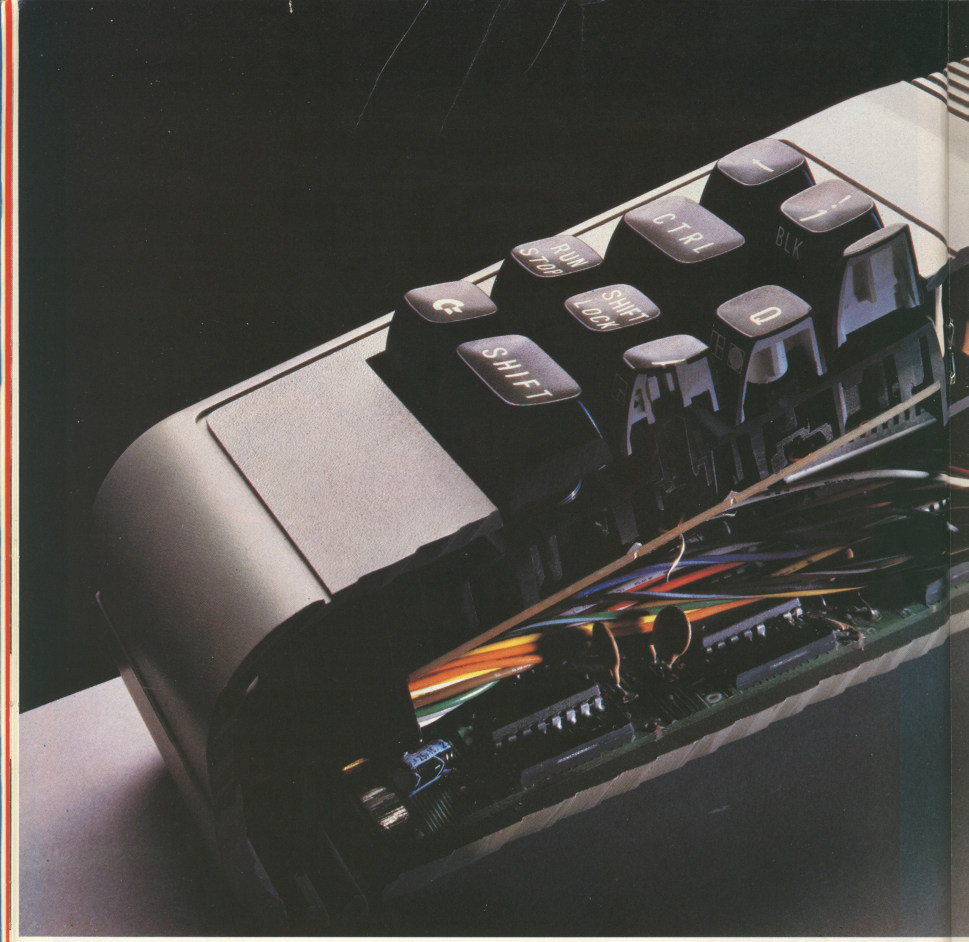

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To play only games on a Commodore computer is like asking Albert Einstein to work out the square root of four.

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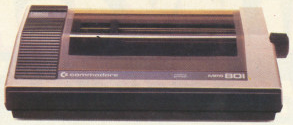

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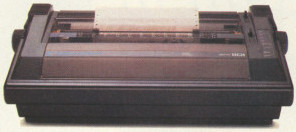

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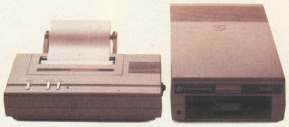

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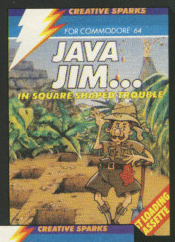

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An amazing graphic action adventure game which puts you in charge of a team of androids trying to reach the core of a nuclear reactor before it explodes.
This game has over 2000 rooms to be negotiated and every single one of them is in 3D!!
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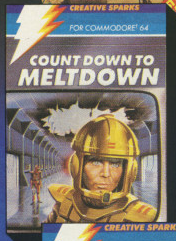
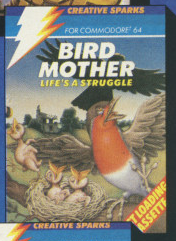


BIRD MOTHER

This is a delightfully original game which uses nature as the setting for a highly compelling and challenging game. Guide the Bird Mother as she builds her nest and raises her young, finally protecting them from a predator hawk.
Fast loading cassette.
The stunning graphics and music in Bird Mother are not to be missed.



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This is a highly sophisticated flight combat simulator which puts you in the pilots seat. Highly advanced machine code programming has ensured you feel every stomach lurching dive and roll.
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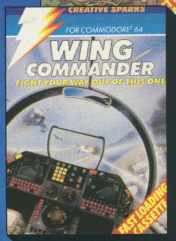

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STAR GAME

Tony Crowther presents LOKO for the 64

THIS MONTH'S Star Game for the 64 comes from the **Potty Pigeon** man, Tony Crowther. 19-year-old Tony wrote **Loco, Killer Watt, Blagger** and many more hit games for Alligata Software before moving to Gremlin Graphics.

Gremlin, based in Sheffield, is a new company dedicated to putting out only the highest quality arcade extravaganzas. Tony Crowther's programming skills are demonstrated to the full on **Percy the Potty Pigeon, Monty Mole** and **Suicide Express** — for more details read the Profile feature in this issue.

Tony has written **Loko** specially for *Commodore Horizons*. You control the locomotive shunting back and fore in a siding, trying to beat off attacks from enemy fighters, bombers and airships.

Using a joystick in port 2, press the Fire button to release deadly smoke bursts. Each time you hit an enemy, it moves back to the top of the screen; but you can't destroy them, so your doom is inevitable. Hit the bombs to score points, and remember that pressing Fire will always fire a new burst, and only one burst can be on the screen at a time. ■

```
 0 POKE49481,210
 1 POKE53269,255
 2 POKE53277,32+16+8:POKE53248+22,44
 3 A$="GREMLIN GRAPHICS ... A.CROWTHER ... "
 4 A$=A$+A$+A$+A$+A$+A$+A$+A$:PRINT"■■"A$:PRINT:PRINT"■PLEASE WAIT"
 5 FORI=0TO255:POKE34000+I,PEEK(1024+I):NEXT:GOSUB900:PRINT"■"
 6 SC=0:TR=3:GOSUB300
10 POKE53248,140:POKE53250,164:POKE53252,0:POKE53253,200
20 POKE53249,197:POKE53251,197
30 POKE2040,204:POKE2041,205
40 POKE53248+28,255:POKE53285,1:POKE53286,0
50 POKE53287,14:POKE53288,14
60 POKE53280,0 :POKE53281,6
70 PRINT"■                                    ■■":A$="                                "
71 PRINTA$:PRINTA$:PRINTA$:PRINT"■■                                    "
72 PRINT"■                                    "
73 PRINT"■                                    "
74 PRINT"■                                    "
75 PRINT"■                                    "
76 PRINT"■                                    "
77 PRINT"■                                    "
78 PRINT"■                                    "
79 PRINT"■                                    "
80 FORI=0TO4:PRINT"■                                    ":NEXT
81 PRINT"■                                    "
90 PRINT"■■                                    "
100 PRINT"■■          PROGRAM BY A.CROWTHER
101 PRINT"■   OF  G R E M L I N  G R A P H I C S
102 POKE53290,10:POKE53291,1:POKE53292,12
103 FORI=0TO9:POKE53254+I,0:NEXT
110 PRINT"■■■
```

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```
130PRINTTAB(32)"■SCORE■":PRINTTAB(31)"■■      ■"
131PRINTTAB(31)SC
132PRINTTAB(32)"■HISCORE■"
133PRINTTAB(31)HI"■■ "
134FORI=0TO10:A=PEEK(53278):NEXT
135PRINTTAB(32)"■TRAINS■"
136PRINTTAB(31)TR"■■ "
140POKE1022,0:SYS49152
150IFPEEK(1023)<>0THENSC=SC+PEEK(1023):PRINT"■■■"TAB(31)SC:POKE1023,0:GOTO200
160TR=TR-1:GOSUB210
161IFTR>0THEN10
165PRINT"■■■■■■■■■■■■■■■■GAME OVER":FORI=0TO1000:NEXT
166IFSC>HITHENHI=SC
167GOTO6
200POKE54283,0:POKE54296,15:POKE54280,100:POKE54284,10:POKE54283,129
201SYS49503
202GOTO140
210POKE54276,0:POKE54273,5:POKE54277,10:POKE54276,129:FORI=0TO20:POKE53281,I
211NEXT:POKE53281,6:RETURN
300PRINT"■■■■■":A$="                                    "
301FORI=0TO10:PRINT"■■■■"A$:NEXT
303PRINT"■■■■■"
304A$(1)="LOKO"
305A$(2)="BY A CROWTHER"
306A$(3)="JOYSTICK PORT ]["":A$(5)="PRESS FIRE TO START"
307A$(4)="(C)1984 GREMLIN GRAPHICS"
308FORI=1TO5:B=16-LEN(A$(I))/2
309PRINTLEFT$("■■■■■■■■■■■■■■■■■■■■",B)A$(I):PRINT
```

```
310 NEXT
311 IFPEEK(56320)AND16THEN311
312 RETURN
500 DATA0,0,0,0,0,0,0,0
501 DATA0,128,0,0,160,21,1,250
502 DATA165,97,170,170,173,2,191,161
503 DATA0,252,1,15,192,0,0,0
504 DATA0,0,0,0,0,0,0,0
505 DATA0,0,0,0,0,0,0,0
506 DATA0,0,0,0,0,0,0,0
507 DATA0,0,0,0,0,0,0,0
508 DATA0,0,0,0,0,0,42,170
509 DATA168,171,171,234,174,235,170,175
510 DATA238,170,174,238,170,174,235,234
511 DATA42,170,168,3,0,0,0,204
512 DATA0,0,84,0,0,84,0,0
513 DATA0,0,0,0,0,0,0,0
514 DATA0,0,0,0,0,0,0,0
515 DATA0,0,0,0,0,0,0,0
516 DATA195,0,0,60,0,0,60,0
517 DATA0,40,0,0,170,0,0,170
518 DATA0,0,170,0,0,170,0,0
519 DATA40,0,0,0,0,0,0,0
520 DATA0,0,0,0,0,0,0,0
521 DATA0,0,0,0,0,0,0,0
522 DATA0,0,0,0,0,0,0,0
523 DATA0,0,0,0,0,0,0,0
524 DATA0,0,0,20,64,0,21,80
525 DATA0,21,80,0,85,84,0,85
526 DATA84,0,85,80,0,16,64,0
527 DATA0,0,0,0,0,0,0,0
528 DATA0,0,0,0,0,0,0,0
529 DATA0,0,0,0,0,0,0,0
530 DATA0,0,0,0,0,0,0,0
531 DATA0,0,0,0,0,0,0,0
532 DATA0,0,128,170,170,128,255,255
533 DATA128,63,255,64,15,255,64,15
534 DATA207,192,15,3,195,3,3,14
535 DATA3,3,14,3,95,170,1,167
536 DATA175,7,169,186,7,173,191,18
537 DATA250,123,18,250,123,18,250,110
538 DATA19,174,106,6,173,255,4,1
539 DATA0,1,4,0,0,80,0,0
540 DATA0,0,0,0,0,0,3,250
541 DATA64,3,170,64,3,170,64,0
542 DATA254,0,0,249,0,64,249,0
543 DATA64,233,0,170,235,176,187,190
544 DATA184,187,170,184,187,170,185,191
545 DATA170,190,171,171,188,235,191,188
546 DATA250,215,240,0,125,0,255,125
547 DATA0,0,125,0,0,20,0,0
548 DATA0,0,0,0,0,0,0,0
600 DATA173,0,220,41,4,208,13,173
601 DATA0,208,201,50,144,6,206,0
602 DATA208,206,2,208,173,0,220,41
603 DATA8,208,13,173,2,208,201,254
604 DATA176,6,238,2,208,238,0,208
605 DATA173,0,220,41,16,208,25,32
606 DATA177,193,169,1,141,80,195,173
607 DATA2,208,141,4,208,169,190,234
608 DATA141,5,208,169,203,141,250,7
609 DATA173,80,195,201,1,208,18,206
610 DATA5,208,173,5,208,173,5,208
611 DATA201,55,176,5,169,0,32,95
612 DATA193,162,0,160,0,185,81,195
613 DATA201,1,208,22,254,6,208,254
614 DATA6,208,189,6,208,201,254,144
615 DATA9,189,7,208,24,105,16,157
616 DATA7,208,232,232,200,192,3,208
617 DATA220,162,0,173,5,220,41,31
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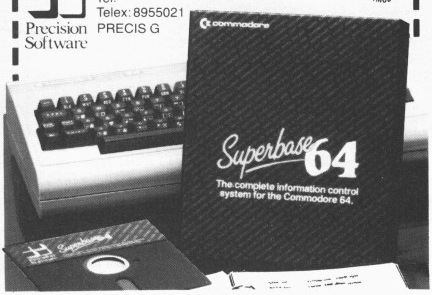

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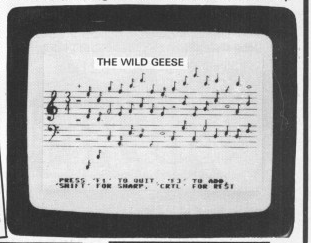

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619 DATA18,189,8,208,141,12,208,189
620 DATA9,208,141,13,208,238,84,195
621 DATA76,191,192,173,85,195,208,15
622 DATA189,8,208,141,14,208,189,9
623 DATA208,141,15,208,238,85,195,232
624 DATA232,224,6,208,198,162,0,160
625 DATA0,185,84,195,201,1,208,15
626 DATA254,13,208,189,13,208,201,220
627 DATA144,5,169,0,153,84,195,232
628 DATA232,200,192,2,208,227,173,30
629 DATA208,141,251,3,173,251,3,41
630 DATA1,240,6,169,1,141,254,3
631 DATA96,76,85,193,1,92,234,234
632 DATA173,251,3,41,4,240,36,173
633 DATA251,3,41,8,240,5,160,0
634 DATA76,46,193,173,251,3,41,16
635 DATA240,5,160,2,76,46,193,173
636 DATA251,3,41,32,240,5,160,4
637 DATA76,46,193,76,72,193,169,0
638 DATA153,6,208,169,70,153,7,208
639 DATA169,100,141,255,3,169,0,141
640 DATA4,208,169,128,141,5,208,96
641 DATA162,210,160,230,200,208,253,232
642 DATA208,248,76,109,193,173,251,3
643 DATA41,2,240,164,76,243,192,169
644 DATA100,141,4,208,169,255,141,5
645 DATA208,76,171,193,96,173,251,3
646 DATA41,4,240,52,173,251,3,41
647 DATA64,240,19,169,200,141,255,3
648 DATA169,0,141,84,195,141,12,208
649 DATA169,255,141,13,208,96,173,251
650 DATA3,41,128,240,19,169,200,141
651 DATA255,3,169,0,141,14,208,141
652 DATA85,195,169,255,141,15,208,96
653 DATA76,198,193,169,0,141,80,195
654 DATA96,169,0,141,4,212,169,58
655 DATA141,5,212,169,30,141,1,212
656 DATA169,129,141,4,212,96,238,252
657 DATA192,173,252,192,201,10,144,25
658 DATA169,0,141,252,192,238,253,192
659 DATA172,253,192,162,0,185,208,132
660 DATA157,0,4,232,200,224,31,208
661 DATA244,76,0,192,0,255,0,255
900 FORI=0TO391:READA:POKE12800+I,A:NEXT
901 FORI=0TO495:READA:POKE49152+I,A:NEXT
902 RETURN
```

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COMMODORE 64, SPECTRUM 48K

Stop the Express

If you have not already guessed from its name, the 1541 Express is a little "black box" which allows you much quicker access to your 1541 disk drive.

With this product your 64 can access and load files from the 1541 at about twice the normal speed. This frees you from the two or three minutes taken to load large programs or files. The 1541 Express is marketed by Ram Electronics, and retails for £49.95.

For your money you are supplied with a cartridge which plugs into the 64's cartridge port, and a short manual (8 pages) to aid installation and explain use of the cartridge.

Before you can use the 1541 Express it is necessary to connect two wires from the cartridge, to two chips inside the 64. This means that the lid must be taken off the 64, which could void your warranty, so be warned!

No hesitation

Having removed the lid on my 64 many times, there was no hesitation at the prospect of more prodding around inside. The two wires are labelled 6510 and U14, indicating the chips that the wires must be connected to. They both have a small grip on the end of the wire so that the connection is secure, but easily removeable. The wire marked 6510 is connected to pin 28 of the processor, and the wire marked U14 is connected to pin 15 of the chip marked U14 (in fact the chip itself is not marked U14, it's labelled on the board beside the chip). It is advisable to run the wires through the back of the 64 so that it can be closed properly!

There's no problem if the wires are connected to the wrong pins; the cartridge simply won't work and you will have to check the connections.

When you power up the 64 with the 1541 Express properly installed, you'll see three lines to the power up message instead of two. The second line should give the product name and copyright message. The amount of RAM is not affected; there are still 38911 bytes available.

The manual is the area sadly lacking, as is so often the case. However, this is a pre-production version. The manual is eight pages long, and the presentation is not nearly as professional as the product itself. The eight pages cover the installation of the cartridge, the operating instructions, limitations of the cartridge, working with other peripherals and very few programmers' notes.

There could have been a great deal more explanation of the cartridge in general, and the problems that might occur in using it with other peripherals. A few demo programs with documentation would not have gone amiss, and certainly more information for programmers wishing to make extensive use of the cartridge and its facilities is a must.

Unlike the manual, using the cartridge is very simple and smooth. When the 64 is powered up with the 1541 Express installed, the two function keys F1 and F3 are set to toggle between fast and slow mode. In other words the normal disk access time may be used with the cartridge in place by pressing the 'CTRL' key and the 'F3' together; the screen will flash once quickly.

To get back to fast mode simply press 'CTRL' and 'F1' together; again the screen will flash once, although this operation takes a little longer. Holding down the 'SHIFT' key and pressing 'RUN – STOP' will load and run the first program on disk. The cartridge changes the default device to disk, saving the need for the ',8'. Files can simply be loaded in the form:

LOAD"<filename><return>

There is no need to enter the device number or close the quotes, and the usual abbreviations are accepted.

Benchtest results

Ram Electronics claims up to three or four times the usual access time. This is more like twice the speed on average. Here are some of the results from the benchtests, giving normal times first then times with the cartridge.

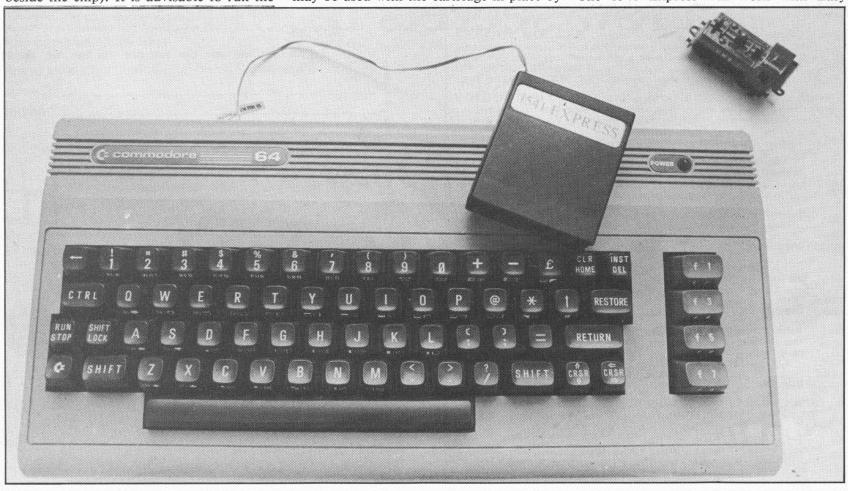
Loading 33K program : 1 min. 24 secs ; 39 secs.

Saving 33K program : 1 min. 31 secs ; 1 min. 6 secs.

Loading 34K file : 1 min. 52 secs ; 1 min. 6 secs (Paperclip file)

Saving 34K file : 1 min. 32 secs ; 1 min. 8 secs (Paperclip file)

These tests are all approximate, but even so they do not actually amount to three times the normal speed. They do however make a huge improvement, particularly with normal programs, but even with files loaded and saved from a word processor. The 1541 Express will work with Easy



Script, Paperclip, and, I am informed, most other soft loaded word processors. From the tests, disk access time is in general reduced by half.

Using other software such as utilities and Basic extensions does not have any adverse effects. Even if a program does conflict, it is often possible to load and run it by switching to normal mode.

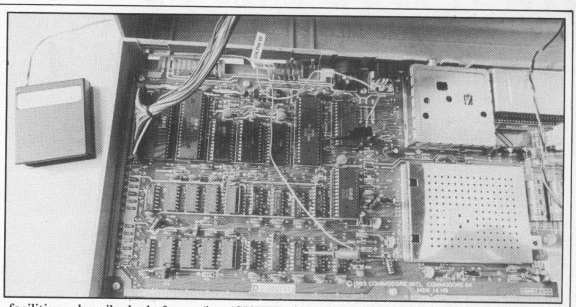
The 1541 normally objects to sprites being on the screen whilst the disk is accessed; but not so with the cartridge installed. You can display sprites and still have access to the disk.

The cartridge reverses one of the drive buffers, reducing the number of files OPEN at any one time from 3 sequential, or 1 sequential and 1 relative files, to 2 sequential files or 1 relative file, in fast mode.

An RS-232 modem may be used with the cartridge. This allows swift downloading of programs. However, if you wish to have more than one device connected to the 64's serial port whilst using the 1541 Express, you will have problems, as it will only access one. So anyone with a 1541 and a printer connected to the serial bus or two 1541's will not be able to use the cartridge with more than one of these devices.

Ram says it is just about to market a cheap cable which will allow you to have two drives, or a printer and one drive, connected whilst using the cartridge in fast mode. The cable will also have some other features — as yet no details, we shall have to wait and see.

The cartridge will give you the extra



facilities described before (ie 'SHIFT RUN – STOP) and default to disk, whether in fast or normal mode. Depending on what printer you are using and how it is connected, the cartridge may work in slow mode with your printer. Two single drives may be connected with the cartridge installed, but only accessed in slow mode.

The code for the cartridge is invisible; the normal cartridge space is $8000 to $9FFF hex, but upon examination there was nothing there. The space that normally occupies the ASCII code for the power up message has some strange code and the area from $DE00 hex onwards will not disassemble. So for those who are curious, this should provide some challenges!

In conclusion, it's a shame about the manual; it could have contained a lot more information and the presentation could have been better. The other drawback is of course the lack of a cartridge port when using the 1541 Express; any cartridges you normally use, or wish to use, cannot be connected. It seems the only way around this is to buy an expansion board. Even then I am not sure if they would work together — perhaps Ram Electronics will clarify this in the near future.

The product is overall all it claims to be and saves a lot of time if you use your 64 and 1541 daily. The general standard of the product is very high and I have no hesitation in recommending it; in fact since reviewing the 1541 Express I have purchased one myself. It is one of those products that you just have to have in spite of the price! ■

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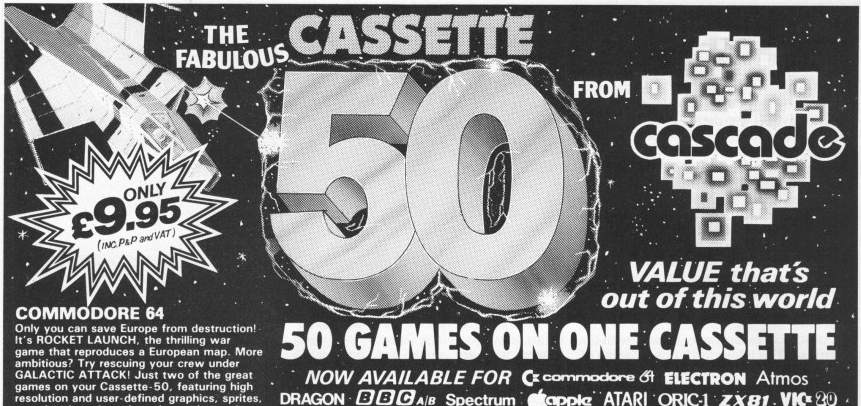

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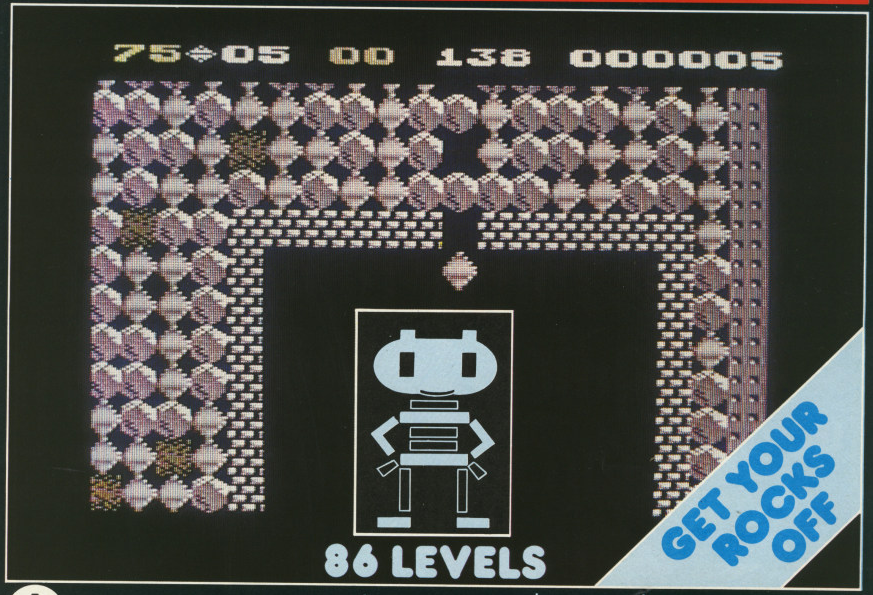

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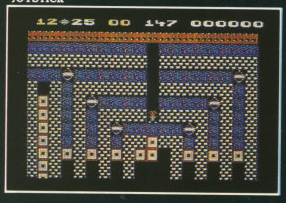

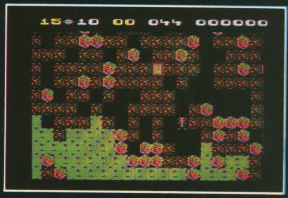

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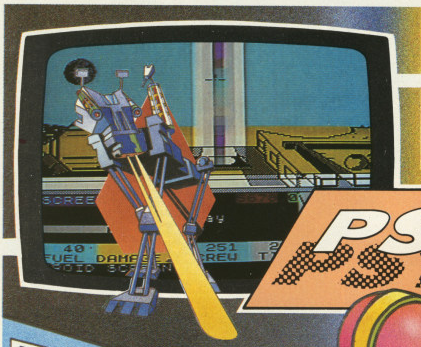

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Speak and spell with Currah's little chatterbox

***David Fox** strikes up a conversation with the Currah Speech 64 voice synthesiser*

AS A PRELUDE to a full review of speech synthesis and voice recognition hardware, which will appear in the New Year, this is a brief look at one of the most attractive speech synthesisers on the market — the Speech 64 from Currah.

Currah's Microspeech for the Sinclair Spectrum was highly praised, sold in thousands, and led to many software houses incorporating it into games. The Speech 64 is an improved version of this unit, and works on the same basic principles.

Human speech can be resolved into around sixty sounds, known as allophones. Rather than limit the range of a speech synthesiser by programming it to reproduce a small number of words recorded digitally into PROMs — Programmable Read Only Memory chips — Currah chose to synthesise allophones and leave it to the individual to combine these into whatever vocabulary was required. To be more clear, you can program Speech 64 to say anything you want it to, though it will sound fairly mechanical — but this adds to the fun, I feel.

Advance

The Speech 64 plugs into the cartridge port and its DIN plug goes into the audio/video socket. Entering INIT will activate the system, which will print an additional copyright message on the screen.

The Speech 64 plugs into the cartridge port and its DIN plug goes into the audio/video socket. Entering INIT will activate the system, which will print an additional copyright message on the screen.

Any key pressed will then be "voiced" (remember to turn up your TV volume)!

One great advance incorporated into Speech 64 is that it can speak in a variety of voices — low or high, with or without inflection.

This has great potential for use in games, especially adventures where different characters could be given widely differing voices. Key voicing can be disabled with KOFF, though for clumsy programmers it could be a boon. All voice selection commands can be incorporated into Basic lines.

Allophones

There are two methods of inputting speech — in ordinary English (or for that matter any other language you require) preceeded by a SAY command; or in allophonic form, combining the 58 available allophones for more precise results.

The Speech 64's text-to-speech converter is incredibly impressive, and nothing like it has been available for the Commodore before now. The unit's operating system even includes a "look-up table" which takes care of words with non-standard pronounciations like "through". Still, it is possible to make it pronounce many words oddly, so this is where the allophonic form comes in handy — though it takes a little getting used to.

Errors

Let's try a little allophonic composition. "Welcome to the United States" would be entered allophonically as "welkum t(ouu)(dth)(ee) y(ouu)n(ii)(tt)id st(aa)ts". Obvious when you look at it!

Spaces in the speech can be produced using standard punctuation, and if you make an error — enter a non-existent allophone — you'll get an error message. Normal text and allophones can be mixed in a SAY statement by enclosing the allophones in square brackets.

Upper case gives higher intonation, so in effect Speech 64 can produce four voices at different pitches. Clever programming can also reproduce different accents and character traits.

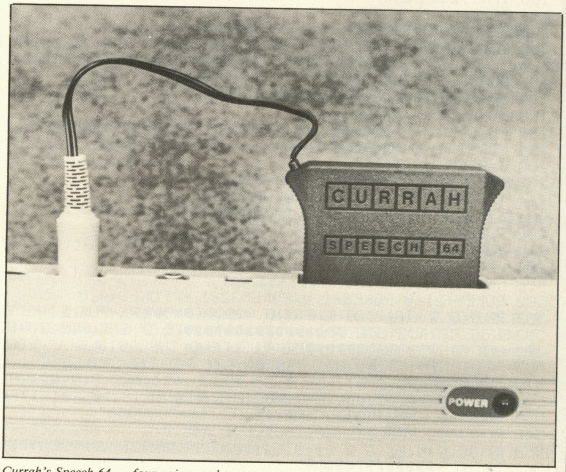
Speech 64 doesn't slow down the execution of programs, since it includes a "buffer" where speech information is stored and released at a standard rate. If you STOP a program the buffer is emptied — otherwise you might have 30 seconds of unwanted speech.

Examples

The comprehensive handbook claims that it's much harder to program Speech 64 in machine code than it is in Basic. However, I doubt whether it will present any difficulty to experienced programmers. Full details are given of how to achieve m/c operation in a number of modes, and there's an example Basic program — a speaking clock using the 64s internal TI$.

Attempts

All in all the four voices, text-to-speech conversion and low price — £29.95 — of the Speech 64 make it seem certain for success. Other attempts by various companies, including Commodore itself, to introduce speech synthesisers, have failed due to a lack of software support and marketing know-how. Currah, it seems, will be making no such mistakes. Already negotiations are being carried out with a number of big software companies to produce Speech 64 compatible games — Anirog's **PC Fuzz** should be the first one. If it's a success, it may well be the first of a long line of talking games which will exploit the capabilities of Currah's excellent product to the full. ■



Currah's Speech 64 — four voices and text-to-text speech

COMMODORE SOFTWARE FILE

Paralander

Paul Talbott of Balerno, Lothian sends this game for the 64

PARA LANDER is a two stage game. In the first section you must land 10 paratroopers safely on the moving rafts below. Use the fire button to drop a paratrooper from your bomber. Random crosswinds make life difficult.

In screen two you must rendezvous your bomber with a fuel station, but you can lose a life if you collide with a thundercloud, reach the bottom of the screen without refuelling, or exceed the 55 second time limit, which decrements by 5 seconds in each attempt. Joystick in port 2. Type in all REMs or you may encounter UNDEF'D STATEMENT errors.

```
10 V=53248:S1=53280:S2=53281:S=54272:GOSUB19991
50 GOTO32000
60 AS=0:LE=60:LI=3
100 REM                                                ###### STAGE 1 ######
105 X=160:Y=70:POKEV+23,1:POKEV+29,1:ML=10:MO=0
106 PRINT"■■■
```

```
564 PRINT"■■■
```

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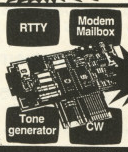

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```
20092 DATA0,64,0,0,112,0,0,16,0,0,32,0,0,32,0,0,64,0,0,64,0
29999 REM                                    ###### PARACHUTE SEQUENCE ######
30000 ML=ML-1:GOSUB30400:POKEV+21,63:DS=256:DF=246:DE=X+12:IFDE>255THENDE=255
30005 FORT=(Y+35)TO204STEP2
30010 POKEV+2,DE:POKEV+3,T
30012 POKEV+40,3
30015 DS=DS-3:POKES+1,DS:POKES+4,19
30020 R1=R1+4:R2=R2+4:R3=R3+4:R4=R4+4
30030 IFR1>255THENR1=INT(RND(1)*75)+1
30040 IFR2>255THENR2=INT(RND(1)*75)+1
30050 IFR3>255THENR3=INT(RND(1)*75)+1
30060 IFR4>255THENR4=INT(RND(1)*75)+1
30065 IFRND(1)<.5THENDE=DE-3:IFDE<0THENDE=0
30066 IFRND(1)>.5THENDE=DE+3:IFDE>255THENDE=255
30070 POKEV+4,R1:POKEV+6,R2:POKEV+8,R3:POKEV+10,R4
30075 DF=DF-3:POKES+1,DF:POKES+4,19
30080 IFPEEK(V+30)AND2THEN30300
30200 NEXTT
30205 FORT=0TO50:POKES+1,T:POKES+4,135:NEXT:IFML=0THEN30450
30210 POKEV+21,61:POKEV+40,0:GOTO204
30300 REM                                    ###### PARACHUTE LANDING ######
30305 IFT<194THEN30200
30307 POKEV+21,125:POKEV+12,DE:POKEV+13,192:POKEV+45,3
30310 POKES+4,33:POKES+1,100:POKES,21:FORT=1TO250:NEXT
30320 POKES+1,134:POKES,30:FORT=1TO500:NEXT
30330 POKES+1,150:POKES,139:FORT=1TO500:NEXT
30340 POKES+1,200:POKES,243:FORT=1TO375:NEXT
30350 POKES+1,168:POKES,250:FORT=1TO125:NEXT
30360 POKES+1,134:POKES,30:FORT=1TO500:NEXT
30370 POKEV+21,61:POKEV+40,0:POKEV+45,0:SCR=SCR+10:MO=MO+1:GOSUB30410
30375 IFML=0THEN30450
30380 GOTO204
30400 REM                                    ###### PRINT SCORE (STAGE 1) ######
30410 PRINT"■■■SCORE:"SCR"■ "
30414 PRINT"■■■■■■■■■■■■■■■■■MEN LEFT:"ML"■ "
30430 RETURN
30449 REM                                    ###### END STAGE 1 ######
30450 J=0:POKEV+21,0:POKES2,5:PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■■NO MEN LEFT!"
30455 PRINT"■■■■■■■■■OUT OF #10 ■MEN YOU LANDED#"MO
30456 PRINT"■■■■■■■■■■ HIT #FIRE ■TO CONTINUE ***"
30457 J=PEEK(56320)
30460 FORT=0TO20:POKES+1,T:POKES+4,33:J=PEEK(56320):IFJ=111THEN500
30461 NEXT
30470 FORT=20TO0STEP-1:POKES+1,T:J=PEEK(56320):IFJ=111THEN500
30471 NEXT
30480 GOTO30460
30500 REM                                    ###### HIT FIRE TO CONTINUE ######
30504 PRINT"■■■■■■■■■ HIT FIRE TO CONTINUE ***"
30506 J=PEEK(56320):IFJ=111THENRETURN
30508 GOTO30506
32000 REM                                    ## TITLE PAGE ##
32010 POKEV+21,0:POKES+1,0:POKES+4,0:PRINT"■":POKE53281,2:POKE53280,0
32020 PRINT"■■■■■      ■▀■ ■■     ■▀■ ■■     ■▀■ ■■     ■▀■"
32021 PRINT"■■■■ ■   ■ ■ ■ ■■ ■   ■ ■ ■ ■■ ■   ■ ■ ■ ■■ ■   ■ ■ "
32022 PRINT"■■■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ "
32023 PRINT"■■■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ "
32024 PRINT"■■■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ "
32025 PRINT"■■■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ "
32026 PRINT"■■■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ ■ ■■ ■ ■  ■■ ■ "
32027 PRINT"■■■■      ■ ■ ■■     ■ ■ ■■     ■ ■ ■■     ■ "
32028 PRINT"■■■■ ■     ■ ■■ ■   ■ ■ ■ ■■ ■   ■ ■ ■■ ■   ■ ■ "
32029 PRINT"■■■■ ■ ■     ■■ ■ ■  ■■ ■ ■ ■■ ■ ■ ▀■ ■▀■ ■■ ■ ■  ■■ ■ "
32030 PRINT"■■■▀▀▀ ■      ▀▀ ▀▀▀ ▀▀ ▀▀▀ ▀▀ ▀▀▀ ▀▀ "
32031 PRINT:PRINT"■■■■ ■▀■    ■■    ■▀■ ■■ ■▀■ ■■ ■▀■ ■■    ■▀■ ■■    ■▀■ ■■
■▀■"
32032 PRINT"■■■■ ■ ■    ■■ ■  ■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■■ ■  ■ ■ ■ ■■ ■    ■ ■■ ■  ■
■ "
32033 PRINT"■■■■ ■ ■    ■■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■ ";
32034 PRINT"■■ ■ ■    ■■ ■ ■ ■■ ■ "
```

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```
32035 PRINT"■■■■ ■ ■    ■■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■ ";
32036 PRINT"■■ ■ ■    ■■ ■ ■ ■■ ■ "
32037 PRINT"■■■■ ■ ■    ■■   ■ ■ ■■  ■■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■■    ■■ ■■    ■ "
32038 PRINT"■■■■ ■ ■    ■■ ■   ■ ■ ■ ■ ■ ■ ■■ ■ ■ ■■ ■ ■ ■■ ■    ■ ■■ ■ ■ ■
 "
32039 PRINT"■■■■    ■■ ■■ ■ ■ ■■ ■ ■■■■ ■ ■ ■■    ■ ■ ■■    ■■ ■■ ■ ";
32040 PRINT"■■■■ ■■"
32041 PRINT"■■■■■    ■ ■■ ■ ■■ ■ ■■ ■ ■■ ■ ■■    ■ ■■    ■ ■■ ■ ■■ "
32042 PRINT"■■■■BY   ■P A U L  T A L B O T T ":PRINT:FORT=1TO2000:NEXT:SC=0
32050 P$="■■■JOYSTICK PORT ■TWO  ■■PRESS FIRE■■"
32052 POKES+4,17:POKES+11,17:POKES+18,17:POKES+24,31
32055 FORT=1TO38:PRINTMID$(P$,T,1),:FORA=1TO100:NEXT
32060 POKES+1,T*2:POKES+8,(T+4)*2:POKES+15,(T+8)*2
32065 NEXT:POKES+1,0:POKES+8,0:POKES+15,0
32070 IFPEEK(56320)=111THENPOKES+1,255:FORT=1TO1000:NEXT:POKES+1,0:GOTO60
32071 GOTO32070
```

Graphics

Andrew Tilley from Trowbridge sends this program for Vic with Super Expander

THIS PROGRAM uses the graphics facilities of the Super Expander to create a collection of designs.

On RUNning the title page appears. Press any key to continue. The graphic designs will then start to be drawn. The randomisation routine near the start of the program is used to overcome the fact that the computer will generate the same pseudo-random series of numbers each time a reset is called, resulting in identical patterns each time.

```
0 REM GRAPHIC DESIGNS   BY ASHLEY WOODHAMS
10 Y=RND(-TI):DEFFNR(Y)=RND(0)*Y:DIMA(16),B(16):COLOR0,0,6,0
20 PRINT"■■■■ GRAPHIC DESIGNS USING■■THE SUPER EXPANDER ■   CARTRIDGE.■■"
30 PRINT"  BY■■ ASHLEY■ WOODHAMS":PRINT"■■■  ■■HIT A KEY TO START":FORT=1TO1000
:NEXT
40 POKE198,0:WAIT198,1:GRAPHIC2:REGION5
50 :
60 :
70 FORL=0TO230STEP20.9:FORC=1TO13:FORT=1TO4:READA(T):NEXTT
80 CIRCLE2,A(1),A(2),L,230-L,A(3),A(4):NEXT:RESTORE:NEXT:GOSUB240
90 DATA282,282,,,742,282,,,282,742,,,742,742,,,512,512,,,512,52,100,50,52,512,75
,25
100 DATA512,972,50,,972,512,25,75,52,52,100,25,972,52,25,50,52,972,75,100,972,97
2,50,75
110 :
120 FORL=0TO512STEP30:CIRCLE1,512,512,200,L:NEXTL:GOSUB240
130 :
140 COLOR1,6,6,0:FORR=1TO5:FORT=0TO6.28STEPπ/(INT(FNR(26)+3))
150 CIRCLE1,512+140*COS(T),512+200*SIN(T),140,200:NEXT:GOSUB240:NEXT
160 :
170 FORE=0TO6:C=0:Z=INT(FNR(5))+3-.5*(FNR(1)>.5):FORT=0TO2*πSTEPπ/Z:C=C+1
180 A(C)=512+280*COS(T):B(C)=512+400*SIN(T):NEXT:FORI=2TOZ*2
190 FORT=1TOI:DRAW1,A(I),B(I)TOA(T),B(T):NEXTT,I:GOSUB240:NEXT
200 :
210 GRAPHIC4:RUN
220 :
230 :
240 FORD=1TO5000:NEXTD:SCNCLR:RETURN
```

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Lack of description

Book: *Commodore 64 Games*
Author: *Kevin Bergin*
Publisher: *Duckworth*
Cost: *£6.95*
Reviewer: *C Whitcombe*

This is a book of 20 programs — some games, some utilities. Each is presented as a listing with comments about how the program works in the same fashion that can be seen in many of the computer monthlies, eg Line X — Line Y 'Set up variables'. While this format may be acceptable in some instances, I think that a book written along these lines should be more descriptive. In some cases, in this book, large sections of the program are completely ignored.

Amongst the offerings are a Snake game, Draughts, Car dodge, Hangman and the obligatory 'Dot Muncher'. The utilities are no more exciting: Hi-res graphics, Block graph, Code creator, User basic and Tape search.

As one of my passions is Music, I was pleased to see a program which allows the keyboard to be used to play tunes. One is also able to change most of the sound parameters. But the result was disappointing. Also, the program will not work as it stands — to my knowledge, the CBM 64 cannot handle a program line of 88 characters.

(NB Kevin Bergin explains that the program will work if characters are tokenised in all lines greater than 88 characters).

At £6.95 that represents about 35p a program. For that sort of money you wouldn't expect too much. For anyone wanting good games, you would do better spending the money on the 'real thing' and anyone wishing to learn something about programming would get better value and just as much knowledge from half a dozen computer magazines. Sorry.

Structured programs

Book: *Discover Your Commodore 64*
Author: *Philip Williams*
Publisher: *Century/ Melbourne House*
Cost: *£2.95*
Reviewer: *Phil Bonner*

Two very misleading statements appear on the cover of this book which detract from an otherwise excellent volume. The first of these is the title, as the text includes very little which would not apply equally well to almost any other home computer. The only specific references to Commodore machines come in the appendices, which include brief instructions on handling CBM peripherals and on using the function keys in Basic programs.

The second and more glaring fault occurs in the back-cover blurb, which claims that the book ". . . makes full use of the machine's sound and graphic capabilities." In fact the book makes no attempt whatever to do either! The *Poke* command is not even mentioned. So, what does the book try to do?

Its aim is to teach the beginner structured Basic programming and good programming habits, and this it achieves very well. It is clear and concise, working through all the fundamental Basic commands logically, with use of flow charts, and building up to an elegant listing for a Metric/ Imperial conversion program. Finally, it covers string manipulation in some detail and makes brief mention of arrays and other commands.

The style of the book is serious without being stodgy, and avoids the pitfall of treating the reader as if he were halfway to idiocy. Philip Williams has provided a thorough home-tutor for the person who wishes to learn to program properly. He has not set out to provide yet another substitute for Commodore's User's Guide.

The book is attractively produced and represents excellent value for money at £2.95.

Vic20 giant book of games lives up to its title

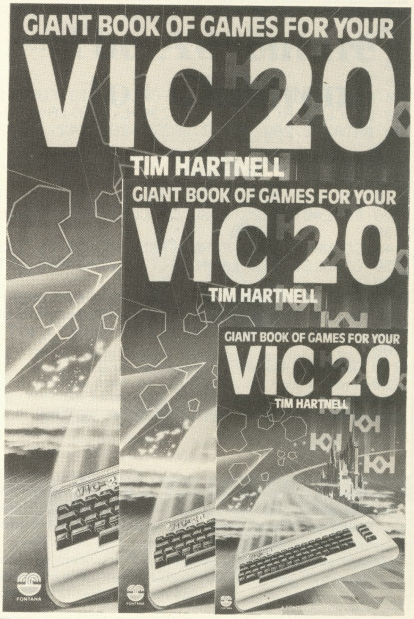
Book: *Giant Book of Games For Your Vic 20*
Authors: *T Hartnell, R Bush and R Young*
Publisher: *Fontana*
Price: *£3.95*
Reviewer: *David Shepherdson*

This excellent book contains 43 programs for the unexpanded Vic, three for the expanded and one for a Vic with Super Expander and Printer/Plotter. All the programs are accompanied by an explanation both of how to enter and how to play or use them.

They are all dumped from a 1520 Printer/Plotter so all are easy to read and enter. Some include Machine Code routines and User Defined Graphics; they range from simple games like "Guess the Animal" types to magnificent two-parters like "Donkey King". There are adventures and strategy games and a few Utility programs like Big Letters, Tape Pictures and Piano. For the +16K Vic user there are three big games: one is a War-game simulation, **Their Finest Hour;** a Kingdom type survival game, **Farmer Jack II;** and **3D Tic-Tac-Toe,** and the Vic plays a very good game!

There's also a chapter on UDGs, which gives a very clear explanation on how to both obtain and use them. The authors themselves give you ideas on how to alter the programs within the book, also there is a section on games you might like to consider writing a computer program for, additional reading and a Glossary. Not the usual type where the various characters are listed, but one where definitions are given. For instance, had you ever heard of Octal? Well, we use the decimal system (10), computers use Binary (2) and Hex (16) and Octal is a numbering system using base 8.

The book itself is well bound, well thought out and I would recommend it for anyone who enjoys game playing and programming on the Vic. You will have fun running the programs and seeing how some ideas could be used in your own programs. Well worth the price.



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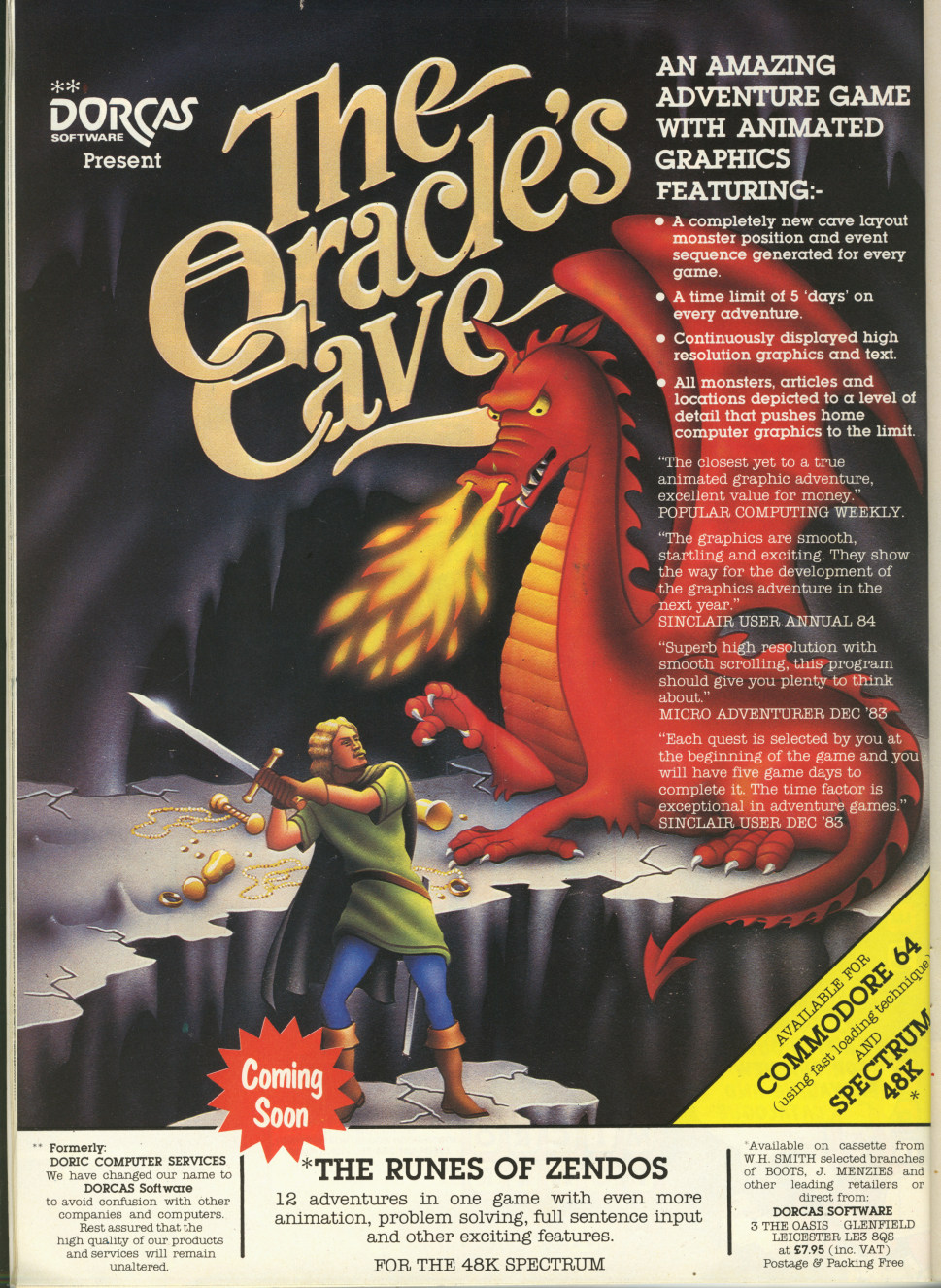

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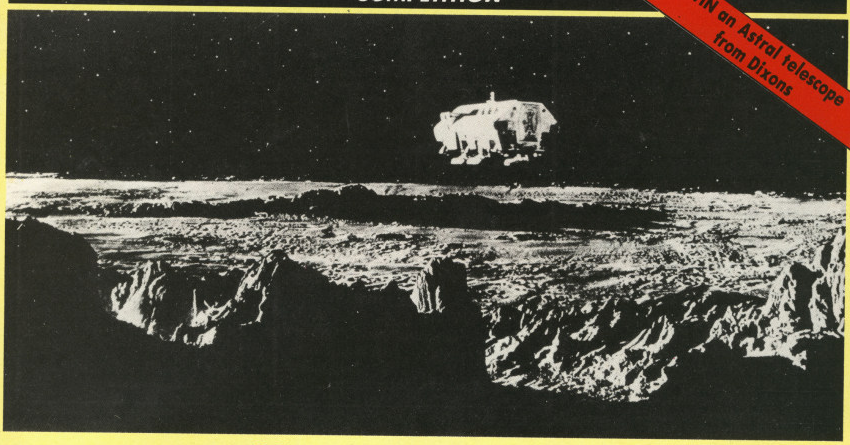


Halley's comet competition

HALLEY'S COMET is coming! And although there's no danger of it hitting our planet, this famous Space Invader will be visible from next year well into 1986.

To make sure you get the best view possible, we're offering one lucky stargazer the chance to win a fantastic **Prinz Astral 400** telescope from **Dixons**, which retails at £99.99.

The Astral 400 has a magnification of up to 233X, and comes complete with 6mm and 20mm eyepieces, a Barlow lens, a sighting scope and diagonal prism and an adjustable tripod with tray.

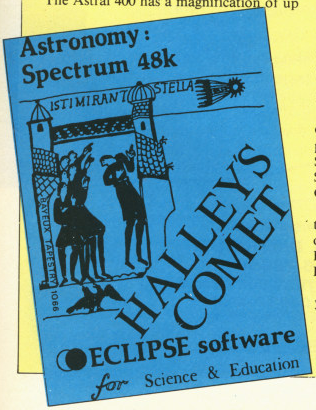
It's one of the successful Astral range which starts with the Astral 80 at £24.99, and goes up to the Astral 500 at £169.99. All you have to do to win is write a program for the Commodore 64 or Vic 20 (with any expansion) which gives a graphic representation of the course of Halley's comet around the sun, or of your artistic impression of the comet. Then complete the tie-breaker in an apt and amusing manner in 15 words or less: "I want to win an Astral telescope from Dixons because . . ."

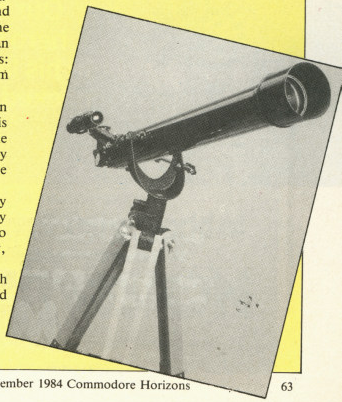
Eclipse Software of 79 Androssan Gardens, Worcester Park, Surrey, is planning a Commodore 64 version of the Spectrum program **Halley's Comet**, by Sunshine author and astronomer Maurice Gavin.

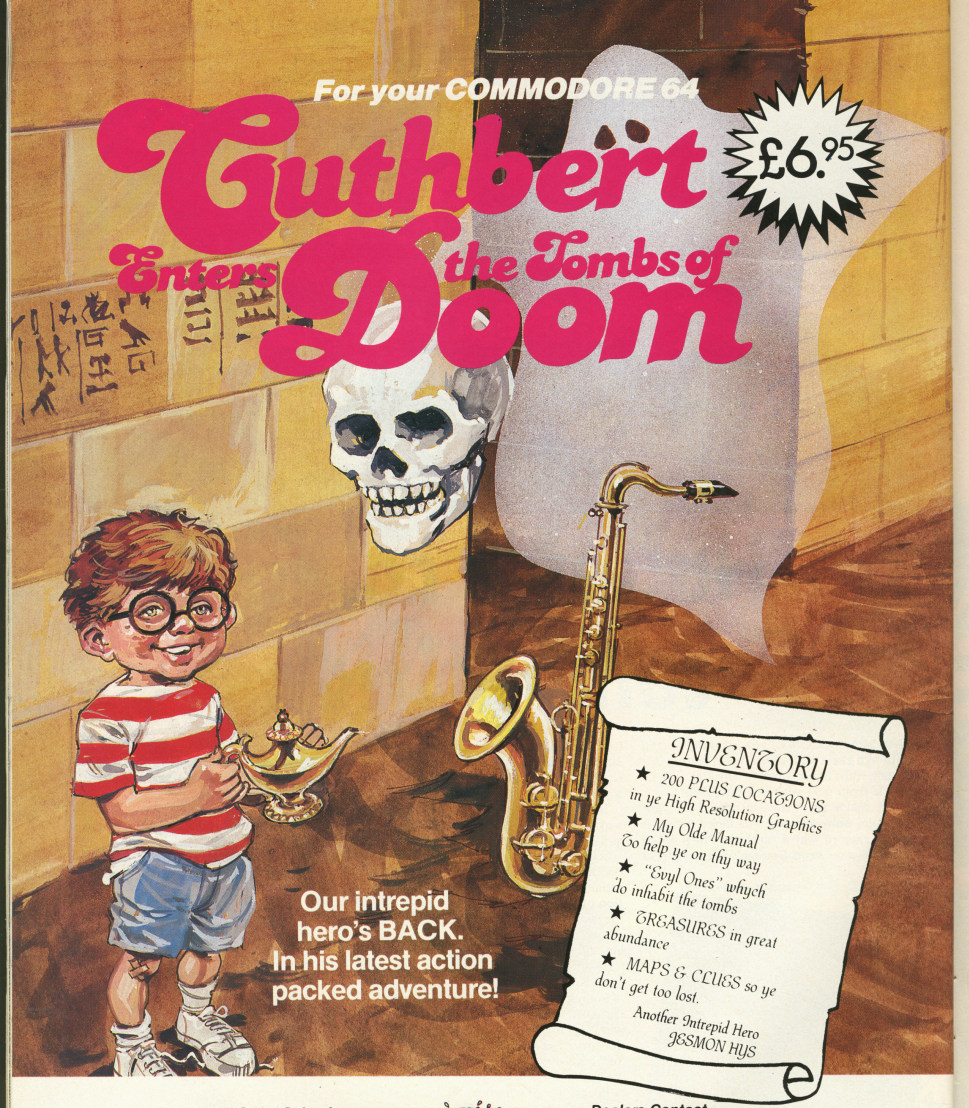
For more information on the comet try the astronomy section of your local library or the Junior Astronomical Society c/o Paul Sutherland, 13 Disraeli Road, Putney, London.

Send your program on tape, together with your name and address and your completed tie-breaker, to **Dixons Telescope Competition, Commodore Horizons, 12/13 Little Newport Street, London WC2R 3LD.** Enclose a s.a.e. if you'd like your tape returned.

The closing date is the last working day of November. Normal competition rules apply, and the winner will be announced in the January issue.







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ANSWER BACK

Relays and m/c

IS IT possible to obtain an interface for the Vic which will allow the control of simple battery-powered electronic circuits, e.g. small DC motors, and will allow information to pass from the circuit to the computer? And where can I find an introductory book on machine code for the Vic?
P Gillen
Galway
Ireland

TRY THE VICREL from Datatronics, which connects to the user port and provides 6 outlet controlled ports max. 24 volts, 10 watts; 2 inlet ports; and a five volt supply current.

If you want to control mains appliances, you will need an opto-isolator as well.

A suitable introduction to machine code on the Vic is the Doctor Watson bookware pack from Honeyfold, Standfast House, Bath Place, Barnet, London.

Expander and modem

I HAVE A Vic 20 with a 16K switchable RAM pack, and would like to add a Super Expander. Will they run at the same time in a two-slot motherboard, or would I need a deselectable motherboard?

Also, is there a modem available for the Vic 20? And can you publish a listing for a good, long piece of music for the Vic? I'm sure you have one hidden away somewhere.
K Whitfield
Haverhill
Suffolk

THE SUPER Expander consists of 3K RAM plus 4K ROM located at $0400-0FFF (1024-4095), and is similar to other 3K expansions. You can use your 16K RAM pack as well, but if your switchable pack contains a 3K switch then you cannot use that option, because it will try to use the same space as the Super Expander.

On modems, enquire through Intelnet, Unit C2, Faircharm Trading Estate, 8-10 Creekside, London SE8, Tel 01-689 9947. Intelnet's planned Vic 20 modem will cost around £50, but does not have Telecom approval and will not access Prestel or Micronet.

As for music on the Vic, there doesn't seem to be a book devoted to the subject, although many general programming guides have sections on sound; perhaps a reader can make a suggestion on this one?

Printer and plotter

I WISH TO daisy-chain a 1520 printer – plotter with my disk drive and MPS 801 printer. Is this possible? My main purpose in purchasing a 1520 is to print address labels, with the letters on the 801.
A D Sinclair
South Shields
Tyne and Wear

YES, IT IS possible, because the 1520 has a device number of 6 and the MPS801 is device 4. Your program should open a channel to the 1520 with, say, OPEN6,6, and to the 801 with OPEN4,4, and then PRINT#6, "Address labels" and PRINT#4, "Letters" will output to the respective devices.

If you are using a word processing program, then set the device numbers accordingly.

Loads of errors

SOMETIMES, when loading a program from tape, it stops with LOAD ERROR just before finishing. What is the PEEK location of this error message — would it be possible to POKE the original number back into it, so that the computer thinks there is no load error and carries on loading the program?
Jim Donaldson
Antrim
N Ireland

WHEN A program is saved to tape, two copies are made by the system. On LOADing, first one copy is loaded, then the second. The two are compared, and if there are any differences you get LOAD ERROR. Eliminating the error message in the case of a corrupted load will not help, since essential parts of the program may be missing.

However, the program may still RUN if the error is not significant. In this case, check if the end of tape pointers agree with the end of program pointers. X and Y should be identical in the following line.

```
X=PEEK(45)+256*PEEK(46):Y=PEEK(174)+256*PEEK(175)
```

If the listing is complete, and does not finish with garbage, then you can resave the program.

Program generation

I HAVE A 64, and am trying to get it to generate its own programs. It's easy enough to get it to produce 10 lines by printing the lines on the screen then filling the keyboard buffer with RETURNS, then ending the program.

I can generate more lines by making the last "new line" a GOTO line, but the GOTO performs a CLR, losing the data in the arrays, and since this is where I store the new program data I cannot use this method. Is there any way of preventing the GOTO from performing a CLR after program editing, or any other way of allowing more than 10 lines of program generation?
S I Franklin
Castel
Guernsey

IT IS NOT the GOTO statement that performs the CLEAR, but the addition of the new lines to your program.

You can get around this problem by POKEing your data into an area of memory which is above Basic, and then PEEKing that area when the GOTO is implemented. The POKEs will be in the original program, and this line could be replaced by the line containing the PEEKs, by making your first new line number the same as the number of the line containing the POKEs.

You can use a counter location so that you can count the number of lines added, e.g. POKE A,PEEK(A)+1. The CLEAR cannot affect the area of memory above Basic.

Random access

CAN YOU help me with a program which will generate random numbers, then at the end show me how many times each number has appeared? I have an unexpanded Vic, but will soon be getting a switchable 16K pack.
A Campbell
Kirkaldy

The following program will work on all Vics (or any Commodore computer!)

```
10 X=RND(0):REM TO SEED THE RANDOM NUMBER GENERATOR
15 J=0:S=0:DIM T(50):REM it is good practice to set variables before dimensioning arrays. This speeds execution.
20 FORJ=1 TO 5000
25 S=INT(50*RND(1)+1)
30 PRINT S;
35 T(S)=T(S)+1:REM this counts the number of times that S is calculated
40 NEXTJ:PRINT
45 INPUT"WHICH NUMBER";S
50 PRINT S"APPEARED "T(S)"TIMES
55 PRINT"ANY MORE 'Y' OR 'N'":A$
60 GETA$:IFA$<>"Y"ANDA$<>"N"THEN60
65 IFA$="Y"THEN45
70 END
```

The REM statements and line 70 need not be entered, and the reason why variables are set first in line 15 is that on RUN variables are created above the program text and below arrays, so that if another variable is mentioned after DIM is executed then the entire array area is moved up in memory, in order to insert the variable in its correct position. This makes the program slower.

If you need help with a technical query or problem write to Jack Cohen, Commodore Horizons, 12-13 Little Newport Street, London WC2R 3LD

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FORBIDDEN Forest, Aztec Challenge, Grid Trap and more for the CBM 64. For sale or exchange. Send SAE for full list. Finn Choong, 11 Winleigh Road, Handsworth Wood, Birmingham B20 2HN.

SPECIAL OFFER for Commodore Horizons readers. Buy your VIC 20+16K stock control at cost price, only £8.50 with free data tape & full documentation. This month only. Martyn Carrick, Wilson Hill Farm, Skidby, Cottingham HU16 5SR.

CBM 64 Software to exchange/sell. Titles include: R.A.C., Decathlon, Boss, Assembler, Beach Head, and much more. Garry Tan, 18 Wragby Close, Bury, Lancashire BL8 1XD or Phone: 061 761-4605 after 7.15 p.m. ask for Garry.

FOR SALE the Hobbit and Solo Flight for CBM 64. Both new and unused. £10 each. Tel: (073 72) 42348 after 6 p.m.

CBM 64 PROGRAMS to swap or sell. Many titles including American. Write to Stephen Kearon, 22 Westminster Lawns, Foxrock, Dublin 18, Ireland. Tel: Dublin 885634.

CBM 64 Software to swap. Have many titles, including some American. Example Zaxxon, One on One. Send list to Garry, 22 Dauntsey Mews, Bellvale, Liverpool L25 2TG Merseyside, all letters replied.

COMMODORE 64 software for sale. Wimbledon £4.50, Siren City £3.50, Star Commando £4, Hustler £3.50. Together sell for £13.50. Contact S. Sung, 1 Hurly Hawkin, Bishopbriggs, Glasgow G64. Send SAE with postal order if sold, money returned.

VIC 20 games for sale. Computer War, T of Evil, Sub Commander at £5 each. Snooker £6. Skramble, Jetpac, Arcada, The Wizard and Princess K-tel, doublesider Amok, Race, Tornado, Gridrunner and Roadrace cartridge £1. Ring Daemon on Stourbridge 392046 any time after 6.30 p.m.

COMMODORE 64 software for sale, most half price: Zaxxon £15, Jumpman £15, Acos + £4, Easy Script £30 original condition. Also wanted: Ringside Seat, Seat, Mule, Combat Leader, Axis Assassin, Worms, might swap. Tel: Waterloooville 266855 after 6 pm.

COMMODORE 64 with cassette, Joystick, Software only ten weeks old £180. Tel: 01-670 9872.

NEW from Rocket Concepts: Mastercode — a game of logic; Robotron Attack and Space Station — arcade games; only £2.95 each. Also Stock Control and Telephone Directory programmes — for business and home use — both only £7.95 on disc or £5.95 on tape. For orders or info contact Ian Hooper, 26 Lordship Pk, London N16 5UD. Tel: 01-800 7171.

CBM 64 Software to swap, many titles, include Blue Max, Revenge, M.C, Neptunes Daughter, Frogger, Pole Position, Pooyan and many others. Interested then contact Gary Marnie, c/o UFO 1st Black Watch, BFPO 106.

FOR VIC 20. I have 130 programs. You can buy or exchange them.My programs are: Gridrunner, Slot Machine, Amok, Abductor, Slalom, Sintetizzatore Vocale, Anti Save, Formula 1, Sargon, Chess, Zombies, Rat Race, Gorf, Camel etc. Silvio Polacco, Molveno Street, 00135, Rome, Italy.

CBM 64 Software half price. Practical 64 disc £20. Data Manaser cassette £10. Data Manaser disc £10. Ultysinth 64 cassette £8. Tel: Walton on Thames (0932) 241242.

CBM 64 Software for sale or swap £65 worth of software including Hobbit, Manic Miner, Voodoo Castle all originals on cassette. The lot for £30 or nearest offer. Phone: (0472) 40088 and ask for Steve or write to 9 Harrington St., Cleethorpes, Sth Humberside DN35 7AY. Tel: 0472 40088

CBM 64 software sale DFM database and labels (£30) £18. Turbo extended basic (£14.95) £10. Pilot 64 (£7.95) £4.50. Ripspeed 64 (£7.95) £4.50. Postage 50p. Tel: 01-590 2792.

FOR SALE Radar Rat Race and Omega Race for VIC 20. Both unused — already got copies of both £5 each or £9 the pair. Phone Nik on 07694 457 after 6p.m.

VIZAWRITE and VIZASPELL on disk for Commodore 64 list £80 new, £60 the pair. Phone Dave 0787-60148 also Jumpman for sale £10.

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1984 VIC 20 data set + 2 month old 16K Vixen switchable Ram pack (3-8-16). 2 books. £45 of software + 1 cartridge. Sell complete, £180 ono. Contact S. Shaw, Aljun-Trio, 12 Lemon Grove, Whitehill, Bordon, Hants GU35 9BE. Tel: Bordon 3683.

VIC 20 home computer with cassette unit, magazines, intro to basic pack 1 and games. £120 ono. Tel: Aylesbury 22310.

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SWAPS

FEMALE COMPUTER tape pals, wanted please. Commodore 64K, Spectrum 48K, everyone answered by gentleman 39. Don't need to be experts, I'm not. Please reply, Mike Peters, 37 Brattleby Crescent, Ermine East, Lincoln, Lincs LN2 2EB.

PENPALS WANTED 12-17 years old. To exchange games, programs, ideas, reviews etc. male or female, VIC 20 users only. Please write to Alan Simpson, 64 Moorside South, Fenham, Newcastle upon Tyne NE4 9BB

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SWAP PIXEL'S ''Trader'' (a graphic adventure which loads in 3 parts into VIC 20 16K), for ''Tomb of Drewan'', ''Gorf'', or ''Omega Race''. Also swap Imagine's ''Wacky Waiters'' for ''Arcadia''. Tel: 0570 470362.

CBM 64 OWNER is looking for other CBM 64 owners to swop tips & programs. Write to W. Harmsen J. Bellamy-Loan 11 1401AW, Bussum, Nederland.

CBM 64 I would like to exchange my programs, please send your list of programs to Fernando Forner, Via Valperga Caluso, 21 10125 Turin, (Italy).

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PEAKSOFT

Tim Loves CRICKET

A PLAYER'S GUIDE — PART 1

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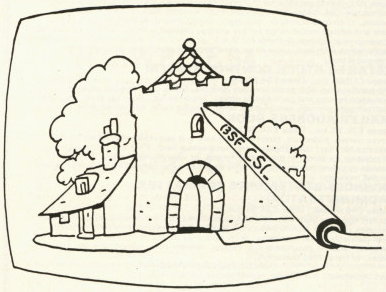

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Tim Love's CRICKET

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VGA 6006

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It's designed to illustrate a simple mathematical calculation in straightforward steps.

Danger Mouse walks into the first room with a number (X) written on a piece of paper which also has four columns, A, B, C and D.

Each room contains instructions and directions to the next room. All numbers should be rounded to the nearest whole integer, and the answer appears in column D on exiting the final room.

All you have to do is work out the purpose of the mathematical calculation which the device illustrates.

When you've worked it out, complete the tie-breaker and send your entry with your name and address to Danger Mouse Competition, Commodore Horizons, 12/13 Little Newport Street, London WC2R 3LD, to arrive no later than the last working day of November.

Twenty lucky winners will receive two Danger Mouse games from Creative Sparks. Double Trouble is an arcade adventure featuring all the TV favourites, Danger Mouse, Baron Greenback and faithful Penfold, in a mad scramble to halt the Baron's plan to create a mechanical Danger Mouse.

The Black Forest Chateau is a text-and-graphics adventure which finds DM in a really sticky situation — only you can help him out of a jam!

So the tie-breaker, which must be completed in an apt, original and amusing manner in 15 words or fewer, is: "I want to help Danger Mouse out of a sticky situation because . . ."

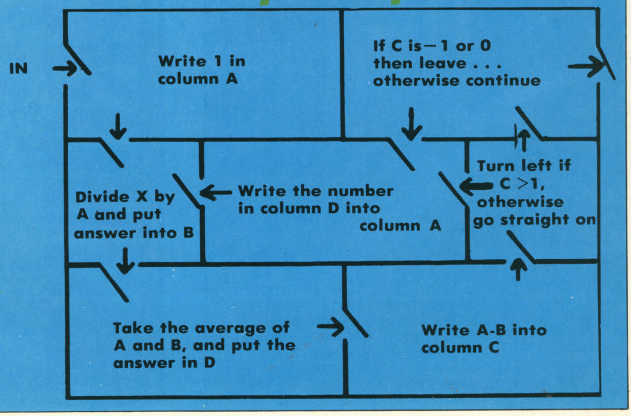
Normal competition rules apply.

The winners of the September **Quicksilva** competition are SM Wilkinson of Northampton, Jeremy Potter of Lincoln, Darrell-John Pratt of Cranbrook, Steve Skinner of Nottingham, William Sinclair of Orkney, Andrew Collins of Dorest, Stephen Irwin of Burnley, MJ Hughes of Wigan, Conor Crowley of Galway, Richard Pike of Wakefield, Robert Miller of Glasgow, Andrew Randall of Croydon, Simon Harper of Romford, Peter Donovan of Braintree, M Ingham of Leeds, AS Pearce of Beckenham, J Coward of Nettlebed, Martin Gilchrist of Emsworth, SC Nicoll of Whitchurch, and Tony Hadland of Henley.

Each will receive a package of the latest games from Quicksilva.

The winner of the **Sunshine Books** competition is Colin Bray of Haywards Heath, who will receive a complete set of Commodore 64 books from the publishers of **Commodore Horizons.**

The Mystery Maze



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- If you're first to ring it, you save the world and collect the £25,000!
- Quite a package! And to give everyone a fair chance, "Eureka!" will be released simultaneously worldwide on October 31st, 1984. No packs will be available until that date. All orders received by mail or phone by 26th OCTOBER will be despatched by post on the 31st right across the world. So order now, and be one of the first off the mark.

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Alice IN VIDEOLAND

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Join Alice in her journey through Videoland - an enchanted place populated by strange creatures such as bread-and-butterflies and pipe smoking caterpillars; where little girls change size and flamingos turn into croquet mallets!

Alice in Videoland is a revolutionary new concept in entertainment for the Commodore 64, incorporating some of the finest graphics ever seen on any home computer, accompanied by a charming musical score. There are four different game scenes involved, and your performance in earlier ones will affect your ability to get through later ones and determine your eventual total score.

Scene One - Stunning title page graphics give way to the first game scene as Alice falls into the rabbit's warren. Score points for collecting the objects to be found there - including keys to open doors, bottles to make her smaller, cakes to make her bigger!

Scene Two - Out in the garden the Cheshire cat looks on as Alice meets the pipe-smoking caterpillar. Help her to catch the bread-and-butterflies and the rocking-horse flies that change into the balls used in the croquet game in the last scene!

Scene Three - Alice is a pawn in the chess game where her opponents are the Jabberwocky and Tweedledum and Tweedledee. Help her across the board by protecting her with your White Knights!

Scene Four -The most bizarre croquet game ever! Help Alice hit the balls through the playing-card-soldier hoops before the Queen of Hearts stomps on them!

Alice in Videoland is available for the Commodore 64 on disk - £12.95, and now on cassette - £8.95.

Alice in Videoland features graphics created with the Koala Pad.

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